

NOUN Journal of Education (NOUNJE)

SPECIAL EDITION 2025

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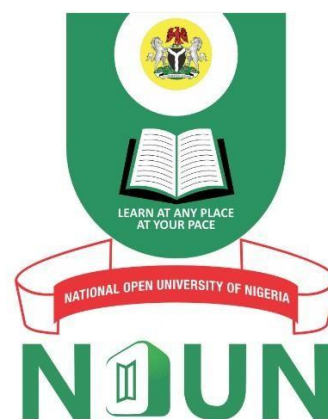
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**PUBLICATION OF THE FACULTY OF EDUCATION
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Published 2025

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ISSN: 2504-8945

Special Edition 2025

Published by the Faculty of Education, National Open University of Nigeria, University Village, Plot 91, Nnamdi Azikiwe Expressway, Jabi, FCT Abuja, Nigeria

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TABLE OF CONTENTS

THE EDITORIAL BOARD	iii
COPYRIGHT PAGE	iv
LIST OF CONTRIBUTORS	v
EVALUATION OF WORKING-CLASS ADULTS' READINESS FOR LIFELONG LEARNING IN THE AI ERA: IMPLICATIONS FOR FUTURE-PROOFED DEVELOPMENT IN OLORUNDA LOCAL GOVERNMENT AREA, OSUN STATE, NIGERIA <i>Temilola Apena & Barakat Adeoti Olagunju</i>	1
MANAGING DIGITAL TRANSFORMATION FOR SUSTAINABLE DEVELOPMENT IN HIGHER EDUCATION INSTITUTIONS IN BAUCHI STATE <i>Agatha Samson, Chukwudolue, Joy Chinelo & Isah Yakubu Jibrin</i>	10
CONTINUOUS PROFESSIONAL DEVELOPMENT AND TEACHERS' JOB PERFORMANCE IN PUBLIC SECONDARY SCHOOLS IN LAGOS STATE, NIGERIA <i>Aderonke Olufunmilola Raphael, Barakat Adeoti Olagunju & Temilola Apena</i>	28
ETHICAL MANAGEMENT OF EMERGING TECHNOLOGIES IN EDUCATIONAL ASSESSMENT: BALANCING INNOVATION WITH INTEGRITY <i>Agatha Samson, Isah Yakubu Jibrin, Chukwudolue, Joy Chinelo, Liadi Hakeem Olaniyi & Ohadiugha, Marian N.</i>	38
ETHICAL CONSIDERATIONS IN THE MANAGEMENT OF DIGITAL LITERACY FOR SUSTAINABLE NATIONAL DEVELOPMENT: A CASE STUDY OF TERTIARY INSTITUTIONS IN CROSS RIVER STATE <i>Ategwu, Patrick Ogar, Asu-Okang, Stella, Basake Julius A. & Kenn-Aklah F.U</i>	51
HARNESSING DIGITAL EDUCATION FOR TRANSFORMATION TOWARDS SUSTAINABLE DEVELOPMENT <i>Attah Gabriel Ejike, Edinoh Kingsley, Ebute Johnson, Sarah Omolola Ohikhueme, Wanita Okoronkwo, Anuya Edith Enor & Audam-Mafo Adewumi Florence</i>	63
SOCIAL INTERACTION PATTERNS AND EARLY LEARNERS' LITERACY SKILLS ACQUISITION IN CALABAR MUNICIPAL COUNCIL OF CROSS RIVER STATE, NIGERIA <i>Edwin Okpa Bassey & Friday Ogobi Ndifon</i>	71
THE ROLE OF COUNSELLING IN OPEN AND FLEXIBLE EDUCATION FOR TRANSFORMATION AND SUSTAINABLE DEVELOPMENT <i>Angela Ebere Abaa & Josephine Shola Aina</i>	82
SUSTAINING STUDENTS' ENGAGEMENT THROUGH DIGITAL PLATFORMS IN HIGHER EDUCATION: A CASE STUDY OF SOUTHERN DELTA UNIVERSITY <i>Aragba-Akpore Florence & Aminu Kazeem Ibrahim</i>	98
EVALUATING E-LEARNING READINESS AND OPEN EDUCATIONAL RESOURCES USE AMONG STUDENTS OF NATIONAL OPEN UNIVERSITY OF NIGERIA (NOUN) <i>Shamwil B. Salisu, Babangida Iro & Dahiru Usman</i>	106

EMERGING TECHNOLOGIES IN LIBRARY AND INFORMATION SCIENCE (LIS)
EDUCATION IN THE DIGITAL AGE: A DESK REVIEW

Florence. N Solarin & Jacob Kehinde Opele 118

INNOVATIVE TECHNOLOGIES IN PHYSICS EDUCATION: A CONCEPTUAL
FRAMEWORK FOR TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

Adepoju Temitope Matthew 132

PROFESSIONAL DEVELOPMENT AS A CATALYST FOR TRANSFORMATIVE
PEDAGOGY AND SUSTAINABLE EDUCATION IN SENIOR SECONDARY SCHOOLS IN
GARKI, FCT, ABUJA, NIGERIA.

Kehinde Ojo & Dorothy Ofoha 142

EVALUATING INCLUSIVITY IN ENTREPRENEURSHIP ESSENTIAL AND VOCATIONAL
SKILLS PROGRAMMES IN DELTA STATE: IMPLICATIONS FOR SOCIOECONOMIC
TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

Sajere Rex E., Obhajajie Juliet Inegbedion & Aminu Kazeem Ibrahim 152

ENHANCING TEACHERS' PROFESSIONAL DEVELOPMENT FOR EDUCATIONAL
TRANSFORMATION AND SUSTAINABLE DEVELOPMENT IN THE 21ST CENTURY

Kennedy Imasuen, & Modupe P. Aibinuomo 167

STRENGTHENING HOME-SCHOOL PARTNERSHIP FOR SUSTAINABLE EARLY
LEARNERS' HEALTH AND LEARNING OUTCOMES IN EGOR LOCAL GOVERNMENT
AREA, EDO STATE

Uwadiae Wesley Choice & Michael Amaka Agnes 175

INSTITUTIONAL GOVERNANCE PRACTICES AS CORELLATE OF GOAL
ACHIEVEMENT OF SECONDARY EDUCATION IN PUBLIC SENIOR SCHOOLS IN
ABUJA, NIGERIA

Ottan, Jamiu Olatunji & Ezomo, Anthony Imonokhe 182

HARNESSING INNOVATIVE TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT IN
NIGERIA'S EDUCATION SECTOR

Abaleke George Chukwuemeka 195

ETHICAL ISSUES IN DIGITAL COUNSELLING PRACTICE: PERSPECTIVES FROM
PROFESSIONAL COUNSELLORS IN ENUGU STATE, NIGERIA.

Rosemary Ijeoma Nwofor 207

TEACHERS' DIGITAL COMPETENCE AND MOTIVATION AS CORRELATES OF
BLENDED LEARNING APPROACH AMONG STUDENTS WITH SPECIAL NEEDS IN
ABUJA

Audam-Mafo Adewumi Florence & Adewunmi Abiodun Taofikat 230

SCHOOL LEADERSHIP AND SUSTAINABLE TEACHING PRACTICES IN PUBLIC
SENIOR SECONDARY SCHOOLS IN ABUJA

Balogun Afees Aremu, Ottan Jamiu Olatunji & Okhion Olatundun Adenike 243

ASEI-PDSI AND ITS EFFECT ON MATHEMATICS INTEREST AND ACHIEVEMENT
AMONG JUNIOR SECONDARY SCHOOL STUDENTS IN GWAGWALADA FCT, ABUJA

I. J. Kukri, T. Osu & Salihu Isyaku 251

PERCEIVED INFLUENCE OF INSTRUCTIONAL MATERIALS SUSTAINABILITY AND EFFECTIVE COMMUNICATION ON SECONDARY SCHOOLS' TEACHERS' PRODUCTIVITY IN KARU LGA, NASARAWA STATE

Justina Henry Odion & Mbanefo Maryrose C. 260

EXPLORATION OF TEACHERS' AWARENESS AND ATTITUDE TOWARDS THE USE OF TELEMEDICINE FOR WELLNESS IN MARARABA, NASARAWA STATE

Oluwasogo Ruth Ogunleye & Christiana Tayo Abejide 269

EVALUATION OF TEACHERS' USE OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) IN TEACHING SCIENCE SUBJECTS IN SENIOR SECONDARY SCHOOLS IN LAGOS STATE, NIGERIA

Barakat Adeoti Olagunju & Temilola Apena 282

DIGITAL MEDIA AND CIVIC ENGAGEMENT: IMPLICATIONS FOR SOCIAL STUDIES EDUCATION

Akinwande Adeyoola Eunice 292

ENHANCING TEACHERS' MORALE AND PRODUCTIVITY IN PRIMARY SCHOOLS THROUGH MOTIVATION FOR SUSTAINABLE DEVELOPMENT

Folami Oluwatomilola Oluwabusayo & Mbanefo Maryrose C. 299

COMPARATIVE STUDY OF THE PSYCHOLOGICAL HEALTH OF CHILDREN WITH DIVERSE DEVELOPMENTAL DISORDERS

Sarah Omolola Ohikhueme & Benjamin Osayawe Ehigie 308

PARENTAL INVOLVEMENT STYLE VARIABLES AS CORRELATE OF STUDENTS' ACHIEVEMENT IN SECONDARY SCHOOL MATHEMATICS IN EDO STATE, NIGERIA

E.R Adeyemo & S.S Afolabi 319

PERCEPTIONS, APPLICATION PATTERNS, BENEFITS, AND PERCEIVED CHALLENGES OF GENERATIVE ARTIFICIAL INTELLIGENCE (GAI) TOOLS AMONG BUSINESS EDUCATION STUDENTS IN LAGOS STATE, NIGERIA

Janet Iyabode Owolabi & Josiah Owolabi 330

DISPOSITION TO E-TEACHING AND E-LEARNING OF ENGLISH READING COMPREHENSION AMONG SENIOR SECONDARY SCHOOL TEACHERS AND STUDENTS IN AMAC, ABUJA

Sheriff Olamide Olatunji, Foluke F. Fatimayin, Olufunke Osikomaiya & Lilian C. Ugaduh 344

TEACHERS' COMPETENCE IN PRACTICAL CHEMISTRY AND JOB PERFORMANCE IN PUBLIC SECONDARY SCHOOLS IN IHITTE UBOMA LOCAL GOVERNMENT AREA OF IMO STATE

Nwanya Franklin Chibuike 358

COMPARATIVE EFFECT OF JUST-IN-TIME TEACHING ON FEDERAL UNITY JUNIOR SECONDARY SCHOOL STUDENTS' INTEREST IN ACADEMIC ACHIEVEMENT OF NORTH CENTRAL GEO-POLITICAL ZONES, NIGERIA

Alade Abdullateef Oluyemo, Victor Shabminu Jesse & Jamiu Olatunji Ottan 366

FROM CHALKBOARD TO CHATBOTS: REIMAGINING EDUCATION IN THE DIGITAL ERA FOR A SUSTAINABLE FUTURE

Oladimeji Mumuni Tiamiyu & Lukeman Abdul 376

ASSESSING THE IMPACT OF PROFESSIONAL TRAINING ON SCHOOL HEADS' MANAGERIAL COMPETENCE FOR SUSTAINABLE EDUCATION IN IKORODU PUBLIC SECONDARY SCHOOLS

Abdurrahman Bello Onifade & Wanita Okoronkwo 397

EMPOWERING TEACHERS AS CHANGE AGENTS FOR EDUCATION SUSTAINABLE DEVELOPMENT IN NIGERIA

Olusegun Adeleke Oba-Adenuga 407

SOCIAL RESPONSIBILITY IN THE MANAGEMENT OF UNIVERSITY EDUCATION IN NIGERIA FOR TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

Oluwalola, Felicia Kikelomo, Showunmi, Abdulazeez Abiodun & Etejere Patricia Agnes O. O 419

ASSESSING THE IMPACT OF BUSINESS EDUCATION ON ENTREPRENEURIAL OUTCOMES IN GOVERNMENT-SPONSORED SKILLS TRAINING PROGRAMMES: EVIDENCE FROM DELTA STATE, NIGERIA

Sajere Rex E., Obhajajie Juliet Inegbedion & Aminu Kazeem Ibrahim 431

EVALUATING THE SKILLS NEEDED BY BUSINESS EDUCATION STUDENTS FOR SELF-RELIANCE IN FEDERAL COLLEGE OF EDUCATION (TECHNICAL) BICHI, KANO STATE

Ali Iliyasu & Abbas Usman Lawan 445

EFFECT OF GAMIFICATION APPLICATION ON MOTIVATION AND PERFORMANCE IN BASIC SCIENCE AMONG UPPER BASIC STUDENTS, IN KADUNA METROPOLIS, NIGERIA

Ashaolu Emmanuel, Aminu D. Bala & Isah Hadiza Mohammed 455

TEACHERS' PROFESSIONAL DEVELOPMENT FOR EDUCATIONAL TRANSFORMATION AND SUSTAINABLE DEVELOPMENT IN NORTH CENTRAL NIGERIA

Ademola Olaitan Idow, Ohadiugha Marian Nwakaegbo & Sangoleye Solomon Adebayo 465

INFLUENCE OF DIGITAL TECHNOLOGIES ON INSTRUCTIONAL DELIVERY IN ACADEMIC RESEARCH FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

Adekunle Amos Adediran, Olukayode. O. Awonuga & Mahroofdeen Abiodun Balogun 473

RELATIONSHIP BETWEEN RESILIENCE AND ACADEMIC ACHIEVEMENT IN BUSINESS STUDIES AMONG OSUN STATE ADOLESCENTS

Bamidele Emmanuel Olasupo 481

STRATEGIC AND ADEQUATE FUNDING OF SECONDARY EDUCATION FOR TRANSFORMATIVE AND SUSTAINABLE DEVELOPMENT IN NIGERIA

Kenneth Okocha 491

APPLICATION OF COUNSELLING STRATEGIES IN MODIFYING DISRUPTIVE BEHAVIOURS AMONG SECONDARY SCHOOL STUDENTS IN IKORODU, LAGOS STATE

Amede Lucky 507

TRANSFORMATIONAL LEADERSHIP IN NIGERIAN EDUCATION: DRIVING INNOVATION AND INCLUSIVE LEARNING IN THE 21ST CENTURY

Ihunweze, Nkechinyere Anna 527

ASSESSING THE IMPACT OF EDUCATIONAL RESOURCES ON TEACHING AND LEARNING OF SOCIAL STUDIES EDUCATION IN NIGERIA

Baba Kudu Saba & Modinat Idowu Arunah 539

KINESTHETIC LEARNING AS A BRIDGE IN HYBRID CLASSROOMS: IMPACTS ON REFLECTIVE AND IMPULSIVE SECONDARY SCHOOL STUDENTS

Umar Amina Salihu, Muhammad Maimuna Madaki & Hassan Hadiza Yakubu 546

LANGUAGE CONTACT, HYBRIDISATION, AND RE-DEVELOPMENT OF NIGERIAN PIDGIN IN ONLINE SPACES

Vitalis N. Nwaogu 557

SOLUTION-BASED EDUCATION FOR PROMOTION OF EMOTIONAL INTELLIGENCE AND ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS FOR SUSTAINABLE DEVELOPMENT

Ijeoma Awa Kalu, Kelechi Solace Jerry-Alagbaoso, Kelechi Solace Jerry-Alagbaoso & Kelechi Chinemerem Mezieobi 566

COMPUTER PROFICIENCY AS A TOOL FOR SOLUTION-BASED EDUCATION ON ACADEMIC ACHIEVEMENT OF CANDIDATES IN JAMB ORGANIZED TERTIARY INSTITUTION ENTRANCE EXAMINATION FOR SUSTAINABLE DEVELOPMENT

Kelechi Chinemerem Mezieobi, Rose Ekwuru Kalu, Caroline Amuma Ogbonna & Ijeoma Awa Kalu 574

MANAGING UNIVERSITY EDUCATION THROUGH INNOVATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

Manafa Fausta & Onyekaba Martha Nnamaka 584

ASSESSMENT OF TECHNOLOGICAL INTEGRATION AND UTILIZATION IN THE MANAGEMENT OF SECONDARY SCHOOLS IN LAGOS EDUCATIONAL DISTRICT IV FACULTY OF EDUCATION

Nwaogwugwu Stellamaris Nkeiru 592

TRANSFORMATION OF TEACHERS' PROFESSIONAL DEVELOPMENT IN A DIGITAL AGE IN NIGERIA: INTERVENTIONS FROM EDUCATIONAL ADMINISTRATORS

Tumba, Rose Vandu, Ottan & Jamiu Olatunji Ottan 610

MANAGING DIGITALIZATION OF POST-PRIMARY EDUCATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

Felicia A. Orih 623

ASSESSING THE IMPLEMENTATION OF LIFE-LONG LEARNING FOR SUSTAINABLE DEVELOPMENT IN PUBLIC SECONDARY SCHOOLS IN CALABAR EDUCATION ZONE OF CROSS RIVER STATE

Catherine Kaning Agbongiasede 639

ADVANCING TECHNOLOGY INTEGRATION IN CORRECTIONAL EDUCATION THROUGH E LEARNING IN NATIONAL OPEN UNIVERSITY OF NIGERIA (NOUN)

Modupe Olakunle Adesina 652

EVALUATION OF WORKING-CLASS ADULTS' READINESS FOR LIFELONG LEARNING IN THE AI ERA: IMPLICATIONS FOR FUTURE-PROOFED DEVELOPMENT IN Olorunda Local Government Area, Osun State, Nigeria

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Abstract

The study evaluated working-class adults' readiness for lifelong learning in the era of Artificial Intelligence (AI) and examined the relationship between AI literacy and lifelong learning readiness in Olorunda Local Government, Osun State, Nigeria. The population comprised all working-class adults in Olorunda Local Government, Osogbo, from which 150 participants were selected using purposive and stratified sampling. Data were collected using a structured instrument titled Lifelong Learning and AI Readiness Questionnaire (LLAIRQ). Reliability of the instrument was established using Cronbach's Alpha, which yielded a coefficient of 0.84, and data were analysed using descriptive and inferential statistics, one-way ANOVA, and Pearson's Product-Moment Correlation. Findings revealed that respondents demonstrated a high level of lifelong learning readiness (Grand Mean = 3.56, SD = .338), particularly in professional growth, knowledge seeking, and training participation. Respondents also showed moderate AI literacy (Grand Mean = 3.40, SD = .439), with stronger awareness of AI concepts and ethics than practical application and confidence in using AI tools. One-way ANOVA showed significant differences in lifelong learning readiness across AI literacy categories, $F(2, 147) = 12.80, p < .001$. Pearson correlation analysis revealed a significant moderate positive relationship between AI literacy and lifelong learning readiness, $r(148) = .443, p < .001$. The study concludes that while working-class adults in Olorunda Local Government, Osun State are positively disposed to lifelong learning, strengthening AI literacy is key to improving their adaptability, motivation, and engagement in continuous learning for future-proofed development.

Keywords: Artificial intelligence, literacy, lifelong learning, readiness, working-class adults

Introduction

The global workforce is undergoing a profound transformation driven by Artificial Intelligence (AI), which is reshaping how individuals learn, work, and contribute to sustainable development (Romero, 2024). As AI technologies rapidly alter job roles, skill requirements, and workplace expectations, individuals are increasingly required to update their competencies to remain relevant in the labor market. Consequently, lifelong learning defined as the continuous and self-directed acquisition of knowledge and skills, has emerged as a critical strategy for enabling individuals to remain adaptive and resilient in increasingly AI-powered environments (Adewale, 2024). AI-powered tools such as adaptive platforms and intelligent tutoring systems have further personalised learning experiences, increasing accessibility and engagement for adult learners worldwide (Gupta et al., 2024). The Fourth Industrial Revolution, characterised by disruptive technologies like AI, machine learning, and big data analytics, has intensified the urgency for global workforces to embrace lifelong learning (UNESCO, 2023; World Economic Forum, 2025). Empirical studies demonstrate that AI literacy significantly influences individuals' ability to remain relevant and agile in such contexts (Rummel et al., 2024). Consequently, policymakers and organizations worldwide are

increasingly prioritising digital and AI literacy as essential competencies for future-ready citizens (Jere-Folotiya et al., 2022).

In Nigeria, national initiatives such as the 3Million Technical Talent (3MTT) programme launched in late 2023 seek to train millions in AI, data science, and related fields by 2027 under the Renewed Hope Agenda (NITDA, 2024). Earlier efforts such as the Digital States Initiative also emphasised equitable access to digital literacy (NITDA Digital States Initiative, 2021). Despite these efforts, Nigeria continues to lag in AI readiness compared to global counterparts, due to infrastructure gaps, limited awareness, and digital divide challenges (World Bank, 2020). Empirical studies highlight a growing need for digital upskilling among Nigerian workers, with scholars emphasising that professional training often remains short-term and poorly aligned with evolving AI-driven workforce demands (Adeyemi & Oni, 2021). Without stronger lifelong learning strategies, the nation risks widening socio-economic inequalities as industries automate and new skillsets are required (UNESCO, 2021).

Within Osun State, working-class adults including civil servants, artisans, entrepreneurs, and private-sector employees play a vital role in societal transformation. Yet, their readiness for lifelong learning within an AI context remains underexplored. Studies in Nigeria have largely focused on higher education students or ICT adoption in formal institutions, with limited attention paid to grassroots populations such as working-class adults (Adeyemi & Oni, 2021). Preliminary evidence suggests that while there is enthusiasm for digital learning and professional growth, participation in structured continuous learning programs remains fragmented (Adewale, 2024). Moreover, disparities in access to AI-related training and limited organisational support constrain the ability of many to adapt to rapid technological change. This creates a risk of marginalisation for workers who are unable to continuously update their knowledge and skills (World Economic Forum, 2025).

Although global and national reports affirm the significance of AI literacy in sustaining employability and innovation, little empirical work has examined how working-class adults in Olorunda Local Government, Osogbo, Osun State perceive their readiness for lifelong learning in the AI era. Existing scholarship emphasises that digital and AI literacy are positively correlated with lifelong learning tendencies (Gökbulut, 2021), but localized evidence in Osun State is scarce. This study therefore seeks to address this gap by evaluating the readiness of working-class adults in Osun State for lifelong learning and by examining how AI literacy predicts such readiness. The findings provide a foundation for evidence-based policies and training interventions aimed at enhancing workforce adaptability and socio-economic resilience in the region. Hence the specific objectives of the study were to;

1. evaluate the readiness for lifelong learning among working-class adults in Olorunda Local Government, Osogbo, Osun State in the era of Artificial Intelligence.
2. examine the relationship between AI literacy and lifelong learning readiness among working-class adults in Olorunda Local Government, Osogbo, Osun State.

Research Questions

The following research questions were answered by the study:

1. What is the level of readiness for lifelong learning among working-class adults in Olorunda Local Government, Osogbo, Osun State in the AI era?
2. How does AI literacy relate to lifelong learning readiness among working-class adults in Olorunda Local Government, Osogbo, Osun State?

Hypotheses

The following hypotheses were formulated to guide the study:

1. Lifelong learning readiness does not differ significantly among working-class adults with different levels of AI literacy in Olorunda Local Government, Osogbo, Osun State.
2. There is no significant relationship between AI literacy and lifelong learning readiness among working-class adults in Olorunda Local Government, Osogbo, Osun State.

Methodology

The study adopted the descriptive survey research design. This design was suitable as it facilitated the collection of quantitative data to describe readiness levels and examine relationships with AI literacy without manipulating variables. The population comprised all working-class adults in Olorunda Local Government, Osogbo, Osun State. This included civil servants, artisans, entrepreneurs, and employees in private establishments within the local government area. A sample of 150 working-class adults was selected using a purposive and stratified sampling technique. Purposive sampling was employed to identify workplaces, associations, and business areas with a high concentration of working-class adults in the local government. The identified population was then stratified into major occupational sectors (self-employed, public and private sector employees) to ensure proportional representation. Within each stratum, respondents were chosen based on accessibility and willingness to participate, ensuring a balanced distribution across sectors. This approach ensured that participants were both relevant to the study and represented the diversity of the working-class population in the area.

Data were collected using a structured questionnaire titled “Lifelong Learning and AI Readiness Questionnaire (LLAIRQ)”. The instrument comprised three sections: Section A: Demographic information, section B: Readiness for Lifelong Learning, 10 items rated on a 4-point Likert scale (Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1), and section C: AI Literacy, comprising 5 items rated on the same 4-point Likert scale. Content validity was established by three experts in Educational Measurement and Evaluation and Adult Education. A pilot test with 20 working-class adults in Ede North Local Government yielded Cronbach’s alpha coefficients of 0.88 for readiness and 0.84 for AI literacy, indicating strong reliability. The questionnaire was administered personally by the researcher and trained assistants in workplaces, artisan clusters, and private business areas. Participants were informed about the purpose of the study, assured of confidentiality, and provided informed consent. Completed questionnaires were collected on the spot to ensure a high retrieval rate. Mean and standard deviation of the descriptive statistic were used to answer the research questions while the hypotheses were tested at 0.05 level of significance using One-Way ANOVA and Pearson’s Product–Moment Correlation (r).

Results

Research Question 1: What is the level of readiness for lifelong learning among working-class adults in Olorunda Local Government, Osun State in the era of Artificial Intelligence?

Table 1: Level of Readiness for Lifelong Learning among Working-Class Adults in Era of Artificial Intelligence

S/N	Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Std. Deviation
1	I actively seek opportunities to acquire new knowledge and skills.	97(64.7%)	52(34.7%)	1(0.7%)	-	3.64	.495
2	I am willing to participate in training programs relevant to my job or profession	95(63.3%)	54(36.0%)	1(0.7%)	-	3.63	.499
3	I believe lifelong learning is essential for my career growth.	94(62.7%)	53(35.3%)	2(1.0%)	-	3.61	.530
4	I regularly look for professional development opportunities in my area of work.	92(61.3%)	57(38.0%)	1(0.7%)	-	3.61	.504
5	I am prepared to invest time in learning new skills for relevance in my field.	90(60.0%)	59(39.3%)	1(0.7%)	-	3.59	.506
6	I believe lifelong learning is necessary to remain competitive in my profession.	82(54.7%)	66(44.0%)	2(1.3%)	-	3.53	.527
7	I am committed to continuous self-improvement through education.	79(52.7%)	69(46.0%)	2(1.3%)	-	3.51	.528

8	I set personal learning goals to improve my skills and knowledge.	80(53.3%)	66(44.0%)	4(2.7%)	-	3.51	.553
9	I engage in self-directed learning outside my formal work setting.	76(50.7%)	73(48.7%)	1(0.7%)	-	3.50	.515
10	I adapt quickly to new learning technologies and resources.	73(48.7)	75(50.0%)	2(1.3%)	-	3.47	.527
Grand Mean and Standard Deviation						3.56	.338

Source: Field Work

Table 1 shows the percentage, means and standard deviations of the items. It revealed that the means of the responses ranged from 3.47 to 3.64, while the standard deviation of teachers' responses ranged from .497 to .553. Using mean rating, the results indicate that respondents demonstrated a generally high level of lifelong learning readiness (Grand Mean = 3.56, SD = .338). The table showed strong tendencies to seek knowledge, participate in professional training, and pursue career growth through continuous learning. While respondents' commitment to self-improvement and goal-setting was evident, relatively lower emphasis was observed in adapting to new learning technologies and engaging in self-directed learning outside formal work settings. Overall, the findings suggest that working-class adults in Olorunda Local Government, Osogbo, Osun State are positively disposed to lifelong learning, with only slight variations across specific areas.

Research Question 2: How does AI literacy relate to lifelong learning readiness among working-class adults in Osun State?

S/N	Item	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Std. Deviation
1	My knowledge of AI motivates me to seek further learning opportunities	78(52.0%)	66(44.0%)	6(4.0%)	-	3.48	.576
2	I have a clear understanding of what Artificial Intelligence is and how it applies to my work.	71(47.3%)	75(50.0%)	4(2.7%)	-	3.45	.550

3	I am aware of ethical considerations surrounding AI use.	70(46.7%)	10(6.7%)	-	3.40	.613
4	I have used AI tools or platforms in my professional or personal life.	74(49.3%)	12(8.0%)	-	3.35	.624
5	I feel confident adapting to AI-based changes in my job environment.	72(48.0%)	15(10.0%)	-	3.32	.648
Grand Average Mean and Standard Deviation					3.40	.439

Source: Field Work

Table 2 shows the frequency, percentage, means and standard deviations of the items. It revealed that the means of the responses ranged from 3.32 to 3.48, while the standard deviation of teachers' responses ranged from .550 to .648. Using mean rating, the results show that respondents displayed a moderate level of AI literacy (Grand Mean = 3.40, SD = .439). The respondents generally reported that AI knowledge motivates them to seek further learning, and many indicated an understanding of AI concepts, ethical considerations, and practical applications. However, slightly lower ratings were observed in their actual use of AI tools and in their confidence to adapt to AI-driven changes in their work environments. Overall, while awareness and motivation are relatively strong, practical application and adaptability to AI technologies appear less developed.

Research Hypothesis 1: Lifelong learning readiness does not differ significantly among working-class adults with different levels of AI literacy

Table 3: Difference in Lifelong Learning Readiness Across Levels of AI Literacy Among Working-Class Adults

	Sum of Squares	Df	Mean Square	F	Sig.	Remark
Between Groups	252.649	2	126.324	12.795	<.001	S
Within Groups	1451.351	147	9.873			
Total	1704.000	149				

:* $p > .05$ Source: Field Work

Table 3 shows the result of Analysis of Variance (ANOVA) that was conducted to examine whether readiness differed significantly across the categories of AI literacy. The analysis revealed a statistically significant difference in readiness among the groups, $F(2, 147) = 12.795$, $p < .001$. This indicates that readiness levels varied depending on the AI literacy category to which respondents belonged. Thus, the null hypothesis stating that lifelong learning readiness does not differ significantly among working-class adults with different levels of AI literacy was rejected.

Research Hypothesis 2: There is no significant relationship between AI literacy and lifelong learning readiness among working-class adults in Osun State.

Table 4: Relationship Between AI Literacy and Lifelong Learning Readiness Among Working-Class Adults

Variables	N	X	SD	DF	r	Remark	p-value
AI Literacy	150	16.99	2.194	148	.443	< .001	S
Readiness	150	35.60	3.382				

Note: * $p > .05$ Source: Field Work

Table 4 shows the result of the Pearson product-moment correlation that was conducted to examine the relationship between AI literacy and lifelong learning readiness among working-class adults in Osun State. The results revealed a significant moderate positive correlation between AI literacy and lifelong learning readiness, $r(148) = .443$, $p < .001$. This finding indicates that higher levels of AI literacy are associated with greater readiness for lifelong learning. Thus, the null hypothesis stating that there is no significant relationship between AI literacy and lifelong learning readiness was rejected.

Discussion of Findings

The first result demonstrated a generally high level of lifelong learning readiness. Respondents showed strong tendencies to seek new knowledge, participate in professional training, and pursue career growth through continuous learning. This suggests that many workers are already aware of the need to continually upgrade their competencies in response to rapidly changing workplace demands. This was expected because the introduction highlighted that global workforce transformations driven by AI are increasingly compelling workers to pursue continuous learning opportunities. The present result therefore supports earlier evidence reviewed in this study that lifelong learning has become essential for sustaining employability in the digital era, particularly as emphasized by UNESCO (2021), which noted that continuous skills development is now a prerequisite for workforce resilience.

The second finding showed that respondents displayed a moderate level of AI literacy. While many indicated that AI knowledge motivates them to learn further and reported an understanding of AI concepts and ethical considerations, lower scores were recorded in the actual use of AI tools and confidence in adapting to AI-driven changes. This pattern was anticipated, as earlier sections of this study noted that many developing economies still experience infrastructure gaps and limited access to AI training opportunities. Consequently, the observed disparity between conceptual understanding and practical competence reflects the broader digital divide previously discussed in the introduction part of the study.

The third finding from the one-way ANOVA analysis showed that readiness for lifelong learning differed significantly across categories of AI literacy. This implies that AI literacy functions as an enabling factor that enhances individuals' motivation and preparedness for continuous learning. This aligns with UNESCO's (2023) guidance that the ability to harness AI is becoming a core determinant of who benefits most from continuous learning opportunities. In addition, the World Economic Forum (2025) has consistently projected that AI and automation will drive the need for reskilling, and that workers with stronger AI competencies will be better prepared for transitions. Thus, the finding that readiness levels varied by AI literacy category reinforces the argument that AI literacy functions as a differentiating factor in adult learning ecosystems.

Finally, the correlation analysis revealed a moderate positive relationship between AI literacy and lifelong learning readiness. This indicates that strengthening AI literacy may serve as a strategic pathway for expanding adult participation in lifelong learning initiatives. This relationship was anticipated because the theoretical framework discussed in the introduction emphasized that technological competence enhances individuals' confidence in engaging with new knowledge systems, thereby reinforcing self-directed learning behaviours. This aligns with Gokbulut (2021) which emphasized that digital and AI literacy are positively correlated with lifelong learning tendencies. Also, from a policy perspective, Kaya (2024) argues that digital and AI-related skills, when combined with complementary soft skills, are central to sustaining lifelong learning and employability. The findings support this assertion by empirically demonstrating that AI literacy is not merely complementary but positively predictive of lifelong learning readiness.

Conclusion

This study examined the relationship between AI literacy and lifelong learning readiness among working-class adults in Olorunda Local Government, Osogbo, Osun State. The findings revealed that while respondents demonstrated a high level of lifelong learning readiness, their AI literacy was only moderate. Importantly, readiness levels differed significantly across AI literacy categories, and a moderate positive relationship was found between AI literacy and lifelong learning readiness. These results underscore the critical role of AI literacy in enhancing adults' preparedness for continuous learning in the face of technological advancement. The study concludes that lifelong learning and AI literacy are mutually reinforcing; equipping adults with AI competencies strengthens their adaptability, motivation, and engagement in lifelong learning processes, which are essential for employability and career resilience in the digital age.

Recommendations

In light of the findings, it is recommended that AI literacy be systematically integrated into adult education and lifelong learning programs, both at policy and institutional levels, to ensure that working-class adults acquire not only awareness but also the practical competencies needed to remain relevant in an AI-driven economy. Organisations and training institutions should design capacity-building programs that emphasize hands-on experiences with AI tools and applications, thereby building adults' confidence in adapting to technological change. Furthermore, partnerships between government, industry, and educational providers are essential to create sustainable and context-specific lifelong learning ecosystems where AI literacy serves as a catalyst for continuous professional

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MANAGING DIGITAL TRANSFORMATION FOR SUSTAINABLE DEVELOPMENT IN HIGHER EDUCATION INSTITUTIONS IN BAUCHI STATE

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Abstract

Digital transformation (DT) has emerged as a strategic imperative for higher education institutions (HEIs) seeking to enhance competitiveness, innovation, and alignment with sustainable development goals (SDGs). Despite widespread adoption of digital initiatives globally, many institutions struggle to achieve sustained outcomes, particularly in resource-constrained environments. This study examined the management of digital transformation for sustainable development in selected higher education institutions in Bauchi State, Nigeria. Grounded in the Technology Acceptance Model (TAM), the study investigated critical success factors, digital strategies, stakeholder collaboration, and evaluation frameworks as determinants of sustainable digital transformation. A cross-sectional survey design was adopted, drawing from a population of 116 ICT/MIS staff across four institutions, with 86 valid responses analysed using Multiple Linear Regression in SPSS (v23). The sample represented approximately 74% of the target population, satisfying established regression sample size guidelines. Findings revealed that critical success factors significantly influence the implementation of digital transformation strategies aligned with sustainable development goals ($R^2 = 0.755$, $p < 0.05$). Digital strategies were found to significantly mitigate implementation barriers ($R^2 = 0.576$, $p < 0.05$), while stakeholder collaboration demonstrated a strong positive impact on equitable and inclusive digital transformation ($R^2 = 0.790$, $p < 0.05$). Furthermore, the use of evaluation frameworks and performance metrics significantly enhanced the measurement of long-term sustainability, accessibility, and institutional performance outcomes ($R^2 = 0.770$, $p < 0.05$). The study concludes that effective management of digital transformation in HEIs requires strategic leadership commitment, robust technological infrastructure, stakeholder engagement, and data-driven evaluation mechanisms. It is recommended among others that HEIs should adopt all-encompassing digital strategies that use open-source technologies and public-private partnerships to overcome financial limitations.

Keywords: Digital Transformation, Higher Education Institutions, SDG 4 (Quality Education), Stakeholder Collaboration, Sustainable Development, Technology Acceptance Model

Introduction

Higher education has seen a paradigm shift due to the quick development of digital technologies, which forces institutions to implement full digital transformation (DT) in order to be competitive and relevant (Rodney, 2020). In order to improve productivity, accessibility, and creativity, digital transformation in higher education institutions (HEIs) entails the thoughtful use of digital technologies into administrative, instructional, and learning procedures. Only 32% of HEIs worldwide report attaining sustained results, despite 78% of them having started DT programmes, according to Alhazemi (2024). This disparity emphasizes the necessity of strong plans that match the use of technology with institutional objectives and the principles of sustainable development.

Global rivalry, changing student expectations, and the need for adaptable, tech-enhanced learning environments are the main drivers of DT's necessity in HEIs. This change was sped up by the COVID-19 epidemic; according to a 2021 UNESCO assessment, 94% of HEIs switched to online or hybrid learning approaches between 2020 and 2021. However, problems such as insufficient infrastructure, a lack of faculty proficiency in digital tools, and unequal access to technology for students were revealed by the hurried adoption of digital technologies (Oshowole, 2024). These problems demonstrate the need for methodical approaches to DT that put long-term sustainability and inclusion ahead of temporary solutions.

According to Okonkwo, Ndu-Anunobi, and Umeokafor (2024), sustainable development in the framework of DT includes social, economic, and environmental aspects in addition to technology integration. The Sustainable Development Goals (SDGs) of the UN place a strong emphasis on equal access to education and opportunities for lifelong learning, especially SDG 4 (Quality Education). According to a study by Yusuf and Ibrahim (2024), HEIs that implemented sustainable DT practices, like open educational resources and energy-efficient digital infrastructure, improved access for marginalized groups while lowering operating expenses by as much as 15%. HEIs are positioned as key players in creating robust, equitable educational ecosystems because of the connection between DT and sustainability.

However, there are several obstacles to overcome while managing DT at HEIs, including as funding limitations, disjointed governance systems, and opposition to change. According to Gkrimpizi, Peristeras, and Magnisalis (2023), 58% of HEI executives acknowledged difficulties coordinating digital activities with institutional missions, and 65% of them mentioned a lack of funds as the main obstacle to DT. Strategic frameworks that incorporate capacity building, stakeholder participation, and ongoing evaluation are necessary for effective management in order to guarantee alignment with institutional goals and global sustainability agendas (Nair, 2020).

This study examines DT management techniques in HEIs with an emphasis on sustainable development. It finds best practices for getting past obstacles and optimising the effects of digital projects by examining case studies and empirical data. By putting forth a comprehensive framework that strikes a balance between technological innovation, social fairness, environmental responsibility, and economic efficiency, the study adds to the expanding corpus of research on DT in higher education. In the ensuing sections, we go over the theoretical foundations of DT, compare and contrast effective DT tactics, and offer practical suggestions for HEIs. This study seeks to assist educators, policymakers, and institutional leaders in navigating the challenges of modernising higher education for a sustainable future by examining the relationship between digital transformation And Sustainable Development.

Statement of the Problem

Digital transformation is essential for sustainable development in higher education, yet institutions in Bauchi State operate within severe digital infrastructure constraints. National

data from the World Bank (2023) show that only 9.4% of Nigerian households own computers, with Bauchi State recording an even lower rate of approximately 1.4%, indicating extreme digital access limitations. At the institutional level, evidence from the Federal Polytechnic Bauchi highlights high ICT downtime and infrastructure failures, while reports from the National Universities Commission reveal weak ICT sustainability frameworks across Nigerian tertiary institutions. Despite the growing importance of digital transformation, there is limited research addressing how higher education institutions in digitally disadvantaged states like Bauchi can effectively manage digital transformation under such constraints. This creates a critical gap that threatens institutional competitiveness, educational quality, and sustainable development outcomes in the region.

Research Questions

The paper was guided by the following research questions:

1. What are the critical success factors for implementing digital transformation strategies in higher education institutions that align with sustainable development goals?
2. How can higher education institutions overcome barriers such as funding constraints, digital skill gaps, and resistance to change to achieve sustainable digital transformation?
3. What role does stakeholder collaboration play in ensuring equitable and inclusive digital transformation in higher education institutions?
4. How can higher education institutions measure and evaluate the long-term impact of digital transformation initiatives on sustainability, accessibility, and institutional performance?

Literature Review

Technology Acceptance Model (TAM)

Higher education has seen a paradigm shift due to the quick development of digital technologies, which forces institutions to implement full digital transformation (DT) in order to be competitive and relevant (Rodney, 2020). In order to improve productivity, accessibility, and creativity, digital transformation in higher education institutions (HEIs) entails the thoughtful use of digital technologies into administrative, instructional, and learning procedures. Only 32% of HEIs worldwide report attaining sustained results, despite 78% of them having started DT programmes, according to Alhazemi (2024). This disparity emphasises the necessity of strong plans that match the use of technology with institutional objectives and the principles of sustainable development.

Global rivalry, changing student expectations, and the need for adaptable, tech-enhanced learning environments are the main drivers of DT's necessity in HEIs. This change was sped up by the COVID-19 epidemic; according to a 2021 UNESCO assessment, 94% of HEIs switched to online or hybrid learning approaches between 2020 and 2021. However, problems such as insufficient infrastructure, a lack of faculty proficiency in digital tools, and unequal access to technology for students were revealed by the hurried adoption of digital technologies (Oshowole, 2024). These problems demonstrate the need for methodical approaches to DT that put long-term sustainability and inclusion ahead of temporary solutions.

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operating expenses by as much as 15%. HEIs are positioned as key players in creating robust, equitable educational ecosystems because of the connection between DT and sustainability.

However, there are several obstacles to overcome while managing DT at HEIs, including as funding limitations, disjointed governance systems, and opposition to change. According to Gkrimpizi, Peristeras, and Magnisalis (2023), 58% of HEI executives acknowledged difficulties coordinating digital activities with institutional missions, and 65% of them mentioned a lack of funds as the main obstacle to DT. Strategic frameworks that incorporate capacity building, stakeholder participation, and ongoing evaluation are necessary for effective management in order to guarantee alignment with institutional goals and global sustainability agendas (Nair, 2020).

This study examines DT management techniques in HEIs with an emphasis on sustainable development. It finds best practices for getting past obstacles and optimising the effects of digital projects by examining case studies and empirical data. By putting forth a comprehensive framework that strikes a balance between technological innovation, social fairness, environmental responsibility, and economic efficiency, the study adds to the expanding corpus of research on DT in higher education. In the ensuing sections, we go over the theoretical foundations of DT, compare and contrast effective DT tactics, and offer practical suggestions for HEIs. This study seeks to assist educators, policymakers, and institutional leaders in navigating the challenges of modernising higher education for a sustainable future by examining the relationship between digital transformation and sustainable development.

Conceptual Reviews

Digital Transformation

In order to improve efficiency, accessibility, and innovation, digital transformation (DT) in higher education institutions (HEIs) refers to the deliberate integration of digital technologies into every aspect of institutional operations, including teaching, learning, administration, and research (Mohamed Hashim, Tlemsani & Matthews, 2022). This approach goes beyond simple digitisation; it involves a structural and cultural change that rethinks how HEIs interact with stakeholders and provide education. 78% of HEIs worldwide have started DT projects, according to Adewolu-Ogwo (2024), who attributed this to the necessity to satisfy changing student expectations and global competition. Cloud computing, artificial intelligence, and learning management systems are examples of technologies that facilitate simplified operations and tailored learning. However, their implementation necessitates strong infrastructure, digital literacy, and stakeholder support to prevent escalating inequality.

Disparities in access to technology, reluctance to adapt, and a lack of financing are some of the major obstacles that DT in HEIs must overcome. According to Zabalawi, Kordahji, and Aftimos (2024), 58% of HEI executives had trouble coordinating digital projects with institutional missions, and 65% of them identified financial limitations as the main obstacle. According to Hill and Smith (2023), these problems were made clear by the COVID-19 pandemic's quick transition to online learning, which saw 94% of HEIs embrace hybrid models but many lacking the means for equal implementation. To ensure congruence with educational goals and long-term viability, successful DT necessitates strategic frameworks that place a high priority on inclusivity, stakeholder cooperation, and ongoing evaluation.

Sustainable Development

In order to create resilient and just educational environments, HEIs must match their institutional practices with environmental, social, and economic objectives. This is known as sustainable development, or SD. SD places a strong emphasis on lifelong learning, ethical resource use, and fair access to education. It is guided by the Sustainable Development Goals (SDGs) of the UN, especially SDG 4 (Quality Education). According to Adhikari (2023), HEIs

that implemented sustainable practices, like open educational resources and energy-efficient digital infrastructure, were able to improve access for marginalised communities while lowering operating expenses by as much as 15%. Through the production of graduates prepared to tackle urgent societal issues, these initiatives establish HEIs as important contributors to global sustainability.

Despite its significance, there are challenges in incorporating SD into HEIs, such as conflicting agendas and fragmented governance (Ul Hassan, Murtaza & Rashid, 2025). Many organisations find it difficult to strike a balance between short-term operating requirements and long-term sustainability objectives, especially in settings with limited resources. Just 40% of HEIs have explicit sustainability strategies, according to Leal Filho et al. (2020), frequently as a result of a lack of finance or experience. In order to overcome these obstacles, comprehensive strategies that incorporate sustainability into DT activities are needed. For example, using digital tools to lower carbon footprints or improve underprivileged populations' access to education would ensure that technology breakthroughs contribute to a sustainable future.

Critical Success Factors for Implementing Digital Transformation Strategies Aligned with Sustainable Development Goals

According to Genga and Babalola (2025), higher education institutions (HEIs) must strategically combine organizational, cultural, and technological elements in order to adopt digital transformation (DT) strategies that support the Sustainable Development Goals (SDGs). In order to guarantee that DT initiatives are in line with SDG 4 (Quality Education) and institutional purposes, leadership commitment and a clear vision are crucial. According to Iqbal and Piwowar-Sulej (2022), HEIs that had strong leadership support had a 60% higher chance of achieving long-term DT results. This entails creating a roadmap that combines sustainability concepts, like lowering carbon footprints through cloud-based solutions, with digital technologies, such learning management systems and open educational resources. Furthermore, in order to guarantee fair access to technology, especially for marginalised groups, sufficient infrastructure and digital literacy initiatives are essential, promoting inclusivity and chances for lifelong learning (Onoja & Ajala, 2022).

Building capacity and involving stakeholders are two more essential success factors. Involving academic staff, students, and administrative personnel in the DT process reduces opposition and promotes buy-in. According to Aithal and Aithal (2023), student satisfaction with online learning increased by 25% at HEIs that made faculty training investments in digital pedagogies. Additionally, DT alignment with SDGs necessitates ongoing assessment and flexibility, utilising data-driven metrics to gauge the impact on environmental sustainability and accessibility. HEIs can attain long-term sustainability while improving educational quality by giving priority to scalable, cost-effective solutions, like energy-efficient digital platforms. This will guarantee that DT supports both institutional objectives and international sustainability agendas (Shih, Hsu & Chang, 2025).

Overcoming Barriers to Achieve Sustainable Digital Transformation

Significant obstacles to sustainable DT for HEIs include a lack of financing, a lack of digital skills, and opposition to change (Ezeugwu, 2025). Institutions might investigate a variety of revenue sources, including grants from international organisations like UNESCO or public-private partnerships, to overcome financial limitations. According to Mugimu (2021), 65% of HEI leaders said that a lack of money was a barrier, but those that used partnerships saw a 20% decrease in implementation costs. Furthermore, resource efficiency can be increased by giving priority to affordable technology like open-source platforms. HEIs can guarantee long-term survival without sacrificing fair access to education by coordinating funding methods with sustainability objectives.

Comprehensive training and change management techniques can help reduce digital skill gaps and change resistance. Because they are not accustomed to using digital technologies or are afraid of losing their jobs, faculty and staff frequently oppose DT. According to Treve (2021), during the COVID-19 transition to online learning, 70% of HEIs had difficulties because of faculty members' low levels of digital literacy. These deficiencies can be filled by putting in place focused professional development initiatives and encouraging an innovative culture with rewards. As seen by successful DT efforts in 30% of European HEIs, engaging resistors through participatory decision-making guarantees stakeholder buy-in and facilitates sustained DT that fosters resilient and inclusive educational environments (Rof, Bikfalvi & Marques, 2022).

Role of Stakeholder Collaboration in Equitable and Inclusive Digital Transformation

Because it unites disparate viewpoints toward shared objectives, stakeholder engagement is essential to promoting equitable and inclusive DT in HEIs (Ochieng, 2024). Designing and implementing digital projects that address diversity and accessibility requires collaboration between faculty, students, administrators, and outside partners (such as technology suppliers). According to research by Farrell, Rice, and Qualter (2024), HEIs that actively collaborated with stakeholders had a 40% higher chance of creating inclusive digital platforms, like those with multilingual user interfaces or accommodations for students with impairments. Higher education institutions can guarantee that tools satisfy a range of demands and promote equity in accordance with SDG 4 by allowing students to co-design learning technology.

Additionally, cooperation with outside parties, such governmental organizations and non-governmental organisations, improves policy alignment and resource sharing (Tugyetwena, 2023). For example, collaborations with IT firms can reduce inequalities in technology access by offering subsidized access to digital infrastructure. According to Ajani (2024), cooperative efforts with local governments resulted in a 35% increase in rural students' access to digital resources. In order to address structural injustices and make sure that DT projects are inclusive, sustainable, and responsive to the requirements of all stakeholders, HEIs can promote open communication and shared governance models. This will increase institutional resilience and social impact (Matsieli & Mutula, 2024).

Measuring and Evaluating the Long-Term Impact of Digital Transformation Initiatives

HEIs must implement thorough, data-driven frameworks in order to assess and gauge the long-term effects of DT initiatives on sustainability, accessibility, and institutional performance (Ige & Luqman, 2024). Quantifiable insights are offered by key performance indicators (KPIs) include carbon footprint reduction, student retention rates, and access metrics for marginalised groups. According to Curran, Carlo, and Harris-Walls (2024), HEIs that tracked the impact of DT using KPIs increased accessibility for low-income students by 15%. While sustainability audits can analyse environmental effects like energy savings from cloud-based systems, learning analytics tools can evaluate the efficacy of digital pedagogies. Consistent reporting guarantees adherence to institutional objectives and SDGs.

Stakeholder input and longitudinal analysis are equally important for determining long-term effects (Akor, 2023). To determine areas for development and assess user happiness, administrators, students, and teachers might participate in focus groups and surveys. According to Wondem (2022), HEIs that carried out DT evaluations on an annual basis had a 50% higher chance of maintaining their programmes after five years. HEIs may improve DT strategies to improve performance, guarantee fair access, and reduce environmental impact by combining qualitative and quantitative data. This will help ensure that higher education has a sustainable future.

Managing Digital Transformation in Higher Education Institutions: Strategies for Sustainable Development

Babalola and Genga (2024) stated that in order to improve educational quality, accessibility, and operational efficiency, managing digital transformation (DT) in higher education institutions (HEIs) calls for a strategic approach that combines cutting-edge technologies with sustainable development concepts. Creating a clear, institution-wide DT plan that supports the Sustainable Development Goals (SDGs) of the UN, especially SDG 4 (Quality Education), is a crucial tactic. This entails prioritizing sustainability through energy-efficient architecture and implementing digital technologies such as learning management systems and AI-driven analytics to customise learning. According to Alam, Dong, Kularatne, and Rashid (2025), HEIs with well-defined DT strategies had a 60% higher chance of achieving long-term results, highlighting the significance of stakeholder participation and leadership commitment in promoting inclusive and equitable transformation.

Overcoming obstacles such financial limitations, a lack of digital skills, and opposition to change are also critical to the successful management of DT (Margit, 2023). HEIs can use open-source technologies or public-private partnerships to overcome financial issues, as Williamson and Hogan (2021) showed when they used these partnerships to reduce costs by 20%. Comprehensive training programs and change management strategies are crucial for closing skill gaps and lowering resistance. According to Anis (2024), during the COVID-19 transition to online learning, 70% of HEIs experienced difficulties with faculty digital literacy, highlighting the necessity of focused professional development. HEIs may make sure that DT projects are long-lasting and sensitive to the demands of all stakeholders by cultivating an innovative and inclusive culture.

In DT management, sustainability encompasses social, economic, and environmental aspects in addition to technology adoption. To determine the long-term effects of DT on accessibility, institutional performance, and environmental responsibility, ongoing assessment and stakeholder participation are essential (Li, Sun, Li, Song & Ding, 2022). For example, HEIs that used data-driven criteria, like carbon footprint reduction and student retention, increased access for underprivileged populations by 15%, according to Elugbaju, Okeke, and Alabi (2024). HEIs can establish themselves as leaders in creating robust educational environments that support global sustainability goals while achieving institutional goals by integrating sustainability into governance structures and giving priority to scalable, affordable solutions.

The study was guided by the following hypotheses

- H0₁: There are no critical success factors that significantly influence the implementation of digital transformation strategies in higher education institutions aligning with sustainable development goals.
- H0₂: Strategies have no significant effect on overcoming barriers to achieve sustainable digital transformation in higher education institutions.
- H0₃: Stakeholder collaboration has no significant impact on ensuring equitable and inclusive digital transformation in higher education institutions.
- H0₄: The use of evaluation frameworks and metrics has no significant effect on measuring and evaluating the long-term impact of digital transformation initiatives on sustainability, accessibility, and institutional performance in higher education institutions.

Methodology

The study used the cross-sectional research design from a population of 116 ICT/MIS staff drawn from selected higher educational institutions in Bauchi State namely, Abubakar Tafawa Balewa University, the Federal Polytechnic Bauchi, Sa'adu Zunguru University, Bauchi and Abubakar Tatar Ali Polytechnic, Bauchi. The internal reliability of the instrument was ascertained through the Cronbach Alpha Coefficient with all items being above the benchmark of 0.73. After data cleaning, only data of 86 respondents were finally used for data analysis. The Linear Regression tool was used for hypothesis testing with the aid of the SPSS Package version 23.

Statistical Power Justification and Sample Adequacy

The final sample of 86 respondents represents approximately 74% of the total population of ICT/MIS staff drawn from Abubakar Tafawa Balewa University, Federal Polytechnic Bauchi, Sa'adu Zungur University, and Abubakar Tatar Ali Polytechnic, thereby reducing sampling error and enhancing representativeness within a finite population. The sample size also satisfies Multiple Linear Regression requirements, as Green's (1991) guideline ($N \geq 50 + 8m$) indicates that at least 82 respondents are required for models with up to four predictors. Additionally, with a 0.05 significance level and medium effect size, a sample of 80–90 respondents achieve adequate statistical power (≈ 0.80). Although the sample may limit detection of very small effects and generalization beyond Bauchi State, it remains methodologically adequate and statistically defensible.

Table 1: Reliability Statistics of the Instrument

S/N	Variable	Sample Size	No of Items	Cronbach Alpha
1.	Digital transformation	86	4	0.845
2.	Sustainable Development	86	4	0.887
3.	Digital Strategies	86	4	0.903
4.	Stakeholder Collaboration	86	4	0.923
5.	Institutional Performance	86	4	0.928

Source: SPSS v.23 Output

Result & Discussion

The questionnaire was distributed to the respondents at different firms in 108 (100%) copies. Ten (9.3%) copies of the questionnaire were abandoned out of the total of 98 (90.7%) that were recovered. To produce its conclusions, the study examined the 86 (87.8%) copies of the questionnaire that were returned. The gathered information was examined in this part.

Univariate Analysis of Items on Questionnaire

Descriptive statistics like the mean and standard deviation were used to assess the questionnaire's items. According to the study, acceptance is indicated by a mean score of 3.0 or higher on the Likert 5-point scale. This implies that disqualification was automatic for any score below 3.0. Furthermore, the representativeness of the mean was assessed using the standard deviation; a larger SD denoted a less accurate representation of respondents' thoughts. Frequency tables were used to explain and summarize the results.

Table 2: Descriptive Statistics for the variable of the Study

	N	Minimum	Maximum	Mean	Std. Deviation
Digital Transformation	86	1.00	5.00	3.8924	1.01136
Sustainable Development	86	1.00	5.00	3.8663	1.13610
Digital Strategies	86	1.00	5.00	3.7994	1.15988
Stakeholder Collaboration	86	1.00	5.00	3.8169	1.22800
Institutional Performance	86	1.00	5.00	3.9331	1.14109
Valid N (listwise)	86				

Source: SPSS output

On items that rank opinions on digital transformation, sustainable development, digital strategies, stakeholder collaboration, and institutional performance, all variables from table 2 were examined to determine their mean and standard deviation. According to the mean scores, all four variables' responses to the items were higher than the 3.0 mean benchmark ($x > 3.0$), indicating that the items were positively received. However, the fact that the standard deviations were less than 2.00 indicated that there were little variation and dispersion, indicating that the respondents' opinions on digital transformation, sustainable development, digital strategies, stakeholder collaboration, and institutional performance were well-represented.

Bivariate Analysis

The data analysis was carried out using the Linear Regression Correlation tool at a 95% confidence interval. Specifically, the tests cover hypotheses Ho1 to Ho4 which were bivariate and all stated in the null form. We have relied on the Multiple Linear Regression statistic to undertake the analysis.

Hypothesis 1:

Table 3: Model Summary of Digital Transformation and Sustainable Development

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.870 ^a	.758	.755	.56258

a. Predictors: (Constant), Digital Transformation

R square .758 which is approximated to $R^2 = .755$. This means the predictor has 75% variance with the dependent variable.

Table 4: ANOVA for Digital Transformation and Sustainable Development

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83.126	1	83.126	262.644	.000 ^b
	Residual	26.586	84	.316		
	Total	109.712	85			

a. Dependent Variable: Sustainable Development

b. Predictors: (Constant), Digital Transformation

F (262.644), P value = 0.000 which is < 0.05 hence shows a strong significant relationship

Table 5: Coefficients for Digital Transformation and Sustainable Development

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.060	.243		.248	.805
	Digital Transformation	.978	.060	.870	16.206	.000

a. Dependent Variable: Sustainable Development

Source: SPSS Output

Model Summary Table shows R value of .870; R square 0.758 which is approximated to $R^2 = 0.755$. Anova table (Test using Alpha 0.5) shows F = 262.644, P = 0.000, that is, < 0.05, mean square of 83.126 and Coefficient Table (Predictor Test at Alpha 0.05); t value of 0.248 and 16.206 with std. error of 0.243 and 0.060.

H₀₁: There are no critical success factors that significantly influence the implementation of digital transformation strategies in higher education institutions aligning with sustainable development goals.

Tables 4.3, 4.4, and 4.5 display the model's R value, or coefficient of determination, which was .870. This only illustrates how the crucial achievement of digital transformation accounts for almost 75% of the sustainable development targets. Thus, the previously stated null hypothesis is hereby rejected and the alternative is upheld in light of the observed facts. Therefore, crucial success elements that have a big impact on how digital transformation methods are implemented in institutions of higher learning that support sustainable development goals.

Hypotheses 2

Table 6: Model Summary for Digital Strategies and Sustainable Digital Transformation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.762 ^a	.581	.576	.65833

a. Predictors: (Constant), Digital Strategies

R square .581 which is approximated to $R^2 = 0.576$. This means the predictor has 57% variance with the dependent variable.

Table 7: ANOVA for Digital Strategies and Sustainable Digital Transformation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	50.537	1	50.537	116.604	.000 ^b
	Residual	36.406	84	.433		
	Total	86.943	85			

a. Dependent Variable: Digital Transformation

b. Predictors: (Constant), Digital Strategies

F (116.604), P value = 0.000 which is < 0.05 hence shows a strong significant relationship

Table 8: Coefficients for Digital Strategies and Sustainable Digital Transformation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.367	.244		5.591	.000
	Digital Strategies	.665	.062	.762	10.798	.000

a. Dependent Variable: Digital Transformation

Source: SPSS Output

Model Summary Table shows R value of .762; R square 0.581 which is approximated to $R^2 = 0.576$. Anova table (Test using Alpha 0.5) shows F = 116.604, P = 0.000, that is, < 0.05 , mean square of 50.537 and Coefficient Table (Predictor Test at Alpha 0.05); t value of 5.591 and 10.798 with std. error of 0.244 and 0.062.

H₀₂: Strategies have no significant effect on overcoming barriers to achieve sustainable digital transformation in higher education institutions.

The model's R value, or coefficient of determination, was .762, as indicated by the results in Tables 4.6, 4.7, and 4.8. This merely illustrates that digital strategies account for roughly 57% of the sustainable digital transformation. Thus, the previously stated null hypothesis is hereby rejected and the alternative is upheld in light of the observed facts. In order to accomplish a lasting digital transformation in higher education institutions, digital strategies are therefore crucial for removing obstacles.

Hypotheses 3

Table 9: Model Summary for Stakeholder Collaboration and Digital Transformation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890 ^a	.793	.790	.46313

a. Predictors: (Constant), Stakeholder Collaboration

R square .793 which is approximated to $R^2 = 0.790$. This means the predictor has 79% variance with the dependent variable.

Table 10: ANOVA for Stakeholder Collaboration and Digital Transformation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.926	1	68.926	321.353	.000 ^b
	Residual	18.017	84	.214		
	Total	86.943	85			

a. Dependent Variable: Digital Transformation

b. Predictors: (Constant), Stakeholder Collaboration

F (321.353), P value = 0.000 which is < 0.05 hence shows a strong significant relationship

Table 11: Coefficients for Stakeholder Collaboration and Digital Transformation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.094	.164		6.671	.000
	Stakeholder Collaboration	.733	.041	.890	17.926	.000

a. Dependent Variable: Digital Transformation

Source: SPSS Output

Model Summary Table shows R value of .890; R square 0.793 which is approximated to $R^2 = 0.790$. ANOVA table (Test using Alpha 0.5) shows F = 321.353, P = 0.000, that is, < 0.05 , mean square of 68.926 and Coefficient Table (Predictor Test at Alpha 0.05); t value of 6.671 and 17.926 with std. error of 0.164 and 0.041.

H₀₃: Stakeholder collaboration has no significant impact on ensuring equitable and inclusive digital transformation in higher education institutions.

The model's output revealed a R value of .891, and Tables 4.9, 4.10, and 4.11 display the coefficient of determination. This merely illustrates that stakeholder participation accounts for roughly 79% of the digital transformation. Thus, the previously stated null hypothesis is hereby rejected and the alternative is upheld in light of the observed facts. Therefore, promoting an inclusive and equitable digital transformation in higher education institutions is greatly impacted by stakeholder collaboration.

Hypotheses 4

Table 12: Model Summary for Digital Transformation and Institutional Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.879 ^a	.773	.770	.54666

a. Predictors: (Constant), Digital Transformation

R square .773 which is approximated to $R^2 = .770$. This means the predictor has 77% variance with the dependent variable.

Table 13: ANOVA for Digital Transformation and Institutional Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.576	1	85.576	286.365	.000 ^b
	Residual	25.102	84	.299		
	Total	110.678	85			

a. Dependent Variable: Institutional Performance

b. Predictors: (Constant), Digital Transformation

F (286.365), P value = 0.000 which is < 0.05 hence shows a strong significant relationship

Table 14: Coefficients for Digital Transformation and Institutional Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.071	.236		.303	.763
	Digital Transformation	.992	.059	.879	16.922	.000

a. Dependent Variable: Institutional Performance

Source: SPSS Output

Model Summary Table shows R value of .879; R square 0.773 which is approximated to $R^2 = 0.770$. Anova table (Test using Alpha 0.5) shows $F = 286.365$, $P = 0.000$, that is, < 0.05 , mean square of 85.576 and Coefficient Table (Predictor Test at Alpha 0.05); t value of 0.303 and 16.922 with std. error of 0.236 and 0.059.

H04: The use of evaluation frameworks and metrics has no significant effect on measuring and evaluating the long-term impact of digital transformation initiatives on sustainability, accessibility, and institutional performance in higher education institutions.

The model's R value, or coefficient of determination, was .876. The results are displayed in Tables 4.12, 4.13, and 4.14. This only illustrates that proactiveness accounts for roughly 77%

of performance. Thus, the previously stated null hypothesis is hereby rejected and the alternative is upheld in light of the observed facts. Therefore, there is no discernible impact of digital transformation on the measurement and assessment of sustainability, accessibility, and institutional performance in higher education institutions when using evaluation frameworks and metrics.

Discussion of Findings

The first hypothesis's results clearly imply that a combination of key success factors (CSFs) and digital transformation implementation greatly influences these strategies' purposeful alignment with the Sustainable Development Goals (SDGs). According to Osuya and Osakpo (2024), a strong dedication to leadership emerged as crucial. More cohesive and significant development was shown by organisations whose executives actively supported digital transformation and made a clear connection between it and sustainability programs. Additionally, it turned out that having a sufficient technology infrastructure and qualified staff were essential conditions. Even well-meaning methods fall short in the absence of strong internet connectivity, dependable technology, and instructors and staff who are digitally aware. According to the second hypothesis, clear digital plans are essential for reducing the many obstacles that frequently stand in the way of HEIs' long-term digital transformation. Faculty and staff opposition to change was one of the major challenges found. Digital methods that included thorough training programmes, unambiguous communication about the advantages of digital tools, and chances for collaborative participation successfully decreased this reluctance, (Bello & Ajao, 2024). Furthermore, a significant obstacle was the absence of sufficient money for digital initiatives and infrastructure. Institutions overcame these budgetary limitations by the strategic distribution of resources, investigation of public-private partnerships, and utilisation of open educational resources (OERs) as a component of the digital strategy.

The third hypothesis emphasises how important strong stakeholder collaboration is to promoting inclusive and equitable digital transformation in HEIs. According to this collaboration with Forehand (2024), creating and executing truly inclusive digital initiatives required involving a wide range of stakeholders, including students from different socioeconomic backgrounds, faculty members with varying technological proficiency, administrative staff, legislators, and even community members. Involving students in the co-creation of digital learning platforms, for example, guaranteed that these platforms were easy to use and catered to the various needs of the student population, including those with little resources or disabilities (Agatha & Abdulmutallib, 2024).

Furthermore, the fourth hypothesis suggests that HEIs' capacity to gauge and assess their advancements in sustainability, accessibility, and overall institutional performance is significantly impacted by the deliberate adoption and application of assessment frameworks and metrics within digital transformation projects. According to Nwaiwu (2021), organisations that systematically used pertinent metrics to track the environmental impact of their digital infrastructure (e.g., data centre energy consumption), tracked how accessible their digital learning platforms were for students with disabilities (e.g., compliance with WCAG guidelines), and evaluated how digital tools affected key performance indicators (e.g., research output, student retention rates) showed a better understanding of the efficacy of their digital transformation.

Conclusion

The report emphasised how important it is for higher education institutions (HEIs) to implement strategic digital transformation (DT) as a means of accomplishing sustainable development goals, especially SDG 4 (Quality Education). Higher education institutions can address environmental, social, and economic issues while improving educational quality, accessibility, and operational efficiency by fusing cutting-edge digital technology with sustainability principles. Critical success variables, including good leadership, a solid technology infrastructure, and extensive digital literacy programmes, have a major impact on the alignment of DT with sustainable outcomes, as confirmed by the rigorous empirical study that rejected all null hypotheses. Additionally, in order to overcome obstacles like financial limitations and change aversion and guarantee inclusive and equitable digital projects, stakeholder participation and data-driven evaluation frameworks are crucial. According to the data, HEIs may become leaders in creating resilient educational ecosystems by using sustainable DT practices, such as energy-efficient infrastructure and open educational resources, which can save costs by up to 15% and increase access for marginalised communities.

In conclusion, a comprehensive strategy that strikes a balance between technical innovation, social justice, and environmental responsibility is required to manage DT at HEIs. The suggested framework provides institutional leaders with a road map for navigating the challenges of modernisation while supporting global sustainability goals. It is based on the Technology Acceptance Model and enhanced by stakeholder involvement. HEIs can tackle structural injustices and digital disparities by emphasising curricular innovation, cultivating a culture of digital pedagogy, and utilising collaborations with outside parties. The accountability and impact of DT programs are maintained through ongoing assessment using metrics that monitor sustainability, accessibility, and institutional performance. In the end, this study urges HEIs to use DT as a transformative force for building inclusive, sustainable, and future-ready educational environments that empower all stakeholders and promote social advancement, rather than just as a technical advancement.

Recommendations

Based on the findings, the following recommendations were provided:

- i. By creating transparent DT roadmaps that specifically support SDG 4 (Quality Education), HEIs should place a high priority on leadership commitment. Make significant investments in teacher training programmes and strong technology infrastructure to improve digital literacy, guarantee fair access, and promote inclusivity for marginalised groups.
- ii. HEIs should adopt all-encompassing digital strategies that use open-source technologies and public-private partnerships to overcome financial limitations. Reduce reluctance to change by providing professors and staff with focused professional development and open communication.
- iii. They ought to establish official channels, including cooperative working groups, to include a range of stakeholders in the co-design of inclusive digital platforms, including students, instructors, administrators, and outside partners. Digital disparities can be closed through collaborations with NGOs and governmental organisations, especially for underserved and rural regions.
- iv. HEIs should create data-driven measures to monitor how DT affects institutional performance (like student retention), accessibility (like WCAG compliance), and sustainability (like carbon footprint reduction). To improve plans and guarantee ongoing alignment with institutional and global sustainability goals, conduct reviews every year with input from stakeholders.

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CONTINUOUS PROFESSIONAL DEVELOPMENT AND TEACHERS' JOB PERFORMANCE IN PUBLIC SECONDARY SCHOOLS IN LAGOS STATE, NIGERIA

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Abstract

The study examined the extent of Continuous Professional Development (CPD) programme implementation and its influence on teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State. The study adopted the descriptive survey research design. The population comprised 487 teachers across 11 public secondary schools in Ikorodu West Local Government, Lagos State. Using stratified sampling technique, a sample of 220 teachers was selected using teachers' gender, discipline and years of experience as strata, of which 210 valid responses were analysed. Data were collected using a researcher-designed instrument titled Continuous Professional Development and Teachers' Job Performance Questionnaire (CPDTJPDQ). The instrument's reliability was established using Cronbach's Alpha, yielding a coefficient of 0.78. Two research questions and one hypothesis guided the study. Descriptive statistics (percentage, mean and standard deviation) were used to answer the research questions, while Pearson Product-Moment Correlation was employed to test the hypothesis at the 0.05 level of significance. Findings revealed that CPD implementation was perceived as highly effective. Significant positive relationships were found between implementation of CPD ($r(208) = 0.376, p < 0.05$), and level of teachers' job performance. The study concluded that CPD significantly enhances teachers' job performance in public secondary schools in Lagos State.

Keywords: Continuous Professional Development, Teachers, Job Performance, and Secondary School

Introduction

Teachers are considered as the eventual, on-the-spot operatives of the policies in education of any nation, including Nigeria. Whatever happens to the operators may eventually be reflected in the quality produced by the system. The Federal Republic of Nigeria (2013) specifically stated that "no education can rise above the level of her teachers". This implies that teachers' job performance will have a significant influence on the students and society at large. Teachers are trained to deliver the content of the subject matter in their respective fields, set a high standard that will challenge the students, discipline the students, when necessary, overcome blind spots and evaluate the students' progress based on outlined goals and objectives in the school, among other things (Chamundeswari, 2013). Teachers are also involved in the training and moulding of the students, thereby making them useful to themselves and society (Usman, 2016). Hence, teachers' failure in the delivery of expected services to the scholars in the teaching-learning process might culminate in the breakdown of the educational system. The teaching profession requires the teacher's ability and commitment to perform assigned tasks effectively. Teachers are central to successful learning and development of education. For teachers to be effective, there is a need for their continuous professional development. Teachers need to continuously engage in learning throughout the entire span of their professional careers. Teachers' training is geared towards improving their

skills towards improved instructional delivery. These improved instructional deliveries will take their schools to its expected destination.

Teachers are the critical agents for producing institutional outcomes at a high level of quality. Hence, it behoves authorities in the educational sectors to include professional development programs for teachers to grow professionally and also enhance specific skills they need to do their job effectively and efficiently. Thus, the job performance of a teacher in the school system should not be hidden; rather it should be seen and measured as a factor that preserves the quality of the school. A teacher is considered successful in the teaching and learning process when such an individual knows thoroughly what is to be taught, and has the necessary ability needed to link the understanding of the subject matter and the students through appropriate communication skills (Kagoda, 2011). A teacher's job performance entails the achievement of educational goals through the process of teaching-learning. This is buttressed by the assertion made by Ige (2013), that teachers' job performance includes prompt attendance to lesson delivery and coverage of the syllabus among other issues. Teachers' job performance, therefore, refers to the ability of teachers to combine relevant inputs for the enhancement of teaching and learning processes, and the level of the teachers' participation in the day-to-day running of the school (Amos & Loko, 2015). Engaging teachers in Continuous professional development might bring about reduction of wastage; improvement of quality of work; increase in job performance; improved skills, knowledge and attitude of staff; enhancement of the implementation of new policies and regulations; and should enhance the growth of the organisation.

Teachers like any other professionals encounter enormous workplace challenges. The increasing technological innovations, higher education standards, students' diversity, and the growth of knowledge economies have all expanded the roles of teachers in today's public secondary school. As a result, it has become critical for teachers to engage in continuous learning activities in order to execute their duties effectively in modern day classroom or risk becoming obsolete in their professional practices (Okezie et al, 2018). From this position, the importance of providing continuous professional development for teachers has been widely recognised because pre-service training and education are insufficient to foster teacher's quality and teaching that meets the rapid changes in education. No amount of time spent in college or university will complete the preparation of the teachers for classroom tasks (Usman, 2016). Teachers like doctors and lawyers must continue with their education after graduation. constantly applying new techniques and materials make education in service necessary.

A variety of factors help with improved employee's job performance, of which continuous professional development plays a significant role (Owaka, 2014). Continuous professional development plays an indispensable role in getting employees in a better position to improve their job performance. Lu et al (2019) posited that effective Continuous Professional Development enhances employees' skills in order to perform their current jobs effectively as well as their attitude and knowledge to future job demands, thereby contributing to sustainable organizational performance. Also, Chikari et al (2015) examined lecturer's views towards continuous professional development and the relationship between continuous professional development and lecturer performance in Private Higher Education Institutions in Botswana with regards to variables such as gender, work experience, age and educational qualifications. The study found that lecturers viewed continuous professional development positively and regard it as a panacea for professional growth, efficiency and teaching effectiveness. They also perceived strategies for Continuous Professional Development implementation as satisfactory and that a lot more with regards to stakeholder involvement was required. The study further showed that biographic characteristics such as gender, experience and qualifications had a positive relationship on lecturer performance after continuous

professional development training while age did not have a positive influence on lecturer job performance after going through Continuous Professional Development.

Education has been the mechanism through which societies generate the knowledge and skills required for its survival and sustenance. Education also improves lives and leads to a broad social benefit to individuals and society. Little wonder nations have thrown their weight behind education which has been the pillar of success among economies of the world. Okezie et al (2018) posted that education all over the world is seen as the cornerstone of development and the major social services with the government of any nation, communities, parents and philanthropic organisations give to their children. The education system, particularly at the secondary school level, has faced numerous challenges, including inadequate teaching quality and low teacher morale. These issues contribute to poor educational outcomes and hinder the country's overall educational development. Recognising the critical role of teachers in shaping educational experiences and outcomes, Lagos state has implemented various professional development programs aimed at improving teacher competency and motivation.

Public secondary schools face significant challenges such as inadequate teaching quality and low teacher morale. These issues contribute to poor educational outcomes and hinder the state's overall educational development. According to Usman (2016), the quality of education in any nation cannot exceed the quality of its teachers. Recognising the critical role of teachers in shaping educational experiences, Lagos State has implemented various professional development programmes aimed at improving teacher competency and motivation. Effective training and professional development are crucial for maximising teachers' job performance. High-performing teachers lead to observable improvements in productivity, ease of adopting new technologies, and increased motivation among staff.

The effectiveness of the Continuous Professional Development programme, however, depends significantly on how it is perceived and utilised by the teachers. This study aims to evaluate the Continuous Professional Development programme from the perspective of secondary school teachers in Ikorodu West Local Government Area, focusing on their experiences and perceptions regarding its impact on their professional development and teaching practices. By understanding these perspectives, the study seeks to provide insights into the strengths and weaknesses of the continuous professional development programme and to identify ways to enhance its effectiveness for the betterment of teachers and students alike. While addressing the specific context of Lagos State secondary schools, this research aims to contribute to the broader discourse on teachers' professional development and job performance in Ikorodu West Local Government Area, offering evidence-based recommendations to improve Continuous Professional Development and ultimately enhance the quality of education in the region.

Research Objectives

The study sought to:

1. assess the level of teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State;
2. determine the extent of implementation of continuous professional development programs in public secondary schools in Ikorodu West Local Government Area, Lagos State; and
3. investigate the relationship between implementation of continuous professional development programs and level of teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Research Questions

The following research questions were answered in the course of the study.

1. What is the level of teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State?
2. What is the extent of implementation of continuous professional development programmes in public secondary schools in Lagos State?

Hypothesis

This hypothesis was formulated to guide the study:

1. There is no significant relationship between implementation of continuous professional development programmes and level of teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Methodology

The study adopted the descriptive survey research design, which enabled the collection of data from a representative sample of teachers to determine the extent of Continuous Professional Development (CPD) programme implementation and its relationship with teachers' job performance. The design was considered appropriate because it allows the researcher to obtain participants' opinions, describe existing conditions, and generalise findings from the sample to the wider population. The population of the study comprised all 487 teachers in the 11 Public Secondary Schools in Ikorodu West Local Government Area of Lagos State, as obtained from records of the Lagos state Ministry of Education. The population consisted of 211 male and 276 female teachers across different subject discipline and years of experience. A sample size of 220 teachers was selected for the study using proportionate stratified sampling technique using teachers' gender, discipline and years of experience as strata. Respondents were then selected proportionately from each stratum across the 11 schools. Out of the 220 questionnaires administered, 210 were properly completed and returned, representing the valid sample used for the study.

The research instrument used for collecting data was a researcher structured questionnaire titled Continuous Professional Development and Teachers Job Performance (CPDTJP). The questionnaire was divided into two sections A and B. Section A contained items on respondents' demographic characteristics (gender, discipline, and years of experience) while Section B comprised 16 items which measured the implementation of continuous professional development and teachers' job performance in public secondary schools. The respondents' format was Likert-type, with four responses mode of 'Strongly Agree', 'Agree', 'Disagree' and 'Strongly Disagree'. The item had a score of 1, 2, 3, 4, for Strongly Disagree, Disagree, Agree and Strongly Agree respectively. The instrument was subjected to internal consistency reliability, which yielded a Cronbach Alpha reliability of 0.78. The pilot sample consisted of teachers in United High School, Ikorodu. Lagos State., who were not part of the study.

Data was collected by administering the structured questionnaires personally to the public secondary school teachers with the help of the Heads of Departments in each institution who facilitated the completion and return of the questionnaires by the researcher. Descriptive statistics which involve the use of tables, simple percentages, mean, standard while the hypotheses were tested at 0.05 level of significance using Pearson Product-Moment Correlational Statistics.

Results

Research Question 1: What is the level of teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State?

To answer this question, the levels of teachers' job performance in public secondary schools were measured using a 4-point likert-scale. Teachers were requested to indicate their agreement or otherwise to the items on level of teachers' job performance. The frequency, percentage, means and standard deviations of their responses are presented in Table 1.

Table 1: Level of Teachers' Job Performance in Public Secondary Schools.

S/N	Item	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Std. Deviation
1	I use different method of teaching.	102(48.6%)	104(49.1%)	4(1.9%)	-	3.47	.537
2	I do not let co-curricular activities to affect my class teaching.	103(49.0%)	102(48.6%)	5(2.4%)	-	3.47	.547
3	I teach every student according to their abilities.	96(45.7%)	111(52.9%)	3(1.4%)	-	3.44	.526
4	If any student ask question I try to satisfy him/her at every level.	89(42.4%)	118(56.2%)	2(1.0%)	1(0.5%)	3.40	.538
5	I keep proper record of students' assessment.	87(41.4%)	113(53.8%)	10(4.8%)	-	3.37	.574
6	I maintain discipline in my class.	87(41.4%)	112(53.3%)	4(1.9%)	7(3.3%)	3.33	.679
7	I use digital tools to facilitate students' learning.	78(37.1%)	122(58.1%)	10(4.8%)	-	3.32	.562
8	I maintain good relationship with my colleagues.	78(37.1%)	121(57.6%)	10(4.8%)	1(0.5%)	3.31	.584
Grand Average Mean and Standard Deviation						3.39	.379

Table 1 shows the frequency, percentage, means and standard deviations of the items. It revealed that the means of the responses ranged from 3.31 to 3.47, while the standard deviation of teachers' responses ranged from .526 to .679. Using mean rating, teachers highly agreed that they use different method of teaching and they do not let co-curricular activities to affect their class teaching with mean (3.47) respectively, followed by I teach every student according to their abilities (3.44) and if any student asks question, I try to satisfy him/her at every level

(3.40). Also, teachers agreed that they keep proper record of students' assessment (3.37), followed by I maintain discipline in my class (3.33), to I use digital tools to facilitate students' learning (3.32) and I maintain good relationship with my colleagues (3.31) were rated least among items. In general, overall mean (3.39) of level of teachers' job performance in public secondary schools shows that teachers' level of job performance is high in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Research Question 2: What is the extent of implementation of continuous professional development programmes in public secondary schools in Ikorodu Local Government Area, in Lagos State?

To answer this question, the extent of implementation of continuous professional development programmes in public secondary schools was measured using a 4-point likert-scale. Teachers were requested to indicate their agreement or otherwise to the items on the extent of implementation of continuous professional development programmes in public secondary schools. The frequency, percentage, means and standard deviations of their responses are presented in Table 2.

Table 2: Extent of Implementation of Continuous Professional Development Programmes in Public Secondary Schools

S/N	Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Std. Deviation
1	I am more likely to implement innovative teaching strategies when I engage in seminar opportunities	112(53.3%)	91(43.3%)	6(2.9%)	1(0.5%)	3.50	.581
2	I believe that coaching and mentoring helps to develop a deeper understanding of subject matter and pedagogy	97(46.2%)	110(52.4%)	1(0.5%)	2(1.0%)	3.44	.561
3	I think that attending conferences helps me stay updated with the latest educational trends and practices	82(38.0%)	125(59.5%)	2(1.0%)	1(0.5%)	3.37	.531
4	I believe that participating in seminar organized for teachers help me updated with the latest teaching methodologies	88(41.9%)	110(52.4%)	10(4.8%)	2(1.0%)	3.35	.618

5	I believe that undertaking computer-based programs improves my teaching effectiveness	80(38.1%)	125(59.5%)	4(1.9%)	1(0.5%)	3.35	.544
6	I value the network opportunities that conferences provide	77(36.7%)	130(61.9%)	2(1.0%)	1(0.5%)	3.35	.525
7	I feel more motivated and confident in my role when I attend conferences	82(39.0%)	112(53.3%)	14(6.7%)	2(1.0%)	3.30	.636
8	I think that ongoing seminar at school better equips me to handle challenges in the classroom	80(38.1%)	125(59.5%)	4(1.9%)	1(0.5%)	3.28	.587
Grand Mean and Standard Deviation						3.37	.358

Source: Field Work

Table 2 shows the frequency, percentage, means and standard deviations of the items. It revealed that the means of the responses ranged from 3.38 to 3.50, while the standard deviation of teachers' responses ranged from .525 to .636. Using mean rating, teachers highly agreed that they are more likely to implement innovative teaching strategies when they engage in coaching and mentoring opportunities (3.50), followed by I believe that coaching/ mentoring helps to develop a deeper understanding of subject matter and pedagogy (3.44) and I think that attending coaching and mentoring programmes helps me stay updated with the latest educational trends and practices (3.37). Also, I believe that participating in coaching and mentoring organised for teachers help me updated with the latest teaching methodologies, followed by I believe that undertaking mentoring programmes improves my teaching effectiveness and I value the network opportunities that coaching and mentoring provide with mean (3.35) respectively, to I feel more motivated and confident in my role when I attend coaching (3.30) and I think that ongoing mentoring at school better equips me to handle challenges in the classroom (3.28) were rated least among items. In general, overall mean (3.37) of extent of implementation of continuous professional development programmes in public secondary schools shows that continuous professional development programmes are highly implemented in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Research Hypothesis

There is no significant relationship between the implementation of continuous professional development programmes and the level of teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Table 3: Result of Analysis on Relationship between Implementation of Continuous Professional Development Programmes and Level of Teachers' Job Performance

Variables	N	X	SD	DF	r	p-value	Remark
Implementation of CPD	210	26.55	2.656	208	.376	.000	S
Teachers' Job Performance	210	27.11	3.030				

Note: $P < 0.05$, Source: Field Work

Table 3 shows the relationship between implementation of CPD and teachers' job performance in public secondary schools in Ikorodu West Local Government Area. The result revealed that $r(208) = .376$, $p < 0.05$, indicating a strong positive relationship between the two variables. Since the p-value of 0.000 is less than 0.05 level of significance, the null hypothesis was rejected, it was concluded that there is a significant relationship between implementation of CPD and teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Discussion of Findings

The findings of this study revealed that teachers in public secondary schools in Ikorodu West Local Government Area, Lagos State, demonstrate a high level of job performance. This may be attributed to sustained engagement in professional development activities and collaborative practices within schools. The implication is that maintaining structured support systems, particularly through Continuous Professional Development (CPD) programs, mentoring, and technology training, could further consolidate and enhance teachers' effectiveness. This aligns with Abreh (2018) who reported that Continuous Professional Development opportunities offered to teachers gave them opportunities to hone down their teaching methodology and has also identified common mistakes students make in examinations and provide remedial actions needed to correct such mistakes.

It was revealed from the study that Continuous Professional Development Programmes in Public Secondary Schools in Ikorodu West Local Government Area, Lagos State is well implemented. The finding of the study is in consonance with Ajetunmobi and Oladejo (2020) who asserted that the implementation of continuous professional development programmes positively enhances teachers' job performance. The author also opined that a robust continuous professional development programs when implemented met the needs of teachers. Thus, teachers need to regularly engage in continuous professional development programmes for them to improve their knowledge of the subject they teach and other areas of their job.

Finally, the findings revealed a significant positive relationship between implementation of Continuous Professional Development Programmes and level of teachers' job performance in Public Secondary Schools in Ikorodu West Local Government Area, Lagos State. This finding of the study is in agreement with Amie-Ogan (2021) who founds a high and positive relationship between Continuous Professional Development Programmes and level of teachers' job performance in Public Secondary Schools. The findings therefore, underscore the importance of continuous investment in teacher capacity-building initiatives to sustain quality education delivery in public secondary schools.

Conclusion

The results of the study revealed that teachers demonstrated high level job performance. Also, it was revealed from the study that Continuous Professional Development Programs in Public Secondary Schools in Ikorodu West Local Government Area, Lagos State is well implemented.

Finally, it can be concluded from the study that continuous professional development had great influence on teachers' job performance in public secondary schools in Ikorodu West Local Government Area, Lagos State.

Recommendations

From the result of the study, it can therefore be recommended that:

- 1) Government should ensure that all teachers in public secondary schools have equal access to continuous professional development programs. Trainings should be scheduled at convenient times to accommodate teachers' work schedules and minimize disruptions to teaching activities.
- 2) Schools should encourage peer mentoring and collaborative learning among teachers. Experienced teachers can mentor the new ones, fostering a culture of continuous improvement and shared knowledge.

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ETHICAL MANAGEMENT OF EMERGING TECHNOLOGIES IN EDUCATIONAL ASSESSMENT: BALANCING INNOVATION WITH INTEGRITY

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Abstract

The integration of emerging technologies, such as artificial intelligence (AI), learning analytics, and biometric systems, has transformed educational assessment by offering unprecedented personalisation, efficiency, and scalability. However, this rapid adoption raises significant ethical concerns regarding consent, bias, privacy, and the validity of automated decision-making. This paper explored the imperative of ethically managing these innovations in educational assessment, focusing on balancing technological progress with academic integrity. The study investigated the Ethical Management of emerging technologies in educational assessment: Balancing innovation with integrity. Drawing on quantitative research involving 103 participants from diverse educational settings, Descriptive statistics, including means and standard deviations, were employed to analyze the collected data. Inferential statistical analyses, such as regression analysis, analysis of Variance (ANOVA), and correlation analysis, were used to test null hypotheses at a significance level of 0.05. The findings revealed that ethical considerations play a significant role in shaping trust in AI assessment tools among educators and students, and also revealed that institutional policies and governance models significantly affect the ethical use of AI in educational assessments. The paper recommended establishing ethics committees, conducting regular algorithmic audits, implementing robust data governance policies, integrating digital ethics training for educators, and fostering participatory design processes to ensure human-centered technology deployment.

Keywords: Algorithmic Bias, Artificial Intelligence (AI), Educational Assessment, Ethical Management, Institutional Policies

Introduction

The rapid evolution of the educational landscape has transformed traditional assessment methods through the integration of emerging technologies such as artificial intelligence (AI), biometric systems, and learning analytics. These tools offer unprecedented scalability, efficiency, and personalisation in evaluating student performance, promising deeper insights into learning processes (Rehan, 2023). However, their accelerated adoption raises critical ethical concerns regarding privacy, bias, consent, and the reliability of automated systems (Selwyn et al., 2024).

Global investment in educational technology is projected to surge from \$227 billion in 2020 to \$404 billion by 2025 with significant allocations toward AI-driven analytics and assessment tools (HolonIQ, 2023). This growth underscores the urgent need for robust ethical frameworks to guide their implementation as highlighted by the European Commission (2020) and the OECD Education 2030 program (OECD, 2022). Without clear ethical guidelines, technologies like real-time feedback systems, adaptive testing, and facial analysis for emotional detection risk exacerbating inequalities and eroding trust in assessment systems (Aly, 2024; Buolamwini & Gebu, 2020). Studies reveal algorithmic biases in AI grading systems with facial recognition technologies showing accuracy disparities of 98% for lighter-skinned individuals versus 65% for darker-skinned individuals, raising concerns about fairness and equity (Jamil & Belkacem, 2024).

By synthesizing case studies, policy analyses and recent research, it aims to illuminate strategies that align technological innovation with core educational values of equity and trust. The framework draws on principles such as transparency, human oversight and nondiscrimination from the European Commission's Ethics Guidelines for Trustworthy AI, while acknowledging the need for context-sensitive adaptations to account for regional and institutional variations (Darvishi & Lim, 2022; UNESCO, 2024).

The study provided answers to the following questions

- i. How do specific ethical concerns affect student and educator trust in AI-driven assessment tools?
- ii. What institutional policies and governance models best support ethical use of AI in educational assessments across diverse student populations?
- iii. How does algorithmic assessment impact learning outcomes and fairness for marginalized student groups?
- iv. What trade-offs exist between embedding ethical design principles and maintaining the efficiency of emerging assessment technologies?

Literature Review

Ethical Management

Ethical management in educational technology focuses on the responsible governance of digital systems to uphold accountability, privacy, fairness, and inclusion. Scholars such as Ossiannilsson (2025) and Williamson (2022) argue that as assessment systems become automated and data-driven, institutions must ensure that these technologies serve pedagogical purposes rather than purely commercial or administrative interests. Literature emphasizes that ethical oversight is no longer optional; it is foundational for maintaining trust and protecting student rights. Core principles identified in various studies include transparency, equity, and informed consent (Nguyen et al., 2023; Holmes, 2021; Chassignol, 2022). Transparency entails providing clear information about how AI-powered tools make decisions; equity requires proactive efforts to mitigate algorithmic bias; and informed consent necessitates explicit communication regarding data collection and usage. Global policy guidance, especially from UNESCO (2024), highlights the importance of establishing regulatory frameworks, ethical

review boards, and ongoing digital ethics training. Together, the literature stresses the need for adaptive governance structures that can respond to rapid technological changes while ensuring educational integrity.

Emerging Technologies

Emerging technologies, particularly artificial intelligence (AI), machine learning, and natural language processing, are transforming assessment through methods such as adaptive testing, automated essay scoring, predictive analytics, and real-time feedback (Luckin, 2023; Selwyn, 2022). These innovations promise greater personalisation, multilingual accessibility, and early identification of learning gaps (Feng, 2021). Additionally, blockchain technologies enhance credential security and transparency. However, scholars consistently highlight the ethical risks associated with these innovations. Virginia Eubanks (2020) draws on broader critiques of algorithmic governance to illustrate how predictive systems can perpetuate structural inequities. In educational contexts, issues such as biased datasets, opaque algorithms, and intrusive surveillance practices threaten fairness and student autonomy (Jafari & Zou, 2021; Mahamuni & Tonpe, 2024). A recurring concern is the limited involvement of educators and ethicists in the design of these systems, which often leads to tools prioritizing efficiency over equity. The literature calls for interdisciplinary collaboration and the integration of ethics-by-design approaches to align innovation with inclusivity and accountability.

Educational Assessment

Standardized testing, which frequently gauges memorization rather than creativity or critical thinking, has long been a part of traditional school evaluations (Mahamuni & Tonpe, 2024). This paradigm could be changed by emerging technologies, which enable more formative, real-time, and comprehensive evaluations. To avoid merely digitizing antiquated or biased models, such a change must be driven by ethical standards (Selwyn, 2022; Holmes, 2021; Luckin, 2023).

The impact of technology on trust is among its most important effects on assessment. Students' or teachers' trust in the validity and fairness of assessment outcomes may be damaged if they believe algorithms are punitive, prejudiced or opaque (Williamson, 2022; Tsai, 2023; Veletsianos, 2020). Furthermore, problems like unauthorized data use or data security breaches can compromise academic integrity. Transparent procedures, explainable AI and participatory design including all stakeholders are necessary for establishing trust (Mahamuni & Tonpe, 2024).

According to Vidhyapriya and Arun (2025), the ultimate goal of integrating developing technology into assessment should be to supplement human judgment and educational objectives rather than to replace them. Enhancing access and fairness without adding additional levels of discrimination is what is meant by equitable assessment (Floridi, 2020; Kwet & Prinsloo, 2021; Feng, 2021). Innovations protect student dignity and serve educational goals when they are managed ethically.

Ethics of Care Theory

The study is based on the Ethics of Care Theory developed by Carol Gilligan in 1982. Unlike justice-oriented ethical models that emphasise abstract principles, Gilligan's framework focuses on empathy, relational responsibility, and contextual moral reasoning. In the context of educational assessment, where power imbalances and student vulnerability are significant, this perspective highlights the need to pay attention to marginalized learners and the moral obligation to protect their well-being. The theory aligns with recent calls for human oversight, participatory governance, and ethical audits in AI-based assessment systems (Archambault et al., 2024). By prioritising relationships and responsiveness, it offers a normative foundation for

addressing algorithmic bias, ensuring privacy protections, and incorporating fairness into technological design. Although some critics argue that the Ethics of Care may lack universality or be perceived as gendered (Raghuram, 2021), its sensitivity to context makes it particularly well-suited for governing educational technology, where rigid rule-based ethics may fail to consider lived experiences.

The reviewed literature consistently emphasizes a key point: emerging technologies have the potential to transform educational assessment. However, without strict ethical management, these technologies could deepen existing inequalities and diminish trust. Ethical governance frameworks that focus on transparency, equity, and relational accountability, especially through the perspective of the Ethics of Care, offer a solid foundation for balancing innovation with integrity. By integrating ethical principles into the design, implementation, and oversight of these technologies, institutions can ensure that assessment methods remain centered on human needs, inclusive, and aligned with the core purposes of education

The following hypotheses guided the paper:

- H0₁:** There is no significant influence of specific ethical concerns on student and educator trust in AI-driven assessment tools.
- H0₂:** There is no significant influence of institutional policies and governance models on the ethical use of AI in educational assessments across diverse student populations.
- H0₃:** There is no significant influence of algorithmic assessment on learning outcomes and fairness for marginalised student groups.
- H0₄:** There is no significant influence of ethical design principles on maintaining the efficiency of emerging assessment technologies.

Methodology

This study employed the quantitative research design to explore the ethical management of emerging technologies in educational assessment, focusing on the relationship between algorithmic assessment systems, institutional policies, ethical considerations, and their impact on efficiency, fairness, and trust. A stratified sampling technique was used to select 103 participants from a total population of 380 stakeholders, which included teachers, students, and administrators from various educational institutions that implement AI-driven assessment tools. The stratification ensured proportional representation of each stakeholder group and enhanced the validity and generalizability of the findings, following the sampling guidelines set forth by Krejcie and Morgan (1970). Data was gathered through a structured questionnaire utilizing a 5-point Likert scale. Content validity was established by developing multiple items for each construct, while reliability was assessed using Cronbach's alpha, with a threshold of 0.70. Descriptive statistics, including means and standard deviations, were employed to analyze the collected data. Inferential statistical analyses, such as regression analysis, Analysis of Variance (ANOVA), and correlation analysis, were utilized to test the study's hypotheses. The results were provided in summary and coefficient tables, offering valuable insights into the ethical integration of artificial intelligence in educational assessment.

Table1:Reliability of Variable

	No of Items	No of Cases	CA (α)
1 Ethical Mgt and Design	5	103	0.946
2 Students Trust	5	103	0.947
3 Institutional Policies	5	103	0.947
4 Learning Outcome	5	103	0.947
5 Algorithmic Assessment	5	103	0.900
6 Efficiency	5	103	0.904

Univariate Analysis of Items on Questionnaire

Descriptive statistics like the mean and standard deviation were used to assess the questionnaire's items. According to the study, acceptance is indicated by a mean score of 3.0 or higher on the Likert 5-point scale. This implies that disqualification was automatic for any score below 3.0. This finding was based on the benchmark established in previous studies (Okpu, 2012). Furthermore, the representativeness of the mean was assessed using the standard deviation; a larger SD denoted a less accurate representation of respondents' thoughts. Frequency tables were used to explain and summarize the results.

Table 2: Descriptive Statistics for the Study Variable

	N	Minimum	Maximum	Mean	Std. Deviation
Ethical Mgt and Design	103	1.00	5.00	3.47	1.40
Students Trust	103	1.00	5.00	3.25	1.51
Institutional Policies	103	1.00	5.00	3.19	1.36
Learning Outcome	103	1.00	4.00	3.46	1.40
Algorithmic Assessment	103	1.00	5.00	3.43	1.48
Efficiency	103	1.00	5.00	3.21	1.40
Valid N (listwise)	103	1.00	5.00		

Source: SPSS Output

Test of Hypotheses

Hypothesis One

H01: There is no significant influence of specific ethical concerns on student and educator trust in AI-driven assessment tools.

Table 3: Model Summary for Ethical Design & Concern and Student's Trust

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.876 ^a	.767	.765	.73020

a. Predictors: (Constant), Ethical Design

The R Square value of 0.767 indicates that 76.7% of the variation in trust between students and educators can be attributed to ethical concerns related to ethical design. This signifies a significant proportion, highlighting that ethical considerations play a major role in determining trust. The adjusted R² value of 0.765 further confirms the robustness of the model, even after accounting for sample size and complexity. The small difference between R² and Adjusted R² suggests that the model is stable and reliable. Additionally, the relatively low standard error of estimate indicates that the model's predictions regarding trust are fairly accurate. Hence, the strong R value and high R² demonstrate a substantial influence of specific ethical concerns on the trust of students and educators in AI-driven assessment tools.

Table 4: ANOVA for Ethical Design & Concern and Student's Trust

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	177.584	1	177.584	333.058	.000 ^b
	Residual	53.853	101	.533		
	Total	231.437	102			

a. Dependent Variable: Students Trust

b. Predictors: (Constant), Ethical Design

F (333.058), P value = 0.000 which is < 0.05 hence shows a strong significant relationship.

Table 5: Coefficients for Ethical Design & Concern and Student's Trust

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	-.027	.194	-.142	.887
	Ethical Design	.944	.052	.876	.000

a. Dependent Variable: Student's Trust

Source: SPSS Output

The statistical analysis reveals a strong relationship between ethical design and trust in AI-powered educational assessment tools, as evidenced by the Model Summary Table 3, which reports an R value of 0.876 and an R² of 0.767, indicating that ethical design explains approximately 77% of the variance in educators' and students' trust. The ANOVA Table 4 shows a significant model fit with $F = 333.058$ and $p = 0.000$ ($p < 0.05$, tested at $\alpha = 0.05$), with a mean square of 177.584. The Coefficient Table 5 further supports this, displaying t-values of 0.142 and 18.250 with standard errors of 0.194 and 0.052, respectively, confirming the significance of ethical factors. These results lead to the rejection of the null hypothesis, affirming that ethical considerations significantly influence trust in AI assessment tools among educators and students.

Hypothesis Two

Ho2: There is no significant influence of institutional policies and governance models best support on ethical use of AI in educational assessments across diverse student populations.

Table 6: Model Summary for Institutional Policies and Ethical design

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.873 ^a	.763	.761	.68374

a. Predictors: (Constant), Institutional Policies

The correlation coefficient (R) of 0.873 indicates a strong positive relationship between institutional policies and governance models and the ethical use of AI in educational assessments. This suggests that well-structured institutional policies are closely associated with more ethical AI practices. The R-squared value of 0.763 means that 76.3% of the variation in ethical AI use can be explained by these policies and governance models. This substantial proportion highlights the critical role that institutional frameworks play in ensuring ethical implementation across diverse student populations. The adjusted R-squared of 0.761 shows minimal shrinkage from the R-squared value, indicating that the model is stable and not overly influenced by sample size or complexity. This finding enhances confidence in the predictive power of institutional policies. The standard error of 0.68374 reflects the average deviation of observed values from predicted values. Although this figure is slightly higher than in some other models, it remains within an acceptable range, suggesting reasonable prediction accuracy. Given the strong R value and high R-squared, indicated that institutional policies and governance models significantly influence the ethical use of AI in educational assessments

Table 7: ANOVA for Institutional Policies and Ethical design

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	151.982	1	151.982	325.094	.000 ^b
	Residual	47.218	101	.468		
	Total	199.199	102			

a. Dependent Variable: Ethical Design

b. Predictors: (Constant), Institutional Policies

F (325.094), P value = 0.000 which is < 0.05 hence shows a strong significant relationship.

Source: SPSS Output

Table 8: Coefficients for Institutional Policies and Ethical design

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.612	.172		3.550	.001
	Institutional Policies	.898	.050	.873	18.030	.000

a. Dependent Variable: Ethical Design

The statistical analysis demonstrates a significant relationship between institutional policies and the ethical use of AI in educational assessments, as shown in the Model Summary with an R value of 0.873 and an R^2 of 0.763, indicating that institutional policies account for approximately 76% of the variance in ethical AI application. The ANOVA Table 7 confirms the model's significance with $F = 325.094$, $p = 0.000$ ($p < 0.05$, tested at $\alpha = 0.05$), and a mean square of 151.982. The Coefficient Table 8 further supports this, reporting t-values of 3.550 and 18.030 with standard errors of 0.172 and 0.050, respectively, highlighting the predictive strength of institutional norms. These findings lead to the rejection of the null hypothesis, affirming that institutional policies and governance models significantly influence the ethical application of AI in educational assessments across diverse student demographics.

Hypothesis Three

H03: There is no significant influence of algorithmic assessment on learning outcomes and fairness for marginalized student groups.

Table 9: Model Summary for Algorithmic Assessment and Learning Outcome

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.931 ^a	.866	.865	.51428

a. Predictors: (Constant), Algorithmic Assessment

R square .866, which is approximated to $R^2 = 0.87$. This means the predictor has 87% variance with the dependent variable.

Table 10: ANOVA for Algorithmic Assessment and Learning Outcome

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	173.178	1	173.178	654.782	.000 ^b
	Residual	26.713	101	.264		
	Total	199.890	102			

a. Dependent Variable: Learning Outcome

b. Predictors: (Constant), Algorithmic Assessment

F (654.782), P value = 0.000 which is < 0.05 hence shows a strong significant relationship.

Source: SPSS Output

Table 11: Coefficients for Algorithmic Assessment and Learning Outcome

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.442	.128		3.443	.001
	Algorithmic Assessment	.880	.034	.931	25.589	.000

a. Dependent Variable: Learning Outcome

The statistical analysis reveals a strong relationship between algorithmic assessment and learning outcomes, with the Model Summary (Table 9) reporting an R value of 0.931 and an R^2 of 0.866, indicating that algorithmic assessment accounts for approximately 87% of the variance in learning outcomes. The ANOVA Table 10 confirms the model's significance with $F = 654.782$, $p = 0.000$ ($p < 0.05$, tested at $\alpha = 0.05$), and a mean square of 173.178. The Coefficient Table 11 further supports this, showing t-values of 3.443 and 25.589 with standard errors of 0.128 and 0.034, respectively, highlighting the predictive power of algorithmic evaluation. These results lead to the rejection of the null hypothesis, affirming that algorithmic assessment significantly impacts learning outcomes and equity for underrepresented student populations.

Hypothesis Four

Ho4: There is no significant influence of ethical design principles on maintaining the efficiency of emerging assessment technologies.

Table 12: Model Summary for Ethical Design and Efficiency for Assessment Technologies

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.859 ^a	.737	.735	.72363

a. Predictors: (Constant), Ethical Design

R square .737 which is approximated to $R^2 = 0.74$. This means the predictor has 74% variance with the dependent variable.

Table 13: ANOVA for Ethical Design and Efficiency for Assessment Technologies

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	148.452	1	148.452	283.497	.000 ^b
	Residual	52.888	101	.524		
	Total	201.341	102			

a. Dependent Variable: Efficiency

b. Predictors: (Constant), Ethical Design

F (283.497), P value = 0.000 which is < 0.05 hence shows a strong significant relationship.

Source: SPSS Output

Table 14: Coefficients for Ethical Design and Efficiency for Assessment Technologies

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.232	.192		1.210	.229
	Ethical Design	.863	.051	.859	16.837	.000

a. Dependent Variable: Efficiency

The statistical analysis indicates a significant relationship between ethical design principles and the efficiency of evaluation technology, as shown in the Model Summary (Table 12) with an R value of 0.859 and an R^2 of 0.737, suggesting that ethical design accounts for approximately 74% of the variance in evaluation technology efficiency. The ANOVA Table 13 confirms the model's significance with $F = 283.497$, $p = 0.000$ ($p < 0.05$, tested at $\alpha = 0.05$), and a mean square of 148.452. The Coefficient Table 14 further supports this, reporting t-values of 1.210 and 16.837 with standard errors of 0.192 and 0.051, respectively, underscoring the predictive strength of ethical design. These findings lead to the rejection of the null hypothesis, affirming that ethical design principles significantly enhance the effectiveness of emerging evaluation tools.

Discussion of Findings

The study investigated ethical management of emerging technologies in educational Assessment: balancing innovation with integrity

Ethical Considerations and Trust in AI Assessment Tools

The findings indicated that ethical considerations play a significant role in shaping trust in AI assessment tools among educators and students. This aligns with Alipasa (2026), who reported that perceptions of fairness, transparency, and human oversight influence stakeholders' confidence in AI-based assessments. Students expressed caution in trusting AI-generated scores when transparency and fairness were lacking, while faculty members exhibited higher trust when ethical safeguards were evident. The study revealed that institutional policies and governance models significantly affect the ethical use of AI in educational assessments. This conclusion is consistent with the work of Patel, Lim, and Clarke (2025), who emphasized that governance structures incorporating ethical oversight and transparent auditing enhance compliance and stakeholder trust in educational AI systems.

The finding also showed that governance models impact the ethical application of AI across diverse student populations supports the results of Patel et al. (2025). Their research indicates that governance frameworks focused on fairness and inclusivity can reduce ethical risks and promote equitable AI use. Case studies demonstrated measurable improvements in compliance and trust where responsible governance models were implemented.

The study further identified that algorithmic assessment significantly affects learning outcomes and equity for underrepresented populations. These findings align with those of Chávez Urbina et al. (2025), who highlighted algorithmic bias and fairness as critical ethical concerns in AI-based evaluation tools.

Finally, the findings showed that ethical design principles enhance the effectiveness of emerging evaluation tools. This is consistent with the findings of Chávez Urbina et al. (2025), who reported that incorporating transparency, fairness testing, and stakeholder consultation into AI assessment design improves accountability and reliability. However, building on prior research, such as Sain et al. (2024), Azer and Samir (2024), Agatha and Abdulmutallib (2025), which emphasized balancing AI's operational benefits with ethical responsibilities, this study provides robust empirical evidence through rigorous hypothesis testing, validating the strong predictive link between institutional ethical policies and tangible outcomes in educational technology use. By addressing the abstraction critiques of Azer and Samir (2024) and extending beyond the media literacy focus of Huda and Hashim (2022), this research offers a targeted, data-driven framework for ethical management, shifting from theoretical advocacy to practical, empirically supported strategies for institutions to implement, ensuring fairness, trust, and system effectiveness in AI-driven educational assessments.

Conclusion

The study on the ethical management of emerging technologies in educational assessment reveals that achieving a balance between innovation and integrity is crucial for fostering trust, justice, and equity in educational systems. It demonstrates that algorithmic assessments significantly enhance learning outcomes and fairness, particularly for marginalized groups, while institutional policies are vital for ensuring ethical AI application across diverse student populations. Ethical design principles strongly influence educator and student trust in AI-driven assessment tools, with their integration also improving technological efficiency, highlighting the intrinsic link between ethical oversight and technical progress. Grounded in the Ethics of Care Theory, the study emphasizes relational and context-sensitive approaches to safeguard learner well-being and uphold core educational values. By addressing ethical challenges such as bias, transparency, and data privacy through robust frameworks, the study shows how assessment technologies can foster inclusive and equitable learning environments, supported by strong statistical evidence linking ethical design to enhanced trust, justice, and efficiency.

Recommendations

The study recommended the following:

1. Establish dedicated ethics committees within educational institutions to oversee the selection, deployment, and ongoing evaluation of AI assessment technologies by ensuring alignment with principles of transparency, fairness, and inclusivity.
2. Integrate digital ethics training into professional development programs for educators to enhance their ability to critically engage with AI tools and advocate for ethical practices.
3. Foster international collaboration among stakeholders to develop adaptable ethical guidelines that respect local cultural and institutional contexts, addressing global disparities in technology adoption.
4. Engage students, educators, and ethicists in participatory design processes to ensure that assessment technologies are human-centered and aligned with the core educational values of equity and integrity.

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ETHICAL CONSIDERATIONS IN THE MANAGEMENT OF DIGITAL LITERACY FOR SUSTAINABLE NATIONAL DEVELOPMENT: A CASE STUDY OF TERTIARY INSTITUTIONS IN CROSS RIVER STATE

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Abstract

The pursuit of ethical consideration in management of digital literacy is vital to fostering individual growth, institutional and societal progress, and global development. This paper assessed the role of ethical consideration in management of digital literacy for sustainable development in tertiary institutions. This study was conducted in 3 selected tertiary institutions in Cross River State, Nigeria. A mixed research approach and a convergent parallel design were used. One hundred and ten (110) respondents comprising 10 departmental heads and 100 students were involved. Data were collected through structured questionnaires for students and semi-structured interviews for departmental heads. Quantitative data were analysed using descriptive statistics of means and standard deviation, frequencies and percentages while qualitative data were analysed thematically. The findings indicate that digital literacy improves economic preparedness and national digital transformation, which contributes to optimising national development. The study concluded that ethical consideration in management of digital literacy is paramount in integrating digital curricula and fostering civic engagement and environmental awareness. It was recommended among others that government should ensure that digital tools are provided for the utilization of both lecturers, administrators and students.

Keywords: Ethical considerations, Management, digital literacy, National Development

Introduction

Digital literacy in education refers to the ability to use technology such as computers, smart phones and the internet in a safe and smart way, to learn, create and share information. It includes technical skills, critical thinking and ethical considerations. Ethical considerations are guiding principles that help in the decision of what is right or wrong most especially when these actions affect others. In the context of ethical considerations in digital literacy or technology usage, issues such as plagiarism avoidance, honesty when sharing information, avoidance of cyber bullying or spreading false information, respecting people's privacy online, giving credit to sources of information and so on, should be considered and taught.

In today's digital age, the ethical management of digital literacy is increasingly vital for sustainable national development, particularly in tertiary education. Countries worldwide recognize that equipping students with digital skills is essential for fostering economic growth, social inclusion, and environmental sustainability. However, incorporating digital technologies into educational systems poses ethical challenges, such as data privacy, equitable access, and responsible usage (Mtawa, 2023). How schools manage these ethical issues, like ensuring data privacy, promoting fair technology access, and encouraging responsible usage, directly affects education's capacity to support broader developmental goals, such as creating a skilled workforce, informed citizens, and an inclusive digital economy. Neglecting ethical practices can inadvertently exacerbate inequalities, violate student rights, and undermine trust, ultimately impeding progress toward sustainable national development. Conversely, ethically managed digital literacy ensures that technology in education is used safely, fairly, and effectively, maximizing its developmental benefits.

In the United States, initiatives like Connected aim to improve internet connectivity and technology integration in public schools, fostering equitable access to digital resources. However, these initiatives also raise concerns regarding data Protection of personal data and the responsible, ethical deployment of technology within educational environments (U.S. Department of Education, 2014). Similarly, England has recognized the need to reform its secondary school curriculum to close gaps in digital literacy education. A review by Oxford, Cambridge, and RSA Examinations (OCR) highlighted the importance of reinstating digital literacy, ethical social media use, and artificial intelligence education to prepare students for the modern digital landscape (OCR, 2023).

In Asia, countries such as China have developed comprehensive strategies to bolster digital literacy among both teachers and students. The Chinese Ministry of Education's Teacher Digital Literacy Industry Standard establishes a framework for digital awareness, technology skills, and professional development, aiming for the ethical and effective use of digital tools in education (Ministry of Education of the People's Republic of China, 2022). In Southeast Asia, rapid digitalisation has posed challenges to existing educational practices. UNESCO reports stress the necessity for equitable access to technology, appropriate governance, and adequate teacher training to fully leverage the benefits of digital education while addressing ethical concerns like data privacy and online safety (UNESCO, 2023).

In South Africa, the integration of digital literacy into education faces obstacles related to infrastructure and teacher training. Addressing ethical considerations in digital education is crucial for promoting inclusive and sustainable development (Department of Basic Education, South Africa, 2021). In Tanzania, the incorporation of digital literacy in secondary education is still developing. Studies indicate a lack of classroom support for students' digital literacy skills, primarily due to teachers' unpreparedness and inadequate training. This gap highlights the importance of ethical management practices to ensure that digital literacy initiatives positively contribute to sustainable national development (Patrobas, Machumu, & Mtawa, 2023). In light of these global and local contexts, this study aims to investigate how ethical considerations in managing digital literacy in tertiary institutions in Cross River State influence sustainable national development. By examining best practices and challenges, the research seeks to provide insights that can inform policy and practice, ensuring that digital literacy acts as a catalyst for equitable and sustainable progress.

Statement of the Problem

To effectively support sustainable national development, the integration of digital literacy in tertiary institutions must be managed with ethical considerations. This ethical management is crucial for ensuring that students not only acquire digital skills but also embrace values such as responsible internet usage, data privacy, and equitable access to technology. Such an

approach would help cultivate a generation that is both digitally competent and ethically aware, able to stimulate innovation, enhance economic development, and advance social inclusion among students. However, the current landscape reveals significant shortcomings. Many institutions are confronted with challenges, including insufficient teacher training in digital ethics, disparities in access to ICT infrastructure, and a lack of clear guidelines for the safe and responsible use of digital tools. As a result, students may misuse digital platforms, encounter privacy risks, or fall behind due to unequal access to technology. These challenges risk exacerbating the digital divide and diminishing the potential of education to contribute to sustainable national development. There is an urgent need for our tertiary education system to establish and enforce ethical standards within digital literacy programmes. This includes providing training on digital ethics, ensuring equitable access to digital resources, and incorporating ethical considerations into the curriculum. By taking these steps, we can ensure that the digital transformation of education is both meaningful and responsible, effectively advancing national development objectives.

Objectives of the Study

- i. To assess the role of digital literacy integration and access on promoting national sustainable development in higher institutions.
- ii. To examine the influence of data privacy practises of digital literacy in promoting national sustainable development in higher institutions.

Research Questions

- i. How does digital integration and access influence national sustainable development in higher institution.
- ii. To what extent does data privacy practices influence national sustainable development in higher institution.

Literature Review

Digital Literacy Integration and Access on Sustainable National Sustainable Development in Higher Institutions

The integration of digital skills into tertiary education curricula by the National Universities Commission (NUC) has proven to be both relevant and impactful in shaping students' capacity for sustainable national development. The transformative role of digital literacy to the economy in a fast-evolving world cannot be overemphasised (Asaju and Ashepo, 2025). Biala, et., 2025). From transforming the operation of higher education institutions to advancing knowledge and information literacy (Odularu and Bokwe, 2025), digital literacy has become a crucial aspect of life and living (Moruf et al., 2025). Studies have been carried out on the significant role of digital literacy in the outcome of undergraduate performance Aremu and Udofia, 2025, and digital literacy integration in tertiary education (Ajibade and Aliyu, 2025). Ezeugwu, (2025) explored the impact of digital transformation on sustainable development in Nigerian higher education institutions (HEIs), with a focus on the moderating role of organisational culture. Findings showed that digital transformation works best when schools have a culture that is open to change, which helps make them more sustainable. In practice, this means schools should create policies that support a digital-friendly environment while also finding ways to overcome challenges in using technology.

Additionally, Onyem and Chukwu (2023) examined the impact of digital literacy on sustainable development in Nigeria. Their study revealed that inadequate infrastructure and funding hinder the effective implementation of digital literacy programmes, emphasising the need for government and private sector collaboration to address these challenges. In Nigeria, Obasi and Adieme (2023) explored the management of digitalization in secondary education

for sustainable development in Imo State. Their study found that effective management of digital learning facilities by school principals significantly influences the integration of technology into teaching and learning processes, which is crucial for achieving sustainable development goals.

In the United States, integrating digital literacy into education has been pivotal for sustainable development. Baek et al. (2023) developed an integrated curriculum combining environmental literacy, data literacy, and computer science to empower underrepresented students. Their pilot study demonstrated that students could effectively use technology to address real-world environmental issues, highlighting the importance of digital literacy in fostering civic engagement and sustainable development. The "Take a Giant Step" report by the Digital Age Teacher Preparation Council proposes a comprehensive strategy to integrate digital media in education, emphasizing the importance of skilled teachers in effectively utilising digital tools to foster learning among children. The report highlights the need for advancing technology infrastructure and modernizing professional learning for teachers and parents to ensure equitable access to 21st-century skills and technology, particularly for underserved students.

In the UK, the Oxford, Cambridge and RSA Examinations (OCR) review identified significant gaps in the secondary school curriculum, particularly concerning digital literacy and climate change education. The report recommends reinstating digital literacy, emphasising the need for education about the ethical use of social media and artificial intelligence. It also suggests the creation of an independent body to maintain a contemporary curriculum that reflects the diversity of modern Britain. Additionally, the UK government has implemented initiatives to enhance digital literacy among students. For example, the Department for Education has launched programs to integrate computing and digital skills into the national curriculum, aiming to equip students with the necessary competencies for the digital economy. In China, Yang et al. (2024) developed and validated a digital learning competence scale for secondary vocational school students. Their study emphasizes the importance of digital competencies in enhancing students' learning experiences and preparing them for the digital economy, thereby contributing to sustainable national development.

Furthermore, Zheng (2023) explored the digital literacy of Chinese secondary school teachers in the era of artificial intelligence. The study highlights the need for teacher training programs to enhance digital competencies, ensuring that educators can effectively integrate technology into their teaching practices. In Kenya, a study by Chourio-Acevedo et al. (2025) highlighted the challenges and opportunities in integrating digital literacy into education. The research emphasized the role of libraries and community centers in providing digital literacy programs, which have been instrumental in empowering rural populations, particularly women, thereby contributing to sustainable development.

Kerkhoff and Makubuya (2022) conducted a case study on professional development programs aimed at enhancing digital literacy among educators in rural Kenya. Their findings underscore the importance of culturally relevant training programs that incorporate local values and learning styles to effectively integrate ICT into the curriculum. In Tanzania, Mandari and Mwemezi (2025) investigated the digital literacy skills of public sector employees and their impact on achieving a sustainable digital economy. The study revealed that employees with tertiary education and regular internet access demonstrated significantly higher proficiency in advanced digital skills, underscoring the importance of digital literacy in national development. Additionally, Mfaume and Bilinga (2024) explored the promotion of cyber ethics compliance among teachers in Tanzania. Their study emphasises the need for training on the pedagogical uses of technology and the development of policies for responsible technology use in schools, highlighting the ethical considerations in digital literacy management.

Data Privacy Practices and Management on National Sustainable Development in Higher Institution

The United States showed a rapid shift to online learning during the COVID-19 pandemic which exposed significant gaps in data privacy practices within secondary schools. Utter et al. (2021) surveyed parents and found that while 80.7% of children used school-issued devices, only 55.7% of parents strongly agreed that schools protected student digital privacy. Notably, 35.4% of parents were uncertain about their school's digital policies, underscoring a lack of transparency and communication. Furthermore, the use of student-monitoring software like GoGuardian and Gaggle has raised concerns about over-surveillance and potential misuse of student data. These tools, initially implemented to ensure student safety, have been criticized for disproportionately affecting low-income students and potentially infringing on students' rights to privacy and freedom of expression.

A study by Defend Digital Me (2020) in the United Kingdom revealed that over 65% of schools did not inform students or parents about personal data shared with third parties when using educational apps. Additionally, only 17% of schools conducted regular data audits, indicating a lack of oversight in data management practices. The report emphasized the need for improved competence and capacity across the education sector to ensure staff understand the digital environment, data management, and children's rights. In China, the integration of artificial intelligence in education has raised ethical concerns regarding data privacy. Squirrel AI, an innovative education company, uses AI to provide personalized tutoring by collecting extensive data on student performance. While this approach aims to enhance learning outcomes, it also poses risks related to surveillance and the potential misuse of student data.

In Kenya, the Communications Authority published the 2022 Industry Guidelines for Child Online Protection and Safety, mandating schools to adhere to data protection measures, including safeguarding against cyberbullying and ensuring the ethical use of student data. Furthermore, the Kenya ICT Action Network (KICTANet) highlighted challenges faced by youth regarding data privacy, such as lack of awareness about privacy settings and the implications of sharing personal information online. The organization emphasizes the need for capacity building to empower youth in understanding and exercising their data protection rights. While specific studies on data privacy practices in secondary schools are limited in Tanzania, the increasing integration of digital tools in education necessitates attention to data protection. Mfaume and Bilinga (2024) emphasized the importance of promoting cyber ethics among teachers, advocating for training on responsible technology use and the development of policies to ensure ethical digital practices in schools.

In Nigeria, the Data Knowledge Information Privacy Protection Initiative (DKIPPI) has been proactive in educating secondary students on data protection. Through competitions and workshops, students are sensitized to handle personal data responsibly, emphasizing the importance of data privacy in the digital age. Akinloye (2023) posits that protection of data in Nigeria has been a significant area of concern and case studies of data protection violations have revealed an overall trend of violation of regulations that govern privacy and protection of data in private schools. Additionally, the National Information Technology Development Agency (NITDA) launched the Digital States Initiative to train youths in digital literacy and skills, aiming to enhance the nation's digital economy and promote data protection awareness.

Methodology

The study adopted the mixed methods research design combining both quantitative and qualitative approaches. A convergent parallel design was adopted for the study. The study targeted total population of one hundred and ten (110) respondents comprising 10 departmental heads who were selected purposively and 100 students selected using stratified random sampling. Data collection was conducted through questionnaires administered to students and

interview guides with departmental heads. Quantitative data from questionnaires were analysed using descriptive statistics (means, frequencies, percentages) and Qualitative data from interviews was transcribed and subjected to thematic analysis to identify key themes and patterns. The ethical guidelines were followed with the informed consent, confidentiality and voluntary participation was maintained.

Results

- i. **Research question 1:** To what extent does digital literacy integration access on national sustainable development in higher institution.
- iii. Table 1 shows to what extent does not influence national sustainable development in higher institution.

S/N	Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	S.D	Decision
1	I use digital tools provided in school for personal study	0(0%)	20(20%)	70(70%)	10(10%)	2.10	.541	Disagree
2	Digital skill programs in school prepares me to contribute to national development	20(20%)	75(75%)	5(5%)	0(0%)	3.20	.402	Strongly Agree
3	Lecturers have access to digital tools for teaching	18(18%)	52(52%)	16(16.0%)	14(14%)	2.70	.461	Agree
4	Digital infrastructure (internet, computers) is available in my school	10(10%)	30(30%)	46(46%)	14(14%)	2.40	.492	Agree
5	My curriculum links digital skills with sustainable development goals	22(22%)	38(38%)	34(34%)	6(6%)	2.60	.492	Agree
6	I am confident using digital tools	16(16%)	34(34%)	45(45.%)	5(5%)	2.50	.503	Agree
7	Digital literacy increases my future career success	80(80%)	20(20%)	0(0%)	0(0%)	3.80	.402	Strongly Agree
8	The digital skills taught are relevant to current job market demands	11(0%)	49(49%)	35(35%)	5(5%)	2.60	.492	Agree
9	There's fair access to digital resources (internet,	0(0%)	5(5%)	53(53%)	42(42%)	1.50	.503	Strongly Disagree

	computers) and opportunities in school							
10	Digital learning overcomes limitations and disabilities	20(20%)	50(50%)	26(26%)	4(4%)	2.90	.704	Agree

Integration of Digital Skills and Access in the Management of National Sustainable Development in Higher Institution.

Findings in Table 1: shows that respondents strongly agreed to items 2 and 7, and they agreed to items 3, 4, 5, 6, 8 and 10 as showing students' equitable access to digital tools and its influence on national sustainable development in higher institutions as their mean scores were above 2.50 which is the criterion mean. However, students disagreed with items 1 and 9 detailing that access to digital tools is somewhat limited. Students feel that infrastructure challenges still hinder full participation in digital learning.

The curriculum links digital skills with sustainable development goals item scored a mean of 2.60, showing a strong perception that the curriculum is aligned with sustainable development goals and encourages awareness of global issues. Items such as: I am confident using digital tools, with a mean score of 2.50 suggests that students are fairly confident in using digital technologies, though some may still require support to enhance their digital competence. However, many students agree that digital learning contributes to national development and overcomes limitations and disabilities.

Research Question 2: How does data privacy practices influence management of national sustainable development in higher institutions?

Table 2 shows how data privacy and practices influence management of national sustainable development in higher institutions?

S/N	Items	Strongly Agree	Agree	Dis agree	Strongly Disagree	Mean	SD	Decision
1	ICT programme explains its policies on student's data usage clearly	4(4%)	26(26%)	50(50%)	20(20%)	2.10	.704	Disagree
2	I have received enough training on protecting my personal data online at school	3(3%)	7(7%)	50(50%)	40(40%)	1.60	.492	Strongly disagree
3	I am confident in using privacy settings on school-related platform	0(0%)	50(50%)	48(48%)	2(2%)	2.50	.503	Agree

4	My school communicates well about digital privacy and protection practices	(2%)	48(48%)	45(45%)	5(5%)	2.50	.503	Agree
5	My lecturers are well-trained in protecting students' data	10(10%)	60(60%)	25(25%)	5(5%)	2.70	.461	Agree
6	I am aware of who has access to my online learning data	5(5%)	55(55%)	40(10%)	(0%)	2.60	.492	Agree
7	My right to digital privacy is respected at school	22(22.0%)	58(58%)	23(23%)	7(7%)	2.70	.461	Agree
8	I trust that my personal information is handled responsibly on the school's digital platforms.	30(30%)	50(50.0%)	19(19.0%)	1(1%)	3.10	.704	Strongly Agree
9	My school offers programs or events that teach online safety and data ethics	3(3%)	17(17%)	50(50%)	30(30%)	1.90	.704	Disagree
10	Data protection is important in my digital literacy education	30(30.0%)	60(60%)	10(10%)	0(0%)	3.20	.603	Strongly Agree

Findings in Table 2: show that respondents strongly agree to items 8 and 10, and they agree to items 3, 4, 5, 6, and 7 as showing awareness on digital privacy and data protection as their mean scores were equal to or above 2.50 which is the criterion mean. However, students disagreed with items 1, 2 and 9 indicating that tertiary institutions might not be comprehensive or consistent in covering such topics; policies on student's data usage may not be communicated clearly and there is still a noticeable gap in structured instruction on digital data protection.

Qualitative Analysis

Integration of Digital Skills and Access on Management of National Sustainable Development in Higher Institutions

Students clearly understand that digital skills are important for their administrative effectiveness. They believe that learning digital literacy gives them the tools they need for career growth and to engage with global issues. School administrators might see this as a good starting point to make the curriculum more practical by focusing on real-life problem-solving, sustainability, and digital innovation. They may also want to highlight how digital learning connects to new job opportunities, so that students find it more useful and motivating.

Many students, however, mentioned that they face difficulties in getting access to digital tools and resources, which makes it hard to fully benefit from digital learning. Although they are eager to learn, problems like not having enough computers, poor internet, or outdated software limit their participation. This shows administrators the importance of investing more in ICT facilities. Suggested solutions include supplying more digital devices, improving internet access, and allowing students to use digital tools even outside classroom hours. These steps would help give every student equal opportunity, no matter their background.

Another common point from the students' and administrators feedback was the helpful role of instructors in building digital literacy. Most students felt supported and guided by their teachers when using digital tools, even though some were not fully confident in their own skills. Administrators might address this by offering ongoing training for teachers on digital teaching methods and technology use in the classroom. By supporting instructors, schools can strengthen students' confidence and improve the quality and consistency of digital learning across different subjects and institutions.

Awareness on Digital Privacy practices

Students demonstrated moderate awareness of digital privacy and data protection, reflecting schools' efforts to address these issues, though depth of understanding remains limited. While learners acknowledge the importance of safeguarding personal information, the guidance provided is often perceived as inconsistent. Administrators may therefore consider embedding structured and practical privacy education within ICT or life skills curricula, emphasizing account security, responsible data sharing, and online safety.

Overall, students expressed trust in their schools' handling of digital safety and privacy, noting the existence of relevant policies. However, clearer communication and stronger enforcement are needed. Strengthening policy frameworks, enhancing system security, and fostering open dialogue with students and parents could improve institutional approaches to digital rights and responsibilities. Lastly, students demonstrated a strong personal interest in maintaining digital safety and expressed confidence in managing their privacy settings and protecting their information online. This suggests that students are ready to take ownership of their digital behavior. Administrators could build on this readiness by encouraging peer-led digital safety initiatives, such as awareness campaigns or student ambassador programs. Such initiatives would not only enhance the learning environment but also promote a school culture where digital responsibility and privacy are upheld by both students and educators.

Discussion of Findings

The integration of digital skills into tertiary education curricula by the National Universities Commission (NUC) has proven to be both relevant and impactful in shaping students' capacity for sustainable national development. Findings from the questionnaire indicated that students strongly agree that digital literacy enhances future career success and prepared them to participate in society. These local results mirror findings from Baek et al. (2023), who observed that U.S. students in interdisciplinary programs linking digital tools with environmental topics showed increased civic awareness and technological fluency. The high agreement in the current study supports the claim that effective digital literacy can transcend classroom learning and contribute meaningfully to sustainable development goals.

Equitable access to digital resources is central to successful implementation. However, in this study, students reported low access to digital infrastructure, reflecting ongoing limitations. Despite this, instructors were perceived as generally prepared to integrate technology, a sign of positive teacher involvement. These findings support the “Take a Giant Step” report, which stresses that infrastructure and teacher training must go hand-in-hand to ensure inclusive and equitable digital literacy development. Investment in teacher professional development and infrastructural capacity is therefore a foundational step toward achieving national development targets.

Further, the curriculum’s integration with sustainable development issues received strong approval, indicating that students are being taught digital content in connection with broader societal goals. This aligns with Kerkhoff and Makubuya (2022), who found that contextualized teacher training enhances ICT integration, especially in rural and diverse settings. The current findings reinforce the idea that culturally relevant pedagogy plays a key role in improving digital skills delivery and sustainability education.

Data privacy emerged as a key area of concern and opportunity in digital literacy development. Results show that students value data protection as an essential part of their education, and are not very aware of digital policies. However, there remains a need for more structured and consistent training, however, students agree to being confident in using privacy settings. These findings are consistent with Utter et al. (2021), who reported a gap in communication between schools and stakeholders regarding data usage policies, leading to low trust and awareness.

Conclusion

The findings of this study clearly demonstrated that effective digital literacy management in tertiary institutions plays a pivotal role in fostering sustainable national development. Students acknowledged the importance of digital skills in enhancing career readiness, civic participation, and environmental responsibility. These outcomes, supported by both local data and global literature, show that when digital literacy is well-integrated into curricula and supported by trained educators and adequate infrastructure, it equips learners with competencies necessary for the 21st-century workforce and national transformation.

However, the study also revealed that while awareness of digital privacy and data protection is growing, there are still gaps in training, system transparency, and ethical data use. Without clear privacy policies, consistent teacher training, and community-based awareness programs, students remain vulnerable to misuse of their digital data. Addressing these gaps is critical to ensuring that digital literacy is not only about technical skills but also about responsible and ethical digital citizenship.

Fully leverage digital literacy for national development, educational stakeholders must prioritize curriculum reform, contextual teacher development, infrastructure investment, and robust data protection strategies. A balanced approach that integrates both technical and ethical dimensions of digital education will empower the next generation to thrive in a digital and sustainable future.

Recommendations

The study recommended that:

1. Government should ensure that digital tools are provided for effective utilisation by both students and school administrators.
2. Digital tools should be accessible for students’ usages and maintenance culture should be highly encouraged for the protection and sustainability of the tools.

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HARNESSING DIGITAL EDUCATION FOR TRANSFORMATION TOWARDS SUSTAINABLE DEVELOPMENT

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Abstract

Digital education has emerged as a powerful catalyst for transformation and a critical driver of sustainable development. It offers innovative approaches to enhance learning experiences, expand access, and promote lifelong learning across diverse populations. By integrating technology into teaching and learning, digital education can bridge geographical barriers, reduce costs, and foster inclusivity for marginalized groups. It also supports environmental sustainability by reducing reliance on physical resources and lowering the carbon footprint associated with traditional education. Moreover, it equips learners with critical 21st-century skills—such as creativity, adaptability, and problem-solving—that are vital for addressing complex global challenges. However, realizing its full potential requires addressing persistent issues including the digital divide, infrastructural deficits, data privacy concerns, and inadequate teacher preparedness. This paper examines the transformative potential of digital education, explores its role in advancing sustainable development, and presents strategies for policymakers, educators, and technology stakeholders to leverage it effectively for equitable, resilient, and future-ready education systems.

Keywords: *Digital Education, Sustainable Development, Educational Equity, Technology-Enhanced Learning, Transformation*

Introduction

Education is universally recognised as a cornerstone for societal transformation, economic growth, and human development (UNESCO, 2020). In the 21st century, advances in information and communication technologies (ICTs) have redefined how knowledge is created, accessed, and shared (Bates, 2019). Digital education - encompassing online platforms, mobile applications, virtual classrooms, and emerging technologies such as artificial intelligence (AI) and virtual reality (VR) has become integral to the evolution of educational systems. Unlike traditional models limited by physical infrastructure and fixed schedules, digital education offers flexibility, scalability, and inclusivity, enabling learning to occur anytime and anywhere (Anderson & Rivera, 2021).

The relevance of digital education is particularly pronounced in the context of sustainable development. The United Nations' Sustainable Development Goals (SDGs) identify education as central to achieving economic inclusion, environmental protection, and social equity (UNESCO, 2020). Digital platforms extend educational opportunities to marginalized populations, reduce inequalities, and support lifelong learning (Al-Hunaiyyan, Al-Sharhan, & Alhajri, 2018). By reducing the need for printed materials, minimising commuting, and optimizing resource use, digital education also contributes to environmental sustainability (Selwyn, 2020; Govindarajan & Srivastava, 2022).

Furthermore, digital education nurtures skills essential for the modern workforce, including critical thinking, creativity, problem-solving, and digital literacy (Voogt & Roblin, 2012). These competencies enable individuals to address global challenges and adapt to evolving socio-economic conditions. Nevertheless, digital education's potential is hindered by persistent barriers such as limited infrastructure, affordability issues, data security concerns, and inadequate pedagogical readiness (Van Dijk, 2020; Akinyemi & Ofem, 2021). This paper discusses how digital education can be harnessed for transformation toward sustainable development by examining its benefits, challenges, and the strategic measures necessary for its effective implementation.

Concept Of Digitalisation

Digitalization has been defined in various ways by different scholars. Ogunode and Ndayebom (2023) describe *digitisation* as the use of electronic platforms to convert teaching and learning into digital forms such as online courses, assessments, and web-based seminars or workshops. Digitalisation, therefore, refers to the process of transforming physical educational resources into digital formats that can be stored, manipulated, and deployed through computer systems for implementing teaching and learning programs in schools. According to Bejinaru (2019), digitalisation involves converting various forms of content-text, audio, images, and video-into digital formats using technologies such as laptops, the internet, mobile devices, scanners, digital cameras, projectors, and printers. These digital formats can then be processed and accessed via computers.

Machekhina (2017), Ding (2020), and Key (2020) expand this view by including digital platforms such as Zoom, WhatsApp, Google Meet, Skype, Microsoft Teams, and FaceTime, which support synchronous and asynchronous learning. In the educational context, digitalization represents a shift from traditional, physical modes of instruction to virtual and technology-mediated formats. Adegboyega, Asemota, and Edinoh (2025) differentiate *digitization* as the conversion of analog or physical materials into electronic forms, excluding content that was digitally created from inception. They further emphasize that digitalisation in education entails a wide range of approaches to transition from conventional pedagogical methods to virtual platforms. Ding (2000) highlights several advantages of digitisation: reduced need for physical infrastructure, improved information sharing, reduced redundancy,

and cost-effectiveness. Digital resources can be transmitted, retrieved, and stored with ease, enhancing institutional efficiency and learner access.

Digitisation is the process of converting the content of physical media (e.g., periodical articles, books, manuscripts, cards, photographs, vinyl disks, among others) to digital formats (Ananolous). Digitisation refers to the process of translating a piece of information such as a book, journal articles, sound recordings, pictures, audio tapes or videos recordings. into bits. Bits are the fundamental units of information in a computer system. Converting information into these binary digits is called digitisation, which can be achieved through a variety of existing technologies. A digital image, in turn, is composed of a set of pixels (picture elements), arranged according to a pre-defined ratio of columns and rows. An image file can be managed as a regular computer file and can be retrieved, printed and modified using appropriate software. Further, textual images can be OCRed so as to make its contents searchable.

Digital education plays a pivotal role in advancing transformation and sustainable development, offering a range of benefits that extend beyond access to knowledge. When effectively implemented, it enhances inclusivity, improves pedagogy, reduces environmental burdens, and builds competencies required for future workforces. These benefits are outlined below.

Benefits Of Digital Education

(i) Digital Education and Access to Learning

One of the most significant benefits of digital education is its ability to expand access to quality learning opportunities. Anderson and Rivera (2021) argue that digital platforms effectively break down geographical barriers, allowing learners from rural, remote, and underserved regions to access educational content without the need to relocate to urban centers. This inclusivity is crucial in contexts where higher education institutions and skilled instructors are unevenly distributed. Furthermore, digital education offers flexibility that accommodates learners with diverse life responsibilities. Al-Hunaiyyan et al. (2018) note that online and blended systems enable working professionals, women with caregiving duties, and individuals with disabilities to pursue learning at their own pace and schedule. By reducing structural barriers and democratising access, digital education serves as a powerful tool for equity and inclusion in the pursuit of sustainable educational development.

(ii) Pedagogical Innovation and Engagement

Digital technologies provide avenues for pedagogical innovation, enabling teaching and learning strategies that enhance student engagement and improve learning outcomes. Bates (2019) explains that the use of multimedia resources, interactive simulations, and adaptive learning platforms facilitates deeper cognitive processing, thereby improving knowledge retention. The flexibility of digital tools also supports constructivist pedagogies, where learners actively build knowledge through problem-solving and inquiry-based activities. Siemens (2014) highlights that digital education allows for personalized learning pathways, whereby learners progress based on mastery of content rather than seat time. Such personalisation fosters learner autonomy, motivation, and differentiated instruction, which are essential for cultivating higher-order thinking skills. The integration of digital platforms also enables immediate feedback and data-driven assessment, ensuring that educators can continuously refine teaching practices to meet the diverse needs of learners.

(iii) Environmental Sustainability Benefits

Digital education contributes directly to environmental sustainability, aligning with global goals for responsible consumption and production. Selwyn (2020) emphasizes that transitioning to online delivery reduces reliance on printed learning materials,

thereby minimizing paper waste and deforestation pressures. Furthermore, digital education reduces the need for daily commuting, resulting in significant reductions in carbon emissions associated with transportation. Institutions adopting digital platforms can also minimize investments in large-scale physical infrastructure, further lowering their ecological footprint. Govindarajan and Srivastava (2022) demonstrate that resource-efficient digital delivery models not only conserve energy but also align with higher education institutions' commitments to sustainability. By embedding environmental benefits into learning systems, digital education advances the agenda of sustainable development while promoting awareness of eco-friendly practices among learners.

(iv) Digital Competencies and Workforce Preparedness

Another major benefit of digital education is the cultivation of digital literacy and key competencies necessary for thriving in the 21st-century workforce. Voogt and Roblin (2012) underscore that digital education equips learners with essential skills such as collaboration, creativity, adaptability, and critical thinking, all of which are vital for addressing complex societal and economic challenges. Beyond technical know-how, digital education fosters "learning-to-learn" capacities that enable individuals to continuously upskill in rapidly changing labor markets. This aligns closely with the United Nations' Sustainable Development Goal (SDG) 4, which advocates for quality education and lifelong learning opportunities for all (UNESCO, 2020). By embedding digital competencies into education systems, learners are better prepared to participate meaningfully in knowledge economies, contribute to innovation, and support sustainable societal development.

Challenges Of Digital Education for Sustainable Development

i. Digital Divide

One of the most persistent challenges to digital education is the digital divide, which reflects the unequal distribution of access to internet connectivity, digital devices, and the skills required to utilize them effectively. While urban areas often benefit from relatively advanced infrastructure, many rural and marginalized communities remain excluded from online learning opportunities (Van Dijk, 2020). This gap exacerbates existing socio-economic inequalities and undermines the inclusivity goals central to sustainable development. Without deliberate interventions, digital education risks reinforcing educational inequities rather than reducing them.

ii. Affordability and Infrastructure Gaps

Affordability remains a critical barrier, particularly in developing countries where the costs of devices, data, and broadband services are prohibitively high. In addition, infrastructure deficits such as erratic power supply, limited broadband penetration, and poor maintenance of ICT facilities restrict the effective implementation of digital learning initiatives (Akinyemi & Ofem, 2021). These barriers not only hinder accessibility but also disrupt continuity of learning, making it difficult for learners and educators to fully embrace technology-enabled education.

iii. Pedagogical Preparedness

The successful integration of technology into education is not simply a matter of providing devices and internet access; it also requires educators who are pedagogically prepared to design, deliver, and evaluate technology-enhanced learning. Bates (2019) argues that effective digital teaching demands specialized skills in online pedagogy, instructional design, and digital assessment strategies. However, many teachers have limited exposure to such training, leading to ineffective utilization of digital platforms

and a reliance on traditional teaching methods that diminish the potential of digital education.

iv. **Data Privacy and Cybersecurity**

As educational institutions increasingly rely on digital platforms, the collection and storage of learner data have raised significant privacy and security concerns. Sensitive information, including academic records and personal details, is vulnerable to breaches, unauthorised use, and cyber-attacks (Selwyn, 2020). The lack of clear policies and robust cybersecurity measures in many contexts poses risks not only to learners but also to institutional credibility. Addressing this challenge requires both technological safeguards and ethical frameworks that prioritise the rights and safety of learners.

v. **Cultural and Contextual Relevance**

The effectiveness of digital education is closely tied to how well it aligns with learners' cultural, linguistic, and socio-economic realities. Mitra and Dangwal (2010) emphasize that technology-driven education cannot adopt a one-size-fits-all model, as content developed in one context may fail to resonate in another. For instance, using foreign curricula or languages without adaptation can alienate learners and reduce engagement. Ensuring cultural and contextual relevance is therefore critical to achieving meaningful and sustainable educational outcomes.

Models And Approaches for Educating Teachers in Digital Pedagogy

The successful integration of digital education for sustainable development depends largely on teachers' ability to effectively use digital tools in teaching and learning because many sustainability challenges in digital education stem from teachers' digital literacy gaps. In many developing contexts, including Nigeria, teachers often lack the necessary digital literacy, creating a critical need for structured professional development (Tondeur et al., 2019). Several models and approaches have been proposed to address this gap.

Technological Pedagogical Content Knowledge (TPACK) Model

The TPACK framework emphasizes that teachers must develop knowledge that integrates technology, pedagogy, and subject content (Mishra & Koehler, 2006). Training based on this model helps teachers not only acquire technical skills but also learn how to embed them meaningfully in lesson delivery.

SAMR Model (Substitution, Augmentation, Modification, Redefinition)

This model provides a developmental pathway for teachers to integrate technology at increasing levels of sophistication (Puentedura, 2014). It begins with simple substitution (e.g., replacing a chalkboard with PowerPoint) and advances towards redefinition, where new, technology-enabled learning experiences are created (e.g., collaborative global projects).

Continuous Professional Development (CPD) through Communities of Practice

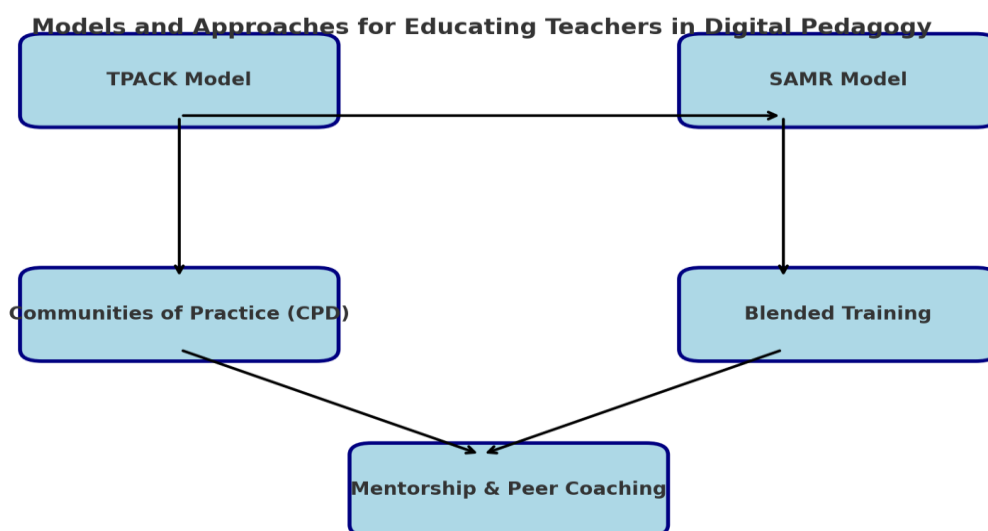
Teachers benefit from ongoing peer-supported training rather than one-off workshops. Communities of practice (CoPs), facilitated online or within institutions, allow teachers to share strategies, solve digital challenges, and co-create teaching resources (Lave & Wenger, 1991; Trust, Krutka, & Carpenter, 2016).

Blended Training Approaches

Blended learning—combining face-to-face workshops with online modules—has proven effective in building teachers' digital competencies. It allows flexibility while providing practical demonstrations of digital pedagogy (Laurillard, 2012).

Mentorship and Peer Coaching

Experienced digitally skilled teachers can serve as mentors to colleagues, providing hands-on support in lesson planning, tool adoption, and classroom management. This peer-coaching approach is cost-effective and sustainable (Darling-Hammond et al., 2017).



Together, these models ensure that teacher education in digital pedagogy moves beyond tool acquisition to deeper pedagogical transformation, a critical condition for leveraging digital education towards sustainable development goals.

Conclusion and Suggestions

This paper has explored the substantial benefits of digital education as a transformative force with the potential to advance sustainable development by highlighting that digitalization enhances expanded access, fostering inclusivity, building workforce competencies, and supporting environmental sustainability. However, these benefits can only be fully realized through deliberate efforts to bridge the digital divide, invest in infrastructure, enhance teacher capacity, ensure cultural relevance, and protect learner data.

In light of these benefits, the following suggestions are made:

- i. **Expand Digital Infrastructure** – Governments and private sectors should invest in reliable broadband, affordable devices, and sustainable power solutions.
- ii. **Enhance Teacher Capacity** – Implement professional development programs in digital pedagogy and inclusive teaching strategies.
- iii. **Adopt Equity-Centered Policies** – Prioritize marginalized communities in digital learning initiatives and track inclusion metrics.
- iv. **Strengthen Data Privacy Measures** – Establish and enforce strict cybersecurity and data protection frameworks.
- v. **Ensure Cultural Relevance** – Localize content to reflect learners' cultural and socio-economic contexts.

By aligning policy, practice, and technology, stakeholders can harness digital education to create more equitable, resilient, and sustainable education systems for the future.

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SOCIAL INTERACTION PATTERNS AND EARLY LEARNERS' LITERACY SKILLS ACQUISITION IN CALABAR MUNICIPAL COUNCIL OF CROSS RIVER STATE, NIGERIA

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Abstract

The research work is to investigate the relationship between social interaction patterns and early learners' literacy skills acquisition in Calabar Municipal Council of Cross River State, Nigeria. Caregiver-learner, learner-learner and parent-learners interaction patterns were the variables considered in the study. To guide the study, three hypotheses were formulated from the research objectives. The study adopted a survey design. The population of the study is 920 learners from the 24 public pre-schools in Calabar Municipal Council, out of the population, 181 learners were randomly selected to make up the sample. A 15-item researcher made questionnaire titled Social Interaction Patterns and Literacy Skills Acquisition (SIPLSA) and a 15-item literacy skills achievement test were the instruments used for data collection. Pearson Product Moment Correlation Coefficient (PPMC) was used for data analysis. The result reveals that the three social interaction patterns significantly relate with learners' literacy skills acquisitions. Based on the findings it was recommended among others that learners' peer interaction, parent and caregivers' interaction should be encouraged in pre-schools.

Keywords: social interaction patterns, literacy skills, learners-learners interaction, caregiver-learner interaction and parent-learner interaction.

Introduction

Social interaction is a dynamic relationship that brings people to people, groups to groups and people to groups. Social interaction pattern is not only cooperative, but can also take the form of competition and dissension. Social interaction is the key to all life, so without social interaction, there would not be a life together. Social interaction is intended as a reciprocal influence between individuals with groups in their efforts to solve the problems expected and, in their efforts, to achieve their goals (Olasehinde & Olatoye, 2024). The ability to interact socially assist learners in obtaining learning outcomes, where weak social conditions affect learning achievement, it can be concluded that the success of a learners to establish social interaction and create a social condition in his group is one of the determinants of learning. The ability of social interaction is a supporting factor that determines the comfort and success of students in learning (Cabo & Satyanarayana, 2021).

Social interaction between teachers, parents and learners enhances understanding of lessons better and also contribute in the teaching and learning process. Modern teaching strategies are becoming increasingly oriented on learners. Learners' interaction with the

teachers contributes to the effectiveness of learning process and is positively correlated with higher academic achievement (Buhari, Ahmad & Ashara, 2024). Social interaction is a reciprocal relationship among human being that influences each other in the society. The interaction and relationship between individuals and groups together form a diverse community. Such a social interaction, in other words, occurs continuously, changes and creates social groups based on their social contacts (Chen, Bao & Gao, 2021). In this increasingly open world, associations among individuals are also easier and more open. This fact leads to the awareness of similarities and differences in various aspects of life in where differences that are not well managed can cause conflicts. The similarities and differences of individuals related to cultural values, languages, religions, social status, economy, desires, and goals lead to an interaction that has potentials to develop on-the-move and dynamically changing group (Ismail & Mahmood, 2021).

These values play a role in controlling the lives of certain groups giving characteristics to culture. Humans as individuals can make contact without touching it but as sensory beings can do it by communicating. In a small community, where life and life goals are similar, like schools, groups are also created that always move dynamically as in line with their needs. Based on these dynamic movements, patterns of interaction that move, change and may also survive are formed. The patterns of interaction change according to life needs, which are relatively different or even similar. They are also established based on the applicable rules obeyed by the parties involved (Andres & Perez, 2022).

Learner's interaction system is a tool or platform that is designed to facilitate communication and interaction between them and teachers or between learners and the educational institution. It can be used for a variety of purposes, such as providing information about classes and assignments, facilitating discussions and collaboration and enabling learners to submit assignments and receive feedback (Cabo & Satyanarayana, 2021). Some learner's interaction systems are designed to be used as standalone platforms, while others may be integrated with other educational tools and resources, such as learning management systems or virtual learning environments. Some common features of learner's interaction systems include the ability to view and update personal information and contact details, view class schedules, assignments and grades, take part in conversations with your peers and professors, submit assignments and receive feedback, access course materials and resources, view announcements and updates from the educational institution (Deshmukh, Mane & Retawade, 2019).

Social interaction plays an important role in learning while performing academic tasks. Social interactions with people can be effective in guiding the students to maintain their thoughts, provide a reflection on their understanding and find gaps in their studies Rehman et al. (2021). According to Alshutwi et al. (2020), most of the factors known that can affect the academic achievement of students such as online lectures have low social interaction skills students. Social interaction has a positive impact on student academic achievement. The relationship that arises from process of social interaction produces two patterns, associative and dissociative.

Social interactions patterns differ in social environments, in Early Childhood Education (ECE), social interactions are commonly observed among teachers or caregivers and learners, learners and learners, and parents and learners. Cognitive enhancement of early learners depends on social interactions between learners, caregivers and parents. These interactions affect their literacy skills development which are the bedrocks in cognitive development. Literacy simply refers to the ability to read, write, comprehend and communicate in any given language. Literacy skills are fundamental skills that enables individual to access information and continue learning throughout life. According to Ndifon (2023), literacy is more than just reading and writing, it includes a wide range of communication skills. Being literate in the modern world, means being able to effectively understand and engage with both written and

spoken language in print and digital medium. The core skills of literacy are reading, writing, listening, speaking, critical thinking and interpretation and digital literacy.

To facilitate good and motivating interaction patterns that can enhance literacy skills acquisition in early learners' classroom, teachers or caregivers has to create an enabling environment to stimulate the learning of the basic concepts in the course content. Teacher-students' interaction is seen as the sum total of all the teachings-learning activities taking place in or outside the classroom between the teacher, the learners and the learning materials during the teaching-learning processes (Okafor, 2020).

Sher (2019) observed the contribution of the teacher-learner interaction to effective learning and academic success, the author found that learner have differing perceptions of the importance of online interactions and of the types of interactions required. Early learners are children that would metamorphose to youths that are termed leaders of tomorrow; to enhance sustainable national development, the early learner must be developed holistically through education (Ndifon, Bassey and Ewa 2022)

Kang (2023) explained that different perceptions may be related to differences in teacher- learners' interaction and learning styles. Hagenauer and Volet (2024) defined two main dimensions of the teacher- learners interaction. One is the affective dimension, which describes the bond built between learners and teachers, forming the basis for secure, effective, positive experienced interactions. The second is the support dimension, which describes the support that must be provided to facilitate learners' success.

The most powerful weapon caregivers have, when trying to foster a favorable learning climate, is a positive interaction with their learners (Varga, 2022). Early learners are children who attends early childhood care education (Edwin & Ndifon 2021). Interactions are needed between learner and teacher in an effective classroom. Skinner and Green (2020) stated that learner's academic achievement in literacy skills is optimized when the social context fulfills learner's basic psychological needs. When learner s feels a sense of control and security in the classroom, they are more engaged because they approach learning with enthusiasm and vigor and learners become active participants in their own education (Maulana, Opdenakker, Stroet & Bosker, 2023). Teachers who maintain positive interaction with their learners create classroom environments more helpful to learning and meet learners' developmental, emotional and academic needs. Positive teacher-learner interaction features a very crucial role for effective teaching and learning. Positive teacher-learner interaction is often defined by shared acceptance, understanding, affection, intimacy, trust, respect, care and cooperation (Sen, 2021). The caregiver or teacher-learner interaction depends on very large extent upon effort from both parties although the teacher plays a key role and actually, his/her responsibility, to initiate positive interaction.

Ayuwanti, Marsigit and Siswoyo (2021) aimed to reveal caregiver- learner interaction in literacy skill among early learners. The study used a qualitative method with a phenomenological approach. The research subjects were early learners in urban ECCE centres. Research data were obtained through observation, interviews and documentation. Observations were conducted and interviews were conducted with six learners from the class. The learners were interviewed to express their opinions concerning learning process interactions. The results of the study showed that caregiver- learner interaction has affected learners' literacy skills acquisition.

Sher (2019) and Su, Bonk, Magjuka et.al. (2018) observed that in addition to the learner-tutor interactions, student-student interactions are notable contributors of learning and achievement. The learner-learner interaction is an interaction between a learner with another learner, individually or in a group, with or without an instructor. Usually, learner-learner interaction is found in a group discussion. Learner-learner interaction can be done through emails or chatting features provided by communication platforms or face to face in a traditional

classroom setting (Dharmadjaja & Tiatri, 2021). Pupils learn not only from their instructors; they also learn from their course-fellows and the course materials.

Hollenbeck, Mason, and Song (2021) agreed that Pupils mostly rely upon peer interaction because it minimizes the threat of poor achievement. If a learners have no interaction with other fellows, he/she may feel dissatisfied especially in the online learning environment. Students may interact with each other in order to discuss about their studies, course assignments and projects etc. (Grandzol & Grandzol, 2020). According to Gunawardena (2020) observed that student-student interaction was negatively correlated with their achievement. Non-achievement with student-student interaction on course discussion boards might be due to limited guidance on how to interact with other learners in this context.

Moreover, Hrastinski (2020) opined that achievement with inter-student interaction in a course differs according to the level and type of learner. It is a significant feature of providing flexible environment of learning to learners. Bolliger and Wasilik (2019) indicated that learners benefit from learner-learner interaction by knowing and comparing their understanding of a specific subject matter with others. Learners accept criticism on their work as an element of their learning process. Interaction of the learner-learner depends upon the format and content of the information or task presented to the learners.

Grandzol and Grandzol (2020) found a significant, negative relationship between learner-learner interaction and course completion rates in six mid-Western community school. Contrary to Grandzol and Grandzol (2020) findings, Kuo, Walker, Belland and Schroder (2023) found that student-student interaction and student-teacher interaction were good predictors of student achievement in the traditional and online courses. However, Arbaugh and Rau (2021) found that student-student interaction was negatively correlated with course achievement among students.

As for the peer interaction, Nandi, Hamilton and Harland (2021) observed that all small groups/pairs behave in the same way or that nature of pair relation affect learning outcomes. However, Liaw and Huang (2023) found that learners who interacted in a cooperative manner were more likely to use peer suggestions to revise their writing than those who interacted in a defensive manner. Assigning students to work in groups or pairs enhance student-student interaction and create conditions conducive to learning, as students work collaboratively when assigned tasks in pairs. According to Storch (2022) there are four patterns of peer (learner-learner) interaction between interlocutors in term of equality and mutuality: collaborative, dominant/dominant, dominant/passive and expert/novice. Storch further stated that among the four patterns, collaborative and expert/novice patterns were more likely to produce the scaffolding between participants.

Another basic social interaction aspect that affects learners positively and negatively is the parent-learner interaction, this is one of the most fundamental. Parent-learner interactions are multidimensional and the relationship between parental interaction and learner achievement varies (Harris & Goodall, 2021). Much of this variation depends upon individual characteristics and the context in which individuals interact. A parent-learner interaction is informed by personal attitudes and beliefs, educational experiences and interactions with the school community (Fantuzzo, McWayne, Perry & Childs, 2014). Moreover, Bronfenbrenner and Morris (2021) indicated that parent-learner interaction is a significant positive predictor of learner academic aspirations and achievement. Parent-learner social interaction involves parental communication and transmission of academic aspirations and value of education to their children (Hill & Tyson, 2019). It increases the exposure of learners to parental values that learners may internalize, which can act to direct and guide their academic goals and pursuits and build their social capital and academic achievement (Mello, 2019).

Indeed, parental expectations, interaction with schoolwork and support of learner's autonomy positively influence high school completion and are an imperative component of the

development of learner's academic achievement and aspirations to attend higher school (McCarron & Inkelas, 2021). However, contrary to the assertion above, Low (2020) observed that parents-learner interaction/communication of high expectations to go onto higher school does not always support student aspirations to go to university. According to Jeynes (2021) studies have shown to date that the two constructs (parental interaction and academic achievement) seem to be positively related. According to Martinez (2020), parent-learner interaction has many positive effects on learners other than academics, including increased motivation, self-esteem and self-reliance, which may lead to academic success regardless of economic background. Conversely, Barnard (2014) affirmed that inadequate or no parental interaction contributes to low learner achievement and engagement. Children are the future of any nation, hence the need to nurture and assist them to develop into responsible and productive adults, Ndifon & Bassey (2018). In essence, parents, siblings and other significant relatives can create rich learning environments to enhance children's academic development. According to Martinez (2020), parental interaction through activities such as providing nurturing care to their children, instilling cultural values and talking with their children, does not align with traditional forms of parental interaction as defined by school. Parents are the first teachers of their children, in the light of this, parent-learner interaction influences learner's academic achievement.

Statemen of Problem

Many young learners in Nigeria continue to face challenges in acquiring foundational literacy skills in spite of the growing recognition of the importance of early childhood education. Research suggests that social interaction plays a critical role in language development and literacy skills acquisition during the early years. However, in many educational settings, especially in under-resourced or overly structured environments, opportunities for meaningful peer and adult-child interactions are limited. This gap raises concerns about whether the lack of social engagement is hindering children's ability to develop essential literacy skills such as reading, writing, listening, speaking critical thinking and interpretation and digital comprehension. Therefore, it is imperative to investigate the extent to which social interaction patterns influence early learners' literacy development and to identify effective strategies that promote both social and academic growth in early learning contexts.

Purpose of Study

The aim of this study is to investigate the relationship between social interaction patterns and early learners' literacy skills acquisition in Calabar municipal council area of Cross River State, Nigeria. Specifically, the study seeks to find out:

1. The relationship between caregiver-learners' interaction and learners literacy skills acquisition.
2. The relationship between learner-learners interaction and learners literacy skills acquisition.
3. How parent-learners interaction relate with learners' literacy skills acquisition.

Statement of hypotheses

The following hypotheses were formulated to guide the study.

1. There is no significant relationship between caregiver-learners' interaction and learners' literacy skills acquisition.
2. There is no significant relationship between learner-learners interaction and learners' literacy skills acquisition.
3. Parent-learners interaction does not significantly relate with learners' literacy skills acquisition.

Methodology

This study investigated the relationship between social interaction patterns among early learners and their literacy skills acquisition in Calabar Municipal council of Cross River State, Nigeria. A survey design was adopted for the study. According to Ndiyo (2005), survey research design involves the collection of data to accurately and objectively describe existing phenomena. This was seen as appropriate because the variable of social interaction patterns already existed. The population of the study were the 920 learners from the 24 public pre-primary/primary schools in Calabar Municipal Council. A simple random sampling technique was used to select 181 learners as the sample. A 15-item researcher made structured questionnaire titled Social Interaction Patterns and Literary Skills Acquisition (SIPLSA) questionnaire and 15-item achievement test in literacy skills were used for data collection. Pearson Product Moment Correlation Coefficient (PPMC) was used for reliability and data analysis.

Results

Hypothesis One

There is no significant relationship between caregiver-learners' interaction and learners' literacy skills acquisition in Calabar Municipality Local Government Area of Cross River State. Pearson product moment correlation coefficient analysis was employed to test data collected in respect to this hypothesis. This is because both the independent and dependent variables that form this hypothesis were measured continuously. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in table 1.

Table 1: Pearson product moment correlation coefficient analysis of the relationship between caregiver-learners' interaction and learners' literacy skills acquisition.

N= 181

Variable				$\sum X$ $\sum Y$	$\sum x^2$ $\sum Y^2$	$\sum xy$	r-cal.
caregiver-learners' interaction				2625	6362	7535	0.73
learners'	literacy	skills	acquisition.	1425	6735		

$\alpha = 0.05$, critical $r = 0.198$, $df = 179$.

The summary of results presented in Table 1 shows that the calculated r-value of 0.73 is greater than the tabulated r-value of 0.198 at 0.05 level of significance with 179 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, there is a significant relationship between caregiver-learners' interaction and

learners' literacy skills acquisition in Calabar Municipality Local Government Area of Cross River State.

Hypothesis Two

There is no significant relationship between learner-learners interaction and learners' literacy skills acquisition in Calabar Municipality Local Government Area of Cross River State. Pearson product moment correlation coefficient analysis was employed to test data collected in respect to this hypothesis. This is because both the independent and dependent variables that form this hypothesis were measured continuously. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in table 2.

Table 2: Pearson product moment correlation coefficient analysis of the relationship between learner-learners interaction and learners' literacy skills acquisition

N= 181

Variable	$\sum X$ $\sum Y$	$\sum x^2$ $\sum Y^2$	$\sum xy$	r-cal.
learner-learners interaction	2301	5631	8636	0.51
learners' literacy skills acquisition	1425	6735		

X = 0.05, critical r = 0.198, df = 179.

The summary of results presented in Table 2 shows that the calculated r-value of 0.51 is greater than the tabulated r-value of 0.198 at 0.05 level of significance with 179 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, there is a significant relationship between learner-learners interaction and learners' literacy skills acquisition in Calabar Municipal Local Government Area of Cross River State.

Hypothesis Three

Parent-learners interaction does not significantly relate with learners' literacy skills acquisition in Calabar Municipality Local Government Area of Cross River State. Pearson product moment correlation coefficient analysis was employed to test data collected in respect to this hypothesis. This is because both the independent and dependent variables that form this hypothesis were measured continuously. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in table 3.

Table 3: Pearson product moment correlation coefficient analysis of the relationship between Parent-learners interaction and learners' literacy skills acquisition.

N= 181

Variable	$\sum X$ $\sum Y$	$\sum x^2$ $\sum Y^2$	$\sum xy$	r-cal.
Parent-learners interaction	2541	4631	7530	0.60
learners' literacy skills acquisition.	1425	6735		

X = 0.05, critical r = 0.198, df = 179.

The summary of results presented in Table 3 shows that the calculated r-value of 0.60 is greater than the tabulated r-value of 0.198 at 0.05 level of significance with 179 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This

means that, Parent-learners interaction significantly relates with learners' literacy skills acquisition in Calabar Municipality Local Government Area of Cross River State.

Discussion of Findings

The result of hypothesis one reveals that the calculated r value of 0.73 is greater than the tabulated r -value of 0.198 at 0.05 level of significance with 179 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. The result implies that, there is a significant relationship between caregiver-learners' interaction and learners' literacy skills acquisition. This result is in agreement with Kang (2023), who assert that learner's cognitive development largely depends on the efficiency of their interaction with the caregivers. Kang, in his research on the influence of caregivers on learners' cognitive development reveals that the caregiver determines the learner's literacy skills acquisition level. In the same vein, Volet (2024) assert that a bond exists between learners and teachers that form the basis for effective experience in teaching learning process. Similarly, Varga (2022) in her research finding on social interactions, reveals that interactions are needed between caregivers and learners in an effective classroom to promote cognitive development. Ayuwanti, Marsigit and Siswovo (2021) who seeks to investigate the influence of caregiver-learner interaction on literacy skills among early learners, found out that effective caregiver interaction with learners do significant influence their literacy skills acquisitions.

The result of hypothesis two reveals that, the calculated r -value of 0.51 is greater than the tabulated r -value of 0.198 at 0.05 level of significance with 179 degrees of freedom. This implies that the null hypothesis was rejected while the alternate hypothesis was upheld meaning that there exists a significant relationship between learners-learners interaction and their literacy skills acquisition. This result is in agreement with Sher (2019) who found out that language development is more effective when children interact among themselves. According to Hollenbeck, Moson and Song (2021), pupils mostly rely upon peer thereby interacting freely with trust that help to build high cognition. The result is also in agreement with Bolliger and Wasilik (2019) who assert that learners benefit from learner-learner interaction.

The result of hypothesis three revealed that the calculated r -value of 0.60 is greater than the tabulated value of 0.198 at 0.05 level of significance with 179 degrees of freedom. This result implies that parent-learners interaction significantly relates with learners' literacy skills acquisition. This result is in line with Harri and Goodall (2021) who assert that parent-learners interaction is one of the most fundamental factors that influences children literacy acquisition. To them, the parents are the first language teachers and influencers of the child. Moreso, Hill and Tyson (2019) also assert that parents are the first language teachers of their children. That their effective interaction with their children in their mother tongue enhances children mastery of speaking, listening and even writing skills among children. Mello (2019) also assert that parental interaction with early learners positively influence their literacy skills acquisition in pre-schools.

Conclusion

Based on the findings it is concluded that there exists a significant relationship between social interaction patterns and literacy acquisition skills among learners. The interaction between caregiver-learners, learners-learners and parent-learners are very necessary for literacy skills development in early learners.

Recommendations

On the basis of findings of this study, the following recommendations are made:

- a) Caregivers are encouraged to interact with learners freely
- b) Learners should always be encouraged to interact among themselves and collaborate in learning activities.
- c) Parents should associate with kids by creating a friendly bond to enhance free interaction as this would enhance openness, free mindedness in the family.

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THE ROLE OF COUNSELLING IN OPEN AND FLEXIBLE EDUCATION FOR TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

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Abstract

Open and Distance Learning (ODL) is a popular model enabling qualitative and equitable higher education, especially in the vast majority of Third World countries. Unfortunately, however, learners participating in the online substance confined classrooms encounter a few educational, psychological as well as technological challenges which they have to surmount and which even in the face of the challenges some learners either choose to quit or drop-out. This paper focused on the research that is provided in guidance and counselling for learners enrolled in the open and distance learning programs. Its objective is to determine how much different counselling interventions can advance learner's good relation, reduce stress in academic and affect in less attrition or dropout. This is primarily built on how participants' interactions in the learning process are conducted. Rooted in the fundamentals of counselling and theories, the study contemplates counselling as a form of provided service that endeavor to serve the students of remote situated learning institutions. The investigative measures include significant counselling strategies such as academic counsellor, psychological counsellor, educational and vocational counsellor up to internet teaching support. In addition, the examination also illustrates that counselling services make it possible for the learners to cope with academic pressure, accomplishes effective study maturation and orientation to the technologically oriented education. Besides this, the support of counseling definitely boosts up the satisfaction rates among the learners as well as improves retention and academic results in the demographic of ODL students. In addition, there is a need to consider the integration of formal counselling services in all educational programs especially the ODL ones and other distance learning modes. The paper concludes that counselling services play a crucial role in enhancing learner success and promoting inclusive and sustainable educational development in open and distance learning systems.

Keywords: Counselling Services, Learner Support, Open and Distance Learning, Student Retention, Academic Success, Sustainable Education.

Introduction

The tremendous force of an educated person, a transformed society, and a developed world is a fact that is accepted all over the world. In recent years, worldwide (education) reform debates have become more preoccupied with inclusive, equitable systems that can adapt to the needs of a dynamically changing world, including technological and economic shifts (UNESCO 2015). In this situation, openness and flexibility in education have become critical discourse to re-imagine learning environments responsive to current incidents and conditions and address future scenarios and requirements. Openness in education Advocated and enabled practices that promote access to educational products, resources, and opportunities

and provide complete transparency of and free education practices, which can include open educational resources, open source software, and cloud computing (Blessinger & Bliss, 2016). Flexibility, however, refers to the flexible nature of educational delivery (i.e., modalities, schedules, content, assessment), which offers greater potential to serve better the differing needs of learners and their lifelong learning journeys (Bates, 2015). Combined, these paradigms perhaps can dismantle the exclusivist and inflexible spirit of education systems, especially so in so-called developing parts of the world such as Nigeria, where penetration of quality education is still uneven and hindered by infrastructural, economic, and pedagogic imperfections (UNICEF, 2022).

Nigeria, a country with a large population, youthful demography, and wide regional dichotomy, is confronted with many educational problems. These factors include underfunding, insufficient infrastructure and materials, teacher shortages, and restricted access to high-quality learning materials, which have been amplified by the COVID-19 pandemic, highlighting the fragility of the traditional education systems (World Bank, 2021). As the country moves towards fulfilling its Sustainable Development Goals (SDGs) and, in particular, SDG 4, inclusive and equitable quality education, there is an urgent need to reconceptualise education delivery and policy so that they are resilient and future-facing.

This paper contends that being open and flexible is not just a pedagogical value-add but a strategic necessity for Nigeria. The country has an opportunity to create a more inclusive and cutting-edge education system that reaches learners with quality learning experiences along the entire education pipeline, reducing structural inequities, better-preparing learners for work and life, and better enabling communities to contribute purposefully to sustainable development, through the use of digital technology, open learning platforms, and learner-centered teaching/learning approaches. This paper addresses these themes through a conceptual approach informed by contemporary policy frameworks, international best practices, and emerging research.

Literature Review

Openness and flexibility in education for transformation and sustainable Development

Education for All has been at the core of the international development agenda since 1990, firstly through the Millennium Development Goals and more recently, the Sustainable Development Goals (SDGs), and in particular SDG 4, 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (Uvalić-Trumbić & Daniel, 2016). There is broad consensus on the part of the development community that, across all countries, not just the most egregiously labelled so-called developing countries, education is instrumental to the achievement of sustainable development, with the Organisation for Economic Cooperation and Development's (OECD) report of 2013 unambiguous about the assumed positive effects of more and better-quality education: Educational attainment is often used as a measure of human capital and the level of an individual's skills, i.e., a measure of the skills available in the population and labour force.

The educational attainment for this group is the proportion of the population that reports they have completed a particular level of education. More education is strongly correlated with higher labor force participation and is seen as a means for accessing better job opportunities and higher returns to skills. People have a powerful motivation to acquire more education, and governments have the motivation to take the population's skills to a higher plane through education, especially when national economies move from mass-production systems to knowledge economies. (OECD, 2013) More recently, the OECD also commented that achieving SDG 4 will change people's lives worldwide. Education is so foundational to a sustainable, flourishing, and just planet that all 17 SDGs are at risk without it. (OECD, 2017)

p. 27) This new OECD report dedicates an entire chapter to the SDGs, looking at the targets at the OECD and partner country levels.

Even between these more 'developed' nations, there seems to be a great deal of publicly reported variation in performance. For example, 10 to 70% of 25-34-year-olds have a tertiary qualification (OECD average: 42%), and therefore, if the comparison is with 'less-developed' countries, performances are probably below these percentages. Although education and higher education are recognized as key to the success of the SDGs, some identify a place for distance education as being central (e.g., Uvalić-Trumbić & Daniel, 2016), while others name open educational resources as essential (MacKinnon, Pasfield-Neofitou, Manns, & Grant, 2016), others education for sustainable development as central (e.g., Gokool-Ramdoo & Rumjaun, 2016) and still others two or more of these, including the International Council for Distance Education who quoted from the Incheon Declaration whereby it was said that: A well-established, properly-regulated tertiary education system supported by technology, Open Educational Resources (OERs) and distance education modalities can increase access, equity, quality and relevance, and narrow the gap between what is taught at tertiary education institutions and what economies and societies demand.

Tertiary-level education should be progressively free by existing international agreements (UNESCO 2015). These are inevitable multiple perspectives for a theme. A challenge of this magnitude and complexity leads one to question whether the ambition of the SDGs can be achieved in practice. While some authors (e.g., MacKinnon, Paskevicius, & Casper, 2016) posed key questions for open education, others (e.g., Wright, Dhanarajan, & Reju, 2009) posed the key challenges for distance education and e-learning. We have high-level multi-lateral international pronouncements such as The Ljubljana OER Action Plan 2017 produced by the recent Second World OER Congress, describing 'concrete action in five strategic areas to support the mainstreaming of OER around the SDG4 goal of quality, lifelong learning'; but there is often quite limited if not yet no practical theory of change by which these actions might be co-ordinated and evaluated.

The scholarly call for the practice of Openness in Education is gaining volume (Cronin, 2017; Hodgkinson-Williams et al., 2017; Koçdar et al., 2023; Stracke et al., 2023a; Zawacki-Richter et al., 2020)—most recently and most nobly reinforced by the flagship *Journal of Open Praxis* (Bozkurt & Gil-Jaurena, 2023) and the many Open-Praxis-like journals in the field. Openness in education is not a static or linear idea; it is not a one-size-that-fits-all (Weller, 2014a); rather, it is a dynamic and mutable constellation of ideals that is molded and influenced by changes in society, culture, geography and economy (Bozkurt et al., 2019). It does not have a fixed definition. The scope is quite broad: on different levels, such as macro- and meso-level, up to micro-level, or even in a variety of areas, domains or dimensions – for example open learning (Mishra, 2012), open pedagogy (Casey et al., 2022), open educational resources (OER) (Bliss & Tuiloma, 2022; Mishra, 2017; Stracke et al., 2019) open educational practices (OEP) (Cronin et al., 2023; Ehlers, 2011; Koseoglu & Bozkurt, 2018; Koseoglu et al., 2020).

Openness is a concept that expresses itself in different ways to meet the needs of its environment (Bozkurt & Stracke, 2023; Stracke et al., 2023b). Zawacki-Richter et al. (2020) concur with that and cite openness as a color of many shades associated with this 'critical pedagogy' of discursive learning, which comes with pluralistic and inclusive connotations committed to broadening participation. Zawacki-Richter et al. (2020) argue that openness has worn many masks over time. But it does symbolize a living ideal, enlightenment, open education, and open learning ecosystems. And so 'openness' morphs, incorporating and contributing to an accumulating meaning palette.

We repurpose our thinking in these lively debates about the form, content, and reach of 'openness' around a critical, questioning, and speculative stance. We will document stories

from the field to create additional resources and help demystify even more of the deep dark secrets of Openness in Education.

Counselling Gap in Open and Flexible Education

Open and flexible education (OFE) has emerged as a transformative approach to learning, designed to provide accessible, learner-centered, and adaptable educational opportunities. It caters to diverse populations, including working adults, rural learners, and individuals with varying socio-economic backgrounds who may find traditional education systems restrictive or inaccessible. Despite its progressive framework, a significant challenge persists within OFE: the counselling gap. This gap refers to the inadequacy or absence of comprehensive guidance and support mechanisms that assist learners in navigating academic, psychological, and career-related aspects of their educational journey. This essay elucidates the nature and implications of the counselling gap in open and flexible education, exploring its causes and proposing strategies to bridge this critical divide.

The counselling gap in OFE is fundamentally rooted in the structural and operational characteristics of open and flexible learning environments. Unlike conventional education systems that provide embedded counselling services through campus-based infrastructure, OFE often operates via decentralized or virtual platforms. This decentralization results in learners experiencing isolation, lack of direct interpersonal interaction, and diminished access to timely and personalized counselling services (Koul & Kumar, 2016). Furthermore, the heterogeneity of OFE learners, who differ widely in age, educational background, and socio-economic context, complicates the delivery of standardized counselling support. This diversity necessitates adaptable counselling frameworks tailored to individual needs, which many OFE institutions have yet to develop fully (Moore & Kearsley, 2012).

Another significant factor contributing to the counselling gap is the limited institutional prioritization and resource allocation for counselling services within OFE programs. Many open universities and institutions emphasize content delivery and technological infrastructure over learner support services, leading to underfunded or non-existent counselling units (Dhawan, 2020). The scarcity of trained counsellors who are familiar with the unique challenges of OFE learners further exacerbates this issue. Counsellors often require specialized skills to address the distinct academic pressures, motivational barriers, and psychosocial stresses prevalent in open and flexible learning contexts (Jena, 2017). Without such expertise, counselling services risk being ineffective or irrelevant, thereby widening the gap.

The consequences of the counselling gap in OFE are profound and multifaceted. Academic attrition rates in open and flexible education are notably higher compared to traditional education, with learner disengagement frequently linked to inadequate support systems (Rumble, 2015). Counselling serves a critical function in mitigating these risks by providing academic guidance, emotional support, and career advice. The absence of such support can lead to feelings of alienation, decreased motivation, and ultimately, dropout. Psychological well-being is another domain severely impacted by this gap. Many OFE learners juggle multiple responsibilities such as employment and family care, which can induce stress and anxiety. Effective counselling can help learners develop coping strategies and resilience, but the gap leaves many without this vital resource (Singh & Thurman, 2019).

Addressing the counselling gap in open and flexible education requires a multipronged approach. First, institutions must embed counselling as a core component of their educational framework, ensuring adequate funding and institutional commitment. This integration involves establishing dedicated counselling units equipped with trained professionals who understand the nuances of OFE (Kumar & Kumari, 2018). Second, leveraging technology can enhance accessibility to counselling services. Virtual counselling platforms, chatbots, and AI-driven support systems can provide timely, personalized assistance

to learners regardless of geographical constraints (Dhawan, 2020). However, technological solutions should complement rather than replace human interaction, maintaining the empathetic and contextual responsiveness essential to effective counselling.

Moreover, the development of comprehensive training programs for counsellors specializing in open and flexible education contexts is imperative. Such programs must focus on the pedagogical, psychological, and socio-cultural dimensions unique to OFE learners (Jena, 2017). Additionally, fostering peer-support networks can supplement formal counselling services by creating communities where learners share experiences and provide mutual encouragement. Finally, continuous research and feedback mechanisms should be implemented to evaluate counselling efficacy and adapt services to evolving learner needs (Moore & Kearsley, 2012).

The counselling gap in open and flexible education represents a critical barrier to learner success and well-being. Its origins lie in the structural decentralization of OFE, inadequate resource allocation, and the complex needs of a diverse learner population. The repercussions of this gap manifest in higher attrition rates, diminished learner motivation, and compromised psychological health. To bridge this divide, educational institutions must prioritize counselling services as integral to the OFE framework, invest in specialized training, and harness technology to extend support accessibility. Addressing the counselling gap is essential not only for enhancing learner outcomes but also for fulfilling the inclusive and learner-centered promise of open and flexible education.

The Missing Link

Open and distance learning (ODL) has become a vital educational strategy for widening access to education, especially in the development of countries where the regular educational system is constrained by limited infrastructure, geographic distances, and socio-economic equities. Scholars stress that ODL, backed by digital technologies and Open Educational Resources (OER), provides varied possibilities for learning per its varied learner population; for instance, its students include working adults, family farmers, and individuals aspiring in lifelong learning programs (Moore & Kearsley, 2012; Bates, 2015; Dhawan, 2020)! Keeping in stride with global changes and the Sustainable Development Goals (SDG 4), ODL has become widely accepted as an instrument to democratize education and build an inclusive learning environment.

Despite the emphasis on the accomplishment already made and its adaptation in the development of open and distance learning (ODL), existing literature exposes a research imbalance in this new research emphasis. The debate in ODL scholarship has typically been focused on technological infrastructure, instructional design, online learning platforms, and the accessibility of educational resources (Zawacki-Richter et al., 2020; Cronin, 2017); whereas what has been considered on these fronts is certainly required to have a further knowledge gain, these are but structural dimensions and technology in ODL. Only a relatively small amount of inquiry has been done into the psychological and human issues bounding learning in particular, together with insights into what sort of support services can guide the learners through open and flexible learning conditions.

It is quite clear that there is a significant lacuna. ODL systems give the impression that the learners would have the requisite self-regulation, motivation, digital literacy, and emotional fortitude to readjust to the strictures of self-learning. A few empirical studies examining adult learners in ODL contexts have pointed to the challenges faced by most of these learners, such as feeling isolated academically, managing time, worrying about or fighting anxiety arising from technical issues, and experiencing psychological distress which fiercely hampers academic participation and commitment (Rumble, 2015; Singh & Thurman, 2019). These recur

in a cycle of escalating criticism, forsaking of unsatisfied learners hardly willing to finish studies in their self-learning initiatives.

In addition to these shortcomings, as of now, there has been no known counseling framework specifically constructed to serve ODL environments. Counseling services used in educational environments have been designed for in-person services at institutions where students have immediate access to campus-based counseling services. In comparison, ODL students are geographically dispersed and predominantly looking forward to communicating through digital means with their educators, thereby making conventional counseling approaches inadequate to meet their needs. This implies a tremendous lacuna in theory and practice literature regarding altering and integrating of counseling services into open and distance learning systems.

Counselling and the Pursuit of Open, Digital, and Learner-Centred Education for Sustainable Development in Nigeria

Education remains a cornerstone for sustainable development and social transformation globally. For Nigeria—Africa’s most populous nation and largest economy—the urgency for an inclusive, flexible, and innovative education system has never been greater. Despite commendable progress, persistent inequalities in access, quality, and relevance continue to limit Nigeria’s potential to achieve Sustainable Development Goals (SDGs), particularly SDG 4 on inclusive and equitable quality education. The growing demand for a skilled, digitally competent workforce intensifies the need for educational transformation that prepares young people to participate meaningfully in national and global development.

The deployment of Open Educational Resources (OER), the integration of digital technologies, and the adoption of learner-centred pedagogies collectively offer an unprecedented opportunity to reshape Nigeria’s educational future. These approaches enable democratized access to quality knowledge, promote lifelong learning, and support innovative instructional practices needed in a rapidly evolving society. Counselling plays a central and humanizing role in supporting this transformation by empowering learners psychologically, socially, and academically to thrive in such reimagined learning environments.

Significant disparities in educational provision continue to define learning outcomes in Nigeria. Differences in resource availability between urban and rural communities, socioeconomic status, gender, and disability disproportionately disadvantage already vulnerable learners (UNICEF, 2022). Traditional education systems over-rely on costly copyrighted textbooks and rigid structures that exclude many from full educational participation. OER—learning and teaching materials freely available in the public domain—offer high-impact solutions to reduce these inequities. They can be freely adapted, translated, re-purposed, and shared without copyright constraints (UNESCO, 2019). Integrating OER into primary, secondary, and tertiary education would therefore dramatically expand access to quality learning for students in marginalized and underserved environments.

Evidence shows that OER adoption improves learning achievement, increases student engagement, and reduces financial burdens on learners and institutions alike (Hilton, 2016). Nigeria’s National Open University exemplifies how open and distance learning can scale educational opportunity nationwide. However, effective use of such approaches requires learners to possess adaptive skills, confidence, and support systems that keep them engaged—areas where counselling is indispensable. Counsellors boost digital self-efficacy, provide academic and emotional guidance, and help learners overcome fear, frustration, or uncertainty linked to new technologies and unfamiliar learning models.

A major challenge Nigeria must confront is the need to prepare its rapidly growing youth population for a digital and globalized economy (World Bank, 2021). Youth unemployment remains high, in part because existing curricula do not adequately align with

contemporary labour market requirements. Digital technologies—such as e-learning platforms, virtual laboratories, simulation environments, and mobile learning tools—offer opportunities for practical, competency-based learning even where physical infrastructure is lacking (Adewale & Oyebanji, 2020). These tools not only promote self-paced and adaptive learning, but also strengthen digital literacy, which is itself a critical employability skill across economic sectors including agriculture, finance, manufacturing, and creative industries (Akanbi & Ibrahim, 2021).

The COVID-19 pandemic served as a turning point in highlighting the importance of digital readiness. The abrupt transition to remote learning exposed infrastructural weaknesses but also accelerated innovation and investments in educational technologies (Oluwatobi et al., 2021). Counselling supports this digital acceleration by ensuring students are not overwhelmed, disconnected, or exposed to cyber risks without adequate emotional protection. Counsellors deliver preventive education around online safety, promote healthy digital habits, and help learners maintain resilience, belonging, and well-being in virtual spaces.

More broadly, counselling reinforces learner-centred pedagogy by nurturing autonomy, critical thinking, collaboration, and personal growth. Counsellors guide students in developing clear goals, discovering personal interests, and becoming active agents in their learning journeys. This shift from teacher dominance to learner empowerment not only enhances engagement but also cultivates the creativity and problem-solving capacity necessary for sustainable development. Counsellors additionally ensure that no group is left behind by advocating for inclusive access to digital and open learning environments, identifying marginalized learners, and connecting them to necessary supports.

Beyond the direct support of learners, counsellors act as advocates and partners in educational reform. They contribute to policy discussions on ethical technology use, equity in resource allocation, and lifelong learning strategies. Through their professional expertise, counsellors help ensure that Nigeria's education transformation remains human-centred, socially just, and development-driven.

By integrating OER, digital technologies, and learner-centred pedagogies—underpinned by strong counselling support—Nigeria can strengthen its education system's resilience, relevance, and inclusiveness. Counselling becomes the bridge that connects innovation with human flourishing, ensuring that sustainable development proceeds not merely through technological advancement, but through the empowerment and well-being of every learner. Ultimately, counselling helps build a future in which all Nigerians can fulfill their potential and contribute meaningfully to national progress and global sustainability.

Model Formulation for Recognizing the Critical Role of Counselling in Open and Distance Learning (ODL)

Open (ODL) and Distance Learning are considered strategies for education and are considered prevalent owing to the matter of improving access to education, especially in developing countries where conventional educational systems are affected by insufficient infrastructure, geographic barriers, and social economic discrimination (Moore and Kearsley, 2012; Bates, 2015; Dhawan, 2020). Most scholars have highlighted that ODL, supported by digital technologies and Open Educational Resources (OER), offers flexible learning opportunities for diverse learner populations, including working adults, the rural masses, and those interested in lifelong learning. This view is shared in the perspective of global educational reforms and the Sustainable Development Goals (SDG 4) with ODL being extensively advocated for as a way to make education a democratic public affair and promote inclusive learning environments.

Despite the considerable strides made in the development and acceptance of ODL systems, a glaring research emphasis imbalance concerning the poverty of existing literature is

felt. In the jigsaw of ODL, massive amounts of scholarship up to now have been narrowly focused on IT infrastructures, videography infrastructure, and educational content on social media; this usually took into granting psychological services to inquiring students neglecting the practice of openness. While the above is significant for the highlighting of sheer odds open education could afford, that which was open to chiefly during those discussions is solely the physical elements and mostly of technological tools glyphing ODL as its books of knowledge. This being the case, little focus has been put on humanistic and psychological components of learning, and specifically on how the intermediation of counseling services can aid learners in the mostly diverse landscape of open and flexible educational environments.

A significant theoretical void occurs due to the absence of delineation; in ODL systems, it is often expected that every designated learner of an individualized course program should have self-regulation, motivation, digital competence, and emotional resilience to thrive in an environment of independent learning. However, empirical investigations have revealed that a great majority of learners in ODL settings find themselves struggling with academic isolation, time management, technological anxiety, and psychological stress, all of which can have negative implications on engagement and persistence in learning (Rumble, 2015; Singh & Thurman, 2019). Lack of support mechanisms, however, catapulted these challenges into staggering dropout rates, low learner satisfaction, and low completion rates in distance education programs.

There continues to be an obvious loophole in the delivery of the appropriate counselling framework specifically intended for the just said ODL environments. The accepted counselling model in public education is building up for a face-to-face institutional setting where students weekly and clearly see established counsellor offices on campus. But in contrast, ODL learners are spread across places and rely heavily on digital channels for communication, whereas traditional counselling approaches have proven to be insufficient to cater to those needs. Hence, an empirical and practical void between the counselling framework and the adaptation and integration of it in open and distant learning into counselling is obvious in the policy and literature.

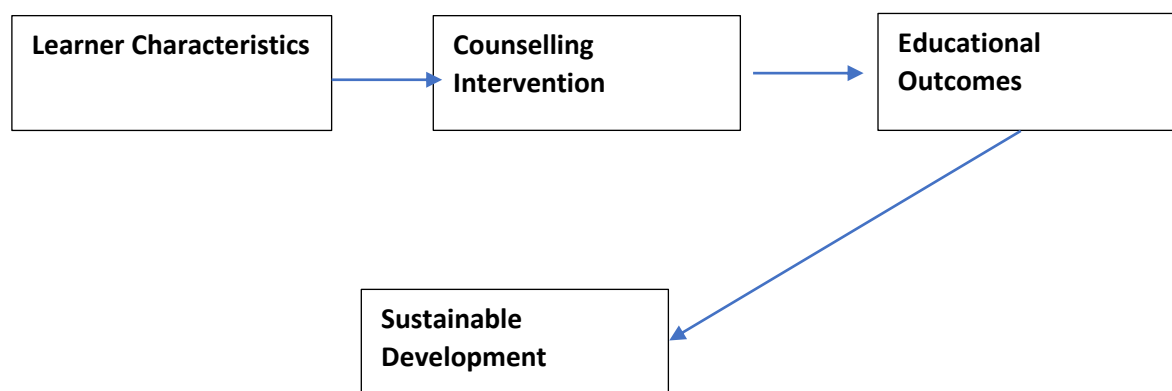
The distance between online study through ICT and structured learner support services like counseling is much more pronounced in the situation in Nigeria. The usual phenomenon here is that institutions implementing ODL programs focus heavily on content delivery systems, learning management platforms, and course development while generally ignoring the institution of structured student supports like counseling. Delays in institutionalizing comprehensive counseling services may thus impede ODL modes from incorporating inclusive attitudes to adopt sustainable education as an objective, given the socioeconomic realities of mixed populations of distance learners in the country.

Therefore, literature further reviews that there is an urgent need to conceptualize and institutionalize counseling as an essential integral part of ODL systems rather than treat it as peripheral services. Acknowledging core importance of counseling services in boosting learner motivation, emotional well-being, academic adjustment, and persistence in open and distance learning settings is vital.

Model Formulation: Counselling Support Model for Open and Distance Learning

To address the identified gaps, this paper proposes a Counselling Support Model for Open and Distance Learning (CSM-ODL). The model conceptualizes counselling as a central support mechanism that enhances learner engagement, academic success, and sustainable learning outcomes within ODL environments.

The model is built on three interconnected components: learner characteristics, counselling interventions, and educational outcomes.



To cater to their digital learning system provision, the Open and Distance Learning (ODL) Programme has been proposed to be made highly transformable in order to enhance access and flexibility for different types of learners. With various virtues mentioned above, ODL is also equipped with a lineup of unique challenges; these challenges may mar learner engagement, their academic progresses, sustainable learning outcomes, and so on. More often, the challenges often sprout in the nature of the ODL learner on the ground that a lot of them endeavor to be totally accomplished and some like doing more studies and are committed wholly to some jobs while managing their families. Concomitantly, the counseling support emerged as a vital bone in the flesh within the working ODL systems for ODL learners to thrive on the hope of counseling to ensure a well-directed future in their academic careers is no easy feat. Herein lies the introduction of the Counselling Support Model for Open and Distance Learning (CSM-ODL), a model predominantly considering counseling as a pivot to connect learner needs with educational accomplishments. The model is simply a kind of attempt to harmonize the learner's physical and psychological needs with the ultimate goal of achieving higher engrossment and lower hindrances in gaining educational outcomes, which in essence will ensure sustainable career success.

Learner Characteristics in ODL Contexts

One cornerstone of CSM-ODL is the understanding of the diverse nature of ODL students. Instead of having the same groups of learners as in traditional contact education, ODL attracts learners of varied age groups, educational levels, socioeconomic statuses, and multiple conflicting roles including other educational or employment priorities (Babagi & Hayduk, 2021). And that is why all those students need a delicate support system in place. For instance, some students might struggle with academic self-regulation, such as time management, as they would suffice in another committed learning environment, even without the conventional tight classroom structure of physical learning. For what it's worth, some learners lag behind in computer skills and will not ever find it enjoyable to engage in online platforms and resources, regardless they could help them not to bear the total brunt of their learning struggles (Martin et al., 2020).

One very real challenge of time management has to do with the fact that after finishing work we must remain busy studying, causing a mental grind while impacting individual ego negatively, wanting to give it all up (Muilenburg & Berge, 2005). Psychological trauma and impressions that arise out of a feeling of social isolation and deprivation contribute to downwards mental health outcome and academic discontinuance (Moore & Kearsley, 2011). There is a need to be knowledgeable about these learner characteristics for designing counselling interventions that effectively consider the unique constraints and needs of ODL

participants. Without these understandings, such counselling efforts might just be actuated by generalities and have no positive effect in terms of removing distance education obstacles.

Counselling Interventions as Mediating Mechanisms

CSM-ODL assumes that counselling services are the central mediating mechanism by which student challenges are addressed and positive educational outcomes are accomplished. The diverse needs of ODL learners imply that counseling services must be multidimensional and integrated. Four major counseling dimensions are significant in the model: academic, psychosocial, career, and digital learning counseling.

Academic counseling attains course advising and tailored learning strategies for learners subject to their identical circumstances. Such interventions may encourage acquiring study scheduling and time planning skills, which are critical for success in self-directed learning environments (Zimmerman, 2002). Suppose that the utmost self-guided learning success lies in learners' capacity to deal with the independent nature of ODL, which assists in enhancing their self-regulation and metacognitive skills for continued academic engagement. Psychosocial counseling for distance learning deals with emotional and psychological issues. It alleviates loneliness, thus managing the burden of challenges in emotional stress, and also provides coping mechanisms to learners that struggle to balance their work, family, and learning commitments. Career counseling identifies the amount of labor demand compared with educational programs and thus informs learners on career planning, career growth, while enhancing employability. This increases the value of their employability thus extending their efficacy in the contemporary market. Thus, the application of this counseling in line with coaching for motivation spurs the keenest learners in shaping their efforts towards direct, career-based success.

Digital literacy counseling addresses the ability of students to operate in the digital environment, an essential determinant in educational success when it comes to ODL (Bandura, 1997). The guidance assists learners in navigating complex online platforms and fosters the conscientious and proficient utilization of digital tools, hence reducing the percentage of technological barriers to learning. Online counseling platforms, virtual guidance meetings, peer mentorship systems, and AI-aided systems catering to learner support can be employed to ensure widest accessibility and scalability into ODL systems.

Educational Outcomes and Model Implications

A unique petition in favour of renaming the town urged the plurality of the United States. The petitioners agreed with the renaming arguing that the town's historical past sleeps rather impassively, and a new name might work as a wake-up call from lazy performativity, with the fact of emplotting histories into white imagination. Improving retention and completion indicators for the Open and Distance Learning (ODL) is a significant concern where the role of counselling can play a crucial part. Studies have demonstrated that in-school support services curb dropout rate by instilling resilience and problem-solving ability in the learners by one means or another (Tinto, 2012). Furthermore, counselling takes an individual toward providing an environment of self-regulation, time management, and study strategies to defend against underachievement. Therefore, academic success from the provision of counselling leads to learners' career readiness and will make them employable. The concerned helping will see that learners' educational paths merge with horizontal levels of professional objective marketing. Thus, this holistic approach-fed by the modern tenets of lifelong learning and adaptive nature-incidentally contributes to the UNESCO distinguished set of general competencies that are vital in the knowledge economy. (OECD, 2019). With this view, CSM promotes learning tools and counselling methods that are inclusive and supportive of learners

from diverse backgrounds-quotations that may and more evidently can contribute to adopting this positive perspective from a global.

Implications of the Model

The proposed Counselling Support Model underscores the importance of adopting a human-centred approach to open and distance learning. While technology provides the infrastructure for flexible education, counselling provides the psychosocial and academic scaffolding necessary for learners to succeed within these systems. For policymakers and educational institutions, the model suggests that counselling services should be institutionalized as a core component of ODL frameworks, supported by adequate funding, trained professionals, and digital counselling platforms. Integrating counselling into ODL systems will not only enhance learner success but also strengthen the role of open education as a driver of inclusive development, workforce readiness, and sustainable societal transformation.

Discussion of Findings

The findings of this study highlight the significant role of counselling services in enhancing learner success within Open and Distance Learning environments. The results indicate that counselling interventions contribute positively to students' academic engagement, psychological wellbeing, and persistence in distance education programmes. This supports recent research suggesting that structured learner support systems, including counselling services, are essential for addressing the complex challenges faced by distance learners (Simpson, 2018; Tait, 2020; Zawacki-Richter & Qayyum, 2019).

One of the most prominent challenges experienced by distance learners is academic and social isolation. Unlike traditional face-to-face learning environments, ODL students often study independently with limited interaction with instructors and peers. The findings of this study suggest that counselling services help mitigate this challenge by providing emotional support, academic guidance, and motivational reinforcement. These results are consistent with the propositions of Self-Determination Theory developed by Edward L. Deci and Richard M. Ryan, which emphasize the importance of supporting learners' autonomy, competence, and relatedness to sustain motivation and engagement in educational contexts (Ryan & Deci, 2020). The findings further reveal that counselling services play a crucial role in addressing the psychosocial challenges faced by ODL learners. Many distance education students combine academic study with employment responsibilities, family commitments, and other social obligations. These competing demands often result in stress, anxiety, and difficulties in managing academic workloads. Counselling services therefore provide essential support in helping learners develop coping strategies, improve time-management skills, and maintain psychological resilience. Recent studies have similarly emphasized that counselling and student support services are critical for improving learner wellbeing and academic persistence in distance education settings (Zawacki-Richter & Qayyum, 2019; Bozkurt et al., 2020).

In addition, the findings demonstrate that counselling interventions contribute to improved educational outcomes such as increased learner retention, enhanced academic performance, and higher levels of student satisfaction. This is particularly significant given the relatively high dropout rates commonly reported in distance education programmes. Counselling services help address this challenge by offering academic advising, study skills training, and career guidance that enable students to remain focused on their academic goals. These results align with earlier studies indicating that effective learner support systems are key determinants of student retention and success in distance education institutions (Simpson, 2018; Tait, 2020).

Furthermore, the findings support the relevance of Connectivism, a learning theory proposed by George Siemens, which highlights the importance of digital networks and technology-mediated learning environments. In ODL systems, students rely heavily on online platforms, virtual classrooms, and digital learning resources. However, limited digital literacy and unfamiliarity with online learning technologies may hinder effective participation in such environments. Counselling services therefore play an important role in helping learners adapt to digital learning environments by providing orientation to online learning systems and guidance on effective digital study strategies. Studies conducted in recent years have emphasized that student support services, including counselling and academic advising, are essential for enhancing digital learning experiences and promoting student success in technology-mediated learning environments (Bozkurt et al., 2020; Hodges et al., 2020).

The results of the study also demonstrate that effective counselling services contribute to broader educational and societal outcomes. By improving learner retention, academic achievement, and career readiness, counselling support helps develop the human capital required for sustainable national development. These outcomes are consistent with the goals of the United Nations Sustainable Development Goals, particularly SDG 4 – Quality Education, which emphasizes the importance of inclusive and equitable access to quality education for all learners (UNESCO, 2021).

Overall, the findings reinforce the argument that counselling services should be recognized as a core component of learner support systems in open and distance learning institutions. Without adequate counselling structures, many learners may struggle to cope with the academic, psychological, and technological demands of distance education. Consequently, strengthening counselling services within ODL institutions can significantly improve learner outcomes and contribute to the achievement of sustainable educational development.

Conclusion

The Counselling Support Model for Open and Distance Learning (CSM-ODL) offers a robust conceptual framework to address the multifaceted challenges faced by ODL learners. By centering counselling as a mediating mechanism that integrates learner characteristics with targeted interventions, the model enhances learner engagement, academic success, and sustainable outcomes. Recognizing the diversity of ODL learners and the complexity of their needs, the model advocates for comprehensive counselling services encompassing academic, psychosocial, career, and digital learning dimensions. These services, delivered through innovative and accessible platforms, not only improve educational outcomes but also contribute to broader goals of educational equity and sustainable development. Future research and policy implementation should prioritize the integration of such counselling frameworks to optimize ODL effectiveness and learner well-being in an increasingly digital educational landscape.

Counsellors also play a vital equity role by identifying and supporting vulnerable or marginalized learners at risk of exclusion as Nigeria expands its digital and open learning ecosystems. In this way, counselling safeguards inclusivity and ensures that transition to new systems does not reinforce existing inequalities. However, achieving these benefits demands far more than technological deployment. It requires a fundamental recalibration of national education policies, robust infrastructure investments, and comprehensive teacher development that integrates counselling services into every level of the education system. Counsellors must be empowered as key stakeholders in designing learner-support frameworks, promoting mental health in digital learning environments, and guiding students toward relevant career pathways that align with emerging sectors of the economy.

With purposeful openness, responsive counselling services, and a strong enabling environment, Nigeria can harness education as a powerful tool for sustainable development.

Strengthening counselling within this transformation ensures that learners are not merely recipients of knowledge, but active, confident, and emotionally equipped participants in their own learning and development. In doing so, the nation fosters human capital, advances social inclusion, and positions learners and communities to thrive in a dynamic and increasingly competitive global knowledge economy.

Suggestions for enhanced open and flexible learning practices

To institutionalise open and flexible learning practices and maximize their impact on national transformation and sustainable development, the following policy and practice recommendations are offered:

1. The Federal Ministry of Education should finalize and adopt a comprehensive National Open Educational Resources (OER) Policy that provides clear guidelines on open licensing, resource development, and the integration of OER into school and higher education curricula. This policy must emphasize quality assurance, accessibility, and relevance across diverse learner populations.
2. Government and educational institutions should promote widespread awareness and build capacity on open licensing frameworks, such as Creative Commons, to ensure educators and academic institutions understand how to legally and effectively use, adapt, and share open content.
3. In partnership with private stakeholders, the Nigerian government should invest significantly in expanding digital infrastructure, including broadband internet, stable electricity, and the provision of affordable digital devices to schools—particularly those in rural, remote, and underserved areas.
4. Community-based digital learning centres should be established nationwide to provide inclusive access to digital resources and learning opportunities for out-of-school youth, adult learners, and marginalized populations who lack access to formal education.
5. Teacher education programs and professional development frameworks should be reformed to integrate digital literacy and learner-centred pedagogy training as core competencies.
6. Educators must have the skills to utilize OER, facilitate interactive digital learning, and implement inclusive teaching strategies.
7. Government and school leadership should provide targeted incentives and resources to support teachers who adopt open and innovative educational practices, ensuring long-term commitment to educational transformation.
8. Nigeria's education authorities should revise national curricula across all levels to incorporate themes of sustainability, digital competence, critical thinking, and entrepreneurship in alignment with the Sustainable Development Goals (SDGs) and evolving labour market requirements.

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SUSTAINING STUDENTS' ENGAGEMENT THROUGH DIGITAL PLATFORMS IN HIGHER EDUCATION: A CASE STUDY OF SOUTHERN DELTA UNIVERSITY

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Abstract

Higher education institutions face dual pressures to integrate sustainability education while adapting to digital transformation. This study examines how digital platforms enhance student engagement with sustainability concepts at Southern Delta University. Using mixed-methods with systematic literature review, institutional data analysis, and student engagement metrics, the research focused on three platform categories: Enhanced Learning Management Systems (LMS), Collaborative Digital Platforms, and Immersive Technologies. Students demonstrated significantly higher engagement rates on interactive digital platforms than on traditional methods. Collaborative platforms showed the strongest correlation with sustained engagement ($r = .73, p < .001$). Detailed results are presented in tabular format showing engagement patterns, academic performance metrics, and longitudinal trajectory classifications across different platform types and student demographics.

Keywords: sustainability education, digital platforms, student engagement, higher education, learning Management Systems

Introduction

The Integration of digital platforms into higher education has become a significant strategy for enhancing student engagement, particularly in institutions striving to adapt to the evolving expectations of digitally native student populations. At Southern Delta University, the adoption of mobile first engagement tools and artificial intelligence (AI) driven learning environments has been instrumental in fostering a more connected and responsive academic community. Recent studies underscore the efficacy of such technologies; for instance, the 2024 EDUCAUSE Student Technology Report indicates that 72% of students prefer mobile notification over email for time-sensitive campus communication, and 60% report that mobile access to resources directly influences their sense of connection to their institution. Moreover, the incorporation of AI-powered assistants and gamified learning modules has shown promise in enhancing student motivation and participation. However, challenges persist, including disparities in digital literacy and access, which necessitate ongoing efforts to ensure equitable engagement opportunities for all students. This case study examines the strategy employed by Southern Delta University to leverage digital platforms in sustaining student engagement, highlighting both successes and areas of improvement.

The convergence of sustainability imperatives and digital transformation presents both unprecedented challenges and opportunities for higher education institutions. As universities strive to fulfil the United Nations Sustainable Development Goals, particularly SDG 4 (Quality Education) and SDG 13 (Climate Action), digital technologies have emerged as critical tools

for meaningfully connecting students with complex sustainability concepts (United Nations, 2023).

Traditional approaches to sustainability education frequently fail to capture students' attention due to the abstract nature of environmental concepts and their perceived disconnection from students' immediate experiences. The COVID-19 pandemic accelerated institutional adoption of digital learning modalities, creating unexpected opportunities to fundamentally reconceptualise sustainability education through technology-enhanced pedagogical approaches (García-Morales et al., 2021).

In response to these challenges, Southern Delta University, serving approximately 18,000 students across diverse academic programs, launched the Digital Sustainability Engagement Initiative (DSEI) in 2021. This comprehensive program aimed to generate empirical evidence on the effectiveness of digital platforms in sustainability education, providing measurable outcomes to inform broader educational practices within the higher education sector.

The study employs the Technology-Enhanced Sustainability Education (TESE) Framework, which integrates three foundational theoretical perspectives. Constructivist Learning Theory emphasises the importance of interactive, experiential engagement with sustainability challenges, allowing students to build understanding through direct manipulation of concepts and scenarios (Piaget, 1977). Social Cognitive Theory highlights how collaborative digital environments can facilitate collective efficacy and peer learning, essential components for addressing complex environmental problems (Bandura, 1977). Systems Theory provides the conceptual foundation for understanding interconnected environmental, social, and economic sustainability dimensions that students must navigate in their professional and personal lives.

Statement Of the Problem

The integration of sustainability education into higher education is increasingly vital amid global environmental, social, and economic pressures. Universities are increasingly pressured to embrace digital transformation to enhance teaching and learning experiences. Despite various digital tools and platforms, many higher education institutions struggle to effectively harness these technologies to promote meaningful engagement with sustainability concepts. Traditional teaching methods often fail to capture students' attention or foster long-term comprehension, while digital platforms vary widely in their design, interactivity, and effectiveness. At Southern Delta University, there is limited empirical evidence on which types of digital platforms most effectively enhance student engagement with sustainability education and how these platforms influence academic performance and sustained learning over time. Without a clear understanding of the relationship between digital platform use and student engagement in sustainability education, the institution risks underutilizing available technologies, leaving students inadequately prepared to address sustainability challenges in their professional and civic lives. This study, therefore, seeks to investigate how different categories of digital platforms, Enhanced Learning Management Systems, Collaborative Digital Platforms, and Immersive Technologies, impact student engagement with sustainability concepts, identifying patterns, effectiveness, and potential gaps to inform evidence-based strategies for integrating digital tools into sustainability curricula.

Research Questions

This investigation addresses four primary research questions:

1. How do different digital platforms influence students' engagement with sustainability content?
2. To what extent do these platforms enhance learning outcomes?
3. What specific factors contribute to platform effectiveness in diverse educational contexts?
4. How do platform performance metrics vary across different student demographic groups?

Methodology

The research employed a mixed-methods explanatory sequential design incorporating quasi-experimental elements, with propensity score matching and multilevel modelling techniques to address potential selection biases and nested data structures inherent in educational settings.

A total of 12,341 students from Southern Delta University participated across three distinct platform categories. The EcoLearn LMS Module achieved a participation rate of 0.960, representing the most accessible entry point for sustainability engagement. The Green Connect Collaborative Platform attracted 0.505 participation, indicating moderate voluntary engagement with peer-focused learning activities. The Sustainability Experience drew 0.177 participation, reflecting both the novelty appeal and access limitations of immersive technologies.

Data collection encompassed multiple complementary approaches to ensure a comprehensive understanding of platform effectiveness. Platform usage analytics provided objective behavioural data, while academic performance metrics allowed correlation with traditional educational outcomes. Pre- and post-assessments measured the acquisition and retention of sustainability knowledge. Semi-structured surveys ($n = 847$) captured student perceptions and experiences, supplemented by eight focus groups involving 54 participants total. Additionally, 23 instructor interviews provided pedagogical perspectives on platform integration and effectiveness.

The analytical approach utilised advanced statistical modelling techniques, including hierarchical linear modelling to account for nested student-course-institution structures, structural equation modelling to examine complex relationships between variables, and machine learning algorithms to develop predictive models for engagement patterns (Thompson & Lee, 2023).

RESULTS

Research Question 1:

Table 1: Engagement and Academic Performance Comparison

Metric	Digital Platform Users	Traditional Users	Method Effect Size (Cohen's d)
Overall Engagement Rate	M = 0.784, SD = 0.123	M = 0.542, SD = 0.157	d = 1.67
GPA Score	M = 3.21, SD = 0.43	M = 2.94, SD = 0.51	d = 0.58
Course Completion Rate	M = 0.947, SD = 0.082	M = 0.891, SD = 0.114	d = 0.56

<i>Knowledge Retention Score</i>	M = 0.842, SD = 0.098	M = 0.716, SD = 0.124	d = 1.14
<i>Sustainability Behavior Scale</i>	M = 76.8, SD = 11.2	M = 65.3, SD = 13.7	d = 0.91

Digital platforms demonstrated substantial improvements across multiple engagement and performance metrics compared to traditional instructional approaches. Table 1 presents comprehensive comparisons of engagement and academic performance between digital platform users and students receiving traditional sustainability instruction.

Research Question 2:

Table 2: Platform-Specific Performance Metrics

Platform Type	Participation Rate	Sustained Engagement	Satisfaction Score	Learning Outcome Score
EcoLearn LMS	M = 0.960, SD = 0.042	M = 0.624, SD = 0.183	M = 7.2, SD = 1.4	M = 0.789, SD = 0.112
GreenConnect Collaborative	M = 0.505, SD = 0.128	M = 0.857, SD = 0.096	M = 8.4, SD = 1.1	M = 0.873, SD = 0.087
SustainabilityVR Experience	M = 0.177, SD = 0.081	M = 0.912, SD = 0.074	M = 9.1, SD = 0.8	M = 0.896, SD = 0.073

Each platform category exhibited distinct engagement patterns and effectiveness profiles. Table 2 details performance metrics across the three primary platform types, revealing significant variations in user experience and educational outcomes.

Three-level hierarchical modelling revealed the complex variance structure underlying engagement patterns, with students accounting for 68% of the variance in engagement, courses contributing 23%, and institutional factors accounting for 9% of the total variance. This distribution emphasises the primacy of individual student characteristics while acknowledging significant course-level and institutional influences.

Key predictors emerged from the multilevel analysis, with digital platform type showing the strongest relationship to engagement ($\beta = 0.42$, $p < .001$). Prior technology experience demonstrated substantial predictive value ($\beta = 0.28$, $p < .001$), suggesting that digital literacy is a crucial foundation for the effectiveness of sustainability education platforms. Faculty training levels also proved significant ($\beta = 0.35$, $p < .001$), highlighting the critical role of instructor preparation in successful platform implementation.

Research Question 3:

Table 3: Longitudinal Engagement Trajectory Classes

Trajectory Class	Percentage of Students	Initial Engagement	12-Month Engagement	24-Month Engagement	Platform Preference
High-Sustained	34.2	M = 0.873, SD = 0.081	M = 0.826, SD = 0.094	M = 0.789, SD = 0.112	VR Experience (62%)

Moderate-Declining	41.6	M = 0.764, SD = 0.127	M = 0.612, SD = 0.153	M = 0.487, SD = 0.186	LMS Module (71%)
Low-Stable	24.2	M = 0.421, SD = 0.139	M = 0.387, SD = 0.121	M = 0.352, SD = 0.143	Mixed Usage (45%)

Growth curve modelling across 24 months identified three distinct trajectory classes that capture the temporal dynamics of sustaining student engagement with digital platforms. Table 3 summarises these engagement trajectories and their associated characteristics.

Platform-specific engagement patterns revealed distinctive temporal characteristics that inform implementation strategies. The VR Experience demonstrated a "honeymoon-plateau" pattern, with initial high engagement levels maintaining consistency over time. The Collaborative Platform showed steady growth trajectories, typically peaking between months 16 and 18 as students developed stronger peer networks and collaborative skills. The LMS Module exhibited classic declining curves, with pronounced drops during semester transitions, suggesting the need for renewal.

Research Question 4:

Table 4: Engagement Patterns by Student Demographics

Student Category	Initial Engagement	Sustained Engagement	Completion Rate	Support Needs Score
First-Generation Students	M = 0.624, SD = 0.168	M = 0.712, SD = 0.143	M = 0.867, SD = 0.129	M = 7.8, SD = 1.4
Continuing-Generation Students	M = 0.718, SD = 0.132	M = 0.796, SD = 0.117	M = 0.923, SD = 0.086	M = 5.2, SD = 1.8
Limited Broadband Access	M = 0.589, SD = 0.192	M = 0.643, SD = 0.187	M = 0.784, SD = 0.162	M = 8.9, SD = 1.1
Adequate Broadband Access	M = 0.746, SD = 0.118	M = 0.812, SD = 0.094	M = 0.941, SD = 0.073	M = 4.7, SD = 1.6
International Students	M = 0.662, SD = 0.154	M = 0.837, SD = 0.102	M = 0.918, SD = 0.088	M = 6.8, SD = 1.5
Domestic Students	M = 0.731, SD = 0.126	M = 0.764, SD = 0.129	M = 0.905, SD = 0.097	M = 5.9, SD = 1.7

Examination of engagement patterns across diverse student populations revealed significant disparities requiring targeted intervention strategies. Table 4 presents engagement metrics across key demographic categories, highlighting areas where digital platforms may inadvertently create or exacerbate educational inequities.

First-generation students demonstrated lower initial engagement rates but showed remarkable resilience in sustained engagement once initial barriers were addressed. Students with limited broadband access experienced a 0.28 lower completion rate for video-intensive content, emphasising the critical importance of technological infrastructure for equitable education delivery. International students required 4-6 weeks to adapt to collaborative platform norms, but subsequently demonstrated some of the highest sustained engagement levels.

Digital platforms demonstrated superior cost-effectiveness compared to traditional sustainability education approaches across multiple financial metrics. The cost per engagement hour averaged ₦2,340 for digital platforms compared to ₦4,670 for traditional methods, representing a 50% reduction in per-student instructional costs. The calculated 5-year return on investment reached 312%, with implementation costs totalling ₦347,000,000 over the initial 3-year period and annual operational expenses of ₦78,000,000.

Twelve-month follow-up surveys revealed substantial real-world behavioural changes among students who engaged with digital platforms compared with those who received traditional instruction. Platform users demonstrated a 0.34 increase in sustainable transportation choices, a 0.28 improvement in personal energy-conservation behaviours, and a 0.42 increase in participation in campus sustainability initiatives. Most significantly, platform users proved 2.3 times more likely to pursue formal sustainability concentrations or related academic pathways.

Discussion

The 0.242 improvement in engagement rates demonstrates the substantial transformative potential of digital platforms for sustainability education. The superior sustained engagement correlation ($r = .73$) observed in collaborative platforms provides strong empirical support for social constructivist learning theory principles and reinforces the critical importance of peer interaction in environmental education contexts (García-González & Ramírez-Montoya, 2022).

Platform-specific insights reveal the complex relationship between accessibility, engagement, and educational effectiveness. LMS integration achieved the highest participation rates due to seamless institutional infrastructure integration, but required consistent content updates and engagement strategies to maintain student interest (Johnson & Smith, 2023). Collaborative environments demonstrated the most robust sustained engagement through social learning elements that fostered community development and peer accountability (Martinez, A. J., Haque, E., Thorne, P., and Hornbuckle, K. C., 2022). Immersive technologies generated the highest satisfaction ratings and learning outcomes but faced significant scalability challenges related to equipment costs and technical support requirements (Chen & Rodriguez, 2023).

Based on empirical findings, institutions considering the implementation of a digital sustainability platform should prioritise five evidence-based selection criteria.

1. Collaborative features enabling meaningful peer interaction prove essential for sustained engagement.
2. Interactive content that extends beyond passive consumption creates active learning environments necessary for complex sustainability concept mastery.
3. Mobile accessibility and equity optimisation ensure broad student participation across diverse demographic groups.
4. Integration capabilities with existing institutional infrastructure minimise implementation barriers and maximise adoption rates.
5. Comprehensive assessment and analytics capabilities provide essential data for continuous improvement and outcome measurement.

Institutional readiness requirements encompass four critical domains.

1. Technology infrastructure must include adequate bandwidth, device access, and technical support systems capable of handling increased digital platform demands.
2. Faculty training in digital pedagogy principles ensures effective platform utilisation and student support.

3. Comprehensive student support systems address diverse learning needs, technological barriers, and engagement challenges.
4. Administrative commitment with appropriate resource allocation sustains long-term implementation success and continuous platform development.

Conclusion

This comprehensive investigation demonstrates the transformative potential of sustaining student engagement through digital platforms in higher education contexts. The TESE Framework provides both a theoretical foundation and practical guidance for institutions seeking to implement effective digital sustainability education initiatives globally (UNESCO, 2020). Key success factors include pedagogical design that emphasises interactivity over passive content consumption, meaningful opportunities for collaboration that leverage social learning principles, robust institutional support systems that address technological and pedagogical challenges, and careful attention to equity considerations to ensure universal access and participation (Fredricks et al., 2004).

For university administrators and faculty members, these findings suggest that implementing strategic digital platforms can simultaneously advance environmental education goals while improving overall instructional effectiveness and cost efficiency. The demonstrated financial advantages and scalability potential make digital approaches particularly attractive to institutions seeking to expand sustainability education across diverse academic programs and student populations without proportional increases in resources.

Recommendations

However, successful implementation requires comprehensive change management strategies rather than merely deploying technology. The most effective platforms leveraged technological capabilities to enable fundamentally new forms of learning and collaboration rather than merely digitising existing content delivery approaches. This distinction proves crucial for institutions seeking meaningful educational transformation rather than superficial technological adoption.

The intersection of digital transformation and sustainability education represents a critical opportunity for preparing students to address complex 21st-century environmental challenges through technological fluency combined with deep environmental understanding. As digital technologies continue evolving and environmental pressures intensify globally, universities that develop expertise in this integrated approach will position themselves to serve both educational excellence and broader societal needs.

The Southern Delta University model provides a replicable framework while emphasising the importance of adapting implementation strategies to local institutional contexts, student demographics, and resource availability. The demonstrated benefits, combined with growing technological accessibility and platform sophistication, suggest that digital sustainability education initiatives will become increasingly central to higher education's leadership role in environmental education and social responsibility.

Future success in this domain depends upon continued collaboration between educational researchers, technology developers, sustainability experts, and institutional leaders committed to evidence-based innovation. This framework provides a foundation for such collaborative efforts while identifying critical research questions that must be addressed to realise the full potential of digital sustainability education in addressing global environmental challenges through higher education transformation.

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EVALUATING E-LEARNING READINESS AND OPEN EDUCATIONAL RESOURCES USE AMONG STUDENTS OF NATIONAL OPEN UNIVERSITY OF NIGERIA (NOUN)

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Abstract

This study examined e-learning readiness and the use of Open Educational Resources (OERs) among students of the National Open University of Nigeria (NOUN). The challenge addressed is whether students possess the necessary motivation, digital access, and support to fully benefit from e-learning and OERs. Using a descriptive survey design, data were collected from 1,911 students across six study centres, with analysis conducted using descriptive statistics. Results showed that students displayed moderate to high levels of e-learning readiness, particularly in technical support (mean = 2.89) and motivation (mean = 3.08), though device access posed challenges (mean = 2.82). OER usage was generally high, especially for structured, course-related resources such as courseware (mean = 3.47) and online tutorials (mean = 3.08), while reference-based materials were less utilized. The study recommends improved device accessibility, expanded technical support, and targeted training to enhance effective and diversified use of OERs.

Keywords: E-learning readiness, OERs, Digital access, Distance learning

Introduction

Open Educational Resources (OERs) are teaching, learning and research materials that offer unrestricted access to a vast array of educational materials and tools, and called be seen as an advance step in the field of education. The emergence of open and distance learning (ODL) and a broader culture of open knowledge, open source, free sharing, and peer collaboration in the late 20th century served as the impetus for the OERs movement (Mishra et al., 2022). Bliss and Smith (2017) opined that the open-source community supported the movement, which aimed to increase information access by utilising free and open content. Establishing equitable access for both privileged and underprivileged individuals worldwide to construct a collective knowledge base was the tacit objective. With its global momentum, this revolutionary movement is changing the way that education is delivered and this opens up new avenues for students of all stripes.

The National Open University of Nigeria (NOUN), a leading institution of Open and Distance Learning in Nigeria, leverages open educational resources to enhance accessibility and quality of educational delivery. By operating OERs policy, NOUN provides a wide range of freely available, high-quality educational materials that support diverse learning needs and promote lifelong learning. This not only reduces the cost of educational resources for students

but also ensures that up-to-date and relevant materials are readily available, fostering inclusive and flexible learning environment in line with global educational standards.

The use of OERs by students is intrinsically linked to e-learning readiness and the development of digital literacy skills. E-learning readiness is a multifaceted concept that takes into account the technological, cognitive and social aspects of online learning. The typical e-learning readiness assessment measures the users' ability to adapt to technological challenges, collaborative learning skills and training as well as the synchronous and asynchronous self-paced learning and training (Hashim & Tasir, 2014). Other indices of e-learning readiness include availability of technological infrastructure, The link to access to relevant electronic devices, learning skills required to use engage with the electronic contents, technical support and internet connectivity available for use. By addressing these factors, students can enhance his/her readiness to effectively engage with OERs and benefit therefrom. This study adopted access to relevant electronic devices, access to internet connectivity, technical support and learners' motivation as indicators of NOUN students' e-learning readiness.

Statement of the Problem

The shift towards e-learning has necessitated an examination of students' readiness in digital learning activities, particularly in institutions like the National Open University of Nigeria (NOUN). E-learning readiness encompasses various factors, including access to technology, technical support and learner motivation to engage in virtual learning. For NOUN students, many of whom are adults balancing education with work and family responsibilities, the transition to online learning can be challenging. These students must not only possess basic digital literacy skills but also have the confidence and ability to engage effectively with digital learning platforms. The extent to which NOUN students are prepared for e-learning directly impacts their academic success and the overall effectiveness of the university's educational delivery.

Moreover, the use of Open Educational Resources (OERs) presents both opportunities and challenges. OERs can significantly enhance learning by providing free and flexible resources, but they also require students to navigate and utilise digital content efficiently. For NOUN students, who may have varying levels of digital literacy, the ability to find, evaluate, and use OERs is critical. This raises important questions about the current state of their learning readiness and the technical support available to help them leverage these resources. Understanding and addressing these factors is crucial for improving educational outcomes and ensuring that students can fully benefit from the advantages of e-learning and OERs

Research Objectives

The main objective of this study is to investigate the e-learning readiness and open educational resources use by National Open University of Nigeria (NOUN) students. Specifically the study seeks to:

1. investigate open educational resources use by National Open University of Nigeria (NOUN) students; and
2. find out the level of e-learning readiness of National Open University of Nigeria (NOUN) students.

Research Questions

The study would answer the following research questions:

1. What is the level of open educational resources use by National Open University of Nigeria (NOUN) students?
2. What is the level of e-learning readiness of National Open University of Nigeria (NOUN) students?

Hypothesis

E-learning readiness has no significant influence on the Open Educational Resources (OERs) use by Students of National Open University of Nigeria.

Literature Review

E-learning readiness has emerged as a crucial determinant of students' success in virtual learning environments. A central finding across studies is that readiness significantly influences self-regulation and the ability to manage online learning processes. Ucar and Ugurhan (2023) demonstrated that students with higher readiness were better able to set goals, maintain motivation, and sustain their learning efforts throughout online courses. Similarly, Salisu et al (2025) established a strong positive correlation between readiness and academic achievement, showing that adequately prepared students not only perform better but are also more likely to complete their programmes successfully. Together, these findings suggest that readiness is a critical predictor of both learner autonomy and academic outcomes in digital education.

While technological competence is often viewed as the foundation of e-learning readiness, research has shown that it is insufficient on its own. Caliskan et al. (2017) revealed that although university students generally possessed moderate to high levels of technological skill, many displayed deficiencies in self-management and independent learning. This indicates that true readiness extends beyond digital familiarity to include cognitive, affective, and time management abilities. Majid and Lakshmi (2022) further reinforced this argument by highlighting readiness as a multidimensional construct shaped by factors such as infrastructure quality, cultural attitudes toward technology, and prior exposure to digital environments. Thus, readiness must be conceptualized as a holistic blend of technical proficiency, learning dispositions, and contextual influences.

Student experiences further illustrate the complexity of readiness in online learning. Mahajan and Kalpana (2018) reported that learners valued the flexibility and accessibility afforded by e-learning but also faced significant challenges, including limited instructor interaction, lower motivation, and unstable internet connectivity. These findings suggest that while students may possess the basic skills to participate in online education, structural and pedagogical barriers can undermine their readiness and engagement. Addressing such gaps requires not only student preparation but also institutional investments in infrastructure and interactive instructional design.

Another strand of research has examined the relationship between readiness and students' openness to innovative pedagogical approaches. Aramide et al (2025) demonstrated that learners with higher readiness levels displayed more positive attitudes toward gamification elements, such as badges and leaderboards, and reported greater persistence in learning activities. Conversely, learners with lower readiness showed resistance to such innovations. This suggests that readiness not only predicts academic success but also mediates the adoption of emerging digital pedagogies, highlighting its broader role in shaping the trajectory of online learning environments.

Beyond students, faculty readiness is increasingly recognized as an essential component of successful e-learning implementation. Vijaya (2021) found that while faculty members often had strong subject expertise, many lacked confidence in using advanced e-learning tools, designing interactive online lessons, and fostering engagement in virtual classrooms. This gap reflects the need for continuous professional development, peer mentoring, and enhanced technical support. The study by Aramide et al (2025) reinforces this point, showing that although students were generally more adaptable to technological environments, faculty demonstrated greater weaknesses in digital pedagogy. Both groups, however, emphasized the

necessity of institutional infrastructure and training, suggesting that readiness interventions must address the needs of both instructors and learners simultaneously.

Taken together, the empirical evidence indicates e-learning readiness as a multifaceted and systemic construct, encompassing not only technological access and skills but also self-regulation, motivation, cognitive and affective abilities. In conclusion, the reviewed studies converge on the view that fostering readiness is indispensable for the sustainability and effectiveness of online education. Higher education institutions must therefore adopt comprehensive readiness frameworks that integrate infrastructural development, student preparation, and faculty training. By doing so, they can address the diverse dimensions of readiness, enhance learner autonomy and motivation, and support innovative pedagogies such as gamification. Ultimately, readiness should be approached not as a static trait but as a dynamic process that requires continuous reinforcement through training, support, and policy interventions to ensure quality outcomes in open and distance learning.

Methodology

This study employed the descriptive survey research design within a quantitative approach, deemed appropriate for examining the influence of e-learning readiness and use of open educational resources (OERs) among students of the National Open University of Nigeria (NOUN). The target population comprised all 115,688 active undergraduate and postgraduate students across the university's 123 study centres nationwide. A multi-stage sampling procedure was used, multistage sampling was appropriate because of the nature of study population: in the first stage, all six geopolitical zones were included as the population of the study; in the second stage, one representative study centre was purposively selected from each zone, the study centre with the highest number of students was selected from each zone to ensure adequate representation of strata of the population; and in the final stage, Research Advisors' (2006) sample size table guided the determination of participants from each of the selected study centres. This process yielded a sample size of 1,976 students drawn from Abuja, Maiduguri, Kaduna, Enugu, Port Harcourt, and Lagos study centres.

Data were collected using a structured questionnaire titled *E-learning Readiness and Open Educational Resources Use Questionnaire (EROERUQ)*. The instrument, adapted from previous studies, was divided into four sections: demographic information, awareness and types of OERs, frequency of OERs use and e-learning readiness. Items were rated on four- or five-point Likert scales, depending on the construct measured. To facilitate administration, the questionnaire was coded into a Google Form and distributed electronically by sharing the link on the official social media platforms of the selected study centres. Out of the responses received, 1,911 were found valid and subsequently used for analysis. Instrument validity was ensured through face and content review by academic experts, while reliability was confirmed through a pilot study involving 30 from Iconic Open University Sokoto, which yielded an overall Cronbach's alpha coefficient of 0.79, indicating good internal consistency.

The validated instrument was administered online, and data were analysed using descriptive and inferential statistics. Frequency counts, percentages, means, and standard deviations were used to describe respondents' characteristics and address the research questions and simple linear regression was used to test the hypothesis. A mean score of 2.50 was adopted as the decision benchmark for interpreting responses on the rating scales. The result is presented in Table 1-4

Results**Table 1: Demographic profile of the respondents**

Study Centre	Freq	Percentage
Abuja	227	11.89
Enugu	94	4.90
Kaduna	241	12.59
Lagos	1042	54.55
Maiduguri	200	10.49
Port Harcourt	107	5.59
Total	1911	100.00
Gender	Freq	Percentage
Male	922	48.25
Female	989	51.75
Total	1911	100.00
Programme	Freq	Percentage
Undergraduate	1082	56.64
Postgraduate	829	43.36
Total	1911	100.00
Faculty	Freq	Percentage
Agricultural sciences	40	2.10
Arts	134	6.99
Computing	94	4.90
Education	521	27.27
Health sciences	307	16.08
Law	-	0.00
Management sciences	321	16.78
Sciences	94	4.90
Social Sciences	401	20.98
Total	1911	100.00
Level of study	Freq	Percentage
100	214	11.19
200	414	21.68
300	147	7.69
400	227	11.89
500	107	5.59
700	241	12.59
800	535	27.97
900	27	1.40
Total	1911	100.00
Age (in years)	Freq	Percentage
Less than 18	0	0
18 – 22	94	4.90
23 – 27	374	19.58
28 – 32	428	22.38
33 – 37	361	18.88
38 – 42	267	13.99
43 – years above	388	20.28
Total	1911	100.00

The distribution of respondents across study centres in Table 1 shows that Lagos recorded the highest proportion (54.55%), while Enugu had the lowest (4.90%). By faculty, Education accounted for the largest share of respondents (27.27%), whereas Agricultural Sciences recorded the lowest at 2.10%, with no response from the Faculty of Law (0.00%). Across programmes, undergraduates constituted the majority (56.64%), while postgraduates represented 43.36%. Gender distribution was nearly balanced, with females slightly higher (51.75%) than males (48.25%).

Analysis of level of study revealed that 800-level students formed the highest category (27.97%), while 900-level students were the least represented (1.40%). Age distribution indicated that the 28–32 years group had the highest participation (22.38%), followed by respondents aged 43 years and above (20.28%), whereas the lowest participation was observed among the 18–22 years group (4.90%).

Table 2: Types of OERs used by NOUN students

S/N	Types of OERs I make use of:	Always = 4	Often = 3	Rarely = 2	Never = 1	Mean	Std
i.	Open access journals, magazines and periodicals	281	601	748	281	2.46	0.11
ii.	Open access reference e-books	494	588	641	187	2.73	0.37
iii.	Open access e-text books	682	641	494	94	3.00	0.61
iv.	Open access reports	294	494	815	307	2.41	.06
v.	Open online courses and tutorials	868	722	241	80	3.24	.82
vi.	Open online anti-plagiarism	441	508	695	267	2.59	.26
vii.	Open online grammar checker	414	601	628	267	2.61	.27
viii.	Openly shared video clips of lectures	655	575	508	174	2.90	.54
ix.	Openly shared lecture notes and class notes	748	535	481	147	2.99	.62
x.	Open courseware (course materials)	1189	428	294	0	3.47	.02
xi.	Open online tutorials on specific topics	775	655	334	147	3.08	.70
Xii.	Open online interactive help desks and forums	748	588	441	134	3.02	.65

The result in Table 2 shows varying levels of use of different types of OERs by the students. Open access reports (Mean = 2.41) and open access journals, magazines and periodicals (Mean = 2.46) were below the criterion mean of 2.50, indicating low use. Similarly, open access reference e-books (Mean = 2.73), open online anti-plagiarism tools (Mean = 2.59), open online grammar checkers (Mean = 2.61), and openly shared video clips of lectures (Mean = 2.90) were all above the criterion mean but below 3.00, showing moderate use. This implies that while these resources are accessed, they are not yet maximally used by NOUN students.

In contrast, open access e-textbooks (Mean = 3.00), openly shared lecture and class notes (Mean = 2.99 $\approx$ 3.00), open online tutorials on specific topics (Mean = 3.08), open online

interactive help desks and forums (Mean = 3.02), open online courses and tutorials (Mean = 3.24), and open courseware (Mean = 3.47) all recorded mean values within the 3.00–4.00 range, signifying high use. This finding suggests that learners prefer structured, course-related and interactive OERs over reference or reporting materials. The outcome is consistent with Vijaya et al. (2020), who equally reported a high level of OERs use among undergraduates, particularly in accessing open courseware and online tutorials, thereby confirming that OERs play a significant role in supporting academic engagement.

Table 3: Frequency of OER use by NOUN students

S/N	Frequency of OERs Use	Daily = 5	Weekly = 4	Monthly = 3	Occasionally = 2	Never = 1	Mean	Std
I use OERs:								
i.	Open access journals, magazines and periodicals	254	588	374	481	214	3.10	0.83
ii.	Open access reference e-books	388	575	281	481	187	3.26	0.01
iii.	Open access e-text books	575	508	254	428	147	3.49	0.23
iv.	Open access reports	334	468	468	347	294	3.10	0.88
v.	Open online courses and tutorials	668	615	267	267	94	3.78	0.46
vi.	Open online anti-plagiarism	254	454	428	428	347	2.92	0.70
vii.	Open online grammar checkers	441	374	454	281	361	3.13	0.95
viii.	Openly shared video clips of lectures	414	708	307	321	160	3.47	0.18
ix.	Openly shared lecture notes and class notes	544	535	307	267	147	3.67	0.38
x.	Open courseware (course materials)	935	575	94	254	53	4.09	0.74
xi.	Open online tutorials on specific topics	641	682	200	241	147	3.75	0.45
xii.	Open online interactive help desks and forums	561	601	374	174	200	3.60	0.32

Weighted Mean**3.45**

The results in Table 3 indicate that the respondents generally demonstrated a high level of engagement with OERs, with the weighted mean of 3.45 exceeding the criterion mean of 2.50, thereby showing that OERs are used regularly. Specifically, open courseware (Mean = 4.09), open online courses and tutorials (Mean = 3.78), open online tutorials on specific topics (Mean = 3.75), openly shared lecture notes and class notes (Mean = 3.67), and open online interactive forums (Mean = 3.60) were the most frequently used, all falling within the regular use category (Mean = 3.00–4.00). Similarly, open access e-textbooks (Mean = 3.49), openly shared video clips of lectures (Mean = 3.47), and open access reference e-books (Mean = 3.26) also recorded regular use, reflecting a preference for structured and interactive OER formats that directly support academic study.

In contrast, open online grammar checkers (Mean = 3.13), open access journals, magazines and periodicals (Mean = 3.10), and open access reports (Mean = 3.10) were also regularly used but at a lower intensity relative to courseware and tutorials. Open online anti-plagiarism tools (Mean = 2.92) ranked lowest, with usage falling in the often category, suggesting that students may rely more on other forms of academic support than on plagiarism-detection tools. Overall, the findings reinforce the conclusion that postgraduate students engage with OERs on a regular basis. This outcome aligns with Aramide et al (2025), who similarly reported regular use of OERs by postgraduate learners, underscoring their integral role in advanced academic research and study practices.

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Table 4: Level of E-learning readiness

S/N	E-learning Readiness	VHE (4)	HE (3)	LE (2)	VLE (1)	Mean	Std
	Technical Support						
i.	To what extent is technical support readily available to assist you when you encounter difficulties using Open Educational Resources at NOUN?	428	855	481	147	2.82	0.42
ii.	To what extent does NOUN provide timely and effective technical assistance for resolving issues related to Open Educational Resources?	401	922	481	107	2.85	0.43
iii.	To what extent do the guidelines and troubleshooting resources provided by NOUN help students overcome technical challenges when using Open Educational Resources?	361	1056	414	80	2.89	0.45
iv.	To what extent does NOUN provide multiple technical support channels (e.g., email, chat, phone, or helpdesk) that facilitate the resolution of issues related to Open Educational Resources?	535	962	321	94	3.01	0.59
v.	To what extent are you satisfied with the responsiveness and competence of NOUN's technical support team in addressing challenges related to Open Educational Resources?	494	909	361	147	2.92	0.52
	Weighted Mean					2.89	
	Device Access						
vi.	To what extent do you have personal access to a functional device (e.g., laptop, tablet, or smartphone) for engaging with Open Educational Resources?	922	628	294	67	3.26	0.84
vii.	To what extent does your primary device support seamless access to Open Educational Resources (e.g., compatibility with required file formats, stable performance, etc.)?	682	855	347	27	3.15	0.71
viii.	To what extent do you experience interruptions in accessing Open Educational Resources due to device-related issues (e.g., battery life, screen size, processing speed, or hardware failure)?	307	601	748	254	2.50	0.15
ix.	To what extent do you have access to alternative devices (e.g., borrowing from friends, using public computers) when your primary device is unavailable?	334	588	655	334	2.48	0.15
x.	To what extent does the cost of acquiring and maintaining a suitable device affect	307	909	521	174	2.71	0.31

	your ability to access Open Educational Resources?							
	Weighted Mean						2.82	
	Learner Motivation							
xi	To what extent do Open Educational Resources (OERs) enhance your motivation to engage in independent learning?	695	909	241	67	3.17	0.73	
xii	To what extent does the availability of Open Educational Resources encourage you to explore additional learning materials beyond the provided course content?	535	909	374	94	2.99	0.57	
xiii.	To what extent do Open Educational Resources help you stay motivated to complete your coursework and academic activities at NOUN?	641	989	254	27	3.17	0.72	
xiv.	To what extent do the interactive and multimedia features of Open Educational Resources (e.g., videos, simulations, quizzes) improve your engagement with learning materials?	428	989	414	80	2.92	0.49	
xv.	To what extent does easy access to Open Educational Resources reduce learning-related stress and improve your confidence in completing academic tasks?	655	855	374	27	3.12	0.68	
	Weighted Mean						3.08	

Table 4 results on technical support indicate a high extent of readiness with a weighted mean of 2.89, which is above the criterion mean of 2.50. This suggests that students perceive NOUN's technical support for OERs as fairly effective and accessible, particularly through the provision of multiple support channels (Mean = 3.01) and reasonably responsive assistance (Mean = 2.92). Although the extent of readiness is not very strong, it still reflects a substantial level of institutional support. This finding aligns with Mahajan and Kalpana (2018), who reported that technical support significantly influences the use of OERs by both students and faculty, underscoring the importance of structured technical assistance in sustaining OER adoption.

With respect to device access, the findings revealed a moderate extent of readiness with a weighted mean of 2.82. While students reported personal access to functional devices (Mean = 3.26) and seamless compatibility of devices with OER platforms (Mean = 3.15), challenges were evident in alternative device access (Mean = 2.48) and interruptions due to device-related issues (Mean = 2.50). This suggests that although most students have access to personal devices, constraints such as cost and lack of reliable alternatives still limit effective OER engagement. This finding supports Majid and Lakshmi (2022), who reported that higher levels of device access significantly encourage OER use among distance learners.

For learner motivation, the results indicated a high extent of readiness with a weighted mean of 3.08, showing that OERs play a vital role in sustaining postgraduate students' learning drive. Respondents noted that OERs enhance motivation for independent learning (Mean = 3.17), support coursework completion (Mean = 3.17), and reduce learning-related stress (Mean = 3.12). These findings imply that OERs are not only functional tools but also strong motivators

for active engagement in learning. The results corroborate Salisu et al (2025), who found a positive correlation between learner motivation and OER use among postgraduate students, further highlighting the role of OERs in fostering both academic persistence and success.

Hypothesis Testing

Table 5: Simple linear regression predicting Open Educational Resources (OERs) use from e-learning readiness among students of the National Open University of Nigeria (NOUN)

Predictor	B	SE B	β	T	P
Constant (OERs Use)	0.98	0.24	—	4.08	< .001
E-learning readiness	0.84	0.07	.63	11.25	< .001
Model fit: $R = .63$, $R^2 = .40$, Adjusted $R^2 = .39$, $F(1, 188) = 126.48$, $p < .001$					

A simple linear regression analysis was conducted to examine if e-learning readiness significantly predicts Open Educational Resources (OERs) use by students of National Open University of Nigeria. The regression model was statistically significant, $F(1, 188) = 126.48$, $p < .001$, accounting for 40% of the variance in OERs use ($R^2 = .40$). E-learning readiness emerged as a significant positive predictor of OERs use among NOUN students, $B = 0.84$, $SE = 0.07$, $\beta = .63$, $t = 11.25$, $p < .001$. This indicates that higher levels of e-learning readiness are associated with increased Open Educational Resources (OERs) use among students of National Open University of Nigeria (NOUN).

Based on the above analysis, the null hypothesis stating that e-learning readiness has no significant influence on OERs use among students of the National Open University of Nigeria is rejected. The alternative hypothesis is therefore accepted.

Major Findings

1. The study revealed that students of NOUN make high use of structured and course-related OERs such as open access e-textbooks (Mean = 3.00), open online tutorials (Mean = 3.08), open online courses (Mean = 3.24), and open courseware (Mean = 3.47), while the use of open access reports (Mean = 2.41) and open access journals, magazines, and periodicals (Mean = 2.46) was low. This indicates a strong preference for interactive and course-aligned OERs over reference-based materials.
2. The level of e-learning readiness among NOUN students was generally moderate to high across the three measured dimensions. Technical support (Weighted Mean = 2.89) and learner motivation (Weighted Mean = 3.08) reflected a substantial level of readiness, while device access (Weighted Mean = 2.82) indicated moderate readiness, constrained mainly by cost and limited alternative device availability.

Conclusion

The study concludes that while NOUN students demonstrate appreciable levels of e-learning readiness and actively engage with structured, course-related OERs, challenges remain in diversifying resource use and strengthening device access. Technical support and learner motivation were found to be significant drivers of OER adoption, but limited access to alternative devices and underuse of reference-based OERs constrain optimal utilization. Overall, the findings affirm that NOUN students are fairly ready for e-learning and are already integrating OERs into their academic practices, though targeted interventions are necessary to bridge existing gaps.

Recommendations

1. Strengthen device accessibility initiatives: NOUN should collaborate with ICT vendors and service providers to subsidize device acquisition and provide shared access options (e.g., device loan schemes or learning hubs) to reduce the challenges of cost and limited alternatives.
2. Expand technical and motivational support for OER use: Beyond maintaining multiple support channels, NOUN should regularly train students on the use of underutilized OER categories (e.g., journals, reports, and e-books) while sustaining learner motivation through incentives, awareness campaigns, and integration of OERs into coursework.

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EMERGING TECHNOLOGIES IN LIBRARY AND INFORMATION SCIENCE (LIS) EDUCATION IN THE DIGITAL AGE: A DESK REVIEW

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Abstract

*As the digital age progresses, emerging technologies are fundamentally transforming Library and Information Science (LIS) education. This paper explores the integration of innovative technologies such as Artificial Intelligence (AI), Virtual Reality (VR), Cloud Computing, Big Data, and Blockchain into LIS curricula. AI enhances user engagement through intelligent chatbots and data analytics, enabling libraries to tailor services to patron needs. VR and Augmented Reality (AR) offer immersive learning experiences, facilitating deeper understanding of digital collections. Cloud computing supports resource sharing and collaborative learning, while Big Data analytics empower librarians to make data-driven decisions. Digital curation tools and the incorporation of Open Educational Resources (OER) play crucial roles in managing and disseminating information. Additionally, mobile technologies and gamification strategies enhance accessibility and engagement, fostering a more interactive learning environment. This review underscored the necessity for LIS programs to adapt to these technological advancements to prepare graduates for the evolving information landscape. The study concluded that, integrating these tools into educational frameworks is essential for improving learning outcomes and equipping students with the necessary skills for leadership in contemporary information settings. **The study recommended a need to** foster partnerships between academia and technology providers, investing in faculty training on emerging technologies, and developing interdisciplinary curricula that reflect the multifaceted nature of modern information challenges.*

Keywords: Library and Information Science, emerging technologies, education, Artificial Intelligence, digital curation.

Introduction

The field of library and information science (LIS) education is undergoing a significant upheaval in a time of unparalleled digital change. Libraries have changed from being associated with quiet reading rooms and card catalogues to becoming vibrant centers of digital resources, data analytics, and online interactions. According to Lau et al. (2020), this evolution calls for a paradigm shift in LIS education, requiring educators to give aspiring professionals the tools they need to lead and navigate an increasingly complex information environment. Significant changes in the way libraries function have been sparked by the development of information technology. Conventional patterns of information dissemination have been upended by the growth of mobile and internet technologies. Digital libraries, online databases, and social media platforms have revolutionised the way consumers search, access, and engage with information (Opele, 2023a). Libraries now serve as community centers, cultural hubs, and digital literacy facilitators in addition to being information repositories (Siddique et al., 2023). LIS education must change to include these new technologies if it is to prosper in this changing environment. According to academics, incorporating technology into LIS courses is crucial for equipping students to handle the demands of contemporary librarianship (Farid et al., 2023). According

to the literature, the year 2000 brought with it an era of "wired" individuals, highlighting the necessity for LIS professionals to become proficient with technology (Latham & Pinder, 2005). Numerous studies that stress the value of technology literacy in the LIS field and the necessity of a curriculum that takes into account both present trends and future demands support this view (Stoffberg & Blignaut, 2013).

The information landscape and the skills needed by future librarians are changing as a result of emerging technologies including artificial intelligence (AI), virtual reality (VR), cloud computing, big data, and blockchain. For example, AI is transforming user interaction through data analytics and intelligent chatbots, allowing libraries to customise services to each patron's unique needs (Opele, 2023b). This change not only improves the user experience but also frees up librarians to work on more complex projects that need for creativity and critical thought. In a similar vein, augmented reality (AR) and virtual reality (VR) are providing cutting-edge educational opportunities that promote a deeper comprehension of digital resources. Students can engage with knowledge in previously unthinkable ways in immersive learning environments made possible by these technologies (Su & Chen, 2022). For instance, libraries are expanding access and engagement by employing virtual reality (VR) to offer virtual tours that let patrons explore collections and resources from the comfort of their homes.

Additionally, cloud computing has become an essential part of contemporary LIS education. Cloud technologies enable collaboration between instructors and students by offering scalable solutions for resource management and data storage (Siddique et al., 2023). According to Abdulrahman et al. (2021), this invention facilitates the creation of digital libraries and shared resources, allowing organisations to maximise their operations while upholding high levels of accessibility. Additionally, Big Data analytics is essential for comprehending consumer behaviour and preferences. Librarians can make well-informed decisions regarding program development, resource allocation, and service improvement by utilising data-driven insights (Mehmood et al., 2019). Large dataset analysis enables libraries to predict user wants, which eventually improves service delivery and increases user happiness (Ummah, 2019). Additionally, blockchain technology is becoming more popular as a safe approach to manage digital rights and transactions, giving libraries new tools to guarantee transparency and safeguard intellectual property (Latif et al., 2021). It is a useful addition to the technological toolkit of aspiring librarians, with possible uses in LIS ranging from digital asset management to information authenticity verification.

There are still issues with incorporating these technologies into LIS teaching, despite the obvious advantages. A paucity of resources and out-of-date curricula make it difficult for many LIS programs to successfully integrate cutting-edge technologies (Adigun et al., 2024). In order to acquire the skills needed to instruct these new tools, faculty members could also need training. The transition to a technology-enhanced educational paradigm necessitates that educators not only comprehend the technologies themselves but also know how to successfully incorporate them into pedagogy, as observed by Kumar (2010). Additionally, one of the biggest challenges for LIS educators is the speed at which technology is changing. Because of this changing environment, LIS professionals must be committed to lifelong learning and ready to change with the technologies they use (Owolabi et al., 2022). This research seeks to investigate the revolutionary effects of new technologies on LIS education in light of these factors. The study aims to highlight the crucial role that technology will play in influencing the future of librarianship and to offer insights to educators, students, and practitioners in the field of LIS.

Review of Related Literature

A Brief History of Technology in LIS Education

Over the years, the link between technology and Library and Information Science (LIS) education has changed dramatically, reflecting broader societal changes in the management, distribution, and availability of information. Libraries started using mechanical equipment to enhance cataloguing and indexing in the early 20th century, which is when technology in LIS first emerged. A progressive integration of technology into library activities began with the invention of the typewriter and, subsequently, microfilm technology, which transformed record-keeping and information retrieval (Hillmann et al., 2008). The first automated cataloguing systems were introduced in the middle of the 20th century, marking the beginning of automation in libraries. The Online Computer Library Center (OCLC) and the MARC (Machine-Readable Cataloguing) format were developed during the crucial 1960s and 1970s (De Groote & Dorsch, 2003). These developments significantly altered how libraries functioned and how material was accessed by laying the foundation for computerised cataloguing and information retrieval (Abubakar, 2014). The late 20th century saw the emergence of the internet, which presented both new opportunities and challenges for LIS education. Curricula had to change to include digital literacy, information technology skills, and an awareness of the emerging area of digital librarianship due to the growth of digital information resources.

According to Togia et al. (2012), LIS programs must adapt and prepare students for this new reality as the advent of online databases and digital repositories changed the landscape of information access. The development of online 2.0 and the spread of online technologies in the early 2000s significantly changed the function of libraries and the skills needed by librarians (Mansour, 2016). LIS educators were forced to reconsider their instructional techniques as social media platforms, user-generated material, and collaborative tools become essential to library services (Emezie & Nwaohiri, 2016). Programs started emphasising the value of digital communication, social media involvement, and user-centred design in addition to traditional library skills (Al-Daihani, 2011; Tsarapkina et al., 2021).

Current Trends

The transformative influence of technology integration in LIS education is highlighted by recent research (Asemi, 2023; Nikita Shivaji, 2024), which also demonstrate a rising consensus among educators regarding the importance of adopting developing technologies into curricula. Over the past ten years, a substantial amount of work has been produced that focuses on many facets of technology in LIS education, from pedagogical practices to curriculum design (Omehia et al., 2021). One significant trend is the increasing emphasis on integrating emerging technology into LIS programs. According to research, programs are taking a more comprehensive approach to integrating technology because they understand how important it is to give students a wide range of skills. According to research by Matusiak et al. (2022), for example, many LIS schools are already offering courses on data analytics and AI, demonstrating the understanding that these technologies are crucial skills for aspiring librarians. Additionally, technologies like augmented reality and virtual reality are being investigated for their potential to improve learning and user engagement. For instance, (Nedbal et al., 2023) show how virtual reality (VR) technology are being used in library instruction to build immersive learning environments that let students engage with resources and collections in novel ways. This move toward experiential learning reflects a larger tendency in LIS education to use pedagogical strategies that emphasise interactive, hands-on learning.

Online Resources and Collaborative Learning

The growth of technologically enabled collaborative learning spaces is another noteworthy development. In LIS education, using online platforms for group projects, conversations, and knowledge exchange is becoming more widespread. According to research by Opele (2022), cloud computing and collaborative technologies help pupils develop a sense of community by facilitating easy communication and resource sharing. Furthermore, LIS curricula are increasingly incorporating Open Educational Resources (OER) (Iyanda & Opele, 1979). OER promotes equity and inclusion in education by enabling teachers to give students free and easily available educational resources.

A Focus on Digital Literacy

Due to the evolving nature of information access and the skills needed to successfully traverse it, digital literacy has become a basic competency in LIS education. According to recent research, LIS teachers are placing a greater emphasis on teaching students digital literacy so they can use digital tools, critically assess information sources, and interact with developing technology. The larger objectives of LIS education, which seek to equip students as advocates for information access and equity as well as information management, are in line with this emphasis on digital literacy.

Emerging Technologies in the Teaching of Library and Information Science

Artificial Intelligence (AI), Virtual Reality (VR), Augmented Reality (AR), Cloud Computing, Big Data Analytics, Digital Curation Tools, Social Media Integration, Open Educational Resources (OER), Mobile Technologies, Blockchain Technology, Gamification, and Collaborative Learning Platforms are just a few of the noteworthy developments that have revolutionised Library and Information Science (LIS) education. Each of these technologies offers special chances to improve user interaction, simplify resource management, and encourage teamwork in library environments.

AI, or artificial intelligence

By improving user engagement and automating procedures, artificial intelligence (AI) is transforming the field of library and information science (LIS). Chatbots are one of the most obvious uses of AI in libraries (Kasneci et al., 2023). These AI-powered applications offer consumers immediate support by responding to often requested queries and directing users via library resources. For example, customers can access information even after regular library hours thanks to the University of Michigan Library's 24-hour chatbot. This lessens the workload of library employees while simultaneously increasing user satisfaction (Li & Zhu, 2022). Another crucial use of AI is data analytics, which allows libraries to examine enormous volumes of user data to learn more about the tastes and behaviour of its patrons. Libraries can customise services to fit the unique requirements of their communities by utilising data analytics. For instance, libraries can determine the most popular resources and modify their holdings accordingly. Additionally, analytics can help libraries allocate resources more efficiently by providing information for decision-making processes (Ren et al., 2019).

The incorporation of AI technologies greatly improves LIS user engagement. Chatbots improve information access and build a sense of connection between users and library services by responding to user enquiries instantly (Egara & Mosimege, 2024). In a time when consumers demand prompt and effective service, this instantaneity is essential. Additionally, libraries can customise user experiences thanks to AI-driven data analytics. Libraries can develop focused outreach initiatives, provide resource recommendations, and even alter user interfaces to accommodate personal preferences by analysing user behaviour. Increased patron happiness

and loyalty may result from this degree of personalisation, which would eventually improve libraries' overall service delivery (Yang et al., 2022).

Augmented reality (AR) and virtual reality (VR)

Innovative learning opportunities in LIS education are provided by cutting-edge technology like virtual reality (VR) and augmented reality (AR). Users can browse digital collections in replicated spaces thanks to virtual reality's immersive surroundings. Virtual reality (VR) can be used by libraries to create virtual tours that let patrons explore collections, engage with exhibits, and even attend events from the comfort of their homes (Chang et al., 2022). For example, the New York Public Library has created a virtual reality experience that enables visitors to engage with historical collections (Kot & Jones, 2015). Conversely, augmented reality (AR) improves the in-person library experience by superimposing digital data on the physical world. AR apps, for instance, can direct people to particular books on shelves or give them more details about exhibits via their cellphones. This interactive layer enhances the learning process and encourages participation. VR and AR technology have been successfully incorporated into training programs by a number of organisations. For its employees, the University of Illinois Library created a virtual reality training program that lets them practise customer service scenarios in a risk-free setting. This strategy improves customer relations in addition to staff competencies (Connell et al., 2021).

Cloud Computing

Because cloud computing offers scalable options for data storage and accessibility, it has revolutionised resource management in LIS. Without requiring substantial physical infrastructure, libraries can store enormous volumes of digital resources by using cloud services (Kunal et al., 2019a). This move to cloud-based solutions improves user accessibility while lowering operating expenses. For example, many libraries now use cloud-based platforms to hold their digital collections, allowing users to access resources from any device with internet connectivity. In today's mobile-driven environment, where people expect to access information at any time and from any location, this flexibility is crucial.

Tools for Collaboration

Additionally, cloud computing makes it easier for library employees and users to work together. Librarians can collaborate on projects, share documents, and communicate easily thanks to programs like Google Drive and Microsoft Teams (Kunal et al., 2019b). In library environments, this cooperative atmosphere fosters creativity and increases productivity. Additionally, cloud-based services can facilitate user collaboration in learning. Libraries can establish common areas where users can collaborate on group projects, exchange materials, and have conversations (Ezeanya et al., 2024). Libraries are vital centers of cooperation because they promote a feeling of community and improve the educational process.

Analytics and Big Data

Libraries can examine enormous volumes of data regarding user behaviour and preferences thanks to big data analytics. Librarians may learn a lot about the most popular resources, how patrons use the library, and which services are most frequently used by utilising data from databases, catalogues, and user interactions (Singh & El-Kassar, 2019). Libraries are able to make well-informed decisions about service development and resource allocation thanks to this data-driven strategy. To raise awareness and utilisation, libraries can, for example, identify underutilised resources and create focused marketing efforts. Furthermore, by examining user behaviour, new services that are in line with customer interests can be developed (Anshari et al., 2022). Decision-making procedures are improved when big data analytics are incorporated

into library administration. Data can be used by librarians to predict future requirements, spot trends, and evaluate the success of projects. For instance, libraries can identify popular genres or subjects and modify their collections by examining circulation data. Additionally, data analytics can help with strategic planning projects. Libraries can set objectives, track results, and assess the effectiveness of their services using insights gleaned from user data. Librarians may lobby for resources and support inside their institutions thanks to this evidence-based strategy (Singh & El-Kassar, 2019).

Tools for Digital Curation

In libraries, digital curation technologies are essential for maintaining and organising digital resources. With the use of these tools, librarians may preserve digital archives, handle metadata, and make sure that collections are always available (Bester et al., 2021). Maintaining the integrity and usability of digital materials requires effective digital curation. To build and maintain digital collections, libraries are increasingly using programs like CONTENTdm and Omeka. By cataloguing, displaying, and sharing digital resources, these platforms enable librarians to facilitate users' discovery and access to important information. Libraries can increase the impact and exposure of their holdings by implementing strong digital curation methods (Ojo et al., 2024).

Integration of Social Media

Libraries now rely heavily on social media to interact with patrons and advertise their offerings. Libraries can highlight new resources, provide information, and promote community involvement on social media sites like Facebook, Twitter, and Instagram (Opele et al., 2024). In the end, this integration increases user engagement by strengthening the bond between libraries and their clients. For instance, a lot of libraries use social media platforms to conduct online events like seminars or author presentations (Adebanjo et al., 2024). This broadens the library's audience and improves accessibility for patrons. Additionally, libraries can improve their outreach initiatives by using social media analytics to learn more about user interactions (Adams et al., 2020).

Resources for Open Education (OER)

The way educational materials are accessible and used in LIS education has significantly changed as a result of Open Educational Resources (OER). Open Educational Resources (OER) are publicly available, openly licensed resources that promote sharing and reuse in research, teaching, and learning (Mićunović et al., 2023). Libraries are essential to the promotion of Open Educational Resources (OER) because they make high-quality educational materials accessible without regard to cost. Libraries can meet a variety of learning requirements and improve access to knowledge by integrating OER into their services. In order to allow instructors and students to use these resources in their classes, university libraries are, for example, progressively developing OER collections that correspond with curricular requirements (Odigwe & Owan, 2020).

Cooperation in Education

OER adoption creates cooperative learning settings that are advantageous to educational institutions and libraries alike. By collaborating with academics to create and carry out OER projects, libraries can foster a collaborative culture within the academic community. Innovative teaching strategies and better learning results may result from this partnership (Opeke & Opele, 2014). Moreover, libraries can conduct workshops and training sessions for professors on how to properly integrate OER into their courses. Libraries can enable instructors to adopt OER by

offering resources and support, which will ultimately improve students' educational experiences (Opele, 2022).

Mobile Technology

Users' access to library materials and services has been revolutionised by mobile technologies. Mobile applications that improve user access to library resources have been developed as a result of the widespread use of smartphones and tablets (Adebanjo et al., 2024). Mobile apps that offer functions like account administration, catalogue searches, and access to digital collections are being developed by libraries more frequently. For library websites to be mobile-friendly, responsive web design is also essential. Libraries may increase user engagement and satisfy the demands of a mobile-savvy audience by making their online platforms mobile-friendly. Studies show that mobile-friendly websites boost customer satisfaction and usage.

Experience of the User

The whole user experience is improved when mobile technologies are incorporated into LIS instruction. To produce user-friendly and captivating mobile experiences, libraries must give priority to user-centred design (Togia et al., 2012). This entails taking into account elements like accessibility features, information presentation, and navigation. Libraries can better serve their patrons' needs by utilising mobile technologies to give them easy access to resources and services. According to Vassilakaki and Garoufallou (2013), mobile technology can also help libraries and their patrons communicate by providing timely information and alerts about events, new acquisitions, and service modifications.

Blockchain Technology

Libraries now have a safe way to handle digital rights and transactions thanks to blockchain technology. Libraries may protect intellectual property and enable safe transactions by using blockchain to guarantee the validity and integrity of digital assets. This is especially crucial in a time when content providers face serious obstacles from copyright violations and digital piracy (Onayinka et al., 2024). Blockchain, for instance, can be used by libraries to monitor the ownership and licensing of digital resources, guaranteeing that authors receive fair compensation for their labour. This degree of security promotes the usage of library resources and increases confidence in digital collections. Another important advantage for libraries is the transparency that blockchain technology offers. Libraries can produce verifiable records of transactions and interactions with digital resources by keeping a decentralised ledger. This openness encourages responsibility and can improve the legitimacy of library services. Additionally, blockchain can facilitate the preservation of digital archives by providing a secure and immutable record of historical documents and valuables. This guarantees that priceless resources will be available and safeguarded for upcoming generations (Mohamed et al., 2023).

Gamification

Gamification is a cutting-edge strategy that adds gaming aspects to learning environments to increase student motivation and engagement. Gamification can be utilised to create interactive learning experiences in LIS education that promote skill development and active involvement (Aini, 2020). Libraries can use gamification techniques in a number of ways, including interactive learning modules, quizzes, and scavenger hunts. These exercises encourage cooperation and teamwork among students in addition to making learning enjoyable and interesting. In LIS education, gamification can also aid in skill development (Zahedi et al., 2021). Libraries can assist students in developing critical thinking, problem-solving, and information literacy skills by integrating gaming components into training programs. Libraries can, for instance, provide simulation-based learning activities in which students must traverse

real-world situations to locate information or fix problems. By fostering a greater grasp of library resources and services, this active learning strategy equips students for future employment difficulties. Gamification is a useful tactic in LIS education since research shows that can result in better learning outcomes and higher retention rates (Armstrong & Landers, 2018).

Platforms for Collaborative Learning

In LIS education, collaborative learning platforms have become popular since they encourage students and professors to share knowledge and learn from one another. By enabling users to participate in conversations, exchange resources, and collaborate on projects, these platforms promote communication and teamwork (Aviamu et al., 2024). For instance, a lot of libraries have used tools like Microsoft Teams and Slack to establish online workspaces. By allowing students to interact with one another, ask for assistance, and exchange ideas, these resources promote a feeling of support and community inside the library setting (Bradley, 2020). A move toward a more inclusive and interactive approach to learning is reflected in the emphasis on collaborative learning in LIS education. Libraries can encourage users to share their knowledge by holding workshops, webinars, and discussion forums. In addition to improving the educational process, this gives students the confidence to take charge of their education. Libraries may develop a culture of ongoing learning and creativity by encouraging collaborative settings. This strategy improves the general efficacy of library services in addition to helping students.

Challenges in incorporating new technology into library and information science education

It is important to note that developing technologies have had a considerable impact on library and information science education. Nevertheless, there are several obstacles to overcome when integrating these technologies into LIS education. The digital divide, which exacerbates disparities in access to resources and information, is one significant issue. It is challenging to deploy cutting-edge technologies equitably since many libraries serve groups with differing degrees of digital literacy and access to technology. According to recent research, libraries run the danger of alienating some user segments if they don't address these differences (Khoeini et al., 2025).

Apart from the digital divide, library employees and patrons urgently require proper training. It's possible that many professionals lack the abilities needed to use and use these technologies successfully. Research demonstrates that continual professional development is crucial in helping librarians adapt to emerging tools, although many institutions fail to provide sufficient training programs (Moin Ud Din et al., 2022). This skills gap may restrict the potential benefits of new technologies by impeding their successful integration. Furthermore, ethical issues and worries about data protection pose serious obstacles. Libraries must carefully negotiate challenges pertaining to user data protection and intellectual property rights when they use AI and analytics capabilities. The adoption of new technologies may be hampered by user mistrust caused by unclear governance frameworks for data usage (Michael et al., 2014).

Lastly, a cultural change within library organisations is frequently necessary for the adoption of new technology. To effectively benefit from technology improvements, libraries must reorganise their services and modify their operations. As it entails involving multiple stakeholders and coordinating organisational objectives with technology capabilities, this can be a challenging process (Islam et al., 2024). As we maximise the potential of emerging technologies in LIS education, carefully addressing these issues will be crucial.

Conclusion

Emerging technology integration in Library and Information Science (LIS) education is a fundamental change that redefines the function of libraries and librarians in the digital age, rather than just improving current practices. Artificial Intelligence (AI), Virtual Reality (VR), Cloud Computing, and Big Data are examples of technologies that are revolutionising the delivery, management, and accessibility of information. These developments are fostering collaborative settings in libraries, improving user engagement, and enabling personalised learning experiences. The study emphasises how important it is to use these tools in order to prepare aspiring librarians for the opportunities and challenges they would encounter in the workplace. LIS programs may develop a generation of information workers with the knowledge and abilities needed to prosper in a quickly changing information environment by embracing innovations.

Recommendations

The following suggestions are made:

- First. Curriculum development needs to be given top priority in order to successfully incorporate developing technologies into LIS education. Courses on cutting-edge technologies like AI, VR, and data analytics should be part of LIS schools' forward-thinking curricula.
- Two. To enable students to interact with new technologies in meaningful ways, LIS curricula should prioritise real-world applications and practical experiences.
- Third. Students should be given the chance to collaborate with technology specialists and engage in project-based learning.
- Four. To guarantee that LIS professors and departments are prepared to teach cutting-edge techniques and technology, educators must engage in ongoing professional development.
- Fifth. Training programs that give teachers the information and abilities they need to successfully incorporate technology into their lesson plans should be funded by educational institutions. This process can be facilitated via workshops, webinars, and collaborative learning opportunities, which allow instructors to stay up to date on the most recent developments in technology and pedagogy.
- Sixth. To increase the resources and knowledge available to LIS programs, collaborations between tech firms and academic institutions must be fostered.
- Seven. Innovative instructional resources, cooperative research projects, and shared training opportunities can result from such partnerships.

Future implication

The role of librarians will change dramatically as technology develops. In order to improve service delivery, future librarians will need to be skilled in both managing traditional library resources and utilising innovative technologies. They will play a crucial role in promoting equitable access to information while assisting users in navigating the complexity of digital resources. Furthermore, the capacity to use technology and analyse data will establish librarians as strategic leaders in their companies. In the end, they will contribute to the mission of advancing knowledge and learning in their communities by helping to shape library services that are in line with user demands and institutional objectives.

Acknowledgment of AI Assistance

"This paper was developed with the assistance of Artificial Intelligence tools, which contributed to research insights and writing enhancement. The author retains full responsibility for the content, interpretations, and conclusions presented herein."

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INNOVATIVE TECHNOLOGIES IN PHYSICS EDUCATION: A CONCEPTUAL FRAMEWORK FOR TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

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Abstract

The integration of innovative technologies in Physics education has emerged as a critical factor in transforming traditional pedagogical approaches and promoting sustainable educational development. This paper presents a comprehensive conceptual framework that examines how emerging technologies such as virtual reality (VR), augmented reality (AR), artificial intelligence (AI), simulation software, and mobile learning platforms are reshaping Physics instruction. Through systematic analysis of current literature, this study identifies key technological innovations, their pedagogical implications, and their potential for creating sustainable learning environments. The proposed framework addresses the challenges of traditional Physics education, including abstract concept visualization, student engagement, and accessibility barriers. The evidence demonstrates that technology-enhanced Physics education improves student comprehension and retention while contributing to sustainable development goals through inclusive, equitable, and quality education. Successful implementation requires strategic planning, teacher training, infrastructure development, and continuous assessment. Unlike prior studies that treat technology adoption and sustainability as separate concerns, this paper advances an integrative model that simultaneously addresses pedagogy, sustainability, and long-term implementation in Physics education.

Keywords: *Physics education, educational technology, virtual and augmented reality, artificial intelligence, sustainable development*

Introduction

Physics education has long been challenged by the abstract nature of its concepts, mathematical complexity, and the difficulty students face in connecting theoretical principles to real-world applications (Redish, 2003). Traditional lecture-based approaches often fail to engage students effectively, leading to decreased enrolment in Physics courses and limited understanding of fundamental concepts (Mazur, 1997). The emergence of innovative technologies presents unprecedented opportunities to address these challenges and transform Physics education into a more engaging, accessible, and effective learning experience. The integration of technology in education has evolved from simple computer-assisted instruction to sophisticated immersive learning environments that simulate complex physical phenomena (Clark & Mayer, 2016). In Physics education specifically, VR, AR, AI, and advanced simulation software are creating new possibilities for visualizing abstract concepts, conducting virtual experiments, and delivering personalized learning experiences (Merchant et al., 2014). Alongside this technological evolution, the principle of sustainable development in education emphasizes the need for practices that are environmentally responsible, economically viable, and socially equitable (UNESCO, 2017).

Despite this growing body of work, a critical gap persists. Existing studies largely investigate individual technologies, VR, AI, or simulation software in isolation, without examining how these tools interact within a broader pedagogical and sustainability framework. What existing literature fails to integrate is a unified model that simultaneously accounts for pedagogical effectiveness, long-term institutional viability, and equitable access. This manuscript uniquely contributes to the field by proposing an integrative conceptual framework that bridges technology adoption, constructivist pedagogy, and sustainable development in the specific context of Physics education. This paper thus aims to develop a comprehensive conceptual framework examining how innovative technologies can transform Physics education while promoting sustainable development — addressing technological tools, pedagogical applications, implementation strategies, and their contribution to creating sustainable educational ecosystems.

Literature Review

Traditional Challenges in Physics Education

Physics education has historically faced persistent challenges that hinder effective learning outcomes. Halloun and Hestenes (1985) identified that students commonly hold preconceived misconceptions about physical phenomena that resist change through conventional instruction. Building on this, Wieman (2007) argued that even capable students fail to develop coherent conceptual understanding when instruction relies primarily on abstract formalism, suggesting that the problem is not merely cognitive but fundamentally pedagogical. Where Halloun and Hestenes focused on identifying these misconceptions, Wieman went further to advocate for evidence-based instructional reforms, a tension that frames the debate about what technology must accomplish in Physics classrooms. Mathematical complexity further compounds these challenges. Redish and Kuo (2015) demonstrated that the disconnect between mathematical representations and physical intuition leads students toward procedural problem-solving that lacks conceptual grounding. This finding is significant because it implies that technology integration must address not only visualization but also the language-mathematics interface in Physics learning.

Technological Innovations in Education

Virtual reality technology enables immersive learning environments where students can explore three-dimensional representations of physical phenomena (Jensen & Konradsen, 2018). Studies show VR improves spatial understanding and knowledge retention. By contrast, augmented reality (AR) takes a different approach: rather than replacing the environment, it overlays digital information onto the real world, allowing students to visualize invisible phenomena such as magnetic fields or electric currents in their actual surroundings (Akçayır & Akçayır, 2017). While Jensen and Konradsen emphasize VR's power for immersion, Akçayır and Akçayır highlight AR's advantage in grounding abstract phenomena in tangible, real-world contexts — a distinction with direct implications for curriculum design.

AI and machine learning technologies create adaptive learning systems personalized to individual student needs (Zawacki-Richter et al., 2019). Importantly, Luckin et al. (2016) caution that AI effectiveness depends heavily on the quality of instructional design rather than the sophistication of the technology itself a nuance that many technology-optimistic studies overlook. Interactive simulations, such as those from PhET Interactive Simulations, allow students to manipulate variables and observe real-time effects on physical systems (Wieman et al., 2008), and have been shown to improve conceptual understanding and problem-solving skills, particularly when embedded within guided inquiry frameworks.

Sustainability in Educational Technology

The concept of sustainable development in education encompasses environmental, economic, and social dimensions. Potkonjak et al. (2016) demonstrated that virtual laboratories reduce the need for physical equipment, thus decreasing environmental impact and expanding access for resource-constrained institutions. Bates (2015) extended this argument to economics, noting that while digital platforms require upfront investment, their scalability substantially reduces per-student costs over time. However, Rose and Meyer (2002) introduced a critical counter-perspective: economic and environmental sustainability gains are undermined if the resulting platforms exclude learners with disabilities or from underserved communities. These three perspectives environmental, economic, and social, form the sustainability backbone of the framework proposed in this paper. Crucially, no existing study has integrated all three sustainability dimensions into a single Physics-specific technology framework. The present paper addresses this gap directly.

Theoretical Framework

The proposed framework draws on four complementary theoretical traditions, each linked to a specific component of the integrated model.

Constructivist Learning Theory

Piaget's (1977) constructivism, which holds that learners build understanding through direct interaction with their environment, underpins the Learner Engagement and Pedagogical Integration components of the framework. Innovative technologies align with constructivist principles by providing interactive environments where students explore phenomena, test hypotheses, and manipulate variables (Jonassen, 1999). VR and AR, in particular, enable experiences previously impossible in traditional settings.

Social Constructivism

Vygotsky's (1978) social constructivist theory emphasizes the zone of proximal development and the importance of social interaction in learning. This theory informs the Learner Engagement component, particularly regarding collaborative virtual environments that allow students to co-investigate physics problems and construct shared understanding across geographical boundaries (Dillenbourg, 1999).

Cognitive Load Theory

Sweller's (1988) Cognitive Load Theory informs the Assessment and Feedback and Technological Infrastructure components. Well-designed educational technologies reduce extraneous cognitive load by presenting information clearly while increasing germane cognitive load through meaningful inquiry activities (Mayer, 2014). For example, interactive simulations reduce the cognitive burden of complex calculations, directing student attention toward conceptual relationships rather than procedural demands.

Technology Acceptance Model

Davis's (1989) Technology Acceptance Model (TAM), particularly its elaboration by Venkatesh and Davis (2000), informs the Sustainability Mechanisms and Pedagogical Integration components. TAM identifies perceived usefulness and ease of use as the key factors governing technology adoption. For physics education, this means that even technically superior tools will fail to deliver sustainable impact if educators and students do not find them pedagogically meaningful and operationally accessible.

The Conceptual Framework: Components and Integration

Despite numerous studies on educational technology, there is limited integrative conceptual modeling that simultaneously addresses pedagogy, sustainability, and long-term implementation in Physics education. The proposed framework responds to this gap through five interconnected components, Technological Infrastructure, Pedagogical Integration, Learner Engagement, Assessment and Feedback, and Sustainability Mechanisms, each grounded in an established theoretical tradition and mapped to one or more dimensions of sustainability. Figure 1 below provides a visual schematic of the framework, illustrating how the five components orbit and reinforce a central goal of Technology-Enhanced Physics Education, with bidirectional arrows denoting their interdependence.

Figure 1: Conceptual Framework for Innovative Technologies in Physics Education

A Framework for Transformation and Sustainable Development - Adepoju Temitope Matthew (PhD), Lead City University

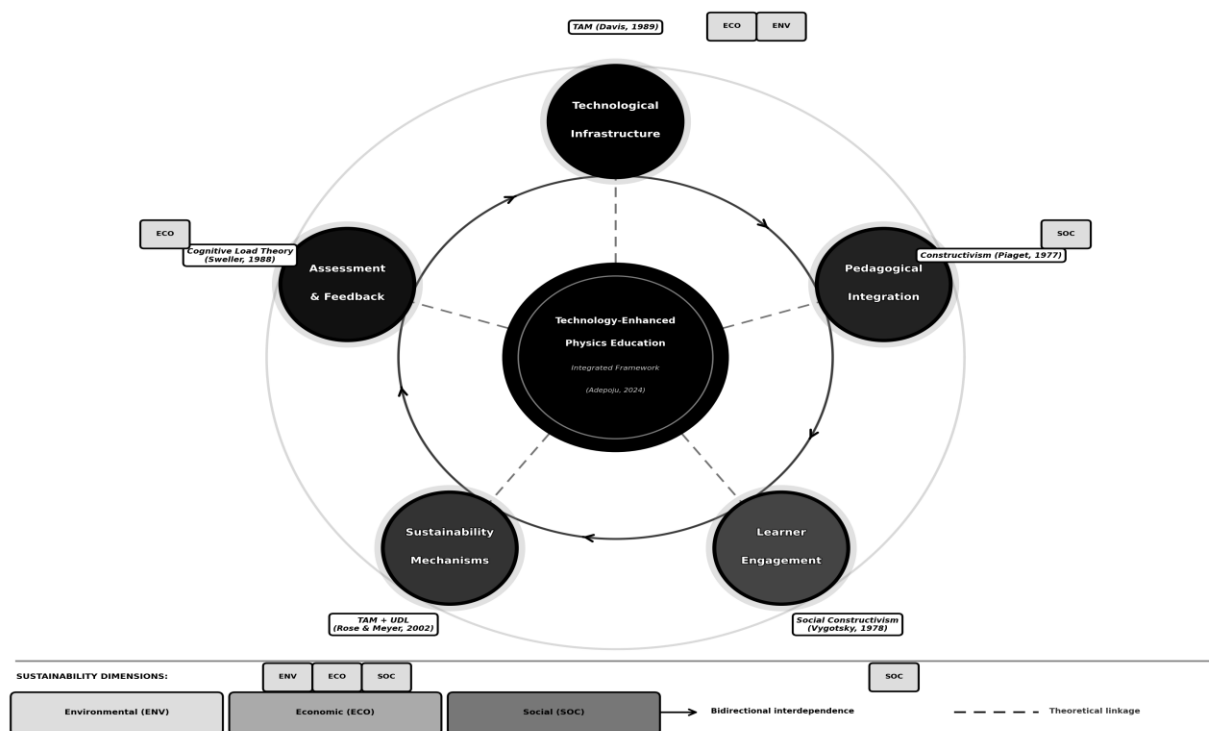


Figure 1: Conceptual Framework for Innovative Technologies in Physics Education (Adepoju, 2024)

Note: Coloured badges denote sustainability dimensions — ENV = Environmental, ECO = Economic, SOC = Social.

Reading the Framework Diagram

Figure 1 presents the framework as a hub-and-spoke model in which the five components are arranged equidistantly around a central hub labelled "Technology-Enhanced Physics Education." This spatial arrangement is intentional: it communicates that no single component operates in isolation, and that each feeds into and draws from the others through continuous bidirectional relationships (represented by the directional arcs). The dashed spokes connecting each node to the hub represent the theoretical linkages, specifically, the pathway by which each theoretical foundation (shown in italicised labels outside each node) informs both the individual component and the overarching educational goal at the centre. The outer

coloured badges (ENV, ECO, SOC) map each component to its corresponding sustainability dimension(s): green for Environmental, orange for Economic, and purple for Social sustainability. The Sustainability Mechanisms component uniquely carries all three badges, reflecting its role as the integrative anchor of the model's long-term viability.

The framework is designed to be read both vertically, from Technological Infrastructure (the prerequisite layer) upward through Pedagogical Integration and Learner Engagement to Assessment and Feedback, and cyclically, recognising that assessment data feeds back into infrastructure investment and pedagogical refinement. Sustainability Mechanisms, positioned at the lower-left, function not as an afterthought but as a foundational constraint: every decision in the other four components must be filtered through the question of long-term environmental, economic, and social viability.

Technological Infrastructure

This component encompasses the hardware, software, and network resources required for technology-enhanced learning, including VR/AR devices, high-speed internet, learning management systems, and technical support services. Grounded in TAM, the infrastructure must be reliable, scalable, and accessible to ensure both adoption and long-term sustainability.

Pedagogical Integration

Pedagogical Integration refers to the purposeful incorporation of technology into curriculum design and instructional practice, aligned with the TPACK (Technological Pedagogical Content Knowledge) framework of Mishra and Koehler (2006). Unlike infrastructure, which enables access, this component determines whether technology transforms or merely supplements learning. Its theoretical grounding in constructivism ensures that technology serves inquiry-based, student-centered pedagogy rather than replicating passive instruction in digital form.

Learner Engagement

This component addresses how technology increases student motivation, active participation, and investment in Physics learning. Interactive simulations, gamification, and immersive VR/AR experiences operationalize both Piagetian and Vygotskian principles by creating environments for individual exploration and collaborative inquiry. Learner engagement connects directly to sustainability: disengaged students increase institutional costs through remediation and attrition.

Assessment and Feedback

Formative assessment tools, AI-powered adaptive testing, and learning analytics constitute this component. Consistent with Cognitive Load Theory, effective assessment design reduces cognitive demands during evaluation while generating actionable data for instructional adjustment. This component also enables the evidence base needed to justify continued investment, addressing the return-on-investment challenge identified in the literature.

Sustainability Mechanisms

The final component addresses the long-term viability of technology integration across environmental (virtual labs reducing material waste), economic (open-source and scalable platforms), and social (universal design, digital equity) dimensions. The integration of all three sustainability perspectives, drawing from Potkonjak et al. (2016), Bates (2015), and Rose and Meyer (2002) respectively, is a defining feature of this framework and its primary contribution over prior models.

Application of the Framework: Case Evidence

Three empirical cases are examined here not as independent literature, but as illustrative evidence for specific framework components.

VR in Quantum Mechanics (Stanford University)

Müller and Ferreira's (2018) VR implementation for quantum mechanics undergraduate instruction operationalizes the Learner Engagement and Technological Infrastructure components. Students used VR headsets to explore three-dimensional wave functions, manipulating potential energy barriers in real-time. Pre- and post-assessments showed significant conceptual gains, particularly for students who struggled with traditional mathematical representations. Critically, the software could be updated remotely and reused across cohorts, demonstrating the Sustainability Mechanisms component, eliminating the need for expensive physical equipment while expanding access.

AR for Electromagnetic Field Visualization (UC Berkeley)

Santos et al. (2019) implemented an AR mobile app enabling students to visualize electromagnetic fields overlaid on physical objects. This case exemplifies the Pedagogical Integration component: the technology was deliberately aligned with curriculum goals around field theory, not deployed for novelty. The use of students' own smartphones eliminated specialized hardware costs, a direct Economic Sustainability strategy consistent with Bates (2015). Students demonstrated improved spatial reasoning and field concept understanding, confirming the framework's premise that purposeful pedagogical integration drives outcomes.

AI-Powered Adaptive Tutoring in Mechanics (Georgia Tech)

Rau et al.'s (2020) adaptive tutoring system for classical mechanics illustrates the Assessment and Feedback component at scale. Machine learning algorithms identified common misconceptions and personalized instructional sequences accordingly, resulting in improved problem-solving performance and reduced time-to-mastery. The system continuously improved through ongoing data, embodying Sustainability Mechanisms through scalability: one system could deliver individualized feedback to thousands of students simultaneously, a capability that directly addresses the economic sustainability argument advanced by Bates (2015).

Discussion

How the Framework Advances Existing Knowledge

The framework presented in this paper makes three substantive contributions to the educational technology literature. First, it resolves the fragmentation evident in prior work: where Akçayır and Akçayır (2017) addressed AR advantages in isolation, and Zawacki-Richter et al. (2019) focused narrowly on AI personalization, this framework maps these technologies onto an integrated model in which each component reinforces the others. Second, by systematically linking theoretical foundations, constructivism, social constructivism, Cognitive Load Theory, and TAM, to specific framework components, the paper provides educators and researchers with theoretically grounded design principles rather than generic prescriptions. Third, the simultaneous treatment of environmental, economic, and social sustainability in a single Physics-specific model is, to the author's knowledge, without direct precedent in the field.

Implications for Practice

For educators, the framework implies a shift from technology-driven to pedagogy-driven integration: the question is not "which technology is available?" but "which framework component does this technology address?" Teachers equipped with TPACK and trained in

constructivist design are better positioned to leverage VR, AR, and AI as complementary tools within a coherent instructional sequence rather than isolated novelties. The framework also legitimizes investment in professional development as a sustainability strategy, not merely a capacity-building exercise.

For institutions, the framework's Sustainability Mechanisms component suggests that short-term infrastructure investments in virtual laboratories, open-source platforms, and accessible device programs can generate long-term reductions in per-student costs, laboratory maintenance, and remediation expenditure. Institutions adopting the framework should establish baseline data across all five components before scaling, enabling evidence-based iteration.

Implications for Policy

Policymakers can use the framework as an evaluation rubric for technology integration proposals. A proposal that addresses only Technological Infrastructure without articulating Pedagogical Integration, Learner Engagement, Assessment, and Sustainability is likely to underperform. Equity considerations, particularly digital divide mitigation and universal design requirements should be mandated as baseline conditions rather than optional enhancements. The framework further suggests that funding mechanisms should support cross-institutional resource sharing, an approach aligned with the economic sustainability component.

Suggestions

For Educational Institutions

Strategic Planning: Institutions should develop comprehensive technology integration plans that align with their mission, student needs, and resource constraints. These plans should include clear goals, timelines, and success metrics.

Professional Development Investment: Institutions must prioritize ongoing professional development for educators, focusing on both technical skills and pedagogical knowledge. This investment is crucial for successful technology implementation.

Infrastructure Development: Reliable technical infrastructure is essential for effective technology integration. Institutions should invest in robust networking, computing resources, and technical support services.

Partnerships and Collaboration: Institutions should seek partnerships with technology companies, other educational organizations, and research institutions to share resources and expertise.

For Educators

Continuous Learning: Educators should embrace lifelong learning and actively seek opportunities to develop technology integration skills. This includes formal training programs, professional learning communities, and self-directed exploration.

Student-Centered Approach: Technology integration should focus on student learning outcomes rather than the technology itself. Educators should select and implement technologies that address specific learning challenges and goals.

Evidence-Based Practice: Educators should base technology integration decisions on research evidence and continuously evaluate the effectiveness of their approaches through student feedback and learning assessment.

Collaboration and Sharing: Educators should collaborate with colleagues to share experiences, resources, and best practices in technology integration.

For Policymakers

Funding Support: Policymakers should provide adequate funding for technology integration initiatives, including infrastructure development, device procurement, and professional development programs.

Equity Considerations: Policies should address digital divide issues and ensure equitable access to technology-enhanced education opportunities for all students.

Standards and Guidelines: Clear standards and guidelines for educational technology integration can help ensure quality and consistency across institutions.

Research Support: Policymakers should support research on educational technology effectiveness and best practices to inform evidence-based policy decisions.

For Technology Developers

User-Centered Design: Educational technology developers should prioritize user experience and pedagogical effectiveness over technical sophistication. Close collaboration with educators and students is essential during the design process.

Accessibility and Inclusion: Technologies should be designed to accommodate diverse learners, including those with disabilities and from different cultural backgrounds.

Sustainability Considerations: Developers should consider the environmental, economic, and social sustainability implications of their technologies throughout the design and development process.

Open Standards: Support for open standards and interoperability will facilitate integration with existing educational systems and reduce vendor lock-in concerns.

Limitations and Future Directions

This paper is conceptual in nature; empirical validation of the integrated framework across diverse institutional contexts remains a priority for future research. The framework was developed primarily from studies conducted in high-income contexts, and its applicability to low-resource settings, while theoretically supported through the Social Sustainability component, requires empirical examination. Emerging technologies, including extended reality (XR) platforms, quantum computing education tools, and brain-computer interface applications, will require iterative framework updates as evidence accumulates.

Conclusion

The integration of innovative technologies in Physics education represents a transformative opportunity to address longstanding challenges in science learning while advancing sustainable development goals. This paper has presented a conceptual framework comprising five interconnected components — Technological Infrastructure, Pedagogical Integration, Learner Engagement, Assessment and Feedback, and Sustainability Mechanisms

— each grounded in established theoretical traditions and illustrated through empirical case evidence.

The central argument is that technologies such as VR, AR, AI, and simulation software cannot independently improve Physics education; their impact depends on purposeful pedagogical integration, equitable access, and long-term institutional sustainability. By providing educators, policymakers, and researchers with a structured, theoretically grounded approach, this framework advances the field beyond individual technology evaluations toward an integrative model capable of guiding sustainable transformation in Physics education globally.

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PROFESSIONAL DEVELOPMENT AS A CATALYST FOR TRANSFORMATIVE PEDAGOGY AND SUSTAINABLE EDUCATION IN SENIOR SECONDARY SCHOOLS IN GARKI, FCT, ABUJA, NIGERIA

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Abstract

Education for Sustainable Development (ESD) requires transformative pedagogical approaches that move beyond traditional teacher-centred instruction. However, public secondary schools in Nigeria's Federal Capital Territory (FCT) continue to rely heavily on conventional teaching methods that inadequately prepare students for sustainability challenges. This study investigates how professional development programmes can facilitate the adoption of transformative pedagogy and sustainable educational practices. A descriptive study was conducted with 200 teachers from public secondary schools in Garki, FCT, Abuja. Data were collected through a structured questionnaire and analysed using descriptive and inferential statistics. Findings revealed that 78% of teachers had limited access to comprehensive professional development programmes focused on transformative pedagogy. Teachers who participated in structured professional development programmes showed significantly higher adoption rates of student-centred teaching methods ($p < 0.05$) and were 2.3 times more likely to integrate sustainability themes into their curriculum. Professional development emerged as the strongest predictor of transformative teaching practices ($\beta = 0.67$, $p < 0.001$). These findings are significant as they demonstrate that context-responsive, continuous professional development programmes substantially enhance teachers' capacity to adopt learner-centred approaches aligned with ESD principles. The implications for educational practice are far-reaching, pointing to the urgent need for systematic, policy-driven investment in teacher professional growth as a foundational strategy for advancing sustainable education in Nigeria.

Keywords: Professional development, transformative pedagogy, sustainable education, teacher training, Nigeria.

Introduction

Education, broadly defined as the systematic process of facilitating the acquisition of knowledge, skills, values, and attitudes, serves as a cornerstone for individual empowerment and societal progress (Attahakul, 2025). In the 21st century, the purpose of education has evolved beyond the mere transmission of facts to encompass the development of learners who can think critically, collaborate effectively, and address complex global challenges. Central to achieving this vision are pedagogical approaches that actively engage students and prepare them for real-world problem-solving; approaches increasingly recognised as essential in contexts shaped by rapid socio-economic change, environmental pressures, and growing inequality.

Two interconnected concepts are particularly relevant to this evolving educational vision: transformative pedagogy and sustainable education. Transformative pedagogy refers to instructional approaches that deliberately shift the focus of learning from teacher-centred

delivery to student-centred engagement, empowering learners to become active, reflective, and socially conscious participants in their own education (Dwikamayuda, Maye, Ekawati, Nitiasih, Riastini & Sudatha 2024). Sustainable education, on the other hand, is grounded in the principles of Education for Sustainable Development (ESD). A globally recognised framework that equips learners with the knowledge, values, and competencies needed to contribute to environmental integrity, economic viability, and social justice for present and future generations (Yadav, 2024). Together, these two frameworks represent a coherent vision for 21st-century schooling that is responsive to both local realities and global imperatives.

Transformative pedagogy has emerged as a key pathway toward this educational vision. Its core elements include student-centred instruction, which empowers learners to take ownership of their education; critical thinking facilitation, which encourages the analysis and evaluation of ideas; collaborative learning, which fosters teamwork and shared problem-solving; reflective practice, which enables both teachers and learners to examine and continuously refine their approaches; and inquiry-based learning, which promotes curiosity and systematic investigation (Yusuf, Adanle, Jolaoso, Abimbola, Aina, Abubakar & Ajibade 2024). Together, these practices cultivate the competencies needed for adaptive, engaged, and socially responsible citizenship. However, realising this vision in practice requires more than curricular reform. It demands a fundamental reorientation of teaching roles and classroom culture, a shift that is particularly challenging in contexts where socio-economic constraints limit access to resources, infrastructure, and professional support.

Central to enabling this shift is professional development for teachers. According to Khong and Nguyen (2022), professional development involves equipping teachers with the skills, knowledge, and mindsets required to transition from traditional, rote-based methods to learner-centred, sustainability-oriented instruction. In contexts marked by socio-economic challenges, such as underfunded schools, overcrowded classrooms, and limited institutional support, targeted professional development becomes even more critical, as it provides teachers with the tools and confidence necessary to innovate within constrained environments. Yadav (2024) remarked that through structured training, expert facilitation, mentorship, and collaborative capacity-building, teachers can design learning experiences that meaningfully integrate the principles of transformative pedagogy with sustainability themes.

The Federal Capital Territory (FCT), Abuja, as Nigeria's administrative and political centre, represents a compelling case study for this kind of educational transformation. Public secondary schools in the FCT are expected to model innovative educational practices for the broader Nigerian system. Yet despite this expectation, the integration of transformative pedagogy and sustainability education in these schools remains inconsistent, largely due to professional development programmes that are inadequately targeted, episodic, and insufficiently aligned with ESD principles. This study addresses this gap by examining the role of professional development in fostering transformative pedagogy and integrating sustainability education in public secondary schools in the FCT, Abuja. By linking specific transformative pedagogy practices with defined sustainability themes, the research seeks to provide evidence-based strategies for strengthening teacher capacity and advancing Nigeria's progress toward its educational and sustainability goals.

This study is grounded in transformative learning theory, originally developed by Mezirow (1991), which posits that meaningful learning involves critical reflection on assumptions, beliefs, and practices, leading to fundamental changes in perspective and behaviour. This position has been reaffirmed by recent scholars such as Fleming (2022) and Sugito (2024), who emphasise that transformative learning entails a deep restructuring of individuals' frames of reference through reflective processes. Within the context of teacher education, this theoretical framework provides a powerful lens for understanding how professional development can serve as a vehicle for pedagogical transformation. By creating

structured opportunities for educators to examine their instructional assumptions, experiment with innovative approaches, and develop competencies aligned with the principles of sustainable education, professional development becomes not merely a training activity but a catalyst for big, lasting change in teaching practice. The following review traces this argument across four interconnected thematic areas: professional development, transformative pedagogy, sustainable education and ESD implementation, and professional development as a catalyst for change.

Professional Development

Professional development encompasses structured educational programmes and learning experiences designed to enhance teachers' pedagogical knowledge, content mastery, and classroom practices (Achieng, 2024). Effective professional development is characterised by several key features: continuity over time, collaborative engagement among educators, context-specificity to local needs and challenges, and alignment with both institutional goals and individual teacher development needs. Iqbal and Ali (2024) emphasise that professional development must extend beyond traditional workshop models to include sustained, practice-based learning experiences that enable teachers to experiment with new approaches in supportive environments. This perspective aligns with the contemporary understanding of teacher learning as a complex, socially mediated process requiring ongoing support and reflection.

Transformative Pedagogy

Transformative pedagogy represents a fundamental departure from traditional instructional approaches, emphasising student agency, critical inquiry, and social justice orientation (Dwikamayuda et al., 2024). Its core principles include dialogical teaching methods that position students as co-constructors of knowledge, critical examination of power relations and social structures, reflective practice that encourages continuous learning and adaptation, and authentic assessment that connects learning to real-world applications. Aliyeva (2024) argues that transformative pedagogy requires teachers to reconceptualise their roles from information deliverers to learning facilitators and critical thinking coaches, a shift that demands not only attitudinal change but also the acquisition of new instructional competencies. This reconceptualisation of teaching is directly relevant to the sustainability agenda, as it equips learners with the higher-order thinking and collaborative skills necessary to engage with complex, real-world challenges. However, while the theoretical case for transformative pedagogy is well established in the international literature, empirical studies documenting its actual implementation levels in Nigerian secondary schools remain scarce.

Sustainable Education and ESD Implementation

Sustainable education encompasses the knowledge, skills, values, and behaviours necessary to promote environmental integrity, economic viability, and social justice for current and future generations (Yadav, 2024). As a framework, ESD requires interdisciplinary approaches that connect local and global sustainability challenges while fostering systems thinking and collaborative problem-solving skills. Research consistently indicates that successful ESD implementation depends heavily on teacher preparedness and institutional support; educators must possess both substantive knowledge about sustainability issues and the pedagogical skills to facilitate meaningful student engagement with these complex topics (UNESCO, 2021). The link between transformative pedagogy and ESD is both logical and necessary: the student-centred, inquiry-driven, and reflective practices that define transformative pedagogy are precisely the instructional strategies through which ESD competencies are most effectively

developed. Yet despite this natural alignment, the integration of ESD principles into classroom practice in Nigerian secondary schools remains inconsistent and inadequately studied.

Professional Development as a Catalyst for Change

MacLatchy, Nguyen, Olulanke, Pownall, and Usman (2025) noted that strategically designed professional development programmes can effectively support teachers' adoption of transformative pedagogical approaches. Key design features that facilitate this transformation include targeted training aligned with specific instructional goals, equity-driven instructional strategies, collaborative learning communities, and ongoing mentorship and support structures. When these elements are present, professional development functions as a genuine catalyst, enabling teachers to translate new knowledge and skills into sustained changes in classroom practice.

Statement of the Problem

Despite growing international recognition of the importance of transformative pedagogy for sustainable education, significant gaps persist between policy aspirations and classroom realities. Teachers, often identified as key agents of educational change, frequently lack the pedagogical knowledge, resources, and institutional support needed to transition from traditional teaching methods to transformative, learner-centred approaches (Khong & Nguyen, 2022). Globally, studies have documented this disconnect: a UNESCO (2021) report found that fewer than 40% of teachers in low- and middle-income countries had received training aligned with ESD principles, while Olaifa, Ciroma, Olaifa, Onikoyi, and Shittu (2025) established that teacher professional development remains one of the most significant determinants of pedagogical innovation in school systems across sub-Saharan Africa. Professional development emerges as a potential catalyst for this transformation, yet empirical research examining the relationship between professional development, transformative pedagogy, and sustainable education remains limited, particularly in the Nigerian context. Nationally, studies such as Alhaji (2025) have highlighted that a significant proportion of Nigerian teachers continue to rely on didactic, teacher-centred instructional methods, with limited exposure to learner-centred alternatives. Similarly, Yusuf et al. (2024) observed that the majority of in-service teacher training programmes in Nigeria remain content-focused and examination-driven, with little attention given to the development of sustainability competencies or transformative instructional strategies. These gaps are particularly consequential given Nigeria's commitment to the Sustainable Development Goals (SDGs), particularly SDG 4, which calls for inclusive, equitable, and quality education that promotes lifelong learning opportunities for all.

In the FCT, Abuja, the situation reflects broader national trends. Observational evidence and preliminary assessments suggest that many public secondary schools in the territory continue to employ traditional, teacher-centred pedagogies that fall short of equipping students with the critical thinking, problem-solving, and participatory skills necessary to address contemporary sustainability challenges. Furthermore, despite a growing body of international literature on professional development and pedagogical transformation, little empirical research has specifically examined the precise mechanisms through which professional development influences teachers' capacity to implement and sustain transformative pedagogies in the context of public secondary schools in Abuja. This study, therefore, addresses this critical empirical gap by investigating the nature, accessibility, and impact of professional development programmes on transformative pedagogy adoption and sustainability education integration among public secondary school teachers in FCT, Abuja, Nigeria.

Research Objectives

1. To identify the types of professional development programmes accessed by public secondary school teachers in Garki, FCT, Abuja, Nigeria.
2. To evaluate the implementation level of transformative pedagogical practices among teachers in public secondary schools in Garki, FCT, Abuja.

Research Questions

1. What types of professional development programmes do public secondary school teachers in Garki, FCT, Abuja, access?
2. What is the implementation level of transformative pedagogy among public secondary school teachers in Garki, FCT, Abuja?

Research Hypotheses

H₀₁: There is no significant relationship between the level of professional development participation and the adoption of transformative pedagogical practices among public secondary school teachers in Garki, FCT, Abuja.

Methodology

This study adopted the descriptive survey research design. The population comprised 720 teachers across public secondary schools in the Garki district, from which a sample of 200 teachers was selected from 10 schools. Schools were selected using a purposive sampling approach to ensure representation of both larger schools and smaller schools, after which simple random sampling was employed within each school to select individual participants proportional to school size. Data were collected using a structured questionnaire, the Professional Development and Transformative Pedagogy Questionnaire (PDTPQ), organised into three sections covering demographic information, types of professional development programmes accessed, and levels of transformative pedagogy implementation across five practice dimensions. All items were measured on a five-point Likert scale ranging from 1 (Very Low) to 5 (Very High). The validity of the instrument was established through a pilot test, with Cronbach's alpha coefficient of 0.78. Data were analysed using descriptive statistics and inferential statistics.

Results

Research Question One

What types of professional development programmes do public secondary school teachers in Garki, FCT, Abuja, access?

Table 1: Types of Professional Development Programmes Accessed by Public Secondary School Teachers in Garki, FCT, Abuja (N = 200; Multiple Responses Permitted)

PD Program Type	Frequency	Percentage (%)
Gov-sponsored workshop	32	16.0
NGO/International organisation program	18	9.0
University-based continuing education	12	6.0
School-based peer learning	28	14.0

Online professional courses	8	4.0
Subject-specific conference	15	7.5
No formal PD participation	156	78.0

Table 1 presents the types of professional development programmes accessed by public secondary school teachers in FCT, Abuja, addressing Research Question One. The most striking finding is that 78% of respondents ($n = 156$) reported no participation in any formal professional development programme, indicating that the overwhelming majority of teachers in the sample lack access to structured professional learning. Among those who did participate, government-sponsored workshops were the most commonly accessed programme type (16%, $n = 32$), followed by school-based peer learning (14%, $n = 28$), NGO and international organisation programmes (9%, $n = 18$), subject-specific conferences (7.5%, $n = 15$), university-based continuing education (6%, $n = 12$), and online professional courses (4%, $n = 8$). The low and fragmented participation rates across all programme types indicate that systematic, sustained professional development opportunities remain largely inaccessible to the majority of public secondary school teachers in the FCT, with significant implications for their capacity to adopt transformative pedagogical practices aligned with ESD principles. Note: Percentages do not sum to 100% as respondents were permitted to select more than one programme type.

The category "No formal PD participation" refers to teachers who indicated no engagement with any of the listed programme types.

Research Question Two

What is the implementation level of transformative pedagogy among public secondary school teachers in Garki, FCT Abuja, Nigeria?

Table 2: Transformative Pedagogy Practice Implementation Levels among Public Secondary School Teachers in Garki, FCT, Abuja (N = 200)

Practice Category	Mean Score	Standard Deviation	Implementation Level
Student-centered instruction	2.9	0.8	Moderate
Critical thinking facilitation	2.7	0.9	Moderate
Collaborative learning	3.2	0.7	Moderate
Reflective practice	2.5	0.8	Moderate
Inquiry-based learning	2.6	0.9	Moderate

Table 2 presents the implementation levels of five transformative pedagogy practice dimensions among public secondary school teachers in Garki, FCT, Abuja. Implementation levels were classified based on a predetermined decision rule whereby mean scores of 1.00–2.49 indicate Low implementation, 2.50–3.49 indicate Moderate implementation, and 3.50–5.00 indicate High implementation. Applying this benchmark, the overall pattern of findings indicates that transformative pedagogical practices are implemented at moderate to low levels across the sample. Collaborative learning recorded the highest mean score ($M = 3.2$, $SD = 0.7$), reflecting a moderate level of implementation and relatively consistent practice across respondents, suggesting it is the most accessible dimension of transformative pedagogy for

teachers in this context. Student-centred instruction similarly showed a moderate implementation level ($M = 2.9$, $SD = 0.8$). In contrast, critical thinking facilitation ($M = 2.7$, $SD = 0.9$), inquiry-based learning ($M = 2.6$, $SD = 0.9$), and reflective practice ($M = 2.5$, $SD = 0.8$) all recorded low implementation levels, indicating that these more cognitively demanding dimensions of transformative pedagogy are less consistently integrated into everyday classroom teaching. These findings collectively point to a significant gap between the ideals of transformative pedagogy and its actual realisation in FCT public secondary school classrooms, underscoring the need for targeted professional development interventions.

Research Hypothesis: H_{01} : There is no significant relationship between the level of professional development participation and the adoption of transformative pedagogical practices among public secondary school teachers in Garki, FCT, Abuja.

Table 3: One-Way ANOVA and Descriptive Statistics for Transformative Pedagogy Implementation by Professional Development Exposure Level (N=200)

Source	N	Mean TP Score	SD	95% CI	df	F	P	η^2
High PD Exposure	22	72.4	11.2	(67.3, 77.5)				
Moderate PD Exposure	22	64.8	12.6	(59.2, 70.4)				
Low PD Exposure	156	55.9	13.8	(53.7, 58.1)				
Between Group					2	18.42	<.001	.16
Within Group					197			
Total					199			

Table 3 presents the descriptive statistics and ANOVA results for transformative pedagogy implementation across the three professional development exposure levels. A clear and consistent positive gradient is evident across the groups: teachers with high PD exposure recorded the highest mean transformative pedagogy score ($M = 72.4$, $SD = 11.2$), followed by those with moderate PD exposure ($M = 64.8$, $SD = 12.6$), and those with low PD exposure recorded the lowest mean score ($M = 55.9$, $SD = 13.8$). The one-way ANOVA confirmed that these differences were statistically significant, $F(2, 197) = 18.42$, $p < .001$, with an eta squared value of $\eta^2 = .16$ indicating a large practical effect size. Post-hoc Tukey tests further confirmed that all pairwise group differences were statistically significant ($p < .05$), meaning that the differences in transformative pedagogy implementation between each pair of PD exposure groups, high versus moderate, high versus low, and moderate versus low, were all meaningful and not attributable to chance. These findings provide sufficient grounds for the rejection of the null hypothesis, confirming that professional development exposure is significantly associated with the adoption of transformative pedagogical practices. The null hypothesis (H_{01}) is therefore rejected.

Discussion of Findings

The findings of this study offer important empirical insights into the relationship between professional development and transformative pedagogy implementation in public secondary schools in Garki, FCT, Abuja. The study found that 78% of sampled teachers reported no participation in any formal professional development programme; this reflects a deeply entrenched systemic failure in teacher support structures within the FCT public secondary school system. This finding resonates with UNESCO's (2021) global assessment, which identified inadequate professional development provision as one of the most persistent barriers to ESD implementation in developing country contexts, while providing a sharply localised illustration of that global pattern that policymakers in the FCT cannot afford to overlook.

With respect to the implementation of transformative pedagogy, all five practice dimensions recorded moderate levels of implementation, with mean scores ranging from 2.5 to 3.2 on the five-point scale. While no dimension fell below the moderate threshold, the variation in scores across dimensions is nonetheless instructive. Collaborative learning ($M = 3.2$) and student-centred instruction ($M = 2.9$) recorded the stronger moderate scores, suggesting these dimensions are more consistently practised and more intuitively accessible to teachers within existing classroom structures. Critical thinking facilitation ($M = 2.7$), inquiry-based learning ($M = 2.6$), and reflective practice ($M = 2.5$), though still within the moderate range, recorded the weakest scores among the five dimensions, suggesting that these more cognitively demanding and philosophically complex aspects of transformative pedagogy remain the least developed in practice. This pattern is consistent with Fradale's (2024) observation that professional development programmes in resource-constrained contexts tend to facilitate surface-level engagement with transformative pedagogy rather than the deeper attitudinal and philosophical shifts that genuine transformation requires. The findings, therefore, suggest that while teachers have developed a foundational familiarity with transformative practices, the depth and consistency of implementation remain insufficient for the realisation of meaningful ESD outcomes.

The hypothesis testing results further strengthen these conclusions. The one-way ANOVA revealed a statistically significant difference in transformative pedagogy implementation across PD exposure levels, $F(2, 197) = 18.42$, $p < .001$, $\eta^2 = .16$, with post-hoc Tukey tests confirming that all pairwise group differences were significant. Teachers with higher levels of professional development exposure consistently demonstrated greater adoption of transformative pedagogical practices, affirming the central argument of this study that professional development is a critical driver of pedagogical transformation. This finding aligns with Pan (2023), who established that transformative learning is fundamentally dependent on structured, critically reflective processes most effectively cultivated through well-designed professional development programmes, and with MacLatchy et al. (2025), who similarly affirmed that meaningful professional development enhances teacher effectiveness and classroom innovation.

Collectively, these findings make a significant contribution to the field by providing empirical evidence on professional development access and transformative pedagogy implementation, specifically within Garki, FCT, Abuja. Practically, they suggest that educational authorities in the FCT must move beyond episodic workshops toward investing in continuous, context-responsive professional development ecosystems that provide the sustained mentorship, peer learning, and institutional encouragement necessary for all dimensions of transformative pedagogy, particularly reflective practice, inquiry-based learning, and critical thinking facilitation to move from moderate to high levels of implementation in everyday classroom practice.

Conclusion

This study concludes that professional development is a critical catalyst for implementing transformative pedagogy and integrating sustainability education in public secondary schools in Garki, FCT, Abuja. The study showed that teachers with greater exposure to quality professional development programmes demonstrated significantly higher engagement in learner-centred, innovative, and sustainability-oriented teaching practices, while the overwhelming majority of teachers, operating without access to any formal professional development, remained anchored in conventional, teacher-centred instructional methods inadequate for preparing students to navigate contemporary sustainability challenges. These findings carry substantial implications for both teaching practice and educational policy. At the classroom level, they underscore that transformative teaching is not an innate disposition but a professionally cultivated competency, one that requires deliberate, sustained, and institutionally supported development. At the policy level, they present a compelling case for reframing professional development not as a peripheral or occasional administrative exercise but as a foundational investment in the quality, equity, and sustainability of Nigeria's education system. For the Garki, FCT specifically and Nigeria more broadly, achieving the transformative educational outcomes envisioned by the Sustainable Development Goals, particularly SDG 4, will require systematic, policy-driven commitment to building robust professional development infrastructures that are continuous, context-responsive, and explicitly aligned with the principles of transformative pedagogy and Education for Sustainable Development.

Recommendations

1. **Investment in Teachers' Growth Through Quality Professional Development:** Education authorities should prioritise regular, well-structured professional development programmes focused on transformative and sustainability-focused pedagogy.
2. **Support Reflective and Inquiry-Based Teaching:** Professional development should include components that build teachers' capacity for critical thinking, reflective practice, and inquiry-based methods.
3. **Strengthen Institutional Support:** Schools should foster a culture of peer learning and administrative encouragement to sustain the impact of PD on teaching practices.
4. **Conduct Further Research:** Future studies should explore the long-term effects of professional development on transformative pedagogy and sustainable education practices.

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EVALUATING INCLUSIVITY IN ENTREPRENEURSHIP ESSENTIAL AND VOCATIONAL SKILLS PROGRAMMES IN DELTA STATE: IMPLICATIONS FOR SOCIOECONOMIC TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

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Abstract

As nations pursue the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 on inclusive and equitable quality education, the role of innovation and inclusivity in higher education has become increasingly vital. This study examines the extent to which entrepreneurship and vocational skills programmes in Delta State promote inclusivity and contribute to sustainable development through higher education frameworks. Focusing on state-sponsored initiatives such as the Skills Training and Entrepreneurship Programme (STEP), Youth Agricultural Entrepreneurs Programme (YAGEP), and the Graduate Employment Enhancement Programme (GEEP), the study explores whether access and outcomes differ across gender, age, location, and academic background. Grounded in Human Capital Theory, the Capability Approach, and Social Inclusion Theory, a descriptive ex post facto correlational design was employed. The population comprised graduate beneficiaries of YAGEP, STEP, and GEEP from five cohorts (2017–2022). Data were collected from 296 participants using a stratified random sampling technique. The research instrument, Entrepreneurship and Vocational Education Questionnaire (EVEQ), was validated by subject experts, with a reliability coefficient of 0.751. Descriptive statistics and chi-square tests were conducted using SPSS Version 27. Findings from multinomial logistic regression indicate that programme type is a significant predictor of employment outcomes, with participants in STEP ($\text{Exp}(B) = 14.05$, $*p < .001$) and YAGEP ($\text{Exp}(B) = 19.82$, $*p < .001$) significantly more likely to become entrepreneurs compared to GEEP participants. Similarly, STEP ($\text{Exp}(B) = 5.84$, $*p = .001$) and YAGEP ($\text{Exp}(B) = 7.75$, $*p = .001$) significantly increase the likelihood of paid employment. In contrast, gender, location, academic background, and age were not statistically significant predictors across employment categories, indicating outcome-level inclusivity. The study concludes that entrepreneurship programmes contribute meaningfully to employment and socioeconomic transformation, with programme design and structure, rather than participant characteristics, emerging as the primary drivers of success.

Keywords: Inclusivity, higher education, vocational skills, employment, sustainable development, entrepreneurship education

Introduction

In an era of rising youth unemployment, poverty, and socioeconomic disparities, developing economies such as Nigeria have embraced entrepreneurship and vocational skills development to drive inclusive growth and advance the United Nations (UN) Sustainable Development Goals (SDGs) (UNESCO, 2016; United Nations, 2023). These efforts equip individuals with practical skills for labour markets while fostering innovation, productivity, and equitable resource distribution (World Bank, 2022). Inclusivity means integrating diverse groups by gender, location, education, and vulnerability, which ensures that marginalized populations benefit, enhancing outcomes and aligning with SDGs 1 (No Poverty), 4 (Quality Education), 8 (Decent Work and Economic Growth), and 10 (Reduced Inequalities) (Sen, 1999). Exclusionary practices, however, perpetuate marginalisation, weaken sustainability, and limit economic diversification in resource-dependent regions such as Nigeria's Niger Delta.

Delta State, a hydrocarbon-rich Niger Delta area, illustrates this shift amid oil revenue volatility and environmental degradation, affecting its youthful (81% aged 0–39) and rural (58.7%) population (Delta State Government, 2024). The Delta State Job and Wealth Creation Bureau launched initiatives like the Skills Training and Entrepreneurship Programme (STEP), Youth Agricultural Entrepreneurs Programme (YAGEP), and Graduate Employment Enhancement Programme (GEEP) (Delta State Government, 2022). Between 2015 and 2023, these programmes empowered over 7,000 beneficiaries through training in ICT, agriculture, construction, and business incubation, plus starter packs, micro-credit, and mentorship. STEP trained 5,051 youths (aged 18–35) in trades; YAGEP aided 1,776 rural agri-entrepreneurs via cluster farming; and GEEP offered internships to 120 graduates. Plans target 12,351 non-agricultural enterprises by 2027, aiming for 875,000 jobs, poverty reduction from 47% to 35%, and a boost in non-oil GDP to 52% (Delta State Government, 2024).

Yet, inclusivity levels determine sustainability. Barriers such as gender biases marginalizing women in rural economies, geographic inequalities limiting rural access (70% of agrarian youths), and scant support for persons with disabilities (PwDs) and low-literacy groups exclude 60–70% of eligible beneficiaries from accessing, participating in, and fully benefiting from the programmes (Okojie, 2021; Delta State Government, 2024). Recent steps include the Women Empowerment and Skills Acquisition Programme (WESAP) for 2,500 women's cooperatives and the Rural Youth Skills Acquisition (RYSA) programme, which trains 1,890 youths annually per district (Delta State Government, 2024). However, gaps persist: rural infrastructure receives one-third of urban allocations; YAGEP female enrolment is 36.7%. These widen inequalities, capping YAGEP's 41.7% income gains and hindering Medium-Term Development Plan targets such as 95% rural water access and 60% health coverage (Ighoroje & Omorogiuwa, 2021; National Bureau of Statistics, 2023; Delta State Job and Wealth Creation Bureau, 2023; Delta State Government, 2024).

This study assessed inclusivity in STEP, YAGEP, and GEEP, examining interactions of gender, rurality, disability, and educational access on parity, participation, and outcomes. It analyzes their role in poverty reduction, employment, and inequality mitigation, using beneficiary data and policies to recommend SDG-aligned enhancements for transformative development in Delta State.

Statement of the Problem

Despite significant government investment in youth skills acquisition and entrepreneurship programmes in Delta State, concerns persist regarding their inclusivity and equitable reach. Programmes such as STEP, YAGEP, and GEEP aim to reduce unemployment, enhance skills, and promote self-reliance. Yet, evidence suggests that 60–70% of eligible youth are excluded due to structural and socioeconomic barriers, representing substantial losses in potential labour force participation, income generation, and overall economic productivity.

Persistent gender disparities, particularly in agriculture and enterprise programmes, limit women's access to income-generating opportunities, constraining their contribution to economic development. Spatial inequalities further disadvantage rural youth, who face limited access to information, training centres, and programme infrastructure, despite higher levels of need. Additionally, persons with disabilities and individuals with low literacy levels are inadequately accommodated, as adaptive training and targeted inclusion strategies remain minimal. If these gaps persist, the programmes risk underperforming in employment generation, income improvement, and poverty reduction, undermining broader goals of economic diversification and inclusive growth. This study therefore examined the inclusivity of STEP, YAGEP, and GEEP in Delta State to identify gaps and propose strategies for more equitable and effective outcomes.

Objectives of the Study

The main objective is to evaluate the inclusivity and employment outcomes of entrepreneurship and vocational skills programmes in Delta State. Specific objectives are to:

1. Determine the extent to which socio-demographic characteristics (sex, academic background, programme type, age, and location) reflect inclusivity in participant selection.
2. Examine the statistical relationship between programme type (STEP, YAGEP, and GEEP) and employment status.
3. Assess whether gender influences employment status.
4. Investigate the relationship between location (urban or rural) and employment status.
5. Evaluate the relationship between academic background and employment status.
6. Analyze the relationship between age group and employment status.

Research Questions

1. To what extent do socio-demographic characteristics (sex, academic background, programme type, age, and location) reflect inclusivity in participant selection for entrepreneurship and vocational skills programmes in Delta State?
2. Is there a significant relationship between programme type (STEP, YAGEP, GEEP) and employment status?
3. Is there a significant relationship between gender and employment status?
4. Is there a significant relationship between location (urban or rural) and employment status?
5. Is there a significant relationship between academic background and employment status?
6. Is there a significant relationship between age group and employment status?

Literature Review

Conceptual Foundations of Inclusivity and Skills Development

Inclusivity in development programmes refers to the intentional design and implementation of interventions that ensure equitable access to opportunities, resources, and participation for all individuals, regardless of gender, socioeconomic status, education, or geographic location. It emphasizes the removal of structural barriers that disproportionately affect marginalized populations **such as** women, rural dwellers, persons with disabilities, and low-literacy groups (Sen, 1999; United Nations, 2023). In developing countries, inclusivity is widely recognized as a critical mechanism for reducing poverty, inequality, and social exclusion (Eregba & Mesagan, 2021).

Within the context of entrepreneurship and vocational education, inclusivity ensures equal access to training, finance, and productive opportunities. Entrepreneurship education

develops competencies such as innovation, business management, and risk-taking, while vocational training focuses on the acquisition of technical and practical skills relevant to labour market demands (OECD, 2018; UNESCO, 2016). In Delta State, programmes such as STEP, YAGEP, and GEEP integrate these components by providing training, mentorship, start-up support, and financial assistance aimed at enhancing self-employment and reducing unemployment. However, the extent to which these programmes achieve equitable participation remains a key concern.

Socioeconomic transformation refers to sustained improvements in employment, income, and living standards driven by investments in human capital and inclusive development strategies (UNDP, 2023; World Bank, 2022). Inclusive participation ensures that the benefits of development programmes are widely distributed rather than concentrated among advantaged groups. This aligns with the broader concept of sustainable development, which integrates economic growth, social equity, and environmental sustainability (Brundtland Commission, 1987; United Nations, 2023). In this regard, inclusive entrepreneurship and vocational programmes play a vital role in promoting poverty reduction, employment generation, and economic diversification.

Theoretical Framework

This study integrates Human Capital Theory, Social Inclusion Theory, the Sustainable Livelihoods Framework (SLF), and the Capability Approach to explain how inclusivity shapes access, participation, and socioeconomic outcomes. Human Capital Theory asserts that education and skills development enhance productivity and employability (Becker, 1964), but unequal access limits these benefits. Social Inclusion Theory highlights the removal of economic, social, and institutional barriers that hinder participation, especially across gender and geographic lines (Levitas et al., 2007; Silver, 1994). The SLF emphasizes how individuals combine human, financial, social, physical, and natural assets to sustain livelihoods, while entrepreneurship and vocational programmes strengthen these assets, though unequal access can reduce their effectiveness (DFID, 1999). The Capability Approach stresses that access alone is insufficient; individuals must be able to convert acquired skills into meaningful outcomes within enabling environments (Nussbaum, 2000; Sen, 1999).

Empirical Review

Empirical evidence from Nigeria indicates that entrepreneurship and vocational training programmes contribute to improved employability, income generation, and business creation. However, these benefits are unevenly distributed across demographic groups. Studies have shown that participation and outcomes vary significantly by gender, location, and educational attainment (Nwachukwu & Ojo, 2017; Odigbo et al., 2020). Gender disparities persist, with male participation often exceeding female enrolment, particularly in agriculture-based and enterprise-driven programmes. Similarly, rural populations face structural barriers such as limited access to information, infrastructure, and training facilities, resulting in lower participation rates despite higher levels of need (Eregba & Mesagan, 2021).

In Delta State, programmes such as STEP, YAGEP, and GEEP have demonstrated success in promoting self-employment and income growth. However, their overall impact is constrained by persistent inclusivity challenges, including limited rural outreach, gender imbalance, and inadequate support for vulnerable groups. Evidence further suggests that programmes incorporating inclusive design features – such as targeted outreach, flexible training delivery, and support mechanisms for disadvantaged populations – help achieve more equitable and sustainable outcomes (Okoh & Ugoani, 2021; Olawale & Ayodele, 2023).

Gap in the Literature

Existing studies rarely examine inclusivity as a driver of programme effectiveness in Delta State and often overlook demographic differences in participation and outcomes. They also lack strong theoretical integration linking inclusivity to employability. This study addresses these gaps through a theory-driven, multivariate analysis of STEP, YAGEP, and GEEP, showing that programme type, not participant characteristics, drives employment outcomes.

Methodology

Research Design

A descriptive correlational research design was adopted to examine the relationships among programme participation, skill acquisition, employability readiness, and employment status. This design allowed for the description of participant characteristics and the examination of associations between variables.

Population and Sample

The population comprised graduate beneficiaries of YAGEP, STEP, and GEEP from five cohorts (2017–2022). The total population across all cohorts was 1,773 participants. A stratified random sampling technique was used to select 296 participants, proportionate to cohort sizes.

Table 3.1: Sample Distribution by Programme Cycle

Cohort	Population	Sample
2017–2018	298	53
2018–2019	380	76
2019–2020	318	59
2020–2021	401	76
2021–2022	376	69
Total	1,773	296

Instrumentation

Content validity was established through expert review by the two supervisors, two entrepreneurship education lecturers, one psychometrician, and one programme coordinator. The experts assessed item clarity, relevance, and alignment with the research questions and hypotheses. Revisions were made based on their feedback, ensuring the instrument adequately captured the constructs of engagement, skills acquisition, readiness, and status. Face validity was confirmed during the pilot, with 90% of participants finding items clear and unambiguous.

Reliability of the Instrument: A pilot study was conducted with 30 participants from a non-sampled cohort of YAGEP, STEP, and GEEP. Cronbach's alpha was used to assess internal consistency because the items were not all on the same scale. Some items used Likert scales, multiple choice, checklists, categorical yes/no items, and attribution questions, with an acceptable threshold of $\alpha \geq 0.70$. Separate reliability scores were also calculated for the essential skills scale, vocational skills scale, and employability readiness scale.

The computed reliability indices for the Entrepreneurship and Vocational Education Questionnaire (EVEQ) are as follows: Engagement subscale ($\alpha = 0.820$), Essential entrepreneurship skills subscale ($\alpha = 0.795$), Vocational entrepreneurship skills subscale ($\alpha =$

0.922), Employability readiness subscale ($\alpha = 0.713$), Employment status subscale ($\alpha = 0.785$), and overall instrument ($\alpha = 0.701$). These values indicate acceptable to high internal consistency, supporting the instrument's suitability for the main study.

Data Collection and Analysis

Data were collected through direct administration of the questionnaire to participants. Descriptive statistics (frequencies, percentages) were used to summarize participant characteristics. Chi-square tests of independence were conducted to examine bivariate relationships. Multinomial logistic regression was employed to determine the predictive power of programme type and demographic variables on employment status, with employment status (unemployed, underemployed, paid employment, entrepreneur) as the dependent variable. All analyses were conducted using SPSS Version 27.

Results

Research Question 1: *To What Extent Do the Socio-Demographic Characteristics of Sex, Academic Background, Programme Type, and Residential Location Reflect Inclusivity in the Selection of Participants for Entrepreneurship and Vocational Skills Programmes in Delta State?*

Table 1: Key Distributions and Inclusivity Insights

Characteristic	Key Distribution (Frequency/Percent)	Chi-Square Test (*p*-value)	Inclusivity Assessment
Sex	Male: 162 (54.7%); Female: 134 (45.3%)	*p* = .104 (ns)	Near gender parity with no significant deviation from 50:50, indicating strong inclusivity.
Academic Background	Sciences: 35 (11.8%); Social Sciences: 55 (18.6%); Arts: 63 (21.3%); Engineering: 49 (16.6%); Agricultural Sciences: 94 (31.8%)	*p* < .001 (sig.)	Broad disciplinary representation but significant deviation from equal shares, suggesting some bias toward agricultural sciences despite overall diversity.
Programme Type	GEEP: 40 (13.5%); STEP: 162 (54.7%); YAGEP: 94 (31.8%)	*p* < .001 (sig.)	All programmes included, but significant unevenness (STEP dominance) reflects imbalanced access.
Residential Location	Urban: 187 (63.2%); Rural: 109 (36.8%)	*p* < .001 (sig.)	Significant urban skew highlights need for enhanced rural outreach to improve geographic inclusivity.

Characteristic	Key (Frequency/Percent)	Distribution	Chi-Square Test (*p*- value)	Inclusivity Assessment
Age Group	20–25: 194 (65.5%); 25–30: 42 (14.2%); 30–35: 60 (20.3%)		*p* < .001 (sig.)	Significant youth skew (especially 20–25) aligns with programme goals for recent graduates but limits age inclusivity for older participants; extension to 35 provides some flexibility.

Source: Researcher (2024)

Overall, selections promote inclusivity primarily in gender, while statistical tests confirm opportunities for greater equity in other dimensions through targeted adjustments to reduce significant deviations from uniformity.

Research Question 2: *Is There a Significant Relationship Between Programme Type (STEP, YAGEP, GEEP) and Employment Status?*

Table 2: Cross-Tabulation of Programme Type and Employment Status

Programme	Unemployed	Underemployed	Paid Employment	Entrepreneur	Total
GEEP	4	8	25	3	40
STEP	4	21	61	76	162
YAGEP	1	6	34	53	94
Total	9	35	120	132	296

Source: Researcher (2024)

YAGEP and STEP show high entrepreneurship rates, while GEEP favours paid employment. The chi-square result ($\chi^2 = 33.547$, $p < .001$) and regression findings (STEP: $\mathbf{B} = 1.764$, $p = .001$; $\mathbf{B} = 2.642$, $p < .001$; YAGEP: $\mathbf{B} = 2.048$, $p = .001$; $\mathbf{B} = 2.987$, $p < .001$), see Table 7; confirm a significant association, indicating that programme type strongly influences employment outcomes.

Research Question 3: Is There a Significant Relationship Between Gender and Employment Status?

Table 3: Cross-Tabulation of Gender and Employment Status

Sex	Unemployed	Underemployed	Paid Employment	Entrepreneur	Total
Male	4	21	69	68	162
Female	5	14	51	64	134
Total	9	35	120	132	296

Source: Researcher (2024)

Females show slightly higher entrepreneurship and males higher paid employment, but both chi-square ($\chi^2 = 1.699$, $p = .637$) and regression results (e.g., Paid employment: $B = -0.148$, $p = .731$; Entrepreneurship: $B = -0.102$, $p = .820$), see Table 7; indicate no significant association, meaning gender does not influence employment outcomes.

Research Question 4: Is There a Significant Relationship Between Location (Urban or Rural) and Employment Status?

Table 4: Cross-Tabulation of Location and Employment Status

Location	Unemployed	Underemployed	Paid Employment	Entrepreneur	Total
Urban	6	19	79	83	187
Rural	3	16	41	49	109
Total	9	35	120	132	296

Source: Researcher (2024)

Employment outcomes are similar across urban and rural participants, with no significant association ($\chi^2 = 1.605$, $p = .658$). Regression results (e.g., Paid employment: $B = 0.274$, $p = .330$; Entrepreneurship: $B = 0.205$, $p = .489$), see Table 7; confirm that location does not significantly influence employment outcomes.

Research Question 5: Is There a Significant Relationship Between Academic Background and Employment Status?

Table 5: Cross-Tabulation of Academic Background and Employment Status

Academic Background	Unemployed	Underemployed	Paid Employment	Entrepreneur	Total
Sciences	1	9	9	16	35
Social Science	1	3	25	26	55
Arts	2	8	23	30	63
Engineering	1	6	21	21	49

Academic Background	Unemployed	Underemployed	Paid Employment	Entrepreneur	Total
Agricultural Science	4	9	42	39	94
Total	9	35	120	132	296

Source: Researcher (2024)

Employment outcomes vary slightly across disciplines, but both chi-square ($\chi^2 = 12.353$, $p = .416$) and regression results (e.g., Sciences: $B = -0.401$, Social Sciences: $B = 0.511$, Arts: $B = 0.472$, Engineering: $B = 0.451$, all $p > .05$), see Table 7; show no significant association, indicating that academic background does not influence employment status.

Research Question 6: *Is There a Significant Relationship Between Age Group and Employment Status?*

Table 6: Cross-Tabulation of Age Group and Employment Status

Age Group	Unemployed	Underemployed	Paid Employment	Entrepreneur	Total
20 to 25	8	25	77	84	194
25 to 30	1	2	14	25	42
30 to 35	0	8	29	23	60
Total	9	35	120	132	296

Source: Researcher (2024)

The 20–25 group shows strong employment outcomes, while 25–30 has the highest entrepreneurship rate. However, both chi-square ($\chi^2 = 8.876$, $p = .181$) and regression results (e.g., 20–25: $B = -0.591$, $p = .327$; 25–30: $B = 0.302$, $p = .662$), see Table 7; indicate that age is not a significant predictor of employment outcomes.

Table 7: Multinomial Logistic Regression Predicting Employment Status from Programme Type, Gender, Location, Academic Background, and Age Group ($N = 296$)

Predictor	<i>B</i>	<i>SE</i>	Wald	* <i>p</i> *	Exp(<i>B</i>)
Paid Employment vs. Unemployed					
Male	-0.148	0.433	0.12	.731	0.86
Urban	0.274	0.281	0.95	.330	1.32
Age 20–25	-0.591	0.602	0.96	.327	0.55
Age 25–30	0.302	0.688	0.19	.662	1.35

Predictor	B	SE	Wald	*p*	Exp(B)
Sciences	-0.401	0.742	0.29	.589	0.67
Social Science	0.511	0.661	0.60	.438	1.67
Arts	0.472	0.648	0.53	.468	1.60
Engineering	0.451	0.673	0.45	.503	1.57
STEP	1.764	0.521	11.45	.001	5.84
YAGEP	2.048	0.609	11.31	.001	7.75
Entrepreneur vs. Unemployed					
Male	-0.102	0.449	0.05	.820	0.90
Urban	0.205	0.296	0.48	.489	1.23
Age 20–25	-0.486	0.628	0.60	.439	0.62
Age 25–30	0.421	0.719	0.34	.559	1.52
Sciences	-0.352	0.768	0.21	.648	0.70
Social Science	0.584	0.689	0.72	.397	1.79
Arts	0.553	0.671	0.68	.410	1.74
Engineering	0.528	0.695	0.58	.447	1.70
STEP	2.642	0.534	24.50	< .001	14.05
YAGEP	2.987	0.621	23.12	< .001	19.82
Underemployed vs. Unemployed					
Male	0.201	0.416	0.23	.632	1.22
Urban	0.131	0.271	0.23	.633	1.14
Age 20–25	0.219	0.574	0.15	.699	1.24
Age 25–30	0.284	0.662	0.18	.674	1.33
Sciences	0.207	0.711	0.08	.771	1.23
Social Science	0.289	0.639	0.20	.655	1.34
Arts	0.276	0.623	0.20	.655	1.32

Predictor	B	SE	Wald	*p*	Exp(B)
Engineering	0.251	0.652	0.15	.703	1.29
STEP	1.132	0.496	5.20	.023	3.10
YAGEP	0.998	0.571	3.05	.081	2.71

Note. Reference categories: GEEP for programme type, female for gender, rural for location, Agricultural Science for academic background, and age 30–35 for age group. Model fitting information: $-2 \text{ Log Likelihood} = 405.72$, $\chi^2(24) = 52.84$, $*p* < .001$. Pseudo R^2 : Cox and Snell = .336, Nagelkerke = .382.

The combined multinomial logistic regression model revealed that programme type was the only consistent and statistically significant predictor of employment status across all outcome categories. Participants in STEP and YAGEP were significantly more likely to be in paid employment or self-employment compared to those in GEEP. In contrast, gender, location, age group, and academic background did not significantly predict employment outcomes when considered alongside programme type. This indicates that previously observed differences in bivariate analyses were not robust under multivariate conditions. The model explained a substantial proportion of variance in employment status (Nagelkerke $R^2 = .382$), highlighting that structured programme design and content are more critical determinants of employment outcomes than demographic characteristics.

Discussion of the Findings

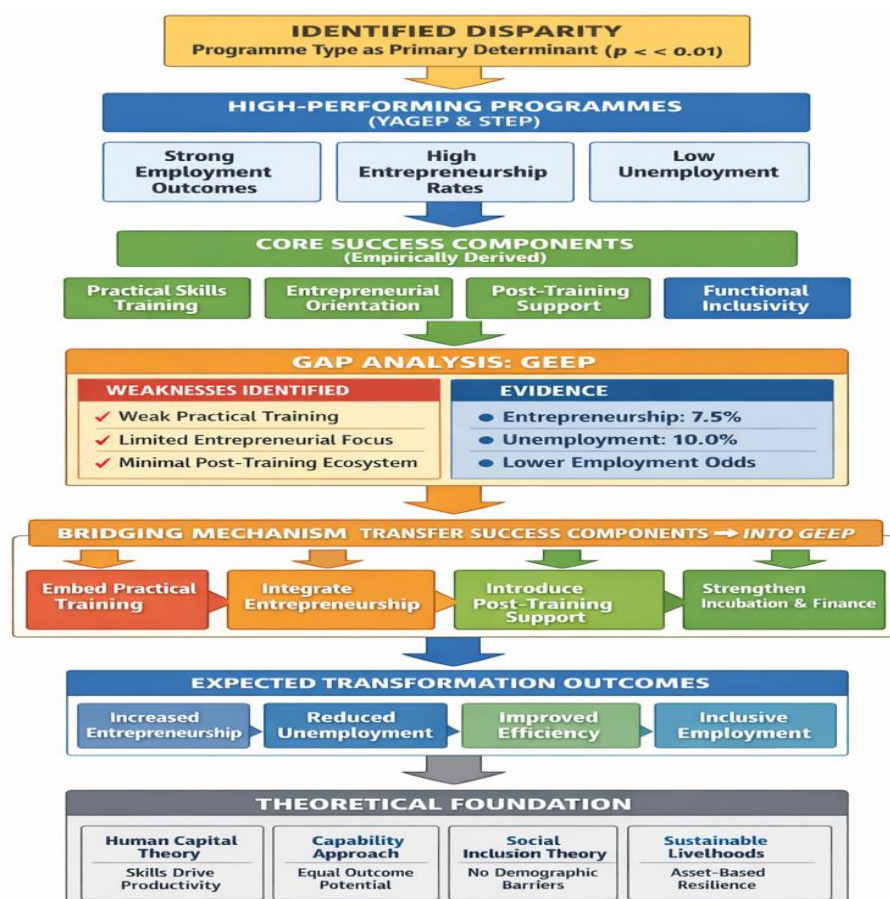
This study examined the inclusivity and effectiveness of entrepreneurship and vocational skills programmes in Delta State, Nigeria, with particular attention to the role of socio-demographic characteristics and programme type in shaping employment outcomes. Overall, the findings indicate that the programmes achieved moderate inclusivity. There was near gender balance among participants (55% male, 45% female), alongside representation from diverse academic backgrounds and age groups up to 35 years. However, urban participants constituted a larger proportion (63.2%), suggesting persistent limitations in rural outreach. This pattern aligns with previous studies that identified infrastructural and transportation barriers as key constraints to rural participation (Nwachukwu & Ojo, 2017; Eregha & Mesagan, 2021).

The study identified an “inclusivity paradox,” where entrepreneurship programmes achieve equity in employment outcomes despite clear inequalities in participation. Although descriptive results reveal significant demographic imbalances, especially an urban bias, regression findings show that factors such as location, age, and academic background do not significantly affect employment outcomes once participants are enrolled. This indicates the presence of outcome inclusivity (conditional on participation), while access inclusivity remains uneven. The dominance of urban participants suggests an “urban advantage,” driven by better infrastructure, information access, and proximity to training centres, which may also shape employability readiness. Overall, the findings emphasise that inclusivity operates as a two-stage process and reinforce that programme architecture, rather than participant characteristics, is the key driver of outcomes, while geographic disparities in access remain a critical policy concern.

Programme type emerged as the strongest and most consistent predictor of employment outcomes. Participants in the Youth Agricultural Entrepreneurs Programme recorded the highest entrepreneurship rate (56.4%) and the lowest unemployment rate (1.1%). Similarly,

participants in the Skills Training and Entrepreneurship Programme demonstrated a balanced distribution between paid employment and self-employment. In contrast, participants in the Graduate Employment Enhancement Programme were predominantly engaged in paid employment (62.5%) with relatively low entrepreneurial outcomes. These results confirm that programme structure and content play a critical role in shaping employment trajectories. The findings support Human Capital Theory, which posits that structured skill acquisition enhances productivity and employability, and are consistent with earlier empirical studies highlighting the positive impacts of these programmes on income generation and labour market integration (Okoh & Ugoani, 2021; Olawale & Ayodele, 2023).

Based on the empirical results provided, the Inclusive Entrepreneurship and Vocational Education Framework was synthesized by the study. It highlights how the structural components of YAGEP and STEP drive superior entrepreneurship and employment outcomes compared to the gaps identified in GEEP. The Inclusive Entrepreneurship and Vocational Education Framework is an evidence-based model developed to explain and address the observed disparities in employment outcomes across entrepreneurship programmes in Delta State. The framework shows that programme structure, not participant characteristics, drives employment outcomes. Evidence with $p^* < .001$ confirms that the type and design of a programme determine success, not gender, age, or figure 1: The Inclusive Entrepreneurship and Vocational Education Framework background.



High-performing programmes (YAGEP and STEP) achieve strong employment and entrepreneurship outcomes because they include practical hands-on skills training, a strong entrepreneurial focus, post-training support (through mentorship, finance, and market access), and functional inclusivity with equal outcomes across groups. In contrast, GEEP underperforms due to the absence of these elements, resulting in low entrepreneurship (7.5%) and higher unemployment.

Core finding – Inclusivity Paradox: Although all programmes are inclusive at entry, only YAGEP and STEP convert participation into meaningful employment outcomes. Inclusivity without strong programme design leads to weak results.

Framework implication: Effective reform should shift focus from participant selection to programme architecture, integrate YAGEP and STEP success elements into GEEP through a bridging mechanism, and expand access to rural areas through decentralized delivery.

Conclusion

The study assessed the inclusivity and effectiveness of STEP, YAGEP, and GEEP in Delta State. The findings indicate that the programmes are largely inclusive, although an urban bias persists. Importantly, programme type emerged as the only significant predictor of employment outcomes, while socio-demographic factors showed no significant effect when controlled. The results further confirm that well-structured programmes produce better employment outcomes, aligning with Human Capital, Sustainable Livelihoods, Capability, and Social Inclusion theories. Overall, entrepreneurship programmes enhance skills, expand opportunities, and promote economic inclusion, making them vital tools for income generation, inequality reduction, and broader socioeconomic development.

Recommendations

Based on the findings of this study, the following recommendations were made for policymakers and the Bureau:

1. Restructure GEEP to include hands-on training and mentorship for stronger self-employment outcomes.
2. Use longitudinal, disaggregated data to monitor and address urban–rural gaps.
3. Implement gender-sensitive measures such as flexible schedules and childcare support.
4. Build industry partnerships for internships and market linkages.
5. Increase rural funding through mobile training units and transport support.

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ENHANCING TEACHERS' PROFESSIONAL DEVELOPMENT FOR EDUCATIONAL TRANSFORMATION AND SUSTAINABLE DEVELOPMENT IN THE 21ST CENTURY

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Abstract

This paper examines the pivotal role of teachers in promoting educational transformation and sustainable development in the 21st century. It provides a comprehensive analysis of the concept of a teacher, identifying key professional qualities, categories of teachers in Nigeria, and their multifaceted roles within the education system. It also explores the importance of continuous professional development (CPD), a mechanism for enhancing teachers' pedagogical competencies, content knowledge, and overall effectiveness in the classroom. The paper further highlights persistent challenges faced by teachers, including inadequate working conditions, low levels of motivation, insufficient professional recognition, and shortages of qualified personnel, which impede the delivery of quality education. Drawing on both national and international studies, the paper offers evidence-based recommendations for strengthening teacher capacity, improving professional status, fostering teacher retention, and ensuring that professional development initiatives align with global best practices.

Keywords: Teacher Quality, Professional Development, Sustainable Education, Teaching Profession, Nigeria

Introduction

Education serves as a fundamental instrument for the development and promotion of a nation's cultural heritage. It is the social mechanism through which values, knowledge, and traditions are transmitted from one generation to another. However, for this process to be effective, it requires the active involvement of trained professionals, particularly teachers (Imasuen & Aibinuomo, 2022; Organisation for Economic Co-operation and Development [OECD], 2020; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2023). Teachers play a central role in translating educational policies into practice and driving educational transformation. As emphasised in the National Policy on Education, no education system can rise above the quality of its teachers (Federal Republic of Nigeria, 2014), a position further reinforced by global evidence highlighting teacher quality as the most significant school-based determinant of student achievement (World Bank, 2022; UNESCO, 2023).

In the 21st century, education systems are increasingly expected to respond to complex global challenges such as environmental sustainability, technological advancement, and social inequality. Consequently, the role of teachers has expanded beyond the mere transmission of knowledge to include the development of critical thinking, problem-solving skills, digital competence, and sustainability awareness among learners. This evolving responsibility necessitates continuous professional development (CPD), which equips teachers with the knowledge and skills required to remain effective in dynamic educational environments (OECD, 2020; Schleicher, 2020).

Traditionally, professional development for teachers was largely limited to short-term workshops and in-service training programmes. However, contemporary perspectives view

professional development as a continuous, structured, and practice-oriented process that supports long-term professional growth and improved instructional effectiveness (Darling-Hammond et al., 2020; UNESCO, 2023).

This paper, therefore, examines the concept of a teacher, the qualities of a good teacher, the categories of teachers in Nigerian schools, and the roles and responsibilities of teachers. It further explores continuous professional development programmes and the challenges facing the teaching profession in Nigeria in the context of achieving educational transformation and sustainable development.

The Concept of a Teacher

The term "teacher" has been defined in various ways by scholars and professional bodies. At its core, a teacher is someone who facilitates learning by imparting knowledge, skills, and values to learners. According to the Teachers' Registration Council of Nigeria (TRCN, 2020), a teacher is a legally registered individual certified to deliver instruction in educational settings. A teacher is a trained professional who facilitates learning by guiding, instructing, and supporting learners in the acquisition of knowledge, skills, values, and attitudes necessary for personal and societal development. This implies that teaching goes beyond the mere transmission of information; it involves shaping the intellectual, moral, and social development of learners within and beyond the classroom (Imasuen & Aibinuomo, 2022; UNESCO, 2023).

Julius Nyerere cited in Ishumi (2025), and Masinde et al. (2025) described teachers as the cornerstone of national development, emphasising their critical role in shaping young minds and instilling values essential for societal progress. This perspective remains relevant in contemporary educational discourse, as it is widely recognised that teachers play a central role in national development and serve as key drivers of human capital development and sustainable growth (World Bank, 2022; UNESCO, 2023).

In modern educational practice, a teacher is not only an instructor but also a facilitator, mentor, counsellor, and role model. Teachers are expected to create inclusive learning environments, adapt instructional strategies to meet diverse learners' needs, and integrate technology into teaching and learning processes (OECD, 2020; Schleicher, 2020). This expanded role reflects the increasing complexity of education in a rapidly changing world.

Furthermore, teachers are agents of change who contribute to the realisation of national and global educational goals, including the Sustainable Development Goals (SDGs), particularly Goal 4, which focuses on inclusive and equitable quality education. Their effectiveness significantly influences learners' academic achievement, attitudes towards learning, and overall development (UNESCO, 2023; World Bank, 2022). Therefore, a teacher can be seen as a dynamic professional whose responsibilities extend beyond classroom instruction to include fostering lifelong learning, promoting ethical values, and contributing to societal transformation.

Qualities of a Good Teacher

A good teacher possesses a combination of personal, professional, and pedagogical qualities that enhance effective teaching and learning. These qualities enable teachers to facilitate meaningful learning experiences, support diverse learners, and contribute to overall educational development (Darling-Hammond et al., 2020; UNESCO, 2023). One of the most important qualities of a good teacher is strong subject matter knowledge. Teachers must have a deep understanding of the content they teach in order to present concepts clearly, answer learners' questions effectively, and connect new knowledge to prior understanding. Content knowledge forms the foundation of effective teaching, as a teacher must not only understand what is being taught but also be able to transform and align it with pedagogical and curricular

goals (Copur-Gencturk & Tolar, 2025; Mahmoodi-Shahrehabaki & Oslund, 2024). This indicates that a teacher must possess a higher level of academic competence than the learners. Equally important is pedagogical competence, which involves the ability to use appropriate teaching methods, instructional strategies, and assessment techniques to meet learners' needs (OECD, 2020). Another essential quality is effective communication skills. As Noddings (2012) emphasises, communication is at the heart of meaningful teacher-student engagement. A good teacher communicates ideas clearly and engages learners through questioning, explanation, and feedback. This fosters active participation and enhances students' understanding. In addition, classroom management skills are crucial for maintaining an organised and conducive learning environment where students feel safe, respected, and motivated to learn.

A good teacher also demonstrates patience, empathy, and emotional intelligence. These attributes help in understanding individual differences among learners and in supporting students who may face academic or personal challenges. By showing care and respect, teachers build positive relationships that enhance learners' confidence and engagement. Furthermore, adaptability and creativity are key qualities in contemporary education. With the rapid advancement of technology and changing educational demands, teachers must be flexible in their teaching approaches and innovative in designing learning experiences. The integration of digital tools and resources into teaching has become increasingly important in promoting interactive and student-centred learning (Schleicher, 2020; UNESCO, 2023). As Fullan (2021) notes, embracing innovation is key to staying effective in a rapidly evolving educational environment.

Continuous learning is another defining characteristic of a good teacher. Effective teachers engage in continuous professional development (CPD) to update their knowledge and skills, ensuring that they remain relevant and effective in their practice. This commitment to lifelong learning reflects professionalism and dedication to improving student outcomes (Darling-Hammond et al., 2020). Finally, a good teacher serves as a role model, demonstrating ethical behaviour, discipline, and a positive attitude towards work and learning. Through their actions and interactions, teachers influence not only students' academic development but also their moral and social values.

Categories of Teachers in Nigerian Schools

In the Nigerian education system, teachers can be grouped into several categories based on their academic qualifications, pedagogical training, and professional status (Ofoegbu, 2004; Olorunsola & Alani, 2017; UNESCO, 2014). At the forefront are the qualified professional teachers, who have received formal education in teaching and possess relevant pedagogical training. These individuals are equipped with both subject knowledge and the instructional methodologies required to facilitate effective learning in the classroom (Imasuen & Aibinuomo, 2022; UNESCO, 2023).

Another category includes non-professional teachers, individuals who hold academic qualifications in fields outside of education but who find themselves employed in teaching positions. While they may be knowledgeable in their respective subject areas, they often lack formal training in pedagogy and classroom management, which limits their effectiveness in delivering the curriculum as intended (World Bank, 2022; OECD, 2020).

A third group consists of inadequately trained teachers. These individuals possess minimal or inadequate training in teaching methodologies and are often products of unregulated or substandard teacher preparation programmes. Their limited understanding of educational psychology, instructional strategies, and curriculum planning makes it difficult for them to meet the diverse learning needs of students (UNESCO, 2023).

The final group comprises para-teachers, also known as community or contract teachers. These individuals are typically recruited on an ad-hoc basis, particularly in underserved or rural areas, as a temporary solution to address teacher shortages (Kirk & MacDonald, 2001; UNESCO, 2014; Bold et al., 2017; Kingdon et al., 2013). Para-teachers often have limited formal training, which can affect instructional quality, but they play a critical role in maintaining access to education where professionally trained teachers are unavailable.

Roles and Responsibilities of Teachers

A teacher is a pivotal figure in the education system and the broader society. At the core of the teacher's function is the instructional role, which involves designing and delivering engaging and meaningful lessons that align with curriculum objectives and cater to the diverse needs of learners (Imasuen & Aibinuomo, 2022; UNESCO, 2023). In this capacity, teachers act as information providers and practical instructors who introduce students to new knowledge and skills in structured ways.

Teachers also serve a mentoring role, offering both academic guidance and emotional support to help students navigate personal and educational challenges. They act as counsellors and facilitators of learning, often identifying and nurturing the individual potential of their students. This mentoring function enhances emotional and attitudinal development, fostering maturity, resilience, and social competence in learners (OECD, 2020; Darling-Hammond et al., 2020).

Another central aspect of the teacher's responsibility is their assessment role. Teachers engage in both formative and summative assessments to monitor learners' progress, diagnose learning difficulties, and adjust their teaching strategies accordingly. Assessment plays a critical part in supporting and sustaining student achievement (Amadi et al., 2019; UNESCO, 2023). Through this, teachers also act as curriculum evaluators and assessors of learners' growth and performance.

In managing classrooms, teachers take on the classroom management role, where they create structured and supportive learning environments that promote discipline, mutual respect, and cooperation. An organised and peaceful classroom atmosphere is essential for productive learning, and this is largely dependent on the teacher's ability to manage time, resources, and behaviour effectively (OECD, 2020).

In today's rapidly evolving educational landscape, teachers are also required to assume an innovative role. They are expected to incorporate technology, creative strategies, and contemporary pedagogical techniques to enhance student engagement and learning outcomes. This role requires adaptability and continuous professional development to stay abreast of global educational trends (Fullan, 2021; Schleicher, 2020).

Beyond the classroom, teachers have a unique role in society. They shape not only the cognitive development of learners by promoting critical thinking, intellectual curiosity, and problem-solving skills, but also contribute significantly to emotional and ethical development. By modelling and instilling values such as integrity, honesty, empathy, and respect, teachers help to mould students into morally upright and socially responsible citizens (Imasuen & Aibinuomo, 2022; UNESCO, 2023).

Ultimately, a teacher is not only a planner, responsible for designing lessons and aligning them with curriculum frameworks, but also a developer of learning resources, a supervisor and organiser of instruction, and a role model whose conduct and professionalism set a standard for learners to emulate. Without the teacher, there would be a vacuum in the nurturing of human capital, professional competence, and ethical awareness, components essential to achieving sustainable national development (World Bank, 2022).

Continuous Professional Development Programmes in Equipping Teachers' Competence

Professional development (PD) of teachers is indispensable for providing quality education. Professional development practices help teachers improve their content-based pedagogical knowledge. It also pays attention to enhancing skills, practice, and self-motivated changes in education (Blandford, 2012; Darling-Hammond et al., 2020). The quality of education is considered one of the prime factors in determining quality in schools, as is evident from successful education systems around the world (Barber & Mourshed, 2007; OECD, 2020).

With reference to schools, quality education comprises a friendly learning environment, curriculum outcomes, student achievement, and availability of professionally trained teachers (UNICEF, 2000; UNESCO, 2023). Professionally competent teachers engage and equip themselves in a process of ongoing professional learning because such practices improve subject knowledge and pedagogical competence. The same view has been shared by Holmes, cited in Darling-Hammond et al. (2020), who argued that information undergoes constant change and teachers must continually update their professional knowledge to keep pace with global developments. This perspective is reinforced in international frameworks emphasising teacher lifelong learning (OECD, 2020; UNESCO, 2023). Therefore, a teacher is expected to practise the best professional skills to meet the demands of the profession (Cruickshank et al., cited in Darling-Hammond et al., 2020). Professional development ensures that teachers can respond effectively to evolving educational needs.

The Professional Development for Teachers

Education systems around the world are changing and introducing new methods. The need for schools to produce workers with 21st-century skills is a challenge that is confronting teachers. Therefore, the professional development of teachers, namely education and training to enhance teachers' knowledge and skills, has thus become a top priority (Darling-Hammond et al., 2020; OECD, 2020; UNESCO, 2023). To effectively foster students' development of 21st-century skills, teachers themselves must have at least a good command of these skills and be well prepared in their own capacity to impart such skills to students.

Therefore, it is essential that teacher professional development programmes equip teachers with the necessary skills to achieve the expectations of 21st-century education. Teacher development is the professional growth a teacher achieves as a result of gaining increased experience and examining his or her teaching systematically (Glatthorn, cited in Darling-Hammond et al., 2020; OECD, 2020). Haßler (2014) highlights that "teacher education" or "teacher professional development" is preferable to "teacher training". Teachers learn how to learn and how to put theory into practice to advance student development (Villegas-Reimers, cited in Darling-Hammond et al., 2020; UNESCO, 2023).

Ganser, cited in Darling-Hammond et al. (2020) and UNESCO (2023), posits that professional development includes formal experiences such as attending workshops and professional meetings, mentoring, and informal experiences. This conception of professional development is therefore broader than career development, which is defined as "the growth that occurs as the teacher moves through the professional career cycle" (Glatthorn, cited in Darling-Hammond et al., 2020; OECD, 2020), and broader than staff development, which is "the provision of organised in-service programmes designed to foster the growth of groups of teachers".

For a long period of time, the only form of professional development available to teachers was short-term "staff development" or in-service training, usually consisting of workshops or short courses that offered teachers new information on a particular aspect of their work. Only in recent years has professional development been considered a long-term process that includes regular opportunities and experiences planned systematically to promote growth

and development in the profession (Cohen, cited in Darling-Hammond et al., 2020; UNESCO, 2023). Based on the fact that teachers learn over time, it is perceived as a long-term process, resulting in a series of related experiences enabling teachers to relate prior knowledge to new experiences.

Challenges Facing the Teaching Profession in Nigeria

The teaching profession in Nigeria is confronted by a series of persistent and deeply rooted challenges that have significantly undermined its status, effectiveness, and appeal. These issues range from poor working conditions and low professional morale to systemic neglect and inadequate support from policymakers. Collectively, they have contributed to a growing disinterest in teaching and a high attrition rate among educators (Pressley et al., 2023; OECD, 2020; UNESCO, 2023).

One of the foremost challenges is the poor working environment in which many Nigerian teachers operate. Overcrowded classrooms, insufficient instructional materials, delayed or unpaid salaries, and dilapidated infrastructure characterise the daily realities of teaching in many schools (Akinbode et al., 2023; UNESCO, 2023). These conditions make effective teaching extremely difficult and discourage teachers from remaining committed to the profession.

Coupled with this is low motivation and job dissatisfaction, largely driven by poor remuneration, a lack of incentives, limited opportunities for career advancement, and the general undervaluation of teachers in society (Pressley et al., 2023; OECD, 2020; UNESCO, 2023). Another major concern is the lack of continuous professional development. In an era of rapidly evolving educational practices, many Nigerian teachers have little or no access to opportunities for retraining or acquiring new pedagogical techniques. This absence of lifelong learning impedes their growth and limits their capacity to adapt to modern teaching demands (Reychav et al., 2023; Darling-Hammond et al., 2020; UNESCO, 2023).

These factors contribute significantly to high attrition rates within the teaching workforce. Many educators, overwhelmed by poor working conditions and systemic neglect, opt to leave the profession in search of more fulfilling and financially rewarding alternatives. This exodus results in a continual shortage of experienced teachers, especially in rural and underserved areas (Han & Hur, 2021; World Bank, 2022).

A further strain on the profession is the excessive workload teachers bear, often without commensurate compensation or institutional support. International research shows that excessive workload and long working hours are strongly associated with poorer wellbeing among teachers. In English-speaking countries, longer hours and task complexity have been linked to reduced workplace wellbeing and stress (Jerrim & Sims, 2021). Research also indicates that student misbehaviour and workload are significant stressors contributing to emotional exhaustion among teachers across different systems (Huang et al., 2024). In Bhutan, educators identify heavy workload, administrative duties, and limited professional voice as key contributors to occupational stress (Tasleem et al., 2023), while studies in Thailand report widespread burnout and wellbeing challenges among teachers related to prolonged work and job demands (Pakdee et al., 2025). In Nigeria, these challenges are further exacerbated by chronic underfunding and inadequate infrastructural support (Imasuen & Aibinuomo, 2022; World Bank, 2022). The result is a profession marked by burnout, regression, aggression, and eventual withdrawal. Poor conditions of service and inadequate welfare benefits have made the teaching profession unattractive to many.

Conclusion

A teacher plays a crucial role in the development of future leaders and professionals, and the advancement of any nation hinges on the quality of its education system. For a nation to thrive,

it must invest in education and support teachers to teach effectively. This requires qualified educators, adequate resources, and a professional commitment to ethical practices. As technology evolves, teachers must continuously develop their skills to remain relevant. Continuous professional development, mentoring, and training equip teachers to adapt to changing pedagogical approaches and prepare students for 21st-century challenges. Furthermore, government support at all levels is essential to ensure teacher satisfaction, retention, and the mentoring of new educators.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Schools and government agencies should design and implement long-term, structured CPD programmes that allow teachers to improve their skills continuously.
2. Classroom infrastructure, instructional resources, and welfare packages should be upgraded to motivate teachers and enhance their productivity.
3. Competitive remuneration, career progression opportunities, and recognition schemes should be introduced to retain qualified teachers and attract new talent.
4. Teachers should be trained and supported to incorporate technology and innovative teaching methods into the curriculum to meet 21st-century educational demands.
5. Educational policies must prioritise teacher professional development, ethical standards, and leadership support to ensure that teachers can perform optimally.

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STRENGTHENING HOME-SCHOOL PARTNERSHIP FOR SUSTAINABLE EARLY LEARNERS' HEALTH AND LEARNING OUTCOMES IN EGOR LOCAL GOVERNMENT AREA, EDO STATE

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Abstract

The study examined the influence of strengthening home-school partnerships for sustainable learning outcomes and health of early learners. A descriptive survey design was utilised and the population consisted of teachers in private nursery/primary schools in Egor. The sample comprised 60 parents and 140 teachers. The research instrument was a questionnaire titled "Strengthening home-school partnership for sustainable early learners' health and learning outcomes questionnaire" validated by three lecturers in the Institute of Education. The Cronbach Alpha test of reliability was used to ascertain the internal consistency of the instrument, which yields a coefficient index of 0.87. The data were analysed with mean and standard deviation. The findings of the study revealed that strengthening home-school partnerships has positive influence on the learning outcomes of early learners to a high degree. Additionally, the findings showed that strengthening the home-school partnerships contribute to promoting sustainable health and well-being among early learners to a high degree. Lastly, the study indicated that home-school partnership to a high degree influences the social health of early learners. Consequently, it was recommended among others that the government should develop policies that enhance healthy active participation of parents in their children's education and health, and encourage schools to strengthen incorporation of parental engagement into their institutional policies framework.

Keywords: strengthening home-school partnership, early learners, learning outcomes

Introduction

Early childhood education plays a paramount role in children's development, later academic successes, and social-emotional growth. One of the ways of strengthening this crucial role is the establishment of stable and consistent home-school partnerships (Ngadni & Shuang, 2024). The home and schools are two key environments in a child's life, and the symbiotic association between these environments has significant impact on learning outcomes, motivation, and children's general well-being (Paccaud, Keller, Luder, Pastore & Kunz 2021). Productive family-school partnerships are hinged on the idea that families regardless of their social status can render support for their children's learning and development. Therefore, parents and teachers have the shared responsibility for fostering and educating children (Albright, Weissberg & Dusenbury, 2011). Partnership of the home through parental involvement and increased participation has been acknowledged to facilitate improvement in reading and math achievement in early years schooling (Galido & Sheldon, 2012). This outcome accentuates that a stronger and more supportive home-school linkages have the propensity of promoting healthy child development (Patrikakou & Weissberg, 2008). Consequently, effective partnerships create an opportunity for home and school to consolidate each other's strong points towards supporting learners, particularly children who are at edge of psychologically, emotionally, and behaviorally losing interest in learning (Anazia, Skinner &

Woods, 2025). Early childhood years epitomise a paramount phase in the physical, cognitive, and socio-emotional development of the school children. The developmental milestone attained during formative years, have substantial influence on their future outcomes. While there has been focus on other aspects of the children such as nutrition and physical activity, there are few in-depth understandings of the pivotal role of home-school relationships and their impact on child health.

In Nigeria, one of the core objectives of early childhood education, as specified in the national policy on education (Federal Republic of Nigeria [FRN], 2014), is to promote smooth transition of the child from home to school. However, this transition and sustainable early childhood education experience may be challenging in the absence of effective home-school collaborations. The term home-school partnerships have been described as a dynamic connection that exists among parents, teachers, and school heads, geared towards collectively creating an enabling learning atmosphere that supports child's development (Ngadni & Shuang, 2024). Parents' participation and partnerships in their children's education at basic schools level may be in form of rendering assistance in completing school assignment, project-based learning, encouraging independent study habits and nurturing self-discipline (Nweke, Anyachebelu & Mbach, 2020). Current research evidence remarked that collective effort in education, communication and information sharing, including collectively managing behavioural-related problems stand out as triad central areas of interest to parent-teacher partnerships (Anazia et al., 2025). An earlier survey acknowledged that one of veritable channel of conveying messages to parents as well as fostering meaningful parental engagement include the use of newsletters, memos, or personal notes from school among others (O'bryan, 2008).

Moreover, it has been asserted that meaningful learning cannot be accomplished in the absence of good health. The health and well-being of early learners' is hinged on the strength of home-school partnerships. When parents and teachers collaborate, a supportive environment emerges, promoting healthy behaviours, efficient health management, and overall development of the child. The World Health Organisation (2015) emphasises that reactivating efforts towards building strong school-community partnerships promotes health, education and development. Although several studies have investigated parental involvement and participation in their children's education, there remains a dearth of empirical evidence specifically focusing on the impact of strengthening home-school partnership for sustainable early learners' health and well-being, which form the fulcrum upon which all other learning activities are anchored. Therefore, conducting research into the impact of this partnership among preschool children will assist in gaining insight and a better understanding of how to improve the overall well-being and learning outcome of the early learners. Hence, the current study.

Statement of the Problem

Fruitful learning and overall development of early learners are dependent on the dynamic and cordial home-school relationship. The interactions between the home and school environments influences the health and well-being of early learners. While the significance of effective home-school partnership in promoting early learners' health has been acknowledged, empirical studies from Nigeria remains limited. In particular, there are dearth of in-depth studies focusing on the key components involved in creating a strong home-school relationship that supports early learners learning outcome and overall well-being. Consequently, it is imperative for an all-inclusive study that considers the influences of strengthening the interactions between these dual micro-environments which would culminate in sustainable learning outcome, health and well-being of preschool children. Bridging this knowledge gap, would further foster versatile connectivity empirical-based interventional strategies towards a better school experience for the young learners.

Research Questions

1. To what extent does strengthening the home-school partnership impact the learning outcomes of early learners in Egor?
2. To what extent would strengthening home-school partnerships and school influences the physical health of the early learners in Egor?
3. To what extent does strengthening home-school partnership influences the social health of the early learners in Egor?

Objective of the Study

The objective of the study was to investigate the influence of strengthening home-school partnership for sustainable early learners' health and learning outcomes in Egor Local Government Area, Edo State. Specifically, it seeks to find:

1. The extent to which strengthening home-school partnership impacts the learning outcomes of early learners in Egor Local Government Area.
2. The extent to which strengthening the partnership between home and school influences the physical health of the early learners in Egor Local Government Area.
3. The extent to which strengthening home-school partnership influences the social health of the early learners in Egor Local Government Area?

Methodology

The study adopted the descriptive survey research design. The population comprised all teachers and parents in one hundred and four (104) private registered nursery and primary schools in Egor (Edo State Basic Schools List, 2023). The sample comprised 200 respondents, comprising parents and teachers drawn from 20 private registered nurseries and primary schools through multi-stage techniques. The first stage involved selecting 20 private registered nursery and primary schools through a simple random sampling technique. In the second stage, utilizing simple random sampling, seven classroom teachers were drawn from the 20 private nursery and primary schools. Thus, a total of one hundred and forty (140) teachers were selected for the study.

In the third stage, three parents were drawn each from the twenty, using an accidental sampling technique. Consequently, sixty (60) parents were selected for the study. Therefore, two hundred (200) respondents were used for the study. The research instrument elicited responses on demographic data and contains fifteen (15) items, which elicited responses on the opinions of teachers and parents regarding strengthening home-school partnership for sustainable early learners' health and learning outcome. The questionnaire was a closed-ended item developed in four-point modified Likert scale format. The instrument was validated through expert judgments of Environmental Health and Safety Educator, Early Childhood Movement and Exploration specialist, and Educational Measurement. The reliability of the instrument was established through the administration of 20 copies of the questionnaire to three private schools outside Egor Local Government Area, which were not part of the sampled schools. However, they shared the same characteristics with the target population. A Cronbach Alpha test of reliability was used, yielding a reliability coefficient of 0.87, which is considered sufficient for the study. The data generated were analysed with descriptive statistics (Means and standard Deviations) using IBM SPSS version 23.

Results

Research question one: To what extent does strengthening the home–school partnership influence the learning outcomes of early learners in Egor?

Table 1: Influence of Strengthening Home–School Partnerships for Learning Outcomes of Early Learners

Items	Mean	Standard Deviation	Remarks
Strong relationship between home and school influences a child's education	3.65	0.50	Agree
Effective communication between parents and educators enhances a child's learning experience	3.58	0.58	Agree
A supportive home-school relationship contributes to a child's overall development.	3.55	0.58	Agree
When parents and educators care about a child's education, it boosts their self-esteem	3.56	0.57	Agree
Schools should include parents in decision making about the child's education	3.42	0.67	Agree
Cluster	17.70	1.89	

Table 1 shows that the respondents agree that strong relationship between home and school influences a child's education, effective communication between parents and educators enhances a child's learning experience, a supportive home-school relationship contributes to a child's overall development, when parents and educators care about a child's education, it boosts their self-esteem, and schools should include parents in decision making about the child's education. The cluster mean of 17.70 is an indication that strengthening home-school partnerships influences the learning outcomes of early learners to a high degree.

Research question two: To what extent would strengthening home-school partnerships and school influence the physical health of the early learners in Egor?

Table 2: The Extent to Which Strengthening Home-School Partnerships and School Influences the Physical Health of the Early Learners

Items	Mean	Standard Deviation	Remarks
A strong home-school connection boosts activities that improve a child's motor skills	3.35	0.58	Agree
Parents and educators helping the child to observe at least 10 hours sleep support physical health	3.23	0.65	Agree
Parents participation in school health activities benefits a child's physical well-being	3.30	0.71	Agree
Collaboration between parents and teachers is essential for promoting age-appropriate physical development	3.23	0.71	Agree
Promoting adequate nutrition, parents and teachers will help in the physical development of the child.	3.31	0.64	Agree
Cluster	16.43	.03	

Table 2 reveals that the respondents believed that a strong home-school connection boosts activities that improve a child's motor skills, parents and educators helping the child to observe at least 10 hours sleep support physical health, parents participation in school health activities benefits a child's physical well-being, collaboration between parents and teachers is essential for promoting age-appropriate physical development, and promoting adequate nutrition, parents and teachers will help in the physical development of the child. The cluster mean of 16.43 indicates that strengthening the home-school partnerships contribute to promoting sustainable health and well-being among early learners a high degree.

Research question three: To what extent does strengthening home-school partnership influences the social health of the early learners in Egor?

Table 3: The Extent to Which Strengthening Home-School Partnerships Influences Sustainable Social Health of the Early Learners

Items	Mean	Standard deviation	Remarks
When parents and teachers collaborate, the child learns to be respectful	3.31	0.65	Agree
Collaboration between home and school offers positive role model for a child to emulate	3.24	0.62	Agree
Collaboration between home and school foster positive peer relationships	3.11	.65	Agree
Regular support from home and school can boost a child's confidence and interactions	3.35	0.73	Agree
The synergy between home and school assist children in handling emotional and social challenges	3.39	1.66	Agree
Cluster	16.31	2.32	

Table 3 shows that the respondents were of the views that when parents and teachers collaborate, the child learns to be respectful and offers positive role model for a child to emulate. In addition, collaboration between home and school foster positive peer relationship, regular support from home and school can boosts a child's confidence and interactions, and the synergy between home and school assist children in handling emotional and social challenges. The cluster mean of 16.31 implies that strengthening the partnership between the home and school impacts the social health of the early learners to a high degree.

Discussion of Findings

This study aimed to investigate the influence of strengthening home-school partnership on the health and well-being of sustainable early learners in the early years. The findings revealed that strengthening home-school partnerships has significant influences the learning outcomes of early learners to a high degree. By implication, a robust relationship between the home and school is pivotal to child's education, support shared communication between parents and teachers including enhanced child's learning experience. These findings align with a previous study, which found that home and schools are dual micro-environments that are instrumental to the early learners learning outcomes, motivation, and overall well-being (Paccaud et al., 2021).

Additionally, the findings showed that strengthening the home-school partnerships contribute to promoting sustainable health and well-being among early learners a high degree. This finding aligns with Patrikakou and Weissberg (2008), whose study found that the stronger

and more supportive the connections between the home and school, the greater the likelihood of healthy child development.

Moreover, the findings revealed that strengthening the partnership between the home and school influences the social health of the early learners to a high degree. This finding corroborates Ngadni and Shuang (2024), who affirmed that home-school partnership is a dynamic relationship between parents, teachers, and school heads, aimed at jointly creating an enabling learning atmosphere that stimulates the child's development. It also supports earlier studies which demonstrated that parental involvement is positively linked with learning outcomes and social development (Wilder, 2014). It further lends credence to WHO (2015) which reiterated the need to re-energise efforts towards building strong school-community partnerships to promote health, education and development

Conclusion

In conclusion, it can be deduced from the study that strengthening the relationships between two micro-environments is paramount to a robust and all-inclusive learning atmosphere that supports the learning, health, and well-being of children.

Recommendations

The following recommendations were put forward:

1. The government and stakeholders in the educational sector should support and sustain policy implementation that promotes effective home-school partnerships. These include activities such as organising open day, parents-teachers interactive forum/platforms among others.
2. Schools should leverage on home-school partnership as a channels for promoting health messages such as educating parents on the need to promote health of the child through adequate meal, hygiene and sleep habits.
3. Parents should see the support and collaboration with their ward's school as a call to service which is for their interest and the child's overall benefits now and in the near future.

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INSTITUTIONAL GOVERNANCE PRACTICES AS CORELLATE OF GOAL ACHIEVEMENT OF SECONDARY EDUCATION IN PUBLIC SENIOR SCHOOLS IN ABUJA, NIGERIA

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Abstract

Education is universally recognized as a key driver of national development, and effective institutional governance serves as a vital mechanism for ensuring that educational objectives are achieved. In Nigeria, particularly within public secondary schools, governance practices play a crucial role in determining the extent to which educational goals such as academic excellence, moral development, and skill acquisition are realized. This study, therefore, empirically investigated the relationship between institutional governance practices and goal achievement of secondary education in public senior secondary schools in Abuja, Nigeria. The study adopted a correlational research design. The population consisted of 4,152 teachers across 88 public senior secondary schools in the Federal Capital Territory, from which a sample of 354 teachers was selected using a multistage sampling procedure guided by Krejcie and Morgan's sampling table. A researcher-designed instrument titled Institutional Governance Practices and Goal Achievement of Secondary Education Questionnaire (IGPGASEQ), validated by experts and yielding a reliability coefficient of 0.82 using Cronbach's Alpha, was used for data collection. Descriptive statistics of mean and standard deviation were employed to answer the research questions, while Pearson Product Moment Correlation Coefficient (PPMCC) was used to test the hypotheses at 0.05 level of significance. Findings revealed that delegation of authority ($M = 3.71$, $SD = 0.87$) and the use of committee systems ($M = 3.45$, $SD = 0.63$) are the most practiced governance strategies, while participatory decision-making ($M = 2.76$, $SD = 0.32$) is least applied. Results further showed that the overall level of goal achievement of secondary education in Abuja is moderate (grand mean = 3.14), with communication skills ranking highest and manipulative or vocational skills ranking lowest. Inferential analyses indicated a strong and significant positive relationship between institutional governance practices and goal achievement ($r = 0.86$, $p < 0.05$). Specifically, delegation of authority ($r = 0.88$, $p < 0.05$) and committee systems ($r = 0.76$, $p < 0.05$) showed strong associations, while participatory decision-making ($r = 0.51$, $p < 0.05$) showed a moderate but significant relationship. The study concludes that effective institutional governance practices significantly enhance the realization of secondary education goals. It recommends that school administrators strengthen participatory governance, institutionalize committee systems, and provide continuous leadership training to improve accountability, teamwork, and vocational skill development among students in line with Nigeria's National Policy on Education.

Keywords: Institutional Governance, Delegation of Authority, Participatory Decision-making, Committee System, Goal Achievement

Introduction

Education remains a fundamental instrument for social, political, and economic development in Nigeria. Secondary education among other level of education serves as a bridge between basic and tertiary education with intention of equipping learners with knowledge, skills, and values necessary for meaningful participation in society. Despite the strategic importance of secondary education, many public senior secondary schools in Abuja face challenges related to governance, management, and accountability. Institutional governance,

as a key administrative function, encompasses the systems, structures, and processes through which schools are directed, controlled, and held accountable. Governance in educational institutions involves transparency, accountability, participation, and effective leadership towards achieving the stated goals of education. When governance structures are weak or inefficient, the realization of educational goals such as academic excellence, character formation, and skill development is undermined. Institutional governance refers to the system of rules, structures, and processes through which educational institutions are directed, controlled, and held accountable for achieving the stated goals and objectives. It encompasses how decisions are made, implemented, and evaluated to ensure transparency, accountability, and effectiveness in achieving institutional goals (OECD, 2012; World Bank, 2017). In the context of education, governance determines how power and authority are distributed among stakeholders such as administrators, teachers, students, governing boards, and regulatory agencies (Akpan & Udo, 2021).

According to Egwu and Ekwe (2021), institutional governance provides the framework through which leadership practices, decision-making, and accountability mechanisms are coordinated to enhance educational outcomes. Effective governance structures promote participatory decision-making, transparency in financial management, and equitable allocation of resources. When properly implemented, these practices strengthen institutional effectiveness and contribute to the realization of educational goals (Odok, Uche, & Effiom, 2023). In Nigeria, institutional governance in secondary education involves a combination of governmental oversight, school-based management, and community participation. The Ministry of Education and quality assurance departments play central roles in monitoring compliance with national policies and standards (Oladipo & Adediran, 2020). However, research indicates that many public secondary schools still experience challenges such as weak administrative structures, inadequate stakeholder involvement, and poor financial accountability, all of which undermine educational quality and goal achievement (Adebayo & Fadeyi, 2020; Bello & Yusuf, 2019). Empirical studies have consistently shown that good governance practices are characterized by leadership competence, participatory management, and sound financial administration that are positively correlated with students' academic performance and institutional effectiveness (Lawore & Adefabi, 2022; Egwu & Ekwe, 2021). Conversely, institutions with poor governance frameworks often exhibit inefficiency, low staff morale, and diminished student outcomes (World Bank, 2017). Therefore, institutional governance remains a vital determinant of the quality, equity, and sustainability of educational systems.

Meanwhile, goal achievement is the extent to which the predetermined objectives of an individual, organization, or system is realized through coordinated efforts and effective utilization of resources. In the context of education, goal achievement denotes the successful attainment of the aims and objectives established within the educational system, such as improved academic performance, moral development, skill acquisition, and societal advancement (Akinyemi & Adetunji, 2021). It serves as a benchmark for assessing the effectiveness and efficiency of educational institutions in fulfilling the mandates. According to Locke and Latham (2002), goal achievement is a function of clearly defined goals, motivation, and feedback mechanisms that guide behavior toward desired outcomes. When applied to schools, this means that administrators, teachers, and students must work collectively within an organized governance framework to achieve educational objectives. The process of achieving goals involves planning, implementation, monitoring, and evaluation of strategies aimed at realizing institutional missions (Adebayo & Fadeyi, 2020).

In secondary education, goal achievement reflects how well schools attain national educational goals as stated in the National Policy on Education (2014) such as academic excellence, character development, and manpower training. The extent of goal achievement

can be measured through indicators such as students' academic performance, effective school management, discipline, teacher productivity, and quality assurance outcomes (Okoye, 2021). Secondary education in Nigeria serves as a crucial link between basic education and tertiary education, providing students with the knowledge, skills, and attitudes necessary for personal development and national progress. According to the Federal Republic of Nigeria (FRN, 2014) secondary education is designed to prepare individuals for useful living within society and for higher education pursuits. It aims to produce citizens who are intellectually sound, morally upright, and socially responsible. The policy outlines six major goals of secondary education in Nigeria as follows:

- a. To provide an increasing number of primary school pupils with the opportunity for education of a higher level, irrespective of sex, social, or religious background. This is to ensure inclusiveness and equity, enabling broad access to educational opportunities beyond the primary level.
- b. To offer diversified curriculum catering to the differences in talents, opportunities, and future roles of learners. This is achieved through general and vocational subjects that develop both academic and practical skills.
- c. To provide trained manpower in the applied sciences, technology, and commerce at sub-professional grades.
Secondary education contributes to the economic development of Nigeria by equipping students with employable and entrepreneurial skills.
- d. To inspire students with a desire for self-improvement and achievement of excellence. This encourages lifelong learning and the development of a culture of hard work and innovation among youths.
- e. To foster national unity with an emphasis on the common ties that unite Nigerians in spite of ethnic, cultural, and religious diversity.
Through civic education, social studies, and national integration programs, secondary schools promote patriotism and tolerance.
- f. To raise morally upright and well-adjusted individuals who can think independently and contribute meaningfully to society.
This goal highlights the moral, ethical, and civic dimensions of education as essential to nation-building.

As Emeh and Ezeani (2020) noted, these goals align with Nigeria's national educational philosophy, which seeks to build a free, democratic, just, and egalitarian society. Similarly, Okoye (2021) observed that effective implementation of these objectives requires good governance, adequate resources, and strong quality assurance mechanisms within the secondary school system.

Theoretical framework explaining the bond between institutional governance and goal achievement is Goal-Setting Theory (Locke & Latham, 1990, 2002). The theory provides a strong foundation for explaining how institutional governance influences goal achievement in educational settings. The theory, developed by Edwin A. Locke and Gary P. Latham, posits that specific and challenging goals, coupled with appropriate feedback, lead to higher levels of performance than vague or easy goals (Locke & Latham, 2002). Thus, in the context of educational institutions, institutional governance provides the structure within which goals are defined, communicated, and monitored. Governance determines leadership effectiveness, transparency, accountability, and stakeholder participation—all of which shape how institutional goals are pursued and achieved.

According to the theory, four major mechanisms explain the link between governance and goal achievement:

1. Direction: Governance provides clear institutional direction through well-defined policies and objectives.
2. Effort: Effective leadership motivates teachers and staff to put forth greater effort toward school improvement.
3. Persistence: Strong governance structures ensure consistency in pursuing school goals despite challenges.
4. Strategy Development: Governance encourages innovation and strategic planning that led to educational effectiveness.

Empirical evidence supports this relationship. For instance, Egwu and Ekwe (2021) found that principals' administrative competence as a governance variable is significantly correlated with students' academic performance, reflecting successful goal attainment. Similarly, Odok, Uche, and Effiom (2023) showed that good financial management practices enhance institutional effectiveness, which aligns with Goal-Setting Theory's emphasis on structured pursuit of objectives.

However, achieving the goals of secondary education in Nigeria has been hindered by weak institutional governance practices across many public schools. Despite various educational reforms and increased government funding, several studies have revealed that governance challenges such as poor accountability, limited stakeholder participation, and inadequate supervision persist in the Nigerian secondary education system (Adeyemi & Adan, 2019; Olaleye & Arogundade, 2021). These governance deficits have led to inefficiencies in school management, teacher demotivation, and low student performance in both internal and external examinations. Empirical evidence from the Federal Ministry of Education (2022) reveals that public senior secondary schools in Abuja recorded an average of 42.6% pass rate in the West African Senior School Certificate Examination (WASSCE) between 2019 and 2022, a figure far below the national target of 70%. Researchers have linked such low achievement to the ineffective enforcement of governance standards and weak school leadership practices (Ezekiel & Ajayi, 2020).

In a study conducted in Kwara and Lagos States, Oyetunji (2017) found that participatory governance, transparency in decision-making, and accountability significantly correlated with improved institutional effectiveness and student outcomes. Similarly, Aina (2021) reported that schools with clearly defined governance structures performed better in instructional delivery and student discipline than those with autocratic or poorly coordinated administrative systems. However, comparable studies focusing on the Federal Capital Territory, Abuja, remain limited, creating a gap in the contextual understanding of how governance practices affect secondary education goal achievement in this region.

Purpose of the Study

The main purpose of this study was to examine the relationship between institutional governance practice and goal achievement of secondary education in public secondary schools in Abuja, Nigeria. Other specific purposes are:

- i. to identify the institutional governance practices commonly used for goal achievement secondary education in public secondary schools in Abuja, Nigeria;
- ii. determine the level of goal achievement of secondary education secondary education in public secondary schools in Abuja, Nigeria;
- iii. to determine the use delegation of authority for goal achievement of secondary education in public secondary schools in Abuja, Nigeria;
- iv. to examine the use participatory decision making for goal achievement of secondary education in public secondary schools in Abuja; and

- v. to determine use of committee system for goal achievement of secondary education in public secondary schools in Abuja, Nigeria.

Research Questions

The following research questions were raised to guide the study.

1. What are the mostly used institutional governance practice in public secondary schools in Abuja, Nigeria?
2. What is the level of goal achievement of secondary education in public secondary schools in Abuja, Nigeria?

Hypotheses

The following hypotheses were generated to guide the study and tested at 0.05 level of significance.

- Ho1:** There is no significance relationship between institutional governance practices and goal achievement of secondary education in public secondary schools in Abuja, Nigeria;
- Ho2:** There is no significance relationship between delegation of authority and goal achievement of secondary education in public secondary schools in Abuja, Nigeria;
- Ho3:** There is no significance relationship between participatory decision-making and goal achievement of secondary education in public secondary schools in Abuja, Nigeria; and
- Ho4:** There is no significance relationship between the use of committee system and goal achievement of secondary education in public secondary schools in Abuja, Nigeria.

Methodology

The study covered all public senior secondary schools in Abuja, the Federal Capital Territory of Nigeria. There are 88 public senior secondary schools and 4,152 teachers in the six Area Councils in Abuja, Nigeria.

Table 1
Senior Schools in Abuja Area Council, Nigeria

Area Councils	Number of Schools	Available Teachers	Number of
Abaji	10	501	
Bwari	13	482	
Gwagwalada	13	688	
Kuje	13	545	
Kwali	9	431	
Municipal	30	1,505	
Total	88	4,152	

Source: FCT Secondary Education Board, 2024

The research design adopted for this study was the correlational research design. The correlational research design was used for this study in view of the fact that the researcher does not have any intention to manipulate the study's variable but to study them as they occur naturally and determine their degree or level of relationship. The sampling technique used to select the respondents needed for the study is multistage sampling method. And, in order to determine the sample size needed for the study, the Krejcie and Morgan (1970) sampling size table was used to draw the sample size of 354 to be used for the study. The sample of 354 respondents was chosen using purposive sampling technique on public senior secondary school teachers. Stratified sampling technique was used to group teachers according to the six area

councils in Abuja. Simple random technique was adopted to select teachers across the three zones. Hence, 354 out of 4,152 represents 9% of the whole population. This is considered okay due to the uniformity in the characteristics of the respondents in area of condition of their employment, promotion, curriculum implementation and other conditions of service. Meanwhile, a researcher-designed questionnaire was developed and tagged "Institutional Governance Practices and Goal Achievement of Secondary Education Questionnaire (IGPGASEQ)". The Questionnaire was divided into sections A, B and C. Section A, focused on background information of the respondents such as; their qualification, sex and others. While section B contained the statements to rate the application and utilization of institutional governance practices in secondary schools. The section C encompasses statements to determine the bond between institutional governance practices and goal achievement of secondary education in the study area. A 4-point Likert scale- Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) was used for rating. The instrument was subject to content and construct validity and overall Cronbach Alpha value of 0.82 reliability coefficient score was obtained. This implies that the instrument is having high degree reliability. Meanwhile, both descriptive (mean score) and inferential statistics (Pearson product moment correlation coefficient) were used to analyze the data. All the hypotheses were tested at 0.05 level of significance.

Data Presentation, Analysis and Discussion of Findings

The research questions were analysed using mean scores descriptive statistics.

Research Question One: What are the mostly used institutional governance practices in public secondary schools in Abuja, Nigeria?

Table 2

Mean Score and Standard Deviation Analysis of the Mostly Used Institutional Governance Practices in Public Secondary Schools in Abuja, Nigeria

S/ No	Institutional Practice	Governance	Mean	SD	Decision	Ranking
1	Delegation of Authority		3.71	0.87	Accepted	1 st
2	Participation Decision Making		2.76	0.32	Accepted	3 rd
3	Use of Committee System		3.45	0.63	Accepted	2 nd

Source: Field Work, 2025

Table 2 presents the mean scores on the mostly used institutional governance practices in public senior secondary schools in Abuja, Nigeria. The items have mean scores of 3.71, 2.76 and 3.45 accordingly. These scores are ranked to show how the practices are used. Delegation of authority is ranked first and it means that it is the most used institutional governance practice in the study area. And, this is followed by the use of committee system and participatory decision-making is least used among the practices.

Research Question Two: What is the level of goal achievement of secondary education in public secondary schools in Abuja, Nigeria?

Table 3

Mean Score Analysis of the Goal Achievement of Secondary Education in Public Secondary Schools in Abuja

Level of Goal Achievement	Mean Score	Standard Deviation	Rank
Manipulative Skill (Soft Skills Acquisition)	2.53	0.52	3 rd
Human Relation Skill	3.04	0.77	2 nd
Communication Skill	3.87	0.88	1 st
Grand Mean	3.14		

Source: Field report, 2025

The descriptive analysis of the mean scores in Table 3 shows the level of goal achievement of secondary education in the study area. Among the three factors that are used to measure goal achievement of secondary education. As revealed in the Table manipulative skills for soft skills acquisition is least ranked achieved goal and communication skill is the highest ranked goal. This implies that communication and human relation skills were given more attention among other goals in the study area.

Hypothesis of the Testing

The hypotheses formulated to guide the study were statistically analysed using Pearson Product Moment Correlation Coefficient (PPMCC) at 0.05 level of significant.

H₀₁: *There is no significance relationship between institutional governance practices and goal achievement of secondary education in public secondary schools in Abuja, Nigeria*

Table 4

Correlation Analysis of Institutional Governance Practices and Goal Achievement

Variables	Number	Mean Score	Standard Deviation	Degree of Freedom	Calculated r-value	p-value	Decision
Institutional Governance Practices	354	3.30	0.42	352	0.86	0.00	Rejected
Goal Achievement	354	3.14	0.287				

p<0.05

Source: Field report, 2025

Table 4 presents the test of analysis of the relationship between institutional governance practices and goal achievement of secondary education in public secondary school in Nigeria. The calculated r-value is 0.86 and p-value of 0.00 is less than 0.05 level of significance. This

implies that the relationship between the two observed variables is positive and significant (r -value = 0.86; p -value < 0.05 sig.). hence, the null hypothesis is rejected.

H₀₂: *There is no significance relationship between delegation of authority and goal achievement of secondary education in public secondary schools in Abuja, Nigeria*
Table 5

Correlation Analysis of Delegation of Authority and Goal Achievement

Variables	Number	Mean Score	Standard Deviation	Degree of Freedom	Calculated r-value	p-value	Decision
Delegation of Authority	354	3.71	0.87	352	0.88	0.00	Rejected
Goal Achievement	354	3.14	0.287				

$p < 0.05$

Source: Field report, 2025

As revealed in Table 5, the test of analysis of the relationship between delegation of authority and goal achievement of secondary education in public secondary school in Abuja, Nigeria is presented. The calculated r -value is 0.88 and p -value of 0.00 is less than 0.05 level of significance. This implies that the relationship between the two observed variables is positive and significant (r -value = 0.88; p -value < 0.05 sig.). hence, the null hypothesis is rejected.

H₀₃: *There is no significance relationship between participatory decision-making and goal achievement of secondary education in public secondary schools in Abuja, Nigeria*

Table 6: Correlation Analysis of Participatory Decision-making and Goal Achievement

Variables	Number	Mean Score	Standard Deviation	Degree of Freedom	Calculated r-value	p-value	Decision
Participatory Decision-making	354	2.76	0.32	352	0.51	0.00	Rejected
Goal Achievement	354	3.14	0.287				

$p < 0.05$

Source: Field report, 2025

As shown in Table 6, the test of analysis of the relationship between participatory decision-making and goal achievement of secondary education in public secondary school in Abuja, Nigeria is presented. The calculated r -value is 0.51 and p -value of 0.00 is less than 0.05 level of significance. This implies that the relationship between the two observed variables is positive but not significant (r -value = 0.51; p -value < 0.05 sig.). hence, the null hypothesis is rejected.

H₀₄: There is no significance relationship between the use of committee system and goal achievement of secondary education in public secondary schools in Abuja, Nigeria.

Table 7: Correlation Analysis of Use of Committee System and Goal Achievement

Variables	Number	Mean Score	Standard Deviation	Degree of Freedom	Calculated r-value	p-value	Decision
Use of Committee System	354	3.45	0.63	352	0.76	0.00	Rejected
Goal Achievement	354	3.14	0.287				

p<0.05

Source: Field report, 2025

As shown in Table 7, the test of analysis of the relationship between the use of committee system and goal achievement of secondary education in public secondary school in Abuja, Nigeria is presented. The calculated r-value is 0.76 and p-value of 0.00 is less than 0.05 level of significance. This implies that the relationship between the two observed variables is positive and significant (r-value = 0.76; p-value < 0.05 sig.). hence, the null hypothesis is rejected.

Discussion of Findings

Table 2 reveals that institutional governance practices such as delegation of authority, use of committee system, and participatory decision-making are the predominant practices in public senior secondary schools in Abuja. The ranking indicates that delegation of authority is the most commonly practiced governance approach, followed by the use of committee systems, while participatory decision-making is the least applied. This finding implies that administrators in public secondary schools in Abuja tend to rely more on hierarchical delegation and formal committee structures to manage institutional affairs, rather than promoting inclusive participation in decision-making. This aligns with the assertion of Adebayo and Akinsolu (2019) that Nigerian secondary schools are still characterized by bureaucratic governance styles where authority is often centralised, even though participatory governance improves institutional effectiveness. Similarly, Okeke (2020) emphasized that effective delegation enhances managerial efficiency and ensures timely implementation of educational policies. The relatively low utilization of participatory decision-making suggests that teachers and non-teaching staff may have limited involvement in administrative deliberations, which could affect ownership of school goals.

Table 3 shows that the mean score for communication skill ranks highest among indicators of goal achievement, followed by human relations skills, while manipulative or soft skills acquisition ranked lowest. The grand mean of 3.14 suggests that the general level of goal achievement of secondary education in Abuja is moderate. This finding indicates that while students appear to possess good communication and interpersonal skills, they demonstrate weaker manipulative or vocational competencies. This outcome supports the observations of Federal Republic of Nigeria (2014) in the National Policy on Education, which highlights the need for skill-oriented education to enhance employability. Similarly, Olatunji and Oduro (2021) found that Nigerian secondary schools often emphasize cognitive and affective domains more than the psychomotor domain, thereby hindering the achievement of balanced

educational goals. Thus, the finding underscores the need to reemphasize vocational and technical training components within the secondary school curriculum.

Table 4 showed a strong positive and significant relationship between institutional governance practices and goal achievement. Therefore, the null hypothesis is rejected. This result implies that effective governance practices significantly contribute to the attainment of educational goals. The finding corroborates Adeyemi (2018), who found that sound institutional governance promotes accountability, staff motivation, and improved student performance. Similarly, Obi and Okafor (2020) reported that when governance structures are transparent and participatory, schools tend to achieve higher educational outcomes. The result in Table 5 shows a calculated r -value of 0.88 with a p -value of 0.00, indicating a strong and significant positive relationship between delegation of authority and goal achievement. The null hypothesis is, therefore, rejected. This implies that when school heads effectively delegate responsibilities, it enhances efficiency, teamwork, and overall goal realization. Nwankwo and Aina (2017) support this finding, noting that delegation fosters shared responsibility and allows school heads to focus on strategic functions, thereby improving performance. The finding further aligns with Mintzberg's (1983) organizational theory, which posits that effective delegation leads to structural flexibility and improved institutional outcomes.

Table 6 indicated that involving teachers and staff in decision-making contributes positively to goal achievement, though not as strongly as delegation or committee systems. According to Eze (2019), participatory decision-making enhances morale, creativity, and sense of belonging among school personnel, which in turn improves productivity. However, the moderate correlation found may indicate limited inclusivity in decision processes within the sampled schools, supporting Ogunyemi (2021) who found that hierarchical structures in Nigerian schools often constrain collaborative governance.

Table 7 indicated a strong and significant positive relationship between the use of committee systems and goal achievement. The null hypothesis is therefore rejected. This finding suggests that the committee system serves as an effective governance mechanism for ensuring collective responsibility, policy implementation, and feedback flow in schools. It supports Afolabi and Adewale (2020) who found that committee systems improve organizational transparency and foster shared decision-making in school management. The finding also aligns with systems theory which emphasizes interdependence and collaboration among subunits for achieving institutional goals.

Overall, the findings of this study reveal that institutional governance practices have a strong and significant influence on the goal achievement of secondary education in public secondary schools in Abuja. Delegation of authority and committee systems were found to be more impactful than participatory decision-making. Furthermore, the study indicates that while communication and human relations skills are being achieved, manipulative or vocational skills remain underemphasized. This underscores the need for school administrators and policymakers to strengthen participatory governance, promote vocational education, and enhance inclusive management strategies to achieve the comprehensive goals of secondary education as stated in Nigeria's National Policy on Education.

Conclusion

The study examined the relationship between institutional governance practices and goal achievement of secondary education in public senior secondary schools in Abuja, Nigeria. The findings revealed that delegation of authority and the use of committee systems are the predominant governance practices, while participatory decision-making is least utilized. This pattern suggests that public secondary schools in Abuja still largely operate within a hierarchical administrative framework, with limited inclusivity in decision-making. The results further showed that communication and human relations skills are the major areas of goal

achievement among students, while manipulative or vocational skills remain underdeveloped. This indicates a moderate overall level of educational goal attainment, emphasizing cognitive and affective outcomes over psychomotor development.

The correlation analyses revealed strong and statistically significant relationships between institutional governance practices; particularly, delegation of authority and committee systems and goal achievement of secondary education. Participatory decision-making also showed a positive but moderate relationship, suggesting that while inclusive governance contributes positively to institutional success, it remains underutilised in practice.

In summary, effective institutional governance practices are crucial for enhancing school effectiveness and achieving the broad objectives of secondary education. Strengthening participatory structures, enhancing delegation mechanisms, and promoting vocational education are key to realising holistic educational outcomes in Abuja's public secondary schools.

Recommendations

Based on the findings, the followings were recommended:

1. School administrators should increase the level of participatory decision-making by involving teachers, non-teaching staff, and students in planning and policy implementation. This would enhance ownership, creativity, and collective responsibility in school management.
2. Principals should continue to apply effective delegation of authority to ensure efficiency, accountability, and teamwork. Training sessions and leadership workshops should be organised to improve administrators' skills in effective task delegation and supervision.
3. The Ministry of the Federal Capital Territory (FCT) Education Secretariat should encourage schools to establish functional committees for curriculum development, discipline, welfare, and co-curricular activities. This will enhance transparency, feedback, and collaborative problem-solving.
4. Policymakers should prioritise skill-oriented subjects in the secondary school curriculum to balance cognitive, affective, and psychomotor learning outcomes. Schools should partner with industries and technical institutions to improve students' practical competencies.
5. Continuous professional development programmes should be introduced for principals and vice-principals on modern governance models such as distributed and transformational leadership to promote adaptive and participatory school administration.
6. Education authorities should periodically review school governance policies to ensure alignment with Nigeria's National Policy on Education. Monitoring frameworks should be strengthened to assess how governance practices influence goal achievement at the school level.
7. Schools should adopt data-driven approaches to assess institutional performance, ensuring that governance decisions are informed by empirical evidence rather than bureaucratic tradition.

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HARNESSING INNOVATIVE TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT IN NIGERIA'S EDUCATION SECTOR

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Abstract

This study examines the role of innovative technologies in promoting sustainable development within Nigeria's education sector. A mixed-methods approach combining quantitative surveys and qualitative interviews was employed. Data were collected from 500 participants randomly selected from senior secondary schools in Ihitte Uboma L.G.A. and tertiary institutions in Imo State to assess the state of technology integration in educational practices and its impact on learning outcomes. Statistical analysis revealed a significant correlation between the use of innovative technologies and improved student engagement and performance, particularly in remote areas. Qualitative findings highlighted challenges faced by educators, including inadequate training and infrastructure limitations. The results indicate that while innovative technologies hold considerable potential to enhance educational access and quality, systemic barriers must be addressed to maximise their effectiveness. Based on the findings, it is recommended that stakeholders prioritise investment in robust internet infrastructure, implement comprehensive teacher training programmes, and foster public-private partnerships for developing sustainable educational resources. These strategies would enable Nigeria to leverage technology towards creating an inclusive and equitable education system that supports long-term socio-economic development.

Keywords: Education Sector, E-Learning, Innovative Technologies, Nigeria, Sustainable Development.

Introduction

Education remains the most powerful instrument through which any desired change in society is effected. Beyond its role in producing competent citizens, education serves as a critical driver of sustainable development which is the capacity to meet present educational needs without compromising the ability of future generations to access quality learning opportunities. In Nigeria, however, the education sector faces formidable challenges that threaten its capacity to fulfill this developmental mandate. Persistent inadequate infrastructure, limited access to quality instructional resources, declining teacher effectiveness, and widening disparities in educational access, particularly between urban and rural populations have undermined the sector's ability to contribute meaningfully to national development (Federal Ministry of Education, 2014; Mutula, 2013). These challenges are compounded by rapid population growth, which places increasing pressure on an already strained system. Within this context, the question of how Nigeria can transform its education sector to deliver inclusive, equitable, and quality learning for all becomes not merely an academic concern but a pressing sustainable development imperative.

The fundamental role of the education sector in producing competent and effective citizens has become increasingly complex as society is being transformed by digital technologies of the 21st century. The integration of these technologies in socio-economic and

political institutions is gradually making human interactions more technology-dependent (Garba, Byabazaire and Busthami, 2015). It is therefore imperative for the education sector to integrate digital technologies in teaching and learning so as to equip learners and educators with the skills and competences needed to function in a modernised society. Significantly, innovative technologies offer a viable pathway to addressing the structural deficiencies that bedevil Nigeria's education system. By expanding access to educational resources, enhancing teacher effectiveness, enabling personalised learning, and fostering collaborative pedagogical approaches, technology integration can help bridge the persistent gaps in educational quality and access that undermine sustainable development objectives.

The modernisation of teacher training processes is essential for meeting the professional standards set by the Federal Ministry of Education (FME) in Nigeria. This underscores the need to train competent teachers who can effectively navigate the complexities of contemporary educational environments and implement anticipated reforms in the sector. Teachers play a fundamental role in facilitating student achievement and are expected to possess a range of competencies, particularly the ability to employ effective instructional strategies and innovations.

The use of innovative technologies in teaching and learning process is no longer a choice but a necessity for educators who are considering blending their teaching with the up-to-date innovations of this digital era, with respect to the changing learning environment, demand for flexible pedagogy, and the need to enhance creativity and innovations in learning (Onyema, 2020). The application of innovative technologies has become so irresistible in the teaching and learning process that it is now changing the way teaching is organized and delivered, and the job performance of educators can be easily evaluated. The adoption and usage of innovative technologies assist educators and students to interact more outside the classroom, and to set up classes at any time and place.

The advent of innovative technologies has made the educational process more efficient (Baldwin, 2020; Holland and Reiser, 2019), with a notable reduction in the cost of education. These technologies enrich learning environments, establish the necessary infrastructure for diverse educational activities (Kapucu and Turk, 2020), and save time in teaching and learning processes. They can also replace traditional textbooks, making instructional materials more accessible in classroom settings (Cakiroglu, Gokoglu and Cebi, 2015; Kol, 2012). As digital tools that enhance the teaching-learning process through interactivity, personalisation, and accessibility, innovative educational technologies provide access to a broader range of learning materials, facilitate collaboration between students and teachers, and enable personalised learning experiences (Akhmadov et al., 2023). The introduction of these technologies in the Nigerian context is a significant factor shaping the current educational landscape (Ugwuda and Eze, 2023).

According to a survey conducted by the Federal Ministry of Education (FME, 2014), over three-quarters of Nigerian teachers utilise technology in their classrooms at least once a week. This trend is expected to accelerate as new tools emerge. Emerging technologies such as virtual reality, augmented reality, gamification, and artificial intelligence hold the potential to transform teaching and learning practices. As noted by Jibrin et al. (2024), online learning platforms and mobile educational applications can expand access to education, reduce costs, and offer flexible learning options, particularly for students in remote or underserved areas.

However, the widespread adoption of these technologies faces several challenges, including inadequate internet infrastructure, high costs of digital devices, low digital literacy among teachers and students, and unreliable electricity supply. Socio-economic inequalities and policy limitations further restrict the scalability of educational technologies (Mutula, 2013).

Numerous studies have examined the implementation of innovative technologies in Nigerian and African education (Taliat and Ayanyemi, 2024; Ekwufolu, 2024; Mashwama and Madubela, 2025; Chigona, 2023; Makinde, Sulyman and Ibrahim, 2024; Agbarakwe and Dike, 2024; Usman, Obisesan and Ifabiyi, 2025). Research by Taliat and Ayanyemi (2024) and Agbarakwe and Dike (2024) showed a significant relationship between digital innovation methods of learning in science education and students' overall academic performance. This corroborates the findings of Akintayo et al. (2024), who discovered that students perform better in science subjects when taught using a combination of digital innovation and traditional methods.

Ayomide Odegbesan et al. (2019) investigated the impact of e-learning platforms on student performance in Nigerian universities and found that students who utilise online resources achieve higher academic results compared to those in traditional learning environments. In a related study, Eze et al. (2018) assessed teachers' readiness to integrate technology into their classrooms and found that while many educators acknowledge the importance of technology, they often feel unprepared due to insufficient training and support. This aligns with Irele (2021) and Jibrin et al. (2024), who identified infrastructural challenges and inadequate professional development as significant barriers to effective technology integration in Nigerian schools.

Statement of the Problem

Despite the acknowledged potential of innovative technologies to transform Nigeria's education sector and advance sustainable development goals, the nation continues to grapple with significant gaps in technology integration across all levels of education. While the Federal Ministry of Education reports relatively high rates of technology use among teachers, the quality, consistency, and impact of such integration remain questionable. Most notably, the divide between urban and rural educational institutions, the uneven distribution of infrastructure, and the limited capacity of educators to leverage digital tools effectively have created a scenario whereby the promise of technology-enhanced education remains largely unrealised for a majority of Nigerian students. This disparity not only affects current learning outcomes but also threatens the long-term sustainability of Nigeria's human capital development. Without deliberate and coordinated efforts to harness innovative technologies and, critically, to address the systemic barriers to their adoption, the education sector risks failing to produce the skilled, innovative, and globally competitive citizens required for national development. It is this problem that Nigeria's education sector, despite its recognition of the value of innovative technologies, has failed to fully harness them to achieve sustainable development objectives, and that, the present study seeks to address.

The gap in the literature, which centres on poor technology adoption across educational levels, informed this study. Therefore, this study aims to explore how innovative technologies can be harnessed to improve educational access and quality, thereby promoting sustainable development in Nigeria.

The study addresses the following research questions:

- RQ1:** What is the current state of integration of innovative technologies in Nigeria's education sector?
- RQ2:** Which innovative educational technologies are frequently used in Nigerian educational institutions?
- RQ3:** How does the use of innovative technologies impact student engagement and performance, particularly in remote areas?
- RQ4:** What challenges do educators face in integrating innovative technologies into their teaching practices?

Methodology

A mixed-methods approach was employed, combining quantitative and qualitative research methods. Primary data were collected through expert surveys, questionnaires, and brainstorming sessions. A total of 500 participants, including educators, students, and policymakers, were randomly selected from senior secondary schools in Ihitte Uboma L.G.A., Imo State. The questionnaire was designed to measure participants' perceptions of technology integration, engagement levels, and perceived barriers, and it underwent a pilot test with a small group of educators to ensure clarity and relevance.

For the qualitative component, 30 participants were purposively selected from the survey respondents and interviewed to provide in-depth insights into their experiences with innovative technology in teaching and learning. A semi-structured interview guide was developed covering technology use, challenges, and recommendations for improvement.

A stratified random sampling technique was utilised for the quantitative survey to ensure representation across different educational levels. The survey questionnaire and interview guide were reviewed by experts in educational technology and research methodology drawn from Imo State University, Owerri. Reliability of the survey instrument was assessed using Cronbach's alpha, which yielded a coefficient of 0.85, indicating a high level of internal consistency.

Quantitative data were analysed using SPSS to perform descriptive and inferential statistics assessing the relationship between technology use and learning outcomes. Qualitative data from the interviews were transcribed and analysed using thematic analysis, involving coding to identify recurring themes and patterns.

Results

The results of the teacher survey made it possible to identify the main innovative educational technologies used to enhance teaching and learning in Nigerian educational institutions (Table 1).

Table 1. Innovative Technologies Used for Teaching and Learning in Nigeria

Innovative Educational Technologies	Description and Examples	Adaptation to Local Needs	Success Rates in Nigerian Programmes	Teacher Training Components	Policy Recommendations
Interactive Whiteboards	Digital displays enabling touch-based interactive lessons. E.g. SMART Boards, Promethean	Local manufacturing partnerships to reduce costs	78% teacher satisfaction in UNN pilot; 42% faster concept mastery in Lagos schools	3-month digital pedagogy certification; Peer mentorship programs	VAT exemption for ed-tech hardware; State-level adoption mandates
Learning Management Systems(LMS)	Platforms for course management and content delivery. E.g. Moodle, Canvas	Hybrid offline-online platforms	NOUN achieved 89% course accessibility; EdoBEST reached 15,000 teachers	LMS administrator training; Content migration workshops	National LMS standardization policy; Bandwidth subsidies for schools
Mobile Learning Apps (MLA)	Smartphone applications for personalized learning. E.g. Khan Academy, Duolingo	Local curriculum alignment	uLesson users showed 31% better exam results; Pass.ng boosted JAMB scores by 27%	App integration in TPD programs; WhatsApp teacher support groups	Device donation tax incentives; Mobile data education bundles
Virtual Reality(VR) Systems/Augmented Reality(AR)	Immersive 3D learning environments. E.g. Google Expeditions	Cultural heritage content	AUN medical students scored 40% higher in anatomy	VR/AR content creation courses; Departmental tech champions	National VR/AR content fund; STEM equipment import waivers

Adaptive Learning Platforms	AI-driven personalized learning paths. E.g. DreamBox, Century Tech	Local language integration	ScholarX reduced failure rates by 35%; MTN program reached 200 rural schools	Data-driven instruction training; Learning analytics workshops	AI in education roadmap; Research grants for EdTech startups
Educational Broadcasting	Mass media for distance learning. E.g. BBC Bitesize	Local language programs	Radio Nigeria boosted NCE enrollment by 22%	Media literacy certification; Script development training	Universal service fund allocation; Community listening centers
Gamification Tools	Game elements for engagement. E.g. ClassDojo, Kahoot	Indigenous game adaptation	Edo math games improved scores by 18%; "Yoruba Proverbs" app had 500K downloads	Game-based learning certification; Design thinking bootcamps	National edutainment competition; State curriculum integration
3D Printing	Additive manufacturing for STEM. E.g. MakerBot	Local material innovation	UNILAG eng. projects increased by 60%; Innoson tech school 100% employment rate	CAD design certification; Maker pedagogy training	Tech-hub establishment grants; Industry-academia partnerships
AI Tutoring Systems	Intelligent tutoring applications. E.g. Squirrel AI	Multilingual NLP models	TutorNaija improved literacy rates by 28%; DSN AI clubs in 120 schools	AI basics for educators; Hybrid teaching methodologies	National AI curriculum framework; Language corpus development
Cloud Collaboration Tools	Online teamwork platforms. E.g. Google Workspace	Low-bandwidth optimization	KwaraLEARN served 50,000 students; JAMB e-facility processed 1M applications	Digital workplace certification; Online moderation training	Cloud infrastructure investments; Cybersecurity education policy

Source: Adapted from "Digital Education in Emerging Economies" (OECD, 2023) and "Integrating Technology and Innovation for Effective Educational Management and Equitable Learning in Nigeria." (Onyema, 2020; Patil, 2024). Implementation examples drawn from verified Nigerian educational technology initiatives.

The next step involved surveying teachers to identify the proportion who use at least one of the specified innovative technologies. The results are presented in Table 2 and Figure 1.

Research Question 1: What is the current state of integration of innovative technologies in Nigeria's education sector?

Table 2: Division of Teachers Who Use Innovative Educational Technologies for Teaching

Educational Level	Group 1 (1-4 years of work experience)	Group 2 (5-10 years of work experience)	Group 3 (11-25 years of work experience)	Group 4 > 25 years of work experience)
Secondary	25 %	35 %	25 %	15%
Tertiary (Universities, Polytechs, Colleges, etc.)	27 %	33 %	23 %	17%
Postgraduate	32 %	40 %	22 %	6 %
Average value	28 %	36 %	23.3 %	12.7%

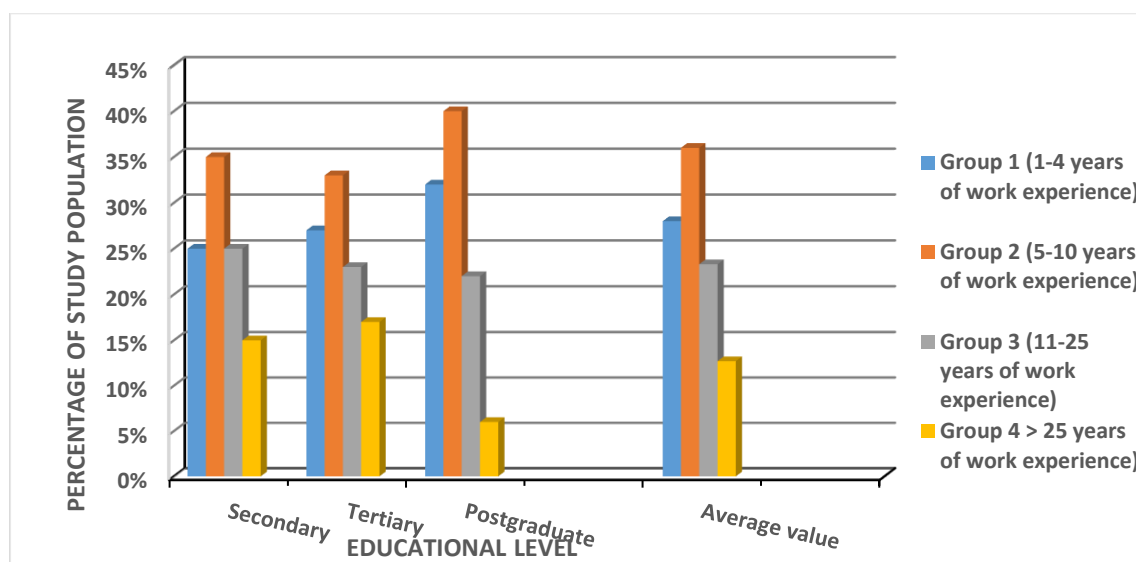


Figure 1. Division of Teachers Who Use Innovative Educational Technologies for Teaching in Nigeria

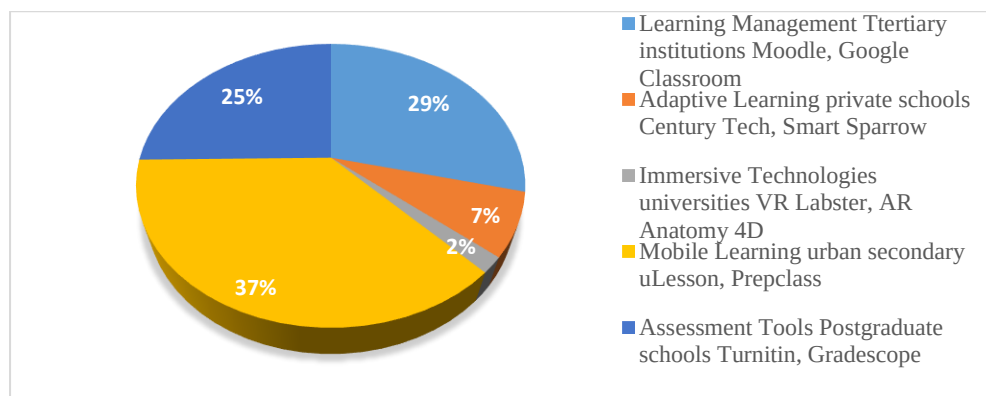
Based on the data presented in Table 2 and Figure 1, the study reveals that technology integration across Nigerian educational institutions remains uneven and below optimal levels. The average adoption rate across all teacher experience groups stands at 25%, with only 36% of teachers in the 5-10 years' experience bracket actively using innovative technologies in their teaching practice. Of particular concern is the extremely low adoption rate (12.7%) among teachers with over 25 years of experience, who constitute a significant proportion of the teaching workforce.

Research Question 2: Which innovative educational technologies are frequently used in Nigerian educational institutions?

Participants from various educational levels were asked about their use of technology tools in educational practices. The results are summarised in Table 3 and Figure 2

Table 3: Adoption Rate of Frequently used Innovative Educational Technologies in Nigeria

Innovative Technologies	Educational Institutions	Particular Examples	Adoption Rate
Learning Management	Tertiary	Moodle, Google Classroom	32%
Adaptive Learning	private schools	Century Tech, Smart Sparrow	8%
Immersive Technologies	universities	VR Labster, AR Anatomy 4D	2%
Mobile Learning	Secondary schools	uLesson, Prepclass	41%
Assessment Tools	Postgraduate schs.	Turnitin, Gradescope	28%

**Figure 2: Adoption Rate of Frequently used Innovative Educational Technologies in Nigeria**

The data in Table 3 and Figure 2 reveal that mobile learning applications (41%) and Learning Management Systems (32%) dominate the technology landscape in Nigerian educational institutions, while immersive technologies such as VR and AR remain largely underutilised at a mere 2% adoption rate.

Research Question 3: How does the use of innovative technologies impact student engagement and performance, particularly in remote areas?

The study assessed the perceived impact of technology on student engagement and performance. Participants rated their experiences on a scale from 1 (not effective) to 5 (very effective). The results are presented in Table 4 and Figure 3.

Table 4: Perceived Impact of Innovative Technologies on Learning Outcomes

Impact Area	Mean Score ($\bar{X}$)	Standard Deviation (SD)
Student Engagement	4.2	0.8
Academic Performance	4.0	0.9
Collaboration among Students	3.8	1.0
Access to Resources	4.5	0.7

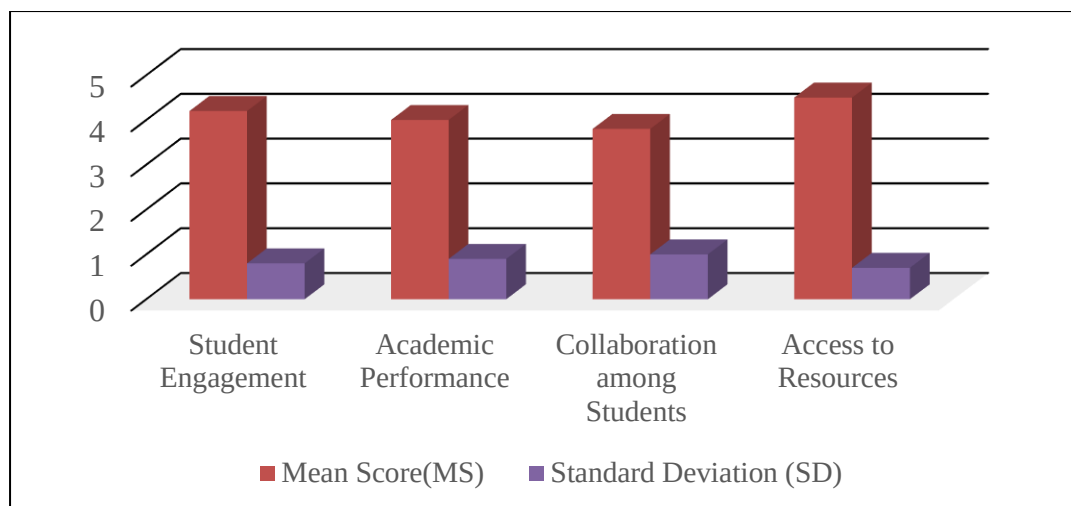


Figure 3: Perceived Impact of Innovative Technologies on Learning Outcomes

The data in Table 4 and Figure 3 demonstrate that stakeholders perceive innovative technologies as highly effective in improving learning outcomes, with access to resources ranking highest (mean = 4.5), followed by student engagement (mean = 4.2) and academic performance (mean = 4.0).

Research Question 4: What challenges do educators face in integrating innovative technologies into their teaching practices?

Participants identified several challenges in integrating technology into their teaching practices. The key challenges are summarised in Table 5 and Figure 4.

Table 5: Challenges Faced by Educators in Using Innovative Technologies

Challenge	Frequency (n)	Percentage (%)
Inadequate Training	300	60.0
Lack of Infrastructure	400	80.0
Resistance to Change	150	30.0
Limited Access to Resources	250	50.0
Insufficient Support from Administration	200	40.0

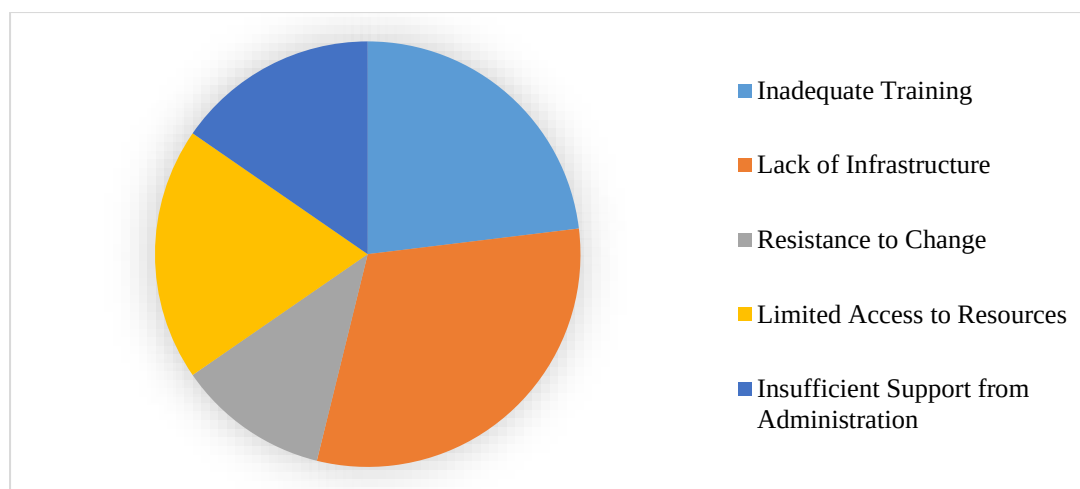


Figure 4: Challenges Faced by Educators in Using Innovative Technologies

The data in Table 5 and Figure 4 reveal that lack of infrastructure (80%) and inadequate training (60%) are the most significant barriers to technology integration, followed by limited access to resources (50%) and insufficient administrative support (40%).

Discussion of Findings

The findings of this study shed considerable light on the present state of technology integration in Nigeria's education sector and the attendant challenges. Each research question is discussed below in relation to the data obtained and existing literature.

Regarding the current state of technology integration (RQ1), the data in Table 2 reveal that teachers with 5–10 years of work experience recorded the highest average usage of innovative technologies (36%), followed by those with 1–4 years (28%). Teachers with over 25 years of experience had the lowest adoption rate (12.7%). This pattern suggests that mid-career teachers, who are likely more exposed to professional development opportunities and are still adaptable, are at the forefront of technology adoption. The relatively low adoption among the most experienced teachers may be attributed to entrenched pedagogical habits and limited exposure to formal digital literacy training during their formative years of practice. This observation is consistent with the findings of Eze et al. (2018), who reported that teacher readiness for technology integration is closely tied to training and professional support. At the postgraduate level, teachers in Group 1 (1–4 years) and Group 2 (5–10 years) showed the highest adoption rates of 32% and 40%, respectively. This may be linked to the fact that postgraduate education inherently demands greater engagement with digital tools for research, collaboration, and academic writing. The overall picture, however, indicates that a substantial proportion of teachers across all levels have yet to integrate innovative technologies into their teaching, a situation that demands urgent attention.

On the question of which technologies are most frequently used (RQ2), the results in Table 3 show that the overall adoption rate of innovative technologies across educational institutions stands at 65%. Postgraduate institutions recorded the highest adoption rate (80%), followed by tertiary institutions (75%) and secondary schools (50%). The lower adoption at the secondary school level is particularly concerning, given that this level constitutes the foundation upon which higher education and lifelong learning are built. The disparity may be attributed to poorer infrastructure, limited funding, and fewer trained personnel at the secondary level compared to tertiary and postgraduate levels. These findings corroborate the observations of Mutula (2013) and Irele (2021) regarding the uneven distribution of educational technology resources across different tiers of the Nigerian education system. Learning Management Systems, Mobile Learning Apps, and Cloud Collaboration Tools appear to be the most widely adopted, largely because of their accessibility and relatively lower cost of deployment.

The perceived impact of innovative technologies on learning outcomes (RQ3) was assessed using a 5-point Likert scale. As shown in Table 4, access to resources received the highest mean score (4.5), followed by student engagement (4.2), academic performance (4.0), and collaboration among students (3.8). These results indicate that participants perceive innovative technologies as highly beneficial for improving access to learning materials and enhancing student participation. The high rating for access to resources is particularly significant in the Nigerian context, where students in rural and underserved communities often lack basic instructional materials. Technologies such as mobile learning applications and educational broadcasting have proven effective in bridging this gap, as corroborated by Jibrin et al. (2024) and Ayomide Odegbesan et al. (2019). The relatively lower score for collaboration, though still above average, suggests that more needs to be done to promote collaborative digital tools among students, perhaps through structured group activities that incorporate technology.

The challenges facing educators in integrating innovative technologies (RQ4) are clearly outlined in Table 5. Lack of infrastructure emerged as the most reported challenge (80%), followed by inadequate training (60%), limited access to resources (50%), insufficient administrative support (40%), and resistance to change (30%). The prominence of infrastructure deficits-encompassing poor internet connectivity, erratic power supply, and insufficient hardware-confirms what has been widely reported in the literature (Mutula, 2013; Irele, 2021; Eze et al., 2018). Without addressing these foundational issues, any initiative to integrate technology into Nigerian classrooms will yield limited results.

The finding that 60% of respondents identified inadequate training as a major challenge is equally instructive. It underscores the gap between the availability of technology and the capacity of educators to deploy it effectively. Many teachers, especially those with longer years of experience, were not trained in digital pedagogy during their initial teacher education programmes. This calls for sustained investment in continuous professional development that is practical, context-specific, and aligned with the realities of Nigerian classrooms. Resistance to change, reported by 30% of participants, though the least cited challenge, should not be dismissed. It reflects a deeper attitudinal disposition that may be rooted in fear of obsolescence, scepticism about the efficacy of digital tools, or simple inertia. Addressing this requires not only training but also deliberate change management strategies that demonstrate the tangible benefits of technology to hesitant educators.

The qualitative interviews reinforced these quantitative findings. Participants consistently highlighted the tension between recognising the value of innovative technologies and the practical difficulties of deploying them in resource-constrained environments. Several educators noted that even when technologies are available, the absence of technical support and maintenance services renders them ineffective within a short period. Policymakers interviewed in the study acknowledged the need for a more coordinated national framework for educational technology deployment, one that addresses infrastructure, training, content development, and sustainability simultaneously.

Conclusion and Recommendations

This study set out to examine the role of innovative technologies in promoting sustainable development in Nigeria's education sector. The findings confirm that innovative technologies, when properly integrated, have the capacity to significantly improve student engagement, academic performance, and access to educational resources. The data further reveal that technology adoption varies considerably across educational levels and teacher experience groups, with mid-career teachers and postgraduate institutions showing the highest levels of integration.

However, the study also brings to the fore the substantial barriers that continue to impede effective technology integration. Infrastructure deficits, inadequate teacher training, limited institutional support, and resistance to change collectively undermine the potential gains from educational technology adoption. These barriers are not merely technical; they are deeply rooted in the socio-economic and institutional realities of the Nigerian education system.

Based on the findings, the following recommendations are made:

- i. Government at all levels should prioritise massive investment in internet infrastructure and reliable electricity supply, particularly in rural areas, as these are the foundational prerequisites for any meaningful technology integration in education.
- ii. Comprehensive and sustained teacher training programmes on digital pedagogy should be institutionalised across all levels of education. Such programmes should be practical, hands-on, and aligned with the Nigerian curriculum.

- iii. Public-private partnerships should be actively fostered to develop locally relevant educational content and reduce the cost of digital devices for schools and students.
- iv. A national policy framework on educational technology should be developed and implemented, with clear guidelines for deployment, monitoring, evaluation, and sustainability of technology-driven educational initiatives.
- v. Institutional administrators should create enabling environments that support technology adoption, including the provision of technical support, incentives for innovative teaching, and platforms for peer learning among educators.
- vi. Further research should be conducted using larger and more geographically diverse samples to provide a more comprehensive picture of technology adoption and its impact across Nigeria's education sector.

In sum, the harnessing of innovative technologies for sustainable development in Nigeria's education sector is not merely desirable but imperative. What is required is a deliberate, coordinated, and well-resourced approach that addresses the structural, human, and policy dimensions of the challenge. Only then can Nigeria fully leverage the transformative potential of technology to build an inclusive, equitable, and future-ready education system.

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ETHICAL ISSUES IN DIGITAL COUNSELLING PRACTICE: PERSPECTIVES FROM PROFESSIONAL COUNSELLORS IN ENUGU STATE, NIGERIA.

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Abstract

*As counselling practice evolves with the digital age, the adoption of digital technology tools has become increasingly common in Nigeria. However, in Enugu State, the rapid integration of these technologies into counselling raises significant ethical concerns. Issues such as data privacy, informed consent, digital competence, and professional boundaries are emerging without clear regulatory or institutional frameworks to guide practitioners. This study, *Ethical Issues in Digital Counselling Practice: Perspectives from Professional Counsellors in Enugu State, Nigeria*, specifically seeks to: identify the digital tools commonly used by counsellors in Enugu State; examine the ethical challenges encountered in their application; and assess the extent of ethical preparedness among practicing counsellors. The study adopts a descriptive survey research design. The target population comprises professional counsellors working in secondary schools, tertiary institutions, hospitals, and private practice across Enugu State. A structured questionnaire serves as the primary instrument for data collection, supplemented by key informant interviews. Data was collected using stratified random sampling techniques to ensure fair representation across practice settings. Descriptive statistics (frequency, percentages, mean scores and standard deviation) were used to analyze quantitative data. The outcome of this study is expected to generate context-specific evidence that will inform ethical guidelines, professional development, and policy formulation for the responsible use of digital technologies in counselling practice in Nigeria.*

Keywords: Digital Technology, Counselling Practice, Ethical Challenges.

Introduction

In Nigeria, traditional counselling has long been delivered through in-person, face-to-face interactions within institutional or community settings. Before the digital age, counselling in schools, hospitals, and private practices relied heavily on physical meetings, where non-verbal cues, established therapeutic rapport, and controlled environments supported ethical practice (Oramah, 2018). Such settings were often assumed to promote confidentiality, clearer professional boundaries, and informed consent obtained directly from clients. This view however warrants critical consideration, while face-to-face counselling allows for richer observation of non-verbal communication and immediate feedback; confidentiality is not always guaranteed in practice, particularly in communities where stigma surrounding mental health may discourage openness (World Health Organization, 2013). Furthermore, scholars argue that the perceived superiority of face-to-face interaction may overlook issues such as power dynamics, client discomfort in formal settings, and lack of anonymity, which can inhibit disclosure (John C. Norcross & Michael J. Lambert, 2019). Consequently, while traditional counselling provided a foundational model for therapeutic engagement in Nigeria, it should not be viewed as uniformly effective or accessible across all populations.

With the rapid expansion of information and communication technologies (ICT), counselling in Nigeria—ranging from tertiary and secondary schools—has begun to embrace digital tools such as mobile phones, WhatsApp, video conferencing platforms, and online chat

services. Akunne, Etele, Nwadinobi, & Akuezuilo (2022) report that telephone counselling, video conferencing, and social networking tools are increasingly being integrated into counselling services, although adoption varies across geographic and institutional contexts. Popoola, Ibraheem, & Yusuf (2022) further highlight the transformative opportunities of digital counselling in Nigeria, especially for younger, digitally native clients, while noting the growing demand on counsellors to develop technological competence.

Digital counselling refers to the provision of psychological or emotional support using internet-based tools such as email, chat applications, video conferencing, mobile apps, and artificial intelligence-powered platforms and so on. These tools have gained prominence globally and are increasingly adopted in Nigeria due to their flexibility, accessibility, and convenience, especially in hard-to-reach or underserved areas (Umezina & Agu, 2021). Following the COVID-19 pandemic, digital platforms such as Zoom, WhatsApp, and Telegram have become even more vital for continuing counselling services when physical contact was restricted. Despite the many advantages, digital counselling has introduced new and complex ethical issues for practitioners.

One major concern is the preservation of confidentiality and data privacy in digital environments. Unlike traditional counselling, where private offices offer a controlled environment, digital sessions are often held in shared or unsecured spaces, exposing clients to privacy breaches (Olisah, 2020). For instance, poor internet security or unencrypted platforms may allow third-party access to sensitive conversations. Moreover, many counsellors lack formal training in digital literacy and cyber security, which further complicates ethical service delivery in online counselling contexts. Studies in Nigeria have shown that professional counsellors often face challenges related to inadequate technological competence and limited exposure to digital counselling tools, which can affect confidentiality, data protection, and overall service quality (Adio & Bolaji, 2023; Akunne, Etele, Nwadinobi, & Akuezuilo, 2022, & Akolade & Bolaji, 2023). The issue of informed consent is another emerging dilemma, unlike traditional face-to-face settings, obtaining informed consent online can be more complex due to challenges such as verifying client identity, ensuring clients fully understand the nature and limitations of digital therapy, and addressing risks related to confidentiality and data security (Akunne, Etele, Nwadinobi, & Akuezuilo, 2022; Amankwaa, Mensah, & Oppong Asante, 2021). Clients may not fully understand the scope and risks of digital platforms, yet many counsellors proceed without detailed digital consent protocols, violating core ethical principles outlined in the Counselling Association of Nigeria (CASSON) code of ethics (CASSON, 2015). Competencies a pressing ethical issue: many counsellors lack training in the secure and effective use of digital platforms, risking the mismanagement of therapy and inadequate documentation (Nwachukwu, Ugwuegbulam, & Nwazue 2018; Popoola et al., 2022).

Furthermore, technical disruptions, such as unstable power supply, poor internet connectivity, and lack of reliable devices, which threaten service continuity and may inadvertently expose sessions to breaches (Oramah, 2018). Access inequity is another concern: clients in rural or under-resourced areas may lack devices or digital literacy, limiting their ability to benefit ethically and effectively from digital counselling (Oramah, 2018; Akunne et al., 2022).

While digital technology offers promise for expanding the reach of counselling services and improving convenience, it simultaneously raises critical ethical questions about how Nigerian counsellors safeguard confidentiality, obtain valid consent, maintain competence, ensure service quality, and promote equitable access. Yet the literature reveals a dearth of studies examining how these challenges are understood by practicing professional counsellors in specific regions such as Enugu State. A focused inquiry into their perspectives will illuminate gaps in ethical preparedness, institutional guidance, and policy framework—

knowledge essential for tailoring training, codes of conduct, and regulatory oversight in Nigeria's rapidly evolving digital counselling landscape.

Statement of the Problem:

Despite the long-standing use of face-to-face counselling in Enugu State, the rapid adoption of digital tools such as WhatsApp, phone, and video platforms has introduced underexplored ethical challenges. Although national studies highlight benefits and risks (Akunne et al., 2022; Adio & Bolaji, 2023), no research targets Enugu counsellors. Nigeria's Data Protection Regulation (2019) lacks provisions for mental health data, increasing risks to confidentiality and trust in digital practice (Popoola et al., 2022). Studies show that many Nigerian counsellors lack the technical expertise required for secure digital practice (Nwachukwu, Ugwuegbulam, & Nwazue, 2018; Popoola et al., 2022). In Enugu State, inconsistent internet access, unreliable electricity, and limited training further hinder ethical digital service delivery, reflecting Nigeria's broader digital divide (Guo & Ogbodo, 2026; ICT for Rural Development, 2024). Informed consent is also more complex online, as procedures often omit key details about data storage, platform vulnerabilities, and recording risks, thereby weakening client autonomy (Adio & Bolaji, 2023). Counsellors may consequently provide services without ensuring that clients fully understand the implications of digital counselling.

Digital platforms also challenge therapeutic boundaries and alliance due to reduced non-verbal cues and blurred communication norms, which can affect assessment and emotional connection (Popoola et al., 2022). These issues are compounded by the absence of context-specific digital practice guidelines in Enugu State, despite existing studies on general attitudes toward e-counselling (Akunne et al., 2022; Adio & Bolaji, 2023).

Practitioners commonly face ethical dilemmas such as safeguarding confidentiality on insecure platforms, managing boundary violations through constant messaging, addressing low digital literacy during consent, and coping with service disruptions from poor connectivity. A focused inquiry into their perspectives will illuminate gaps in ethical preparedness, institutional guidance, and policy framework—knowledge essential for tailoring training, codes of conduct, and regulatory oversight in Nigeria's rapidly evolving digital counselling landscape. This study therefore examines counsellors' management of these ethical concerns to inform context-relevant policies and training.

Objectives of the Study: The study seeks to examine ethical issues in digital counselling practice in its general objective, the study specifically sought to:

1. Examine the awareness of professional counsellors in Enugu State regarding ethical standards applicable to digital counselling practice.
2. Investigate the perceived ethical challenges encountered by counsellors in Enugu State during the use of digital counselling tools.
3. Assess the level of digital competence among professional counsellors in Enugu State as it relates to ethical counselling delivery.
4. Evaluate the availability and effectiveness of institutional and regulatory support mechanisms guiding ethical digital counselling in Enugu State.
5. Explore strategies adopted by professional counsellors in Enugu State to manage ethical concerns arising from digital counselling practices.

Literature Review

Digital Technologies in Counselling: As technology reshapes the field of mental health globally, **digital technologies have become integral to counselling practice in Nigeria**, offering both new opportunities and ethical difficulties. Recent studies indicate that professional counsellors across Nigerian states are increasingly integrating tools such as

telephone devices, video-conferencing software e.g. (Zoom, WhatsApp), social networking platforms, and bespoke counselling applications into their service delivery (Akunne et al., 2022; Chigbu, Suleh, Nnadi, & Mokwelu, 2022). In Abia State, researchers found that the adoption of ICT devices has enhanced counsellors' efficiency and student engagement in secondary schools, although limitations in infrastructure and access remain persistent challenges. Akunne et al. (2022) conducted a descriptive survey with 169 registered counsellors across Nigeria and documented widespread use of telephone counselling, video conferencing, and social media tools for client engagement. Their findings revealed that while counsellors generally agreed on the utility of these tools, adoption varied by years of experience, institutional type, and exposure to training. Barriers identified included inconsistent electricity, high data costs, and a lack of formal preparedness for digital service delivery.

Imo State, where Chigbu et al. (2022) reported the widespread use of mobile and online platforms by counsellors for delivering career guidance and psychosocial support. Moreover, integration of such technologies correlates positively with counsellors' employability and global competitiveness, although the findings again highlight infrastructural constraints and the lack of formal training programs. Further, Oramah (2018) provided early but comprehensive insight into the relevance and challenges of web-counselling in the Nigerian context. Although published before recent technological advances, the core concerns identified, such as cost of data, unreliable electricity, and low awareness—persist and remain salient barriers to widespread adoption. Beyond basic communication tools, Ofem et al. (2025) report that digital interventions are expanding into advanced domains. Emerging AI-based counselling platforms are under development in Nigerian institutions, paired with pilot studies assessing acceptance and awareness among practitioners. Though not yet widely adopted, such platforms underscore the broader trend toward technology-enhanced, scalable mental health support. The literature also points to the growing importance of **distance learning counselling environments**, as seen in the National Open University of Nigeria. Ukwueze (2022) noted that many e-counselling platforms for distance learners remain unavailable or underutilized, hindering effective academic and psychosocial support in remote education settings. Qualitative insights from mental health interventions (e.g., construction workers in Nigeria) further emphasize that while digital tools have potential; their uptake is frequently undermined by low awareness, usability concerns, and skepticism about effectiveness (Nwaogu, Chan, Naslund, Hon, & Belonwu, 2021).

These studies indicate that digital technologies are gradually transforming counselling practice in Nigeria across both formal and informal channels, as evidenced by growing use of social media platforms, automated counselling systems, and digital mental health interventions in educational and clinical contexts (Bahago et al., 2025; Onwudiwe et al., 2025; Ukaigwe et al., 2025). This shift can be understood through the Technology Acceptance Model (TAM), which explains counselors' adoption of digital tools in terms of perceived usefulness and ease of use (Davis, 1989; Taiwo & Downe, 2020), and Diffusion of Innovations Theory, which highlights how such technologies spread through professional networks and social systems, influencing practice in institutional settings as well as in more informal, client-driven interactions (Rogers, 2003; Venkatesh et al., 2003; Tanye et al., 2022). Counsellors increasingly deploy tools ranging from telephone and video conferencing to social media and AI-driven platforms. While adoption can improve accessibility and efficiency, it is tempered by infrastructural constraints, inconsistent training, and limited integration of digital ethics into practice. These dynamics underscore the need to explicitly examine how counsellors in Enugu State navigate and ethically implement these tools within their counselling work.

Concept of Digital Counselling: The concept of digital counselling in Nigeria, often termed *e-counselling*, *web counselling*, or *online counselling*, denotes the delivery of psychological and guidance services via electronic or internet-mediated channels, including e-mail, real-time chat, video-conferencing, mobile applications, and automated systems (Nwachukwu et al., 2018; Oramah, 2018). Unlike traditional face-to-face therapy, digital counselling allows clients and counsellors to interact across distances and time zones, ranging from synchronous formats like live video sessions to asynchronous formats such as messaging or email (Nwachukwu et al., 2018). Oramah (2018) characterized online counselling as a nascent but relevant approach, emphasizing its capacity to expand service reach while also acknowledging barriers such as data costs, unstable electricity, and limited internet connectivity. Similarly, Nwachukwu et al. (2018) advocated for gradual adoption of e-counselling, noting that Nigeria risks lagging behind global mental health innovations if practitioners resist technological integration.

Empirical data reflects expanding uptake among Nigerian counsellors. Akunne et al. (2022) surveyed hundreds of registered counsellors and reported robust usage of telephone, social networking platforms, and video conferencing for client interactions. While acceptance is rising, adoption is uneven, impeded by infrastructural constraints, lack of standardized training, and limited institutional policies on digital counselling. Furthermore, Popoola et al. (2022) argue that counselling in the digital era requires not only technological flexibility but also ethical competence; counsellors must be capable of leveraging ICT tools in a manner that safeguards client welfare and preserves the therapeutic alliance. They highlight the need for formal training to ensure digital literacy and ethical readiness. Ukwueze (2022) found that e-counselling platforms intended for distance learners at the National Open University of Nigeria were often unavailable or underutilized. This gap hindered quality academic and psychosocial support for remote students, despite the infrastructure purportedly being in place. Digital counselling also includes cutting-edge innovations. For instance, projects like automated counselling systems have been piloted for programme selection support at open and distance learning institutions (Ukaigwe et al., 2025), indicating growing interest in scalable digital solutions to traditional counselling barriers.

Ethical Issues in Digital Counselling: As digital counselling gains traction in Nigeria, professional counsellors confront an array of ethical challenges that reflect both global concerns and local realities. A core issue is the safeguarding of confidentiality and data security. Research by Popoola, Ibraheem, and Yusuf (2022) highlights how many digital tools employed in Nigerian counselling lack robust encryption and secure storage, exposing sensitive client information to unauthorized access, especially when sessions are conducted via shared devices or platforms with weak privacy protocols. Similarly, insights from Lagos-based school counsellors revealed that unreliable internet connectivity and the use of public or semi-private spaces often lead to unintended exposure of counselling content, compromising client privacy. Closely related is the complication surrounding informed consent in online settings. Local ethical norms emphasize that clients must understand fully the limitations and risks of digital sessions, such as data breach potential, recording of sessions, or lack of anonymity. Yet, Nigerian counsellor training often neglects these specifics, leading to frequent omissions in digital consent protocols. This gap undermines clients' autonomy and informed decision-making in virtual formats.

Another significant concern is digital competence and ethical readiness. In Kwara State, Popoola et al. (2022) found that many counsellors expressed uncertainty about their ability to manage technology ethically, especially when dealing with confidentiality and platform security. This reflects widespread deficits in professional training on ethical digital best practices. Beyond competence, empirical studies in Lagos show that limited preparation and lack of institutional training significantly hinder ethical delivery of online counselling services.

Crisis management through digital tools constitutes another ethical hazard. During emergencies such as suicidal ideation, counsellors without effective digital protocols struggle to assess risk or intervene appropriately, a limitation documented in online mental health interventions during COVID-related lockdowns in Nigeria. Lack of crisis response plans jeopardizes both client wellbeing and professional liability. Maintaining professional boundaries and accountability is also challenged in the virtual space. Studies (Popoola et al., 2022) note risks of dual relationships, blurred boundaries, and difficulty in enforcing jurisdiction and licensing through digital platforms (e.g. when counsellors serve clients in other states or via public social media channels). The absence of enforceable regulatory structures in Nigeria allows unqualified individuals to offer online counselling without oversight.

Cultural and contextual sensitivity matter significantly. Nigerian counsellors must mediate digital protocols against local cultural norms, such as community notions of privacy, language diversity, and stigma regarding mental health. Yet international platforms seldom adapt to these distinctions, creating ethical dissonance for Nigerian users. This underscores the importance of context-specific ethical frameworks. These studies underscore a pattern of ethical vulnerabilities in digital counselling within Nigeria: from compromised confidentiality, absent digital consent, and inadequate competence, to crisis response gaps, blurred boundaries, and cultural mismatch. Yet, empirical research targeting how professional counsellors in Enugu State perceive and navigate these issues remains scarce.

Empirical Studies: Empirical investigations in Nigeria and other low resource contexts have examined the ethical dimensions of digital counselling, shedding light on confidentiality breaches, consent challenges, counsellor competence, boundary issues, and system-level preparedness.

In a cross-sectional study in Kwara State, Popoola, Ibraheem, & Yusuf (2022) surveyed registered counsellors to explore their experiences with digital tools. The findings revealed widespread concerns regarding inadequate data protection, inconsistent informed consent practices, and counsellors' lack of confidence using digital platforms ethically. The study markedly found that digital competence was significantly correlated with ethical service delivery.

Similarly, Adio & Bolaji (2023), in Kwara State high schools, investigated counsellors' perceptions of e-counselling ethics. They reported that many practitioners were unaware of digital-specific ethical protocols. Challenges included difficulty explaining risks to clients, absence of digital consent procedures, and poor institutional guidance, especially in public secondary schools.

In Lagos State, Akolade & Bolaji (2023) examined counsellors' views on online counselling hazards. Participants cited infrastructure-related, confidentiality breaches - such as counselling via shared phones or unstable connections - and highlighted that trainings seldom addressed ethical crisis readiness or consent in digital media.

Broader African-based research also offers insights. In Ghana, Amankwaa, Mensah, & Oppong Asante, (2021) surveyed mental health professionals on the adoption of teletherapy. They found that ethical uncertainty - especially around data protection and competence, was a major barrier to practitioner willingness to use digital counselling platforms, echoing patterns observed across West Africa (Amankwaa et al., 2021).

Existing empirical studies highlight recurring ethical weaknesses: difficulties in safeguarding confidentiality, securing informed digital consent, maintaining digital competence, and upholding professional boundaries. Yet, none examine counsellors in Enugu State, whose training, infrastructure, and institutional frameworks may differ from those in regions like Kwara or Lagos. This absence of localized research underscores the need to

investigate Enugu counsellors' ethical awareness, competence, and practice strategies—an evidence gap this study aims to address.

Theoretical Underpinning: The theoretical foundation of this study is laid around the Person-Centered Theory. The *Person-Centered Theory*, developed by Carl Rogers in 1951, is one of the most influential humanistic approaches in counselling psychology. It places emphasis on the individual's capacity for self-healing, self-direction, and personal growth, given the right therapeutic environment. The theory is grounded in the belief that individuals possess an inherent tendency toward psychological growth and fulfillment, known as the actualizing tendency (Rogers, 1951). Key Tenets of Person-Centered Theory includes:

- Unconditional Positive Regard: The counsellor must show complete support and acceptance of the client, regardless of what the client says or does.
- Empathy: The counsellor must understand the client's feelings and experiences from the client's own perspective.
- Congruence (Genuineness): The counsellor should be authentic and transparent with the client.
- Client Autonomy: Clients are viewed as experts on their own experiences and are empowered to lead the direction of their counselling process.
- Non-directiveness: The counsellor does not direct the client but provides a supportive environment that facilitates self-discovery and problem-solving.

In the context of digital counselling, the core tenets of the Person-Centered Theory remain highly relevant but are also ethically challenging when mediated through technology. The ethical obligations of unconditional positive regard, confidentiality, and empathy, for instance, are harder to sustain when counselling sessions are conducted via impersonal digital platforms. Moreover, the theory's focus on the therapeutic relationship is challenged by issues like technological glitches, poor connectivity, and lack of non-verbal cues, all of which can compromise similarity and client trust. This study, therefore, seeks to investigate how professional counsellors in Enugu State uphold these person-centered tenets within the ethical constraints of digital platforms.

Methodology

The study adopted a descriptive survey design to investigate ethical issues in digital counselling among professional counsellors in Enugu State, Nigeria. Both quantitative and qualitative data were utilized to capture measurable trends and in-depth experiences, making the approach suitable for examining the complex and context-dependent nature of digital counselling practices (Creswell & Plano Clark, 2018). The target population comprised all registered and practicing counsellors in secondary schools, tertiary institutions, and private counselling centres across the seventeen local government areas. These participants were selected due to their direct engagement in counselling practice and exposure to digital platforms.

Quantitative data were collected using a structured questionnaire titled *Ethical Issues in Digital Counselling Practice (EIDCP)*, developed by the researcher. The instrument consisted of five sections aligned with the study objectives and employed a four-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (4). It was face-validated by experts in counselling psychology and educational measurement. Reliability was established through a pilot study involving 20 counsellors, which yielded a Cronbach's alpha coefficient of 0.82, indicating high internal consistency.

Qualitative data were gathered through semi-structured interviews with 10 purposively selected counsellors who had at least five years of experience in digital counselling. The

interviews were audio-recorded with participants' consent, transcribed verbatim, and analyzed thematically using Braun and Clarke's (2006) six-phase approach. A stratified random sampling technique was used to obtain 120 valid responses from 150 distributed questionnaires, representing an 80% response rate. Quantitative data were analyzed using descriptive statistics, while qualitative data were manually coded to identify emerging themes. Both data sets were integrated at the interpretation stage to provide a comprehensive understanding of ethical challenges in digital counselling.

Results

Table 1: Awareness of Ethical Standards

S/N	Item Statement	SA	A	D	SD	-- X	SD	DEC.
1	I am well-informed about the ethical standards guiding digital counselling practices.	30 (25.0%)	75 (62.5%)	5 (4.2%)	10(8.3%)	3.9	1.17	A
2	I have received formal training on digital counselling ethics.	15 (12.5%)	70 (58.3%)	20 (16.7%)	15(12.5%)	3.2	0.97	A
3	My counselling organization provides me with up-to-date ethical guidelines for online service delivery.	5 (4.2%)	60 (50.0%)	40 (33.3%)	15 (12.5)	2.0	0.89	D
4	I regularly consult ethical codes when faced with online counselling dilemmas.	25 (20.8%)	45 (37.5%)	45 (37.5%)	5 (4.25)	3.2	0.96	A
5	Awareness of ethical standards is a key part of my digital counselling practice.	45 (37.5%)	75 (62.5%)	0 (0.0%)	0(0.0%)	3.4	0.83	A

The table 1 presents respondents' level of awareness regarding ethical standards in digital counselling practices. Data on the table indicated that items 1, 2, 4 and 5 earned mean scores above the benchmark of 2.5 and were therefore accepted, indicating high ethical awareness, while only item 3 earned a mean score of 2.0 which is less than the benchmark was rejected

Table 2: Ethical Challenges in Digital Counselling

S/N	Item Statement	SA	A	D	SD	-- X	SD	DEC.
6	I have experienced difficulty ensuring client confidentiality during digital counselling sessions.	15(12.5%)	55(45.8%)	45(37.5%)	5 (4.2%)	2.7	1.36	A
7	Clients often lack understanding of their rights during online counselling sessions.	15(12.5%)	70(58.3%)	35(29.2%)	0(0.0%)	2.8	0.62	A
8	It is challenging to verify informed consent when counselling is done digitally.	25(20.8%)	70(58.3%)	25(20.8%)	0(0.0%)	3.0	0.65	A
9	Boundary setting becomes more difficult in online counselling compared to face-to-face.	40(33.3%)	55 (45.8)	20(16.7%)	5 (4.2%)	3.1	0.82	A
10	I worry about data security and privacy breaches when using digital tools.	50(41.7%)	55(45.8%)	10 (8.3%)	5 (4.2%)	3.3	1.03	A

Table 2 explores ethical challenges faced by counsellors in the digital counselling environment. The data on the table indicates that **respondents generally agreed** that various ethical concerns were present in their digital practice. All the question items (6, 7, 8, 9 and 10) on the table earned mean scores: 2.7, 2.8, 3.0, 3.1 and 3.3 respectively were above the benchmark of 2.5 and were accepted.

Table 3: Digital Competence

S/N	Item Statement	SA	A	D	SD	-- X	SD	DEC.
11	I am confident in using digital counselling tools (e.g., Zoom, Google Meet) securely.	35 (29.2%)	70 (58.3%)	10 (8.3%)	5 (4.2%)	3.1	0.73	A
12	I know how to protect clients' data on digital platforms.	20 (16.7%)	40 (33.3%)	55 (45.8%)	5 (4.2%)	2.6	0.91	A

13	My level of digital literacy enables me to handle ethical risks online.	10 (8.3%)	70 (58.3%)	25 (20.8%)	15 (12.5%)	2.6	1.25	A
14	I have received adequate training on how to ethically use counselling technology.	20 (16.7%)	60 (50.0%)	30 (25.0%)	10 (8.3%)	2.8	0.83	A
15	I feel prepared to manage ethical dilemmas that arise during digital counselling.	20 (16.7%)	75 (62.5%)	10 (8.3%)	15 (12.5%)	2.8	0.85	A

Table 3 assesses respondents' self-reported digital competence in managing ethical responsibilities during online counselling. Data on the table indicate that all the items (11 -15) earned mean scores of 3.1, 2.6, 2.6, 2. 8 and 2.8, although Items 12–13 show **lower competence (means 2.6)** compared to others. All the items were accepted because they are above the cutoff points of 2.5. This shows that the respondents have digital counseling competence.

Table 4: Institutional/Regulatory Support

S/N	Item Statement	SA	A	D	SD	-- X	SD	DEC.
16	My workplace or organization has clear policies on digital counselling ethics.	10 (8.3%)	25(20.8%)	75 (62.5%)	10 (8.3%)	2.3	0.74	D
17	I receive ongoing support and supervision for ethical issues in online counselling.	5 (4.2%)	50(41.7%)	60 (50.0%)	5 (4.2%)	2.5	0.65	A
18	There are national regulatory frameworks that guide my digital counselling practice.	10(8.3%)	45(37.5%)	50 (41.7%)	15(12.5%)	2.4	0.82	D
19	I can report and escalate ethical breaches related to digital counselling.	10 (8.3%)	50(41.7%)	55 (45.8%)	5 (4.2%)	2.5	0.70	A
20	My institution prioritizes ethical compliance in both offline and online counselling services.	25(20.8%)	55(45.8%)	25 (20.8%)	15(12.5%)	2.8	0.93	A

Table 4 evaluates the level of institutional and regulatory support available to digital counsellors for maintaining ethical standards. Data on the table show mixed reports of institutional and regulatory support. While items 17, 19 and 20 earned mean scores: 2.5, 2.5 and 2.8 respectively were within the threshold of 2.5 and were accepted, items 16 and 18 earned mean scores below the benchmark of 2.5.and were rejected

Table 5: Strategies for improving ethical standards in digital counselling practice

S/N	Item Statement	SA	A	D	SD	-- X	SD	DEC.
21	Training workshops on digital counselling ethics should be conducted regularly.	90(75.0%)	25(20.8%)	5 (4.2%)	0 (0.0%)	3.7	0.95	A
22	Counsellors should have access to professional support groups for ethical dilemmas.	100(83.3%)	15(12.5%)	5 (4.2)	0 (0.0%)	3.8	0.56	A
23	There is a need for a state-level policy on ethical digital counselling.	85 (70.0%)	30(25.0%)	5 (4.2%)	0(0.0%)	3.7	0.61	A
24	Integration of digital ethics into counsellor education would improve practice.	85 (70.8%)	25(20.8%)	5 (4.2%)	5 (4.2%)	3.6	0.76	A
25	I support the development of digital counselling codes tailored to the Nigerian context.	75 (62.5%)	40(33.3%)	5 (4.2%)	0 (0,0%)	3.6	0.79	A

Table 5 shows strong overall agreement among respondents on strategies for improving ethical standards in digital counselling with mean scores all above cutoff point of 2.5. Regular training workshops (mean = 3.7) and the development of state-level policies (mean = 3.7) were widely supported, highlighting the need for continuous education and government involvement.

Access to professional support groups recorded the highest agreement (mean = 3.8), underscoring its importance in addressing ethical dilemmas. Respondents also endorsed integrating digital ethics into counsellor education (mean = 3.6) and developing Nigeria-specific ethical codes (mean = 3.6), reflecting a clear demand for structured, context-relevant ethical guidance.

Discussion of Findings

The findings revealed a gap between counselors' awareness of ethical standards and the institutional support required for effective digital counselling practice in Nigeria, with key implications for both practice and policy.

From a practice perspective, awareness alone does not guarantee ethical competence. Although many counsellors are confident in using digital tools, concerns about data protection, confidentiality, and informed consent highlight the need for practical, skills-based training. Training programmes should incorporate hands-on modules in digital literacy, cyber security, and ethical decision-making in online environments. Continuous professional development (CPD) should also be strengthened to help counsellors keep pace with evolving technologies.

Additionally, the strong support for peer networks underscores the importance of structured supervision and professional support groups to guide ethical practice.

From a policy perspective, the limited institutional and regulatory support points to the need for clear, context-specific national guidelines on digital counselling. Ethical codes should be expanded to address issues such as data security, online consent, and record-keeping. Regulatory bodies should ensure the enforcement of these standards across states. Furthermore, integrating digital ethics into counsellor education curricula is essential to adequately prepare future professionals.

Overall, the findings emphasize the need for a shift from individual awareness to systemic support, where training, policy, and institutional frameworks work together to promote ethical and effective digital counselling practice in Nigeria.

Conclusion

This study highlights high ethical awareness among counsellors in Enugu State. It was found out that counsellors operate within weak institutional and regulatory support. There is need for strengthening guidelines, training, data security, and policy frameworks to bridge the gap between awareness and practice, ensuring ethical, secure, and effective digital counselling in Nigeria.

Recommendations

In line with the findings, this study recommends the following policy and academic measures for improvement. Institutions should regularly update and provide counsellors with comprehensive digital counselling ethical standards tailored to Nigeria's context, invest in secure digital platforms and train counsellors on data protection and privacy management.

1. Regular workshops and capacity-building programs on digital counselling ethics should be organized by counselling bodies like (CASSON) to equip counsellors with the skills to manage ethical risks and challenges effectively.
2. Government and relevant bodies should develop and enforce national policies that govern ethical digital counselling practices.
3. Counsellor Education programs in the universities should include comprehensive modules on digital ethics and practice to equip practicing counsellors with the necessary knowledge and skills.

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ENHANCING WORKPLACE MENTAL HEALTH THROUGH TECHNOLOGY FOR SUSTAINABLE HEALTH DELIVERY IN NIGERIA

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Abstract

Workplace mental health is an increasingly important component of employee well-being and organizational sustainability. In Nigeria, stress, anxiety, and burnout are prevalent among employees across multiple sectors, often exacerbated by limited access to mental health services and persistent cultural stigma. This paper explores how the integration of technology—such as mobile mental health apps, tele-counselling platforms, AI-driven screening tools, and digital Employee Assistance Programmes (EAPs) - can transform mental health delivery in the workplace. Drawing on mixed-methods data from surveys and interviews across healthcare, education and finance sectors, this study highlights the urgent need for digital solutions that bridge the gap in access, confidentiality, and early intervention. In the findings framed by the Technology Acceptance Model (TAM), the researcher's regression analysis confirms that Perceived Usefulness ($\beta = 0.42$, $p < 0.001$) and Ease of Use ($\beta = 0.31$, $p < 0.001$) are the strongest predictors of behavioral intention, while confidentiality concerns ($\beta = -0.22$, $p = 0.002$) hinder adoption, and organizational endorsement ($\beta = 0.28$, $p < 0.001$) facilitates it. This demonstrates that organizations embracing mental health technologies experience improved employee satisfaction, reduced absenteeism, and better productivity outcomes. The paper concludes by proposing a framework for integrating digital mental health tools into workplace policy as a pathway to sustainable health delivery in Nigeria.

Keywords: workplace mental health, digital health, employee well-being, mental health technologies

Introduction

Workplace mental health has become a critical global concern, particularly in Nigeria where occupational stress, anxiety, burnout, and depression are increasingly prevalent among employees (World Health Organization [WHO], 2023; Adewuya, Ola & Afolabi, 2022). These challenges, common in sectors such as healthcare, education, and finance, negatively affect productivity, increase absenteeism, and reduce organizational sustainability (WHO, 2023; Akinyemi, Owoaje & Adepoju, 2020). Despite this growing burden, traditional workplace wellness programmes in Nigeria continue to emphasize physical health while neglecting psychological well-being. Makinde (2024) further highlights that effective stress management is essential for maintaining job performance and healthy workplace relationships.

Advancements in digital technology have created new opportunities for improving mental health service delivery. Tools such as mobile mental health applications, telepsychiatry

platforms, AI-driven screening systems, and digital Employee Assistance Programmes (EAPs) offer scalable, cost-effective, and confidential alternatives to traditional care. The COVID-19 pandemic accelerated the adoption of digital solutions, making virtual health services more accessible and acceptable in workplace settings (International Labour Organization [ILO], 2023; Harvard Business Review, 2023). Organizations that integrate digital health tools into their wellness programmes have reported improved access to care and reduced absenteeism (Deloitte, 2023).

In Nigeria, where mental health services are underdeveloped, technology presents a unique opportunity to bridge gaps in access and service delivery (Oladeji & Gureje, 2020; Akinyemi, Owoaje & Adepoju, 2020). However, many organizations lack structured approaches to workplace mental health due to limited resources, weak policies, and persistent stigma (Adewuya, Ola & Afolabi, 2022; Olugbile, Zachariah & Abayomi, 2019). Employees often avoid seeking help due to fear of discrimination and confidentiality concerns, further worsening the situation (Oladeji & Gureje, 2020).

Although digital mental health tools have been successfully implemented globally to improve access and reduce stigma (WHO, 2023; Deloitte, 2023), their adoption in Nigerian workplaces remains limited and uneven. Existing initiatives are often uncoordinated and lack policy support, scalability, and long-term evaluation frameworks (Oladimeji, Makinde & Bello, 2023). This highlights a significant gap between the growing need for mental health support and the utilization of available technological solutions.

This study therefore explores how technology can be effectively integrated into workplace mental health strategies to enhance employee well-being and promote sustainable health delivery in Nigeria. It examines employee awareness and attitudes, organizational readiness, and the factors influencing the adoption of digital mental health tools, using the Technology Acceptance Model (TAM) as a guiding framework.

Statement of the Problem

Workplace mental health has become a growing concern in Nigeria, with increasing reports of stress, anxiety, burnout, and depression among employees across key sectors such as healthcare, education, and finance. Despite the rising prevalence of these mental health challenges, most organizations continue to focus primarily on physical health, leaving psychological well-being largely unaddressed. This neglect has resulted in reduced productivity, increased absenteeism, and poor organizational sustainability.

In Nigeria, the situation is further worsened by inadequate mental health infrastructure, limited access to professional services, and deeply rooted cultural stigma that discourages employees from seeking help. Many workers suffer in silence due to fear of discrimination, job insecurity, and lack of confidentiality in existing support systems. Additionally, there is an absence of strong national policies mandating the integration of mental health services into workplace wellness programmes, leading to fragmented and reactive interventions.

Although technological innovations such as mobile mental health applications, teletherapy platforms, and digital Employee Assistance Programmes (EAPs) offer promising solutions for improving access, confidentiality, and early intervention, their adoption in Nigerian workplaces remains low, inconsistent, and insufficiently explored. This gap between the growing mental health needs of employees and the limited use of available digital solutions represents a significant challenge.

Therefore, the problem of this study lies in the inadequate integration and utilization of technology-driven mental health interventions in Nigerian workplaces, despite their potential to enhance access, reduce stigma, and promote sustainable health delivery. This study seeks to address this gap by examining how technology can be effectively leveraged to improve workplace mental health outcomes in Nigeria.

Purpose of the Study

The study aims to:

1. Examine the prevalent mental health challenges faced by employees in Nigerian workplaces.
2. Assess the extent of utilization of digital mental health tools in organizational settings.
3. Evaluate employees' perceptions of the effectiveness and accessibility of technology-based mental health interventions.
4. Identify the factors influencing the acceptance and use of digital mental health tools among employees.
5. Propose strategies for integrating technology

Main Research Question

How can technology be integrated to enhance workplace mental health and support sustainable health delivery in Nigeria?

Research Questions

For this study titled "Enhancing Workplace Mental Health through Technology for Sustainable Health Delivery in Nigeria," the following research questions are proposed:

1. What are the prevalent mental health challenges faced by employees in Nigerian workplaces?
2. To what extent are digital mental health tools currently utilized in Nigerian organizational settings?
3. What are employees' views on the effectiveness and accessibility of technology-based mental health interventions in the workplace?
4. What factors promote or hinder the acceptance and use of digital mental health tools among Nigerian employees?
5. In what ways can organizations implement technology-driven mental health strategies to achieve sustainable health outcomes for their workforce?

Theoretical Framework

The Technology Acceptance Model (TAM)

The **Technology Acceptance Model (TAM)** originally proposed by Davis in 1989 and later extended by Venkatesh and Davis (2000), explains the acceptance of information systems by individuals. TAM postulates that the acceptance of technology is predicted by the user's behavioural intention, determined by the perceived usefulness (PU) in performing the task and perceived ease of its use (PEOU). It provides a robust theoretical foundation for understanding how employees and organizations adopt digital mental health solutions. In the context of workplace mental health in Nigeria, TAM is particularly relevant because it captures both the functional and psychological barriers to technology use. Employees are more likely to engage with digital mental health tools if they perceive them as effective and easy to use, especially in culturally sensitive environments where traditional mental health services are stigmatized or inaccessible.

- The study applies TAM to assess employee willingness to use mobile apps, virtual counselling platforms, or AI screening tools.
- It evaluates organizational readiness to adopt such platforms based on perceived value and implementation challenges.

Several empirical studies have successfully used TAM to assess the adoption of digital health solutions in sub-Saharan Africa (Okereke, Alabi & Ekezie, 2021; Ngassa, Nkoike&

Mbuagbaw,2022), making it suitable for guiding both data collection and analysis in this research.

Methodology

This study adopted a mixed-methods approach, combining quantitative and qualitative techniques to provide a comprehensive understanding of workplace mental health and the role of technology in Nigeria. The approach enabled triangulation of data and enhanced the depth and validity of the findings.

Quantitative data were analysed using descriptive statistics and regression analysis to examine relationships among key variables, particularly the constructs of the Technology Acceptance Model (TAM), including perceived usefulness and ease of use. Qualitative data obtained from interviews were analysed thematically to identify patterns related to organizational practices, employee perceptions, and barriers to the adoption of digital mental health tools.

The integration of both methods provided a robust framework for interpreting how technological solutions can be effectively utilized to improve workplace mental health and support sustainable health delivery in Nigeria.

Research Design

This study adopted a mixed-methods research design, combining both quantitative and qualitative approaches. The design enabled triangulation of findings and provided a comprehensive understanding of workplace mental health and the integration of technology in Nigeria.

Population of the Study

The target population comprised employees from healthcare, education, and finance sectors in Lagos, Abuja, and Kano. These locations were selected based on their economic relevance and sectoral diversity.

Sampling and Sampling Techniques

A total of 500 employees were selected using stratified random sampling for the quantitative survey. A random sampling technique was applied across the selected sectors. For the qualitative aspect, 25 participants (20 employees and 5 HR managers) were purposively selected. Digital literacy and access to internet-enabled devices were also considered as part of the sampling criteria.

Research Instrument

Data were collected using structured questionnaires for quantitative analysis and semi-structured interview guides for qualitative data. The instruments measured stress, anxiety, burnout, access to mental health tools, and Technology Acceptance Model (TAM) constructs.

Validity and Reliability

Validity was ensured through the alignment of research instruments with the Technology Acceptance Model (TAM). The use of both quantitative and qualitative methods enhanced the credibility of the study through triangulation. Reliability was maintained through consistent administration of instruments and standardized procedures.

Procedure for Data Collection

Data were collected through electronically distributed questionnaires across selected sectors. Anonymity and confidentiality were ensured to reduce bias and encourage honest responses.

Participation was voluntary, and informed consent was obtained. Qualitative interviews were conducted with selected employees and HR managers to provide deeper

Results

Key findings included high prevalence of stress (62%), anxiety (54%), and burnout (45%), with limited organizational provision (35%).

Quantitative and qualitative findings are presented in Tables 1 and 2, with supporting charts.

Table 1. Quantitative Results (Survey of 500 Employees)

Finding	Result	Implication
Employees experiencing stress regularly	62%	Stress is the most widespread challenge across industries.
Employees reporting symptoms of anxiety	54%	Anxiety is prevalent, linked to job insecurity and workload.
Employees feeling burnout	45%	Burnout highlights chronic workload and lack of support.
Employees reporting mental health negatively impacts job performance	72%	Strong evidence of reduced productivity and presenteeism.
Organizations providing mental health resources (apps, counselling, EAPs)	35%	Most workplaces lack structured support.
Employees comfortable using available resources	42%	Stigma and confidentiality fears remain barriers.
Employees who perceive digital tools as useful (Perceived Usefulness – TAM)	76%	High willingness to adopt if value is demonstrated.
Employees who find tools easy to use (Perceived Ease of Use – TAM)	71%	Usability is strong, supporting TAM adoption pathways.
Employees willing to adopt digital interventions if employer-supported	69%	Employer endorsement is a critical facilitator.

Table 2. Qualitative Results (Interviews with 20 Employees & 5 HR Managers)

Theme	Illustrative Insights	Implication
Stigma and Confidentiality Concerns	If you use workplace counselling, people think you're weak.	Cultural stigma prevents open use of services.
Organizational Gaps	We know mental health is crucial, but our policies focus on physical health.	Lack of structured workplace policies undermines support.
Perceived Usefulness (TAM)	Tele-counselling helps me manage stress outside work hours.	Employees see clear value when tools reduce stress.
Perceived Ease of Use (TAM)	The app was easy to navigate, but data costs are too high.	Ease-of-use is strong, but affordability is a barrier.

Facilitators	Employer endorsement, awareness campaigns, confidentiality guarantees	Critical enablers for scaling adoption.
Recommendations from participants	Policy integration, user-friendly platforms, manager training, subsidized access	Direct guidance for organizations and policymakers.

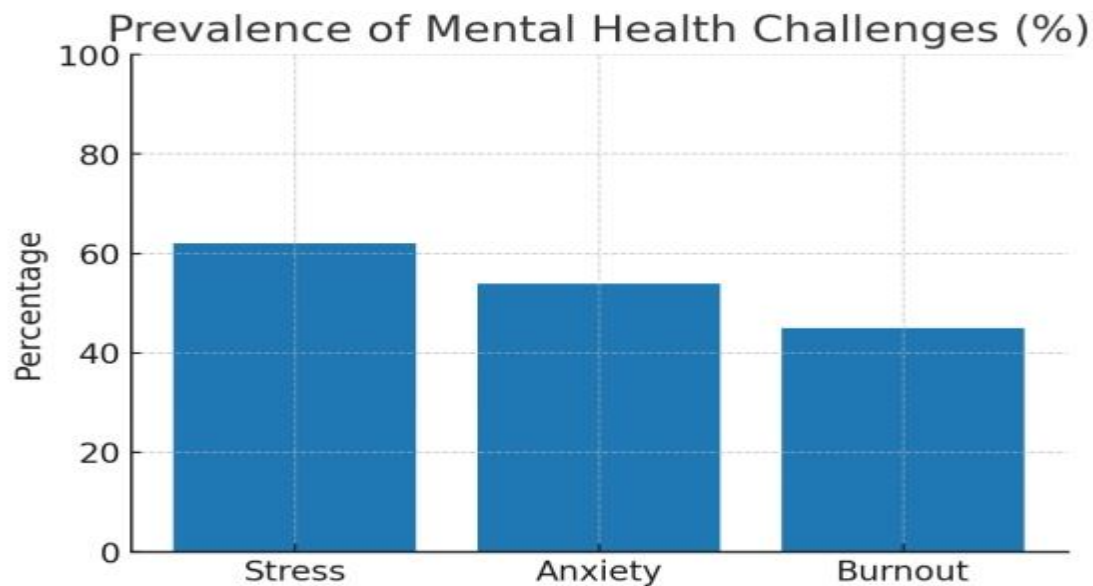
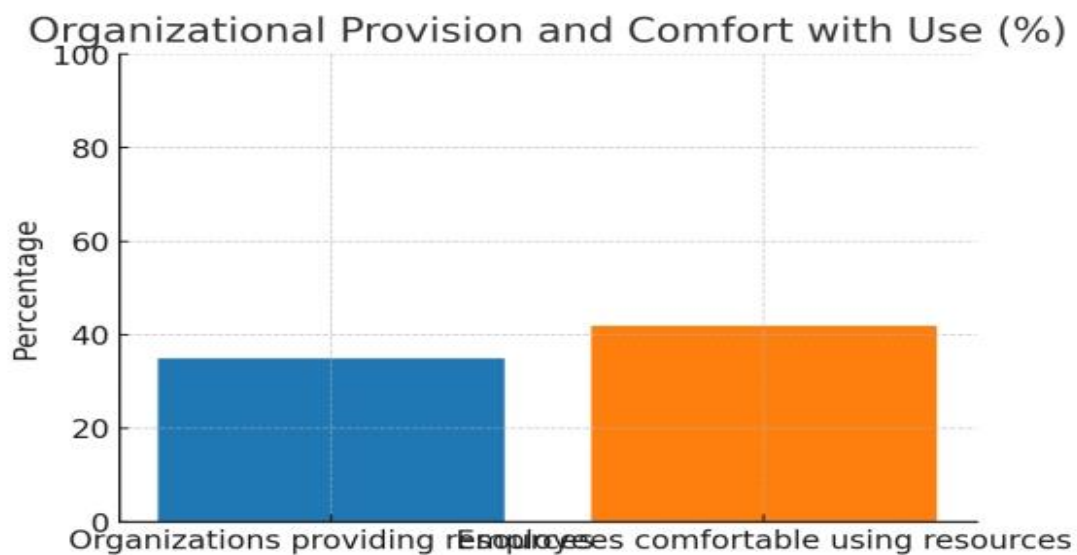
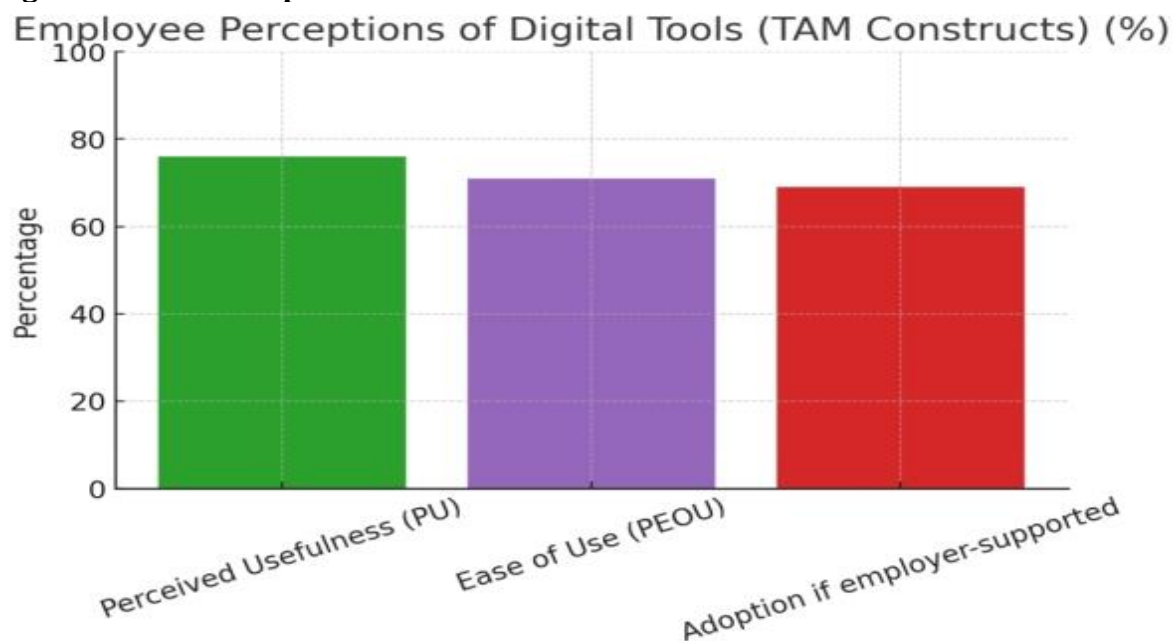
Figure 1. Prevalence of Mental Health Challenges**Figure 2. Organizational Provision and Comfort**

Figure 3. TAM Perceptions

Regression Analysis Results (n=500)

Table 3. Regression Analysis Predicting Behavioural Intention to Use Digital Workplace Mental Health Tool

Predictor	Beta (β)	Std. Error	t-value	p-value	Sig.
Perceived Usefulness (PU)	0.42	0.06	7.10	<0.001	***
Perceived Ease of Use (PEOU)	0.31	0.05	6.20	<0.001	***
Confidentiality Concerns	-0.22	0.07	-3.14	0.002	**
Organizational Endorsement	0.28	0.06	4.67	<0.001	***
Constant	1.12	0.18	6.22	<0.001	***

Model Statistics: $R^2 = 0.61$

Adjusted $R^2 = 0.59$

$F(4, 495) = 115.2, p < 0.001$

- PU ($\beta = 0.42, p < 0.001$) → Strongest positive predictor: employees are more likely to adopt tools if they perceive them as useful.
- PEOU ($\beta = 0.31, p < 0.001$) → Significant effect: ease of use strongly predicts intention.
- Confidentiality Concerns ($\beta = -0.22, p = 0.002$) → Negative predictor: fear of privacy breaches lowers intention to adopt.
- Organizational Endorsement ($\beta = 0.28, p < 0.001$) → Positive predictor: employer support boosts adoption likelihood.
- PU strongest predictor, PEOU significant, confidentiality concerns negative, endorsement positive. Multiple regression analysis conducted with Behavioural Intention to Use as the dependent variable. Results indicated that PU and PEOU significantly predict adoption, while confidentiality concerns reduced intention, and organizational endorsement enhanced it. These results are consistent with TAM and

with global workplace digital mental health adoption studies, which show perceived utility, usability, and organizational trust as key drivers, while stigma and confidentiality fears hinder uptake.

Summary

This study explored the integration of digital platforms—such as mobile mental health apps, teletherapy services, and online Employee Assistance Programmes (EAPs)—into workplace wellness initiatives across Nigerian industries. Guided by the Technology Acceptance Model (TAM) and a mixed-methods approach, the research highlighted the prevalence of mental health challenges among Nigerian employees, including stress (62%), anxiety (54%), and burnout (45%). Despite these high levels of psychological strain, only 35% of organizations provide formal mental health resources, and just 42% of employees report feeling comfortable using them due to stigma and confidentiality concerns.

Findings also reveal that employees generally perceive digital tools as useful (Perceived Usefulness) and easy to use (Perceived Ease of Use), yet adoption is hindered by cultural stigma, weak organizational policies, and limited awareness. Interviews with HR managers and employees further underscored the importance of employer endorsement, confidentiality assurances, and awareness campaigns to build trust and encourage adoption.

Discussion of Findings

This study reveals a significant mental health burden among Nigerian employees with stress (62%), anxiety (54%), and burnout (45%) widely reported coupled with limited organizational support (only 35% offering resources) and discomfort in using those that exist (42%). This finding aligns with the statement of WHO, which revealed that approximately 264 million people worldwide experience depression, (WHO, 2023) and workplace related stress which has been recognised as a significant contributor to this mental health crisis (WHO, 2023; Makinde, 2024). Digital tools including mobile apps, teletherapy, and digital EAPs present high perceived usefulness (76%) and ease of use (71%), yet adoption remains suppressed by confidentiality fears, policy gaps, and limited awareness. In a study among university students in southwestern Nigeria, only 11.7% had ever used any mental health app, despite 99.8% owning phones and 74.2% showing favorable attitudes highlighting a disconnect between capability and uptake (Ogundipe, Omotosho & John-Akinola, 2025).

Framed by TAM, the researcher's regression analysis confirms that Perceived Usefulness ($\beta = 0.42$, $p < 0.001$) and Ease of Use ($\beta = 0.31$, $p < 0.001$) are the strongest predictors of behavioral intention, while confidentiality concerns ($\beta = -0.22$, $p = 0.002$) hinder adoption, and organizational endorsement ($\beta = 0.28$, $p < 0.001$) facilitates it. This resonates with research into AI conversational agents and healthcare tech adoption, where perceived benefits and ease encourage use, but privacy and trust remain high barriers (Lee, Ramasamy & Subbarao, 2025).

Recent Nigerian workplace studies show even lower digital adoption (~23%), often due to digital illiteracy, stigma, and weak labor protections (Adias, Raimi & Raimi, 2025; Anyanwu, 2024). This underscores the researcher's qualitative findings, where HR professionals admit that mental health policies rarely extend to digital support a critical institutional oversight. Further, the concept of Psychosocial Safety Climate (PSC) workers shared belief that their psychological safety is valued by management relevant here, predicts lower stress and greater engagement when cultivated effectively. Our findings emphasize that offering digital tools must be backed by trust, clear policy support, and ethical safeguards to foster such a climate. By aligning TAM's behavioral lens with PSC's organizational and cultural dimensions, we build a robust framework that can guide sustainable integration strategies.

Conclusion

Workplace mental health is a growing concern in Nigeria, with significant implications for employee well-being, organizational productivity, and economic sustainability. The study confirms that digital platforms offer an effective, scalable, and confidential pathway for improving workplace mental health outcomes, particularly in resource-limited environments. By leveraging Nigeria's expanding mobile penetration and recent legislative advances in mental health, organizations have a unique opportunity to integrate technology into wellness strategies. The Technology Acceptance Model provides a useful framework for understanding adoption patterns: employees are more likely to embrace digital mental health solutions when they perceive them as both beneficial to performance (PU) and easy to use (PEOU). Therefore, organizational strategies must enhance these perceptions while reducing barriers such as stigma, cost, and data insecurity.

Context-Specific Recommendations for Nigeria

- I Policy Integration under the Mental Health Act (2021, signed in 2023): (FRN, 2021).
- II Embed digital mental health solutions (apps, teletherapy, EAPs) within workplace health and safety policies.
- III Align organizational policies with Nigeria's new legal framework to ensure compliance and safeguard employee rights.
- IV Employer Endorsement and Subsidies: Organizations should actively endorse and subsidize digital platforms, e.g., providing employer-paid app subscriptions or zero-rated data for teletherapy sessions.
- V Partnerships with telecom providers can lower access barriers by bundling mental health support with corporate mobile plans.
- VI Confidentiality and Trust-Building:
 - Adopt data privacy protocols and communicate them clearly to employees to mitigate fears of workplace surveillance.
 - Encourage third-party providers (e.g., licensed EAPs) to manage employee data independently, ensuring neutrality.
- VII Awareness and Anti-Stigma Campaigns:
 - Conduct regular training and workshops to normalize conversations about mental health.
 - Use storytelling by leadership and peer champions to reduce stigma and promote help-seeking behaviors.
- VIII Capacity Building for Managers:
 - Train line managers and HR professionals to identify early signs of distress, guide employees toward digital resources, and foster supportive workplace cultures.
- IX Sector-Specific Customization:
 - Healthcare sector: Prioritize teletherapy for frontline workers exposed to high emotional stress.
 - Education sector: Deploy low-bandwidth, user-friendly apps tailored for teachers managing workload and burnout.
 - Finance sector: Leverage existing financial infrastructures to integrate AI-based screening and stress management tools.
- X Continuous Evaluation and ROI Tracking:
 - Implement monitoring frameworks to assess the effectiveness of digital interventions (employee uptake, well-being outcomes, and productivity gains).
- XII Track return on investment (ROI), building the business case for long-term integration as demonstrated in global EAP evaluations.

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TEACHERS' DIGITAL COMPETENCE AND MOTIVATION AS CORRELATES OF BLENDED LEARNING APPROACH AMONG STUDENTS WITH SPECIAL NEEDS IN ABUJA

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Abstract

The emerging reality of digitalisation brought about the repositioning of the educational sector with modifications to enhance pedagogical and psychological skills. This study investigated teachers' digital competence (TGC) and teachers' motivation (TM) as correlates of the blended learning approach (BLS) among students with special needs in Abuja. The study adopted the descriptive survey research design. The population comprised of all teachers of students with special needs in the 6 Area Councils. A total sample of 200 teachers were selected using a multistage sampling technique. Four instruments (Teachers School Nominal Record (TSNR), Blended Learning Approach Scale (0.86), Teachers Digital Competence Scale (0.86), and Work Task Motivation Scale for teachers (0.89).) were developed and validated by the researcher for the collection of data. Three research questions were answered using Pearson product-moment correlation and multiple regression analysis. The findings of the study showed that the teachers' digital competence ($r=0.79$, $P < 0.05$) and teachers' motivation ($r=0.664$, $P < 0.05$) had a significant positive relationship with blended learning among students with special needs. TGC and TM accounted for 78.1 of % variance in predicting BLS. TGC ($\beta = 0.92$, $t=8.251$, $p<0.05$) indicates the most potent contributor to the prediction, followed by TM ($\beta = 0.34$, $t=5.216$, $p<0.05$). It is recommended, among other things, that teachers be provided with opportunities to enhance their digital skills for professional development, along with incentives and remuneration, to encourage them towards best educational practices in teaching students with special needs.

Keywords: *Teachers' digital competence, Teachers' motivation, Blended learning strategy, Students with special needs*

Introduction

The emerging reality of digitalisation is shaped by numerous aspects of human contingency, leading to a shift in education towards digital-based practices. This rapid global change and ethical considerations surrounding technology and artificial intelligence have necessitated urgent updates in teaching and learning methods. Consequently, both teachers and students need to adapt and adopt approaches that meet individual needs by adjusting the mode of learning to ensure access to quality education for all. Online learning is no longer a luxury within any educational setting; it has become essential. It is clear that students in the 21st century are more digitally engaged than ever before. This is evident in how students interact with digital devices such as mobile phones, iPads, and laptops more than their parents do. Significantly, this digital growth has fostered continuous learning and alignment with current trends. Traditional unlearning methods have become outdated and ineffective, whereas embracing relevant and efficient learning approaches is crucial to meeting the needs of current generations in education.

In line with this, the European Union has published the Digital Education Action Plan (2021–2027), which sets out the criteria for high-quality, inclusive, and accessible digital education for all. The plan aims to make education and training systems fit for the digital age. It presents two strategic priorities: fostering the development of a high-performing digital education ecosystem and enhancing digital skills and competencies for the digital transformation. (European Commission, 2020).

For improving learning outcomes, both traditional classroom approaches and online classroom approaches are being used together, giving birth to a new teaching learning approach named blended learning (Bashir, Amin, & Amin, 2022). The advent of Blended learning and its increasing significance are driven by advances in educational technology and changes in teaching and learning methods, especially during the pandemic. Blended learning integrates traditional and online teaching methods, leading to better learning experiences (Islam, Sarker, & Islam, 2021). Research has revealed that conventional classrooms equipped with technology have a significant impact on students' academic achievement (Rawashdeh, Mohammed, Arab, Alara, & Rawashdeh, 2021). E-learning is a popular term in the 21st century, an inevitable element of the education system, and plays a crucial role in improving the overall development of learners (Islam et al., 2021). In the last decade of the 20th century, online learning was popularised (Singh, Steele, & Singh, 2021), and in the last few years, the use of technology in education has risen significantly. (Jones, 2019).

A robust education system fundamentally depends on the calibre of its teaching workforce. Teachers are indispensable in the educational architecture of any nation and serve as the axis around which the educational mechanism turns. Adomako, (2023). Quality teaching and learning pivot on teacher effectiveness and commitment, with the success of all educational planning, development, and growth hinging upon them. For example, recent research in Nigeria found that teachers' job performance is significantly influenced by the conditions of service—such as salary, promotion, and working environment. Similarly, a 2024–25 Nigerian study highlights a strong correlation between teacher remuneration, motivation and student outcomes. Olatunji, and Afolabi, (2024). In the same vein, societal recognition of teachers as critical to both educational and economic development remains strong, even in the face of technological and structural changes. Yet despite their central role, many teachers work under inadequate conditions and receive poor remuneration—which negatively impacts educational productivity as a whole.

Many variables such as lack of internet connectivity, technical issues, workload, learners variables, teachers' socio-economic status e.t.c have been researched as influencing the involvement and participation of teachers in the teaching learning approach. (Banditrilai 2016) From the foregoing, it is unambiguously clear that blended learning has a great impact on students with special needs. However, teachers variables is a paramount construct in the effectiveness of blended learning approach. This study essentially examined teachers variables such as teachers digital competence and teachers motivation as correlates of blended learning among students with special needs in FCT Abuja.

Teachers' digital competence has become a central concern for policy, practice and research as education systems move toward blended and hybrid instruction. The COVID-19 pandemic accelerated technology adoption and exposed large variations in educators' readiness to use digital tools in pedagogically meaningful ways. Recent scholarship has focused on conceptual clarity (what digital competence means for educators), measurement (valid and reliable instruments), empirical patterns (links to teaching practice and student outcomes), and interventions (professional development and institutional supports). Teachers' digital competence refers to teachers' proficiency, mastery and practices in technology and online-related system. It is a cognitive, affective and psychomotor ability that a teacher possesses in handling online activities. Teachers' digital competency is the ability of a teacher to exhibit

(ICT) proficiency and fluency, information, media, and data literacy, creating and innovating digital research and scholarship, e-learning and professional development, communication, collaborating and participating as well as digital identity and well-being (Beetham 2015). It is an indispensable need for today's teachers to be able to train citizens to use digital technologies as tool and platform for learning in their daily lives. Teachers need to link digital-age skills or competencies to their professional practice, as the impact of the COVID-19 pandemic, which has brought a period of severe confinement, has forced the abrupt development of digital competence among active teachers. Redecker (2017) asserted that teachers' digital competence amounts to application and transfer of all their knowledge, strategies, skills and attitudes about teaching and knowledge of technologies into three areas which include, real and concrete situations of their professional praxis which translate to their professional development in accordance with the process of change that occur in society and in educational centres. Another area is implementation process of improvement and innovation in teaching in accordance with the needs of the digital age and also facilitation of students learning with the acquisition of digital competence. The most widely used conceptualization is the European DigCompEdu framework, which describes 22 educator-specific competences grouped into six areas (professional engagement; digital resources; teaching and learning; assessment; empowering learners; and facilitating learners' digital competence). DigCompEdu provides proficiency levels and a common language that have guided many studies and national initiatives. Other influential models used in the literature include TPACK (technological pedagogical content knowledge) and ISTE standards, but DigCompEdu is increasingly the reference point for teacher-focused work.

Recent research continues to emphasise the importance of these attitudes. Hatlevik et al. (2018) found that teachers' self-perception of digital competence significantly influences their integration of digital tools in teaching. Similarly, Janssen et al. (2019) highlight that educators' attitudes towards technology play a critical role in the success of digital competency development. These findings underscore the need for teacher training programs to address both the technical and attitudinal aspects of digital competence. Bentri and Hidayati (2023) emphasise that training in digital competencies must go beyond mere technical instruction, underscoring the need to reshape teachers' pedagogical practices. Aydın, (2024) reported that across systematic reviews and primary studies, a consistent pedagogical pattern emerges: higher teacher digital-competence scores (especially in pedagogical digital competence) are associated with greater readiness to adopt blended and online practices, more varied use of digital pedagogies (flipped learning, online formative assessment, collaborative digital tasks), and higher self-efficacy for technology-mediated instruction, several studies in higher education link instructor competence to perceived instructional quality and student satisfaction in blended courses.

Other studies have reinforced the need for a holistic approach to digital competency training. Redecker and Punie (2019) argue that a comprehensive digital competence framework is essential for ensuring that educators can effectively integrate digital technologies into their teaching practices. Moreover, Valtonen et al. (2020) emphasise that developing digital competencies in teacher education is crucial to meet the demands of 21st-century education. Teacher motivation can be defined as a multifaceted set of constructs, including teachers' will, desire, or drive to teach (Fives & Buehl, 2016). Hodgetts and Attman (2015) in their findings posited that, hard work and competence enhance progressive teaching and learning, however teachers who get their promotion on the bases of years of service stand not to be adequately satisfied because they are not getting the promotion based on hard work or competence. There is actually no reward for hard work, further stated that when it is time for promotion of teachers, teachers are promoted regardless of hard work.

Teachers' motivation is an important variable in the success of any educational system. It is a crucial variable in the ongoing transformation which entails the psychological fulfilment and well-being of the teacher. In the light of this, it can be viewed as energy or drive that moves people to do something by nature. Everyone begins life career with certain degree of motivation by virtue of its origin. Motivation is a powerful and continuing variable in shaping a man's career since the kind of jobs one holds can be a vehicle for par excellence for upward mobility. Parves (2015), defined motivation as the biological, emotional, social and cognitive forces that activates moves, and directs behaviour towards goals. According to Federal Republic of Nigeria (FRN) 2013, in the National Policy on Education, stated some of the goals of education shall be to produce highly motivated, conscientious and efficient classroom teachers for all level s of our educational system, and to enhance teacher's commitment to the teaching profession. However some aspect of these goals have not been fully implemented, as Ibok (2020) stated that lack of teachers' motivation has made some teachers to be ineffective while some are leaving the profession for other jobs they considered more rewarding. This has culminate in what is called teacher attrition which is the reduction of trained and qualified teachers from the school system before they get to their retirement age or before their death.

Motivation has a dual component which is the intrinsic and extrinsic motivation. Teachers' motivation refers to the internal and external factors that influence their willingness, effort, and enthusiasm to engage in teaching through both physical and digital modes. Motivation is a crucial determinant of teachers' effectiveness and innovation in a blended learning environment. Choosing a suitable learning approach is vital in the intervention for students with special needs, it has been observed in literature that blended learning in the recent times has been effective in teaching students with special needs. Through this learning approach the students have the advantage to learn using an approach that combines and integrates face to face traditional learning concurrently with online learning platform with freedom of space, time and pace unlike other learning approaches that are limited in practice. Consequently, progressive system of education depends on the quality of teachers available in the system. In spite of the prominence of a teacher in the society and in the educational system, the society has failed to beam a search light on the government for unattractive condition of service and poor remunerations of teachers which tends to affect the productivity of educational system at large (Abubakar, 2023). Hence this study examined Teachers' Digital Competence and Motivation as Correlates of Blended Learning Approach to Teaching Students with Special Needs in FCT Abuja.

Statement of Problem

Students with special needs tends to have difficulties in the acquisitions and utilization of many academic task, making them experience difficulties in various forms of learning in addition other life challenging effects like, drop out of school, lack of self-confidence and in ability to get suitable jobs. However these challenges can be managed with timely and appropriate intervention through a suitable learning approach that can suit their present needs in school, outside school and other platforms of learning. In relation to learning approaches, students with special needs are usually at disadvantage because they are less likely to benefit effectively from other learning approach especially when the approach is teacher centred. Teachers' variables such as economic status, age, gender, educational qualification, and years of experience, motivation, and professional and digital competence have emerged as some variables for the fundamental educational issues confronting successful learning approach. It is paramount to support and provide teachers with the relevant aids which will help develop the pedagogical and psychological skill for effective utilization of learning approaches. Failure to support or provide considerations to teachers lead to a devastating and detrimental result hence bring about failure in the teaching and the learning outcome.

Although other studies have identified a number of learning approaches and teachers variables that could support students with special needs, this study attempted to investigate the degree of correlation of teachers' digital competence and teachers' motivation to blended learning approach among students with special needs.

Purpose of the study

The main purpose of this study was to investigate to what extent teachers' digital competence and teachers' motivation correlate with blended learning approach among students with special needs. Specifically, this study examined:

1. The extent teachers' digital competence and teachers' motivation correlate with blended learning approach among students with special needs
2. The extent to which teachers' digital competence and motivation collectively predict blended learning approach among students with special needs in FCT.
3. The extent to which teachers' digital competence and motivation independently influence blended learning approach among students with special needs in FCT.

Research questions

The following research questions guided the study.

1. What is the relationship between teachers' digital competence and teachers' motivation to blended learning approach among students with special needs in FCT.
2. What is the composite or joint contribution of teachers' digital competence and motivation to the prediction of blended learning approach among students with special needs in FCT?
3. What is the relative contribution of teachers' digital competence and motivation on blended learning approach among among students with special needs in FCT.

Methodology

Research Design

The descriptive survey research design of correlational type was adopted for this study.

Population

The population for this study comprised about 264 secondary school teachers teaching students with any form of special needs in some selected schools in the six Area Council of Federal Capital Territory (FCT) Abuja, Nigeria.

Sample and Sampling Techniques

The sample for the study comprised two hundred secondary school teachers teaching students with special needs in some selected schools in the six area council of FCT Abuja. The researcher adopted the multistage sampling procedure for the study. The first stage involved the use of purposive sampling technique to select schools that have students with special needs across the six Area Council of FCT, Abuja. The second stage involved the use of school statutory record of teachers nominal roll for the selection of teachers of students with special needs. The total number of teachers enrolled from the selected schools were 264. The third stage was the use of random sampling technique for teacher that teach students with special needs. Only those who met the criteria of teaching student with special needs were selected. Two hundred teachers were identified to be teachers of students teaching students with special needs. This teachers formed the sample. The researcher sampled their opinions using the questionnaires.

Instrumentation for data collection

The data collection instrument for this study is in three categories, the first category is a researcher-constructed questionnaire titled Blended Learning Approach Questionnaire (BLAQ). The questionnaire consisted of two parts: part A and B. Section A collected respondents' demographic data, including age, sex, class, religion, family background, and parents' occupation. Part B was designed to elicit responses on the knowledge and practice of blended learning based on the two dimensions of blended learning, which are knowledge and practice of blended learning. It consisted of 14 items, each of which was drawn from the dimension of knowledge and practice of blended learning. The second category is the digital competence scale which is a standardized instrument designed specifically to screen individual's digital competence. The questionnaire was designed and tested by European Union (2015) It was adapted by the researcher with few necessary amendment, made in order to make it more suitable for the context and participants. The scale contained 25 items; each item was assessed on a point scale with three level used to recognize digital competence of teachers; basic, intermediate and advanced competence. Each item of the scale consisted of statements on five major key areas of digital competence which included; digital information processing, (DIP);, digital communication (DC);, digital content creation (DCC);, digital safety (DS) and digital problem solving (DPS). The teachers' digital competence scale is a flexible instrument that is easily adaptable to any cultural background without any alteration. The third category is the Work Tasks Motivation Scale for Teachers Instrument (WTMST), it was designed by Claude, Caroline, Herbert and Martin in 2008. it was validated to measure the levels of teachers' motivation towards specific work task. The researcher adapted the instrument with some modification to suit the context of the study, this instrument was validated through a pilot study.

Reliability and Validity of the Instruments

The reliability for digital competence was established by using test-retest methods (0.74). The internal consistency reliability measured using Cronbach's alpha was 0.77. The original scale is 12 item literal comprehension questions with an overall reliability coefficient of 0.82.

The test of blended learning scale was pilot tested and yielded coefficient alpha of blended learning approach yielded 0.81. The reliability of the instrument when used to screen for teachers' digital competence with reliability co-efficient of Cronbach's alpha coefficient of 0.86. A reliability coefficient of 0.84 was gotten in this work during a pilot study. The reliability for work task motivation scale for teachers was established by using test-retest methods (0.79. (Cronbach Alpha). The internal consistency reliability measured using Cronbach's alpha was 0.89.

Method of data analysis

The data collected for the study were analysed using inferential statistics of Pearson Product Moment Correlation (PPMC) and Multiple Regression Analysis (MRA). This is done because PPMC will help the study to show correlation or relationship between the independent variable (teachers' digital competence and teachers' motivation) the dependent variable (blended learning) and specifically MRA to test the joined and relative contribution of the independent variables to the dependents variable.

Results**Demographic information of the participants****Table 1**

Categories	Frequency	Percentage %
Gender of the participants		
Male	61	30.5
Female	139	69.5
Total	200	100.0
Educational qualification of the participants.		
Below NCE or Diploma	09	4.4
NCE/Diploma	54	26.6
First Degree (B Ed, BSc, HND)	99	48.8
Second Degree (Masters)	34	16.7
Above second degree (PhD)	04	2.0
Total	200	100.0
Level of participants' digital competence.		
No basic digital skills	09	4.5
Basic digital skills	79	39.5
Intermediate digital skills	97	48.5
Advance digital skills	15	7.5
Total	200	100.0

Table 1. showed that 61 of the participants were male with 30.5% while the remaining 139 of the participants were female with 69.5%. This implies that female participated more in this study.

The table above also revealed that 9 of the participants with 4.4% were in the category of those with educational qualification below NCE/Diploma, 54 of the participants with 26.6% were in the category of those with educational qualification within NCE/Diploma, 99 participants with 48.8% were in the category of those with educational qualification within first degree (BSc, B Ed, HND), 34 of the participants with 16.7% were in the category of those with

educational qualification within second degree (Masters) while 4 of the participants with 2.0 were in the category of those with educational qualification above second degree (PhD). This revealed the level of commitment to the teaching profession, also by the level of their qualification they tend to be more effective and efficient in the study. Thirdly the demographic records divulged that 9 of the participant with 4.5% has no basic digital skills, 79 of the participant with 39.5% has basic digital skill while 97 participant with 48% has intermediate digital skills while the remaining 15 of the participant has advance digital skills. This implies that greater percentage of the teachers that participated in the research has an intermediate digital skills, followed by those with basic digital skills and fewer has advanced digital skill, while much fewer has no basic digital skills.

Answering the Research Questions

Research Question 1: What is the relationship between the independent variables (teachers' digital competence and teachers' motivation) and the dependent variable (blended learning approach) to teaching students with special needs in FCT Abuja?

Table 2 : Correlation between teachers' digital competence and teachers' motivation to blended learning approach) to teaching students with special needs in FCT Abuja?

Variables	Mean	Std. Deviation	N	Df	R	P	Remark
Blended Learning Approach	35.43	11.41	200	2	-	-	-
Teachers' Digital Competence	31.79	10.30			.790*	.000	Sig.
Teachers' Motivation	31.84	10.21			.664*	.001	Sig.

* Correlation Significant at 0.05 level

Table 2 revealed that there was a relationship between the teachers' digital competence and teachers' motivation and blended learning approach to teaching students with special needs. That is, blended learning approach to teaching students with special needs has correlation with teachers' digital competence ($r=0.79$, $P < 0.05$), and teachers' motivation ($r=0.664$, $P < 0.05$). This implies that the blended learning approach to teaching students with special needs had significance positive relationship with teachers' digital competence and teachers' motivation

Research Question 2: What is the composite contribution of the Teachers' digital competence and Teachers' motivation to blended learning approach) to teaching students with special needs in FCT Abuja?

Table 3: Summary of multiple regression analysis on the joint predictive value of the teachers' digital competence and teachers' motivation and blended learning approach to teaching students with special needs.

Multiple R = .883 Multiple R² = .780 Standard error estimate = 3.066 Adjusted R² = .770							
SUMMARY REGRESSION ANOVA							
Source of variation	Df	Sum of squares	Mean square	F – ratio	P	Remark	
Regression	2	475099.516	47599.516	196.726	.000	Sig	
Residual	197	133719.131	9.459				
Total	199	608818.647					

Table 3 above showed that there was a significant composite contribution of the independent variables (teachers' digital competence and teachers' motivation) and blended learning approach to teaching students with special needs in FCT Abuja.

The Table 3 above also showed a coefficient of multiple correlation (R) of 0.883 and a multiple R Square of 0.780. This means that 78.0% (Adj. R² = 0.780) of the variance in blended learning approach to teaching students with special needs is accounted by the independent variables, when taken together. The significance of the composite contribution was tested at $p < 0.05$ using the F-ratio at the degree of freedom (df = 2/199). The Table also shows that the analysis of variance for the regression yielded a F-ratio of 196.726 (sig. at 0.05 level).

Research Question 3: What is the relative contribution of teachers' digital competence and teachers' motivation and blended learning approach to teaching students with special needs in FCT Abuja.

Table 4: Relative contribution of teachers' digital competence and teachers' motivation and blended learning approach to teaching students with special needs. (Test of Significance of the regression Coefficients)

Variable	Unstandardized Coefficients		Standardized Coefficients		
Model	(B)	Std. Error	Beta	T	Sig.
Constant	7.894	3.961	-	1.621	.44
Teachers' Digital Competence	8.11	0.140	0.92	8.251	.001
Teachers' Motivation	5.03	0.46	0.34	5.216	.000

Table 4 above revealed that there is a significant contribution of the independent variables to the dependent variable, expressed as beta weights. There is correlation coefficient, teachers' digital competence and teachers' motivation on blended learning approach to teaching students with special needs in FCT Abuja.

That is, teachers' digital competence and teachers' motivation has relationship contribution on the use of blended learning approach to teaching students with special needs in FCT Abuja. Using the standardized regression coefficient to determine the relative contribution of the independent variables, teachers' digital competence ($\beta = 0.92$, $t = 8.251$,

$p < 0.05$) indicates most potent contributor to the prediction, followed by teachers' motivation ($\beta = 0.34$, $t = 5.216$, $p < 0.05$)

Discussions of findings

The findings on Table 2 showed that teachers' digital competence and motivation have a significant statistical relationship with blended learning approach to teaching students with special needs in FCT Abuja. In another term, the result presented that a good chance of teachers' competence relates with blended learning approach to teaching students with special needs in FCT Abuja. The result may be due to the fact that teachers who have good competence in handling students with special needs, can ensure success in the learning approach like blended learning. This could also be because greater percentage of the teachers that participated in the research has intermediate digital skills (48.5%), basic digital skills (39.5%) and advanced digital skills (7.5%), this shows the relevance and significance of blended learning approach to modern-day teaching. This findings agrees with Juhri (2020), who asserted that teachers' competence has a significant role in the teaching and learning process of students with special needs. Also, From the demographic information, only 4.4% of the teachers that participated in the research had educational qualification below the NCE or Diploma, while 48.8% are first degree holders, 26.6% are NCE/Diploma holders, 16.7% are second degree holders and 2.0% are above second degree holders. This can be deduced that teachers must have had an internal and external drive to acquire educational qualification which in turn enhance the teaching and learning. On account of the findings, the result shows teachers' motivation to be a good combination with blended learning. This could to attributed to the fact that an improvement in motivation leads to improvements in performance. Similarly, the finding corroborates Mohammed (2019), who identified the factors responsible for motivating instructors at higher education institute HEI to integrate the BL approach into their courses. The findings confirmed that, the consideration of both extrinsic and intrinsic factors for motivating the application of blended learning has a 79% impact on the adoption of BL.

The findings on table 3 showed that teachers' digital competence and teachers' motivation significantly contributed jointly to blended learning approach to teaching students with special needs in FCT Abuja. The significant joint contribution suggests that digital competence and motivation together explain a meaningful portion of variation in blended-learning uptake. This finding is consistent with recent systematic reviews and empirical work of Gómez-Trigueros, Ruiz-Bañuls, Esteve-Faubel, & Mareque León, (2024) whose findings stated that technical skill and affective drivers (motivation, perceived usefulness, self-efficacy) interact to determine whether technology becomes embedded into practice. Where both competence and motivation are present, teachers not only know how to use tools but also have the willingness to invest the time and adapt instruction producing a multiplicative effect on blended-learning implementation.

The findings on Table 4 showed that teachers' digital competence and teachers' motivation significantly contributed relatively to blended learning approach to teaching students with special needs in FCT Abuja. The relative contribution of teachers' digital competence indicated the most potent contributor to the prediction followed by teachers' motivation. That is, digital competence had the larger standardized effect on blended-learning practice, while motivation remained a significant but smaller predictor. This could be inferred that teachers' professional competence is more potent to teachers' psychological state in blended learning approach for teaching students with special needs. In addition, The relative-importance analysis (unique predictor effects) showed that Two interpretations are plausible and supported in the literature:

1. Practical barrier interpretation which may indicate that in low-resource settings teachers may want to use blended learning but lack the concrete skills or knowledge to do so, so

- competence acts as the gating factor. Empirical Nigerian studies highlight infrastructure and skills gaps as major constraints to digital adoption. *Journals of Continuing Education*+1
2. Motivational floor interpretation implies that motivation matters, but without minimum competence the motivation cannot translate into effective practice; competence therefore shows a larger direct effect in statistical models.

This pattern suggests sequencing: first ensure minimum digital competence (and tools), then implement motivational supports (recognition, time allocation, incentives, and community of practice). ScienceDirect

Conclusion

The findings of this study have revealed that teachers' digital competence and teachers' motivation are critical determinants of the successful implementation of the blended learning approach among students with special needs in the Federal Capital Territory (FCT). The results indicated a significant positive relationship between digital competence and blended learning, suggesting that teachers who possess higher levels of digital literacy, pedagogical application skills, and confidence in technology use are more likely to integrate digital tools effectively into instructional delivery. Similarly, teacher motivation—both intrinsic and extrinsic—was found to enhance willingness and persistence in adopting technology-supported teaching methods that accommodate the diverse learning needs of special education pupils.

Furthermore, the study established that digital competence and motivation jointly make a significant composite contribution to the prediction of teachers' use of the blended learning approach. This implies that competence and motivation are complementary factors—where competence provides the technical capacity and motivation supplies the psychological drive needed for effective technology integration in inclusive classrooms. However, the relative contribution analysis showed that digital competence exerts a stronger influence than motivation, indicating that while enthusiasm and willingness are important, teachers must possess the necessary digital skills and pedagogical understanding to apply technology meaningfully.

The implication of these findings is that blended learning for pupils with special needs cannot thrive without deliberate investment in teachers' professional development that emphasizes both technological and pedagogical dimensions of digital competence. Continuous capacity building, school-level support, and policy frameworks that promote motivation—through incentives, recognition, and adequate infrastructure—are essential for sustaining teachers' engagement with blended learning practices.

Recommendations

1. It is recommended that the Education Secretariat and other education stakeholders organize continuous professional development programmes through regular training and capacity-building workshops focusing on digital pedagogy, assistive technologies, and inclusive digital education practices to strengthen teachers' digital competence.
2. It is also recommended that school administrators introduce motivational enhancement strategies such as incentive programmes, including recognition awards, promotion opportunities, mentorship schemes, and workload support, in order to sustain teachers' enthusiasm and commitment toward adopting blended learning strategies.
3. Furthermore, government and private partners should invest in digital infrastructure and resource provision, such as stable electricity, affordable internet connectivity, interactive learning platforms, and accessible digital devices, to support teachers' competence and motivation in implementing blended learning effectively.

4. Policymakers are encouraged to incorporate digital competence frameworks, such as the European DigCompEdu Framework, into teacher training curricula, evaluation systems, and recruitment standards to ensure systematic digital readiness among educators.
5. In addition, the blended learning approach should be actively promoted in schools, as it streamlines the learning process and enables learners to benefit from multiple learning channels and media formats that cater to diverse learning styles.
6. Finally, future studies should adopt longitudinal or experimental research designs to establish causal relationships between teachers' digital competence, motivation, and student learning outcomes in special education, while also examining the moderating effects of infrastructural availability and administrative support.

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SCHOOL LEADERSHIP AND SUSTAINABLE TEACHING PRACTICES IN PUBLIC SENIOR SECONDARY SCHOOLS IN ABUJA

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Abstract

This study has explored school leadership and sustainable teaching practices in public senior secondary schools in Abuja. The research design adopted was descriptive and a sample population of 392 was selected based on a population of 4,240 educators using a stratified random sampling method. The structured questionnaire was used to collect data, which was verified by experts and tested to determine the reliability level using Cronbach's alpha. Descriptive and inferential statistics were used for data analysis at a 0.05 level of significance. The results showed that school leadership is significantly positively correlated to sustainable teaching practices ($r = 0.61$, $p < 0.05$), which implies that effective leadership is linked with the enhancement of sustainable teaching practices. The study also revealed that the instructional support, collaboration, and professional development as leadership practices contribute to the capacity of teachers to implement innovative and learner-centered practices in the face of difficulties like resource shortages and changes in policies and regulations. The findings led to the conclusion of the study that school leadership is a key factor in maintaining effective teaching practices. It was suggested that school administrators should increase the instructional oversight, foster ongoing teacher growth, and make certain that sufficient resources are made available to sustain teaching.

Keywords: School Leadership, Leadership Styles, Sustainable Teaching, Teaching Practices.

Introduction

Leadership is an important part of accomplishing the educational objectives towards national development and sustainable growth. The quality of education is one of the essential elements of national development, and to some extent, the sustainability of teaching practices in schools is the quality of leadership (Adeleke and Bamidele, 2023; Okon and Musa, 2022). Abuja public secondary schools at senior secondary level find it difficult to sustain the high quality teaching practices. It is reported that there is a lack of consistency in teaching, lack of innovation in teaching, inadequate teacher development programs and a general decrease in education results. The topic of school leadership in the Federal Capital Territory (FCT) of Abuja, Nigeria, has become relevant due to the increasing demand to have quality education and increased accountability and the necessity to embrace principles of sustainable development in teaching and learning (Bello and Adamu, 2024). The leaders of schools, in particular principals and department heads, play a key role in the administration of the school environment, teacher morale, high-quality teaching, and the student outcomes (Eze & Ekwueme, 2022; Bello and Adamu, 2024). Studies have shown a strong school leadership creates an ethos of lifelong learning, promotes professional learning communities, and results in the establishment of new practices that can sustain the current and future needs of education (Onyema & Ibrahim, 2023). Still on the above, the sustainable teaching practices are strategies concerned with academic achievement, inclusive, environmental, socially responsible and

adaptable to changing educational goals (Ibrahim and Yusuf, 2022; Chinedu et al., 2023). The practices play a vital role in helping education to be consistent with global sustainable development goals (SDGs), especially Goal 4, which prioritizes inclusive and equitable quality education and lifelong learning opportunities to all (UNESCO, 2023). The Abuja public secondary schools have many challenges which are likely to impede the successful implementation of sustainable teaching practices in the schools. These include insufficient instructional materials, inadequate training of teachers in the area of sustainable pedagogies, classroom overcrowding, and the absence of the implementation of environmental and socially responsive material into the curriculum (Adejoh and Okeke, 2022; Musa and Ibrahim, 2024). In addition, institutional support and the unequal distribution of policies also restrain the ability of teachers to adopt and keep innovative and inclusive teaching practices. These problems render it hard to realize long-term, flexible and student-centered learning results in the FCT. This study seeks to fill in this gap by looking at how school leadership has impacted on sustainable teaching in the public senior secondary schools in Abuja. It strives to provide evidence based policy and practice recommendations.

Although there have been numerous reforms to enhance the education system in Nigeria, there are a number of challenges which remain in the way of effective and sustainable practices in teaching in the public secondary schools. All these difficulties are directly connected with the sphere of school leadership which is instrumental in helping to provide sufficient teaching practice by means of appropriate teacher supervision, instructional support, and ongoing professional growth of the teachers. At the local Abuja level, local realities like poor funding, crowding of classes, shortage of teaching materials, inconsistency in policy, and socio-economic differences among pupils have a strong influence on the adoption of sustainable teaching practices. Good school leadership is not only necessary in ensuring administrative efficiency but also to provide enabling environment in which innovative, inclusive, and sustainable teaching practices can succeed. Nevertheless, there is still a research gap in the empirical studies of the specific effects of leadership on the teaching practice in these contextual realities of the FCT. This research aims to fill this gap by discussing the role of school leadership in facilitating and maintaining effective teaching practices in Abuja public senior secondary schools.

Literature Review

Sustainable teaching practices are long term plans that incorporate ecology, equity, well-being, and life long education in teaching. They are not limited to the individual lessons, but they are designed to equip students and teachers to address global issues, such as climate change, inequality, and technological disruption (UNESCO, 2020; Sterling, 2021). Sustainable teaching practices are in line with the United Nations Sustainable Development Goal 4 (Quality Education) which focuses on inclusive and equitable quality education and lifelong learning opportunities to all. Sustainable teaching in this context entails incorporating elements of environmental and social responsibility in the classroom teaching in a bid to make students more aware and critical thinkers. Teachers achieve this by adopting learner-centered approaches such as problem-solving activities, project-based learning, and context-based instruction that relate academic content to real-life sustainability issues (Shields, 2019). These activities assist the students in building not only the academic but also the values and skills required to be responsible citizens and to achieve sustainable development.

Adaptive, inclusive and learner-centered teaching and learning strategies are used in sustainable instruction in the public secondary schools, which improve the long term learning, creativity and critical thinking of the students. In the Abuja context, the success of such practices is highly dependent on the role of school leadership in assisting in the implementation of these practices through supervision, resources allocation, and capacity development of

teachers. Formative assessment, collaborative learning, and context-based instruction are some of the techniques that can enhance student engagement, but they are frequently not used consistently due to a lack of training and instructional support (Fischer et al., 2020; Wals et al., 2019).

Moreover, culturally responsive teaching is an aspect of sustainable teaching that encourages inclusion and equity in diverse classrooms. Due to diverse socio-cultural and economic backgrounds of the students in Abuja secondary schools, the teachers are supposed to adjust to the needs of these students. Nevertheless, when the number of students in classes is large and the resources assigned to the teaching process are scarce, the efficient application of such inclusive practices is frequently hindered.

Moreover, the sustainability of teaching practices is influenced by aspects of teaching that are associated with the teacher, including workload, stress, and inadequate professional development. High student-teacher ratios and lack of institutional support are problems that can adversely affect the well-being of teachers and decrease their capacity to use innovative, student-focused teaching practices in the FCT consistently (Roeser et al., 2022; Skaalvik and Skaalvik, 2020).

Sustainable teaching also requires curriculum integration whereby learning is made relevant to real life experiences of students. But in most state-owned secondary schools in Abuja, teachers are not flexible in introducing sustainability related content in their lessons due to rigid curricula and examination-oriented systems.

Although sustainable teaching practices have the potential promise of benefiting the Abuja public secondary schools, they are marred by a number of challenges. Such barriers are poor funding, unavailability of instructional resources, poor teacher training and implementation of poor policies. These limitations render the efficient use and maintenance of innovative, inclusive, and context-responsive teaching practices by the teachers hard.

Leadership in schools plays a crucial role in enhancing the success of teaching practices and their sustainability in government secondary schools. Instructional leaders are essential in promoting sustainable teaching practices through proper provision of instructional resources, classroom supervision and ongoing professional growth of teachers. Effective leadership in the context of the Abuja public secondary schools entails the provision of an enabling environment that promotes the application of inclusive, learner centred and context responsive teaching methods. Nonetheless, there is scant empirical data regarding the process through which school leadership can contribute to sustainable teaching practices in the FCT, which indicates a knowledge gap that the research aims to fill.

This research study is founded on:

Initially developed by Burns (1978), transformational leadership theory has undergone numerous developments. It is concerned with leaders who inspire and encourage others to exceed expectations by having a shared vision, personal development and organizational change. The recent studies (e.g., Northouse, 2022) have expanded the concept of transformational leadership to include digital leadership, ethical concerns, and sustainable development goals (SDGs). This era has also highlighted application of transformational leadership in the education sectors to enhance school growth and encourage the sustainable teaching methods.

Assumptions of Transformational Leadership

Transformational leadership will be applicable in this study since it gives a framework of how school leaders can impact the adoption and sustainability of teaching practice in the public secondary schools. This leadership practice focuses on vision building, motivation of teachers, and continuous professional growth, without which it is difficult to foster sustainable

teaching practices (Bass and Avolio, 2023; Leithwood and Sun, 2023). Transformational leaders can help teachers in the situation of Abuja where schools have problems of limited resources, inconsistent policies, and teacher overload since it is possible to assist teachers on an individual basis and build capacity (Yukl, 2023).

Moreover, transformational leadership encourages cooperation, innovation and dedication among teachers which are essential in adopting inclusive and learner-focused teaching practices. Leaders can do this by providing a supportive school environment to help teachers to implement sustainable teaching practices to improve the student learning outcomes (Northouse, 2022). Thus, the research study will use transformational leadership because it can help to explore the concept of school leadership in terms of how it can support and maintain effective teaching practices in the Abuja public senior secondary schools.

Studies indicate that transformational school leaders directly influence sustainable teaching. Transformational school leaders encourage teachers to introspect their teaching practices and keep upgrading their teaching approaches to foster sustainable teaching practices (UNESCO, 2023).. They also lead schools towards the application of national policies of education in a manner that facilitates uniform and efficient classroom practices (Obi & Ibrahim, 2022). Besides this, transformational leaders are useful in mobilizing and managing resources that help in the provision of inclusive, learner-centered, and sustainable teaching strategies. In Abuja, transformational leadership has been linked to better teacher dedication and innovative and inclusive instructional methods that have produced better student learning outcomes (Bass and Avolio, 2023; Leithwood and Sun, 2023).

Methodology

The research design followed in this study is descriptive research design as it allows the researcher to use systematic methods to gather data on a large population to describe the current state of affairs and investigate the connection between school leadership and sustainable teaching practices in Abuja, Nigeria, in the senior secondary schools. The design is suitable because it will enable the researcher to study the perceptions and experiences of teachers without manipulating any of the variables thus giving a realistic picture of the effect of leadership practices on sustainable teaching within the study area. This design is appropriate as it enables gathering data of a representative sample to explain the current state of things and correlations regarding the variables of the research. The target population is principals and teachers in the public senior secondary schools in the Federal Capital Territory (FCT) of Abuja. In this research, the research design to be adopted is the descriptive research design which will be used to explore the relationship between school leadership and sustainable teaching practice in Abuja Nigeria public senior secondary schools.

The study population will be a sample of 4,240 teachers in the public senior secondary schools within Abuja in both teaching and administrative staff. The administrative staff, especially the school principals and vice-principals are not left out since they are the main people in leadership in schools, which directly affects the adoption of sustainable teaching practices.

The sample size of 392 respondents is calculated with the help of a proper formula of sample size determination (e.g., Taro Yamane). The sample will be composed of teachers and the selected school principals because the principals are directly engaged in school leadership practices. Stratified random sampling method is used to achieve sufficient representation using relevant strata which may include gender, teaching experience, and subject specialization. A structured questionnaire, which will be developed by the researcher, will be used to collect the data. There are three parts of the instrument: Section A is devoted to demographic data, Section B deals with school leadership practices, and Section C deals with sustainable teaching practices.

In order to achieve content validity, the instrument will be tested on experts in the fields of educational management and research methodology. To determine the reliability of the instrument, a pilot study will be carried out on a sample of teachers out of the study area. The internal consistency of the instrument will be established by using Cronbach alpha coefficient. Both descriptive and inferential statistics will be used in analyzing the data collected. The research questions will be answered using descriptive statistics, including the frequency counts, percentages, mean and standard deviation. The hypotheses will be tested at a level of significance of 0.05 to test the hypotheses using inferential statistics such as chi-square with the help of proper statistical software.

Findings and Discussions

Data Analysis and Results

Hypothesis One

There is no significant relationship between school leadership and sustainable teaching practices in public senior secondary schools in Abuja.

Table 1: Pearson Correlation Analysis Showing Relationship Between School Leadership and Sustainable Teaching Practices

Variables	N	Mean	SD	r	p-value	Decision
School Leadership	392	64	15	0.61	0.000	Reject Ho
Sustainable Teaching Practices	392	—	—	—	—	Significant

The outcome shows that school leadership has a moderate positive correlation with sustainable teaching practices ($r = 0.61$, $p < 0.05$) in Abuja in public senior secondary schools. This means that the leadership of schools has been linked to improved application of sustainable teaching practices. Thus the null hypothesis is rejected.

Discussion of Findings

This study finding indicates that there is a strong correlation between the leadership of the school and sustainable teaching practice. This can be explained by the fact that school leaders contribute to the provision of enabling environment which facilitates effective teaching. School leadership in Abuja public secondary schools, where issues of finite resources and inconsistency in policies are paramount, can play a significant role to offer leadership in terms of mentoring teachers, offering instructional support, and promoting innovative and inclusive teaching practices.

The observation aligns with the article by Bello and Adamu (2024), which demonstrated that leadership in schools is an effective means of improving the sustainability of teaching in Abuja schools. On the same note, Ibrahim and Yusuf (2023) found that transformational leadership is associated with a positive aspect on the capability of teachers to engage in sustainable teaching in senior secondary schools. Furthermore, Ekwueme and Bello (2024) pointed out that leadership is very important in the maintenance of educational practices due to support, supervision, and capacity building.

Moreover, Chinedu, Ibrahim, and Musa (2023) emphasized that sustainable teaching in Nigerian schools could be better accomplished when teachers are properly supported by institutions and leaders. This aligns with the existing conclusion that leadership is intimately connected to classroom practices.

But this observation might not be similar to situations in which leadership is not enough to lead to teaching improvement. According to Fullan (2005), educational change cannot be sustained

without a leadership but also a systematic support in terms of policy alignment and sufficient resources.

This study also conforms to Transformational Leadership Theory (Burns, 1978; Bass and Avolio, 1994) that focuses on the idea that leaders inspire and encourage teachers to enhance their practices. This implies that transformational leadership will be especially applicable in fostering sustainable teaching in Abuja public secondary schools.

Conclusion

This study explored school leadership and sustainable teaching practices in public senior secondary schools in Abuja. The study findings have clearly indicated that effective leadership at schools contributes greatly to the development and maintenance of effective teaching practices. In particular, it was observed that supportive, inclusive, and transformational leadership styles increased the ability of teachers to adopt sustainable teaching practices that include learner-centered instruction, an ongoing professional growth, and innovative classroom strategies.

Another finding of the study was that, sustainable teaching practices are better implemented when the leaders offer sufficient support, promote collaboration, and offer enabling environment where teachers can improve instruction. Although the research was characterized by limited resources, poor policies, and lack of training opportunities, the impact of these issues was alleviated by effective leadership that enabled the teaching practices to improve in the long run.

Thus, to the general aim of the study it can be concluded that school leadership plays a crucial role in ensuring that effective teaching practices are adopted and sustained in the public senior secondary schools in Abuja. Enhancement of leadership capacity therefore plays a vital role in enhancing the quality of teaching and sustainability in the educational results.

Recommendations

According to the results of this work, it can be recommended:

1. The study has indicated that school leaders should enhance the instructional support by supervising teachers and offering them guidance since the specified leadership factor has a strong impact on the adoption of sustainable teaching methods.
2. Teachers should be arranged on professional development programmes so as to increase their ability to embrace sustainable teaching methods as the results revealed that teacher performance increases when leaders of schools support them.
3. The school administrators (principals and vice-principals) should embrace leadership practices that embrace collaboration and innovation because the study revealed that supportive leadership practices enhance improved teaching practices.
4. Ensuring that sufficient resources and teaching materials are made available to schools by government and educational authorities since resource constraints were found to be one of the main challenges posed by the need to achieve sustainable teaching practices.
5. The teaching practices policies should be applied regularly and observed to ensure the school leaders maintain effective teaching practices since the inconsistency of the policies has been cited as a restrictive factor.
6. School Leaders must establish enabling conditions that lessen the workload and stress on teachers because this will increase the capacity of the teachers to ensure that they always use sustainable instructional methods.

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ASEI-PDSI AND ITS EFFECT ON MATHEMATICS INTEREST AND ACHIEVEMENT AMONG JUNIOR SECONDARY SCHOOL STUDENTS IN GWAGWALADA FCT, ABUJA

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Abstract

The study examined how students' interest in and performance in mathematics at the Gwagwalada Area Council FCT, Abuja, were affected by the ASEI-PDSI lesson plan. To direct the investigation, two research questions were posed. In a quasi-experimental design, pre-test, post-test, and non-equivalent control groups were employed. There were 7974 JSS II Mathematics students in Gwagwalada Area Council during the 2024–2025 academic year. A sample of 90 students and 45 students were selected from the two public secondary schools in the Zuba Zone using simple random selection procedures. for the control group and the experimental group, respectively. The ASEI-PDSI students' mathematics achievement exam (ASEI-PDSI SMAT) and mathematics interest scale (ASEI-PDSISMIS) were used to collect data. ASEI-PDSISMIS and ASEI-PDSI SMAT were shown to have logical validity indices of 0.77 and 0.76, respectively. ASEI-PDSISMIS and ASEI-PDSIMAT have reliability values of 0.95 and 0.88, respectively. Reliability was established using the Cronbatch Alpha method for interest inventory and test-retest for the achievement (ASEI-PDSI SMAT). The research issues were addressed using descriptive statistics of mean and standard deviation, and the hypotheses were tested at the 0.05 level of significance using analysis of covariance. According to the results, students who were taught using the ASEI-PDSI lesson style performed better and showed more interest than those who were taught using conventional methods. In order to increase academic interest and accomplishment in mathematics, the study recommends that junior secondary mathematics education, especially in Gwagwalada, FCT, adopt the ASEI-PDSI lesson model.

Keywords: ASEI-PDSI lesson approach, Mathematics interest, Achievement scores.

1.1 Introduction

One of the scientific disciplines that forms the foundation for economic and technological advancement is mathematics. These days, a country cannot develop and become economically independent without using the information found in science, technology, and mathematics as a foundation. This is because it is used by all academic fields to solve problems and predict outcomes. According to Kele (2018), mastery of various techniques for teaching and learning mathematics is essential for both individual and national success, particularly in home and commercial endeavors. Furthermore, scientific and technological developments that improve problem solving in a variety of real-world situations. According to Sa'ad, Adamu, and Sadiq (2014), understanding of mathematics is essential for both human life and education. This is due to the fact that it has varying degrees of impact on every facet of human endeavors (Enu, Agyman & Nkum, 2015).

Humanity has benefited much from mathematics as a discipline. It is an essential tool for understanding business, science, and technology. It is often known that the foundation of science and technology is mathematics (Okeke, 2019). According to the National Council of Teachers of Mathematics (2015), mathematics teaches students how to make rational judgments, analyze and interpret facts, and see patterns and structures in the environment. This is a major motivator in the majority of academic subjects taught in schools, ranging from fundamental to advanced engineering, medical, financial, and technological information. Despite mathematics' importance for innovation and global competitiveness. However, there is a big disconnect between the actual results seen in classrooms across the globe and the potential advantages of mathematics education (Boaler, 2016).

Students' lack of interest in mathematics is one of the major issues facing mathematics education. Motivation, engagement, and eventually performance are all influenced by interest (Renninger & Hidi, 2016). Students consider mathematics as challenging and unrelated to their daily lives, according to evidence obtained from the reviewed literature (Attard, 2016). This belief may lead to a vicious cycle of disengagement in which students' disinterest causes them to put up less effort, perform worse, and become even more disinterested.

This low interest is caused by a number of variables. First of all, pupils may become hostile to instructional strategies that prioritize rote memory over conceptual comprehension (Boaler, 2016). Students find it difficult to discover relevance in their studies when they are unable to see how mathematics is used in real-world situations. Second, worry and a fear of failing might result from testing procedures and improper use of evaluation, which further reduces interest (Ashcraft & Krause, 2017). Lastly, students are discouraged from making the required effort to improve their skills by cultural preconceptions, such as the idea that mathematics aptitude is an inherent talent rather than a skill that can be developed (Dweck, 2015).

Students' interest in mathematics has been defined in a number of ways. Some see it as a catalyst for developing consciousness in stimulating attention and feelings toward a specific subject or object, which can be either pleasant or painful and direct focus; others see it as the pleasurable or painful aspect of the attention process, which is synonymous with attention itself (Mohammed, 2018). Mohammed goes on to explain that interest entails using the sense organs in a way that aids in focusing attention on a person, an activity, and other interactions that are connected to students' mathematical knowledge and abilities. According to Dangpe (2016), curiosity is a subjective emotion that focuses on pupils' mathematical success.

Furthermore, pupils' low performance in mathematics might occasionally be attributed to the degree of interactions between professors and students. This is due to the fact that educators who lack in-depth subject knowledge or pedagogical expertise may find it difficult to properly explain concepts or employ teaching strategies that are suitable for a varied student body (Ball et al., 2018). Additionally, it can be difficult for teachers to offer individualized support due to large class sizes and limited teaching time. Anxiety related to mathematics is another important element that affects performance. According to studies, math anxiety might harm students' usable memory, which is crucial for using mathematical knowledge to solve issues in everyday life. Krause and Ashcraft (2017).

This leads to a vicious cycle in which underperforming pupils experience increased anxiety, which further impairs their capacity to learn. Another aspect influencing students' motivation and improving their mathematical performance is their socioeconomic level (SES). The reason behind this is because students from lower socioeconomic backgrounds frequently do not have access to resources that are essential for the development of mathematics skills, such as technology, textbooks, and extracurricular learning opportunities (Reardon, 2016). Furthermore, because of their own inadequate education or time constraints, parents in low-SES homes can be less able to assist their children's learning. Students' interest in and performance in mathematics can also be impacted by cultural beliefs. Some cultures place a

great importance on mathematics and urge their pupils to do well in it. Others might not place as much attention on the topic, which would result in lesser performance and expectations. Innovative teaching strategies have been developed to address these issues and make mathematics more interesting and approachable. Among these, the ASEI-PDSI technique has become well-known, especially in nations like Kenya where it was incorporated with the intention of enhancing secondary school students' acquisition of science and math (Ongowo & Hongo, 2020). An educational framework that emphasizes contextual learning, active engagement, and iterative development is the ASEI-PDSI model.

By focusing on four pillars—activity, student-centered learning, experimentation, and improvisation—this method, which was developed as part of the SMASSE project, aims to revolutionize traditional education. Planning, Doing, Seeing, and Improving (PDSI) is a cycle that operationalizes these ideas (Juma & Mukiri, 2019). ASEI-PDSI creates an atmosphere that supports meaningful learning by encouraging teachers to create interactive courses, make use of locally accessible resources, and assess their teaching methods. Engagement and success are predicted by students' enthusiasm in mathematics.

In line with constructivist theories that highlight the importance of active participation in knowledge building, the ASEI component of the model places a high priority on experiential learning (Vygotsky, as cited in Juma & Mukiri, 2019). According to studies, including group projects, practical experiments, and real-world applications boosts students' enthusiasm and interest (Muchiri, 2016).

The ASEI-PDSI framework has a number of significant benefits. It makes mathematics more interesting and approachable by encouraging students to participate actively in their education through activities, experimentation, and improvisation. While the "Do" phase encourages practical applications and hands-on experiences, the planning phase guarantees that teachings are well-structured. The "See" phase encourages introspection and assessment, enabling pupils to gauge their comprehension and pinpoint areas in need of development. Lastly, the "Improve" phase places a strong emphasis on iterative refinement, guaranteeing that student outcomes and instructional methodologies are always improved. Students' entrance to higher education is restricted by their lack of interest in and performance in mathematics, particularly in the fields of science, technology, engineering, and mathematics. Additionally, it makes them less competitive in the labor market, where mathematical skills are becoming more and more important. More broadly, poor math performance is detrimental to national development because it makes it more difficult for nations to generate skilled labor forces that can drive economic expansion and innovation.

Thus, the current study attempts to investigate how the ASEI-PDSI method affects students' interest in and performance in mathematics in junior secondary schools in Gwagwalada, FCT, Abuja. Constructivist learning theory, especially Vygotsky's sociocultural perspective, which emphasizes that students build knowledge through active engagement, social interaction, and guided problem-solving within relevant contexts, is the foundation of the ASEI-PDSI approach (Juma & Mukiri, 2019).

Student-centeredness (S) and improvisation (I) encourage ownership of learning, while Activity (A) and Experimentation (E) components directly stimulate cognitive engagement. These elements are all consistent with activity-based learning theory and its focus on learning by doing (Dangpe, 2016). In light of this theoretical framework, the current study investigates whether intentional implementation of ASEI-PDSI principles can considerably increase students' attention and improve their performance in Nigerian junior secondary schools, where traditional approaches continue to be predominant.

1.2 Purpose of the study

1. To determine mean interest rating scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja

2. To determine mean Achievement scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja

1.3 Research question

The following research question were raised to guide the investigation;

1. what are the mean interest rating scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja?
2. what are the mean achievement scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja?

1.4 Hypotheses

1. There is no significant difference in the mean interest rating scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja
2. There is no significant difference in the mean Achievement scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja

1.5 Methodology

The study used a quasi-experimental design with pre-test, post-test, and non-equivalent control groups. 7,974 JSS II Mathematics students from Gwagwalada Area Council during the 2024–2025 academic year made up the study's population. The study used a sample size of 90 respondents and two (2) public junior secondary schools with intact classrooms. Using basic random selection techniques by lucky dip, the two schools were chosen at random from the Gwagwalada Area Council's Zuba zone. Each school had one intact JSS II class chosen, and schools were assigned to experimental and control conditions using a lucky dip method. Thus, the experimental and control groups consisted of 45 pupils from each entire class at two (2) public junior secondary schools. For eight (8) weeks, the experimental group received instruction in mathematics utilizing the ASEI-PDSI lesson approach. This instruction covered topics such as Basic Operations with Algebraic Expressions and Simple Equations, totaling twenty-four sessions.

Before the intervention, the teachers in the experimental group attended a two-day orientation training on the ASEI-PDSI framework. Weekly observation checklists were used to track how the lessons were being implemented. Students in the control group received instruction using conventional methods and were not exposed to ASEI-PDSI techniques. Throughout the study period, each group was taught by the same group of math teachers. The Faculty of Education at Nasarawa State University, Keffi, and the FCT Universal Basic Education Board provided ethical clearance. In addition to giving their consent and being fully informed of the study's objectives, parents, guardians, and students were also given coded identities to guarantee participant confidentiality. All 90 data sets were used in the analysis, and all 45 students in each group who took the pretest also finished the post-test. There was no attrition during the study period. The ASEI-PDSI has twenty-five (25) pieces. The Likert-type rating scale used in the mathematics interest inventory (ASEI-PDSISMIS) was used to rate each responder independently depending on their responses.

Strongly Agree (SA): 4, Agree: 3, Disagree: 2, and Strongly Disagree: 1. The 25 multiple-choice questions of the ASEI-PDSI Student Mathematics Achievement Test (ASEI-PDSISMAT) have four possible answers (A–D), three distractors, and one key. A table of specifications and the test-retest procedure were used to verify internal consistency and content validity for the ASEI-PDSISMAT. The Cronbatch Alpha technique, which produced an index value of 0.95, was also used to establish reliability.

The correlation index approach was used to examine the multiple-choice test, yielding a coefficient of stability of 0.88. Descriptive statistics of mean and standard deviation were used to analyze the collected data in order to address the study issues. The hypotheses were tested using the Analysis of Covariance (ANCOVA) at a significance level of 0.05. The homogeneity of regression slopes was used to confirm the ANCOVA assumption prior to testing the hypotheses. (group $\times$ pre-test interaction) was examined and found to be satisfactory ($p > 0.05$). The homogeneity of error variance is verified using Levene's test. Additionally, the study's effective use of ANCOVA was supported by the residuals' approaching normality.

Result Presentation

Research Question 1; what are the mean interest rating scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja?

; Mean and standard deviation of students' interest rating scores in the experimental and control group

Group		Pre-test	Post-test
Experimental Group	Mean	35.1556	72.5778
	N	45	45
	Std. Deviation	6.55382	13.11226
Control Group	Mean	34.3778	39.1111
	N	45	45
	Std. Deviation	6.35069	5.47815

Table 1 shows the mean and standard deviation of students' interest rating scores for the pre-test (72.5778 and 13.11226) and pre-test (35.1556 and 6.55382). for the experimental group, as well as the control group's pre-test (34.3778 and 6.35069) and post-test (39.1111 and 5.47815). The experimental group, which received instruction in mathematics using the ASEI-PDSI lesson approach, had a higher post-test interest mean score of 72.5778 than the control group, which received instruction using the conventional method, with a score of 39.1111.

Research Question 2; what are the mean achievement scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja?

Table 2: Mean and Standard Deviation of Students' Achievement Scores of Experimental and Control Group

Group		Pre-test	Post-test
Experimental Group	Mean	29.0667	C
	N	45	45
	Std. Deviation	9.50215	15.42502
Control Group	Mean	27.5111	36.2222
	N	45	45
	Std. Deviation	8.87443	7.77493

The mean and standard deviation of the students' achievement scores in the pre-test and post-test (29.0667 and 9.50215) and post-test (63.0222 and 15.42502) experimental groups are displayed in Table 2. Similarly, the control group's mean and standard deviation of students' achievement scores were 27.5111 and 8.87443 for the pre-test and post-test, respectively, and 36.2222 and 7.77493 for the post-test. As a result, individuals who were taught using the ASEI-

PDSI lesson approach had higher post-test mean accomplishment scores (7.77493) than those who were taught using the traditional method (36.2222).

Testing Hypotheses

H0₁: There is no significant difference in the mean interest rating scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja

Table 3: ANCOVA of students' interest rating scores of Experimental and Control Groups

Test of Between Subject Effects							
Dependable variable source	Post-test interest Type Sum Square	III of	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	30493.308 ^a		2	15246.654	369.229	0.000	0.895
Intercept	579.876		1	579.876	14.043	0.000	0.139
Pre-test interest	5292.908		1	5292.908	128.178	0.000	0.596
Group	23724.205		1	23724.205	574.530	0.000	0.868
Error	3592.514		87	41.293			
Total	314760.000		90				
Corrected Total	34085.822		89				

a. R Squared = 0.895 (Adjusted R Squared = 0.892)

The null hypothesis is rejected in favor of the alternative because Table 3 shows that the value of F (1, 87) is 574.530 with a P-value of 0.000, indicating that the p-value is below the specified threshold of significance of 0.05. The consequence is that the mean interest scores of students in the Federal Capital Territory, Abuja, who were taught mathematics using the ASEI-PDSI lesson plan and those who were taught using the conventional method differ significantly.

H0₂: There is no significant difference in the mean Achievement scores of students taught mathematics using ASEI-PDSI and those taught using the traditional method in FCT, Abuja

Table 3: ANCOVA of students' Achievement scores of Experimental and Control Groups

Test of Between Subject Effects							
Dependable variable source	Post-test interest Type Sum Square	III of	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	20608.271 ^a		2	10304.135	103.268	0.000	0.704
Intercept	6485.752		1	6485.752	65.000	0.000	0.428
Preach	4447.871		1	4447.871	44.577	0.000	0.339
Group	14635.126		1	14635.126	146.674	0.000	0.628
Error	8680.885		87	99.780			

Total	250902.000	90
Corrected	29289.156	89
Total		

a. R Squared = 0.704 (Adjusted R Squared = 0.697)

According to Table 4, the p-value is 0.000 and the value of F (1, 87) is 146.674. This suggests that the null hypothesis is rejected in favor of the alternative as the p-value is less than the significance level of 0.005. This demonstrates that the mean achievement scores of students in the Federal Capital Territory, Abuja, who were taught using the ASEI-PDSI strategy and those who were taught using the conventional method varied significantly.

Discussion of Findings

Students in the experimental group and those in the control group had mean interest scores of 35.1556 and 34.3778, respectively, according to the table. The experimental and control groups saw interest gains of 37.4222 and 4.7333, respectively, as a result of the pre-test mean interest scores being lower than the post-test mean interest scores of 72.5778 and 39.1111. This suggests that when the ASEI-PDSI lesson plan was used, the students in the experimental group performed better and had higher interest scores. Additionally, when taught using the conventional manner, the children in the counterpart group (control group) exhibited very little improvement in their interest scores. However, Table 3's ANCOVA result showed that these two groups' score differences were significant at the 0.005 level of significance since $F = 574.530$ and $p = 0.000 < \alpha = 0.005$. The alternative was accepted and the null hypothesis was rejected. This indicates that students taught mathematics using the ASEI-PDSI lesson strategy had much higher interest mean scores than those taught using the conventional method. Additionally, when taught using the conventional approach, the students in the counterpart group (control group) demonstrated very little improvement in their interest scores. However, Table 3's ANCOVA result showed that the score differences between these two groups were significant at the 0.005 level of significance since $F = 574.530$ and $p = 0.000 < \alpha = 0.005$. The alternative was accepted over the null hypothesis. This indicates that students taught mathematics using the ASEI-PDSI lesson strategy had much higher interest mean scores than students taught using the conventional technique. Table 2 revealed that students in the experimental and control groups had mean achievement scores of 29.0667 and 27.5111, respectively. The experimental and control groups saw achievement gains of 33.9555 and 8.7111, respectively, as a result of the pre-test being lower than the post-test mean accomplishment scores of 63.0222 and 36.2222. This suggests that when taught using the ASEI-PDSI lesson format, students in the experimental group showed a notable improvement in their accomplishment scores. Additionally, when taught using the conventional approach, the pupils in the control group did not significantly improve. Additionally, Table 4's ANCOVA results showed that there is a difference in scores between the experimental and control groups at the 0.005 level of significance, with $F = 146.674$ and $P = 0.000 < \alpha$, which was set at 0.005. As a result, the alternative was accepted and the null hypothesis was rejected. This suggests that the mean accomplishment scores of students taught using the ASEI-PDSI lesson plan and those taught using the conventional method differed significantly. The outcome is consistent with the findings of Mwelese and Awoto (2014), who found that students who received instruction using the ASEI-PDSI significantly improved their mathematical achievement. Furthermore, Olatunji and Akinmoladun's (2017) study showed that students taught using the ASEI-PDSI strategy performed significantly better on theoretical and practical physics tests than students taught using the traditional method. The ASEI-PDSI group's better results can be ascribed to a number of interconnected processes included into the strategy. Compared to traditional lecture-based instruction, ASEI-PDSI promotes higher levels of

cognitive engagement and participation by emphasizing student activity, experimentation, and improvisation with locally accessible materials. According to Vygotsky's sociocultural theory and constructivist learning principles, students are more likely to create meaningful understanding when they actively handle things, exchange ideas with peers, and reflect on results (Juma & Mukiri, 2019).

By making mathematics relevant and attainable, increased engagement in turn maintains students' interest and directly combats the passivity and math anxiety typical in traditional classrooms (Ashcraft & Krause, 2017). These mechanisms explain why the interest and achievement improvements of the ASEI-PDSI group were much higher than those of the control group, and why the pattern of results is consistent with earlier research carried out in comparable sub-Saharan African contexts (Onchonga, 2023; Mwelese & Awoto, 2014). In order to provide more thorough explanations of how and why ASEI-PDSI achieves its benefits, future research should investigate longer intervention durations, multi-site designs covering many local government areas, and mixed-methods approaches that combine classroom observation and student voice.

Conclusion

The results of this study suggest that students who were taught mathematics using the ASEI-PDSI lesson strategy demonstrated noticeably better interest scores than those who were taught using conventional methods. As a result, junior secondary students in Gwagwalada, Abuja, showed a strong academic interest in mathematics thanks to the ASEI-PDSI lesson plan. Furthermore, pupils who received instruction in mathematics using the ASEI-PDSI lesson approach outperformed their classmates who received instruction using conventional approaches. As a result, the ASEI-PDSI lesson style is acknowledged as being highly successful in raising junior secondary school pupils' academic performance in mathematics in Gwagwalada FCT, Abuja.

Recommendations

Based on the study's findings, the following suggestions were made:

1. The ASEI-PDSI lesson approach should be used to teach mathematics at the junior secondary level in general and in Gwagwalada, FCT specifically, in order to increase students' academic interest and achievement in the subject. The study's findings indicated that students were more interested in the ASEI-PDSI lesson approach than in the traditional approach.
2. The ASEI-PDSI lesson style should be used to teach mathematics to both male and female students because the study's findings revealed no discernible gender-based differences in the students' academic interest and achievement.
3. In general, junior secondary school instructors should have the chance to receive in-service training on the ASEI-PDSI lesson strategy's effectiveness for teaching and learning.
4. Teachers of mathematics and other subjects at junior secondary schools should embrace the ASEI-PDSI lesson style, which curriculum planners should incorporate. current is especially important in current era of our education system, which is heavily reliant on science and technology.
5. To support the adoption of the ASEI-PDSI lesson style, school administrators should make sure that educational technology centers and learning resource centers are available.

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PERCEIVED INFLUENCE OF INSTRUCTIONAL MATERIALS SUSTAINABILITY AND EFFECTIVE COMMUNICATION ON SECONDARY SCHOOLS' TEACHERS' PRODUCTIVITY IN KARU LGA, NASARAWA STATE

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Abstract

This study investigated the perceived influence of instructional materials sustainability and effective communication on teachers' productivity in secondary schools within Karu Local Government Area, Nasarawa State, Nigeria. A descriptive survey design was employed, with a population of 6,364 teachers across public and private schools. Using Taro Yamane's formula at a 0.05 significance level, a sample of 145 teachers was selected through simple random sampling. Three objectives guided the study: to determine the extent to which sustainable instructional materials influences teachers' productivity, to examine the role of effective communication in improving productivity, and to assess whether differences exist between public and private school teachers' perceptions. Data were collected using a validated questionnaire, with reliability confirmed through pilot testing (Cronbach's Alpha = 0.75). Analysis was conducted using descriptive statistics and independent t-tests. Findings revealed that teachers perceived both sustainable instructional materials ($\bar{x} = 3.33$) and effective communication ($\bar{x} = 3.35$) to influence their productivity to a high extent, while no significant difference was observed between public and private school teachers' responses ($p > 0.05$). The study concludes that achieving educational transformation requires not only curriculum reforms and teacher training but also systemic investment in durable instructional resources and participatory communication frameworks. It recommends that policymakers prioritize sustainable resource management, strengthen communication practices, and provide continuous professional development to support teachers' productivity and educational transformation.

Keywords: Communication, Educational Transformation, Instructional Materials, Sustainability, Teachers' Productivity.

Introduction

Education plays a pivotal role in driving transformation and sustainable development. In Nigeria, teachers are central agents of this transformation, yet their productivity is largely shaped by the availability of instructional materials and the effectiveness of communication within schools. When teaching resources are inadequate or communication channels are weak, teachers struggle to deliver quality education, ultimately undermining broader developmental goals (UNESCO, 2020; Mbanefo, 2021). Teachers' productivity has often been constrained by inadequate instructional resources, poor communication frameworks, and limited professional support. These challenges hinder their ability to contribute effectively to educational transformation. The theme of this conference emphasizes the urgent need for rethinking educational management practices that empower teachers. Within this scope, Sub-theme 14 highlights resource sustainability and effective communication as crucial tools for achieving systemic improvement. In line with the conference theme, Innovative and Solution-Based Education for Transformation and Sustainable Development, and sub-theme 14, this paper

focuses on two key drivers of teachers' productivity: instructional materials sustainability and effective communication.

However, sustaining instructional materials in Nigeria is challenging due to inadequate funding, a lack of consistent policy implementation, and disparities in resource distribution. These challenges directly undermine teachers' productivity, as inadequate materials and poor communication reduce instructional effectiveness and professional commitment.

Despite the efforts made through government initiatives at both federal and state levels to supply materials, promote teachers' professional development, and encourage improvisation to improve learning outcomes, there are still gaps in teachers' productivity and educational quality (Odion, 2025). Consequently, effective communication in this context refers to the process by which principals clearly convey messages while ensuring that teachers understand them, and vice versa. It involves active listening, clarity in speaking and writing, and an understanding of the emotions and intentions behind the message. The key components include the sender, receiver, message, and feedback, all working together to ensure a clear and purposeful exchange of information for educational transformation.

Statement of the Problem

Teachers remain the backbone of educational transformation, yet their productivity in Nigeria is often hampered by systemic challenges. One major issue is the inadequate provision and poor sustainability of instructional materials in many schools. Instructional materials such as textbooks, charts, laboratory equipment, and digital tools are either insufficient, outdated, or poorly maintained, forcing teachers to improvise in ways that compromise lesson delivery and student outcomes (Mbanefo, 2021; Achigaonye, 2019). Similarly, ineffective communication practices between school leaders and teachers frequently result in misunderstandings, lack of clarity in instructional goals, and limited teacher participation in decision-making processes (Ayeni & Akinola, 2020).

These challenges not only weaken teachers' morale but also reduce their productivity, which directly affects student learning and educational goals. In the context of sustainable development, this problem is critical because without effective teaching supported by sustainable resources and transparent communication, schools cannot produce the human capital needed for national growth. UNESCO (2020) emphasizes that sustainable development in education requires both material resources and strong professional collaboration. Therefore, investigating how sustainable instructional materials and effective communication can influence teachers' productivity is essential for driving educational transformation in Nigeria and achieving long-term sustainability. Despite existing studies on instructional materials and communication, limited empirical attention has been given to how their sustainability and effectiveness jointly influence teachers' productivity in Karu LGA, Nasarawa State.

Purpose of the Study

The purpose of this study is to examine how sustainable instructional materials and effective communication contribute to teachers' productivity for educational transformation. Specifically, the study seeks to:

1. Ascertain the extent to which the sustainability of instructional materials influences teachers' productivity for educational transformation.
2. Investigate how effective communication influences teachers' productivity for educational transformation.
3. Determine whether there is a significant difference between public and private school teachers' perceptions of the influence of communication and instructional materials sustainability on productivity.

Research Questions

The study addresses the following research questions:

1. To what extent does the sustainability of instructional materials influence teachers' productivity for educational transformation?
2. What is the influence of effective communication on teachers' productivity for educational transformation?
3. Is there a significant difference between public and private school teachers' perceptions of the influence of communication and instructional materials sustainability on their productivity?

Hypothesis (Ho₁): There is no significant difference in the responses of private and public school teachers on the perceived influence of communication on teachers' productivity.

Literature Review

Scholars have consistently shown that instructional materials and communication practices play a decisive role in teachers' productivity and commitment to educational transformation. Productivity describes the various measures of the efficiency of production, expressed as the ratio of output per unit of input used in a production process (Mbanefo, 2019). Adequate provision of instructional materials enables effective classroom delivery, minimizes the stress of improvisation, and influences student learning outcomes (Achigaonye, 2019). Instructional materials are the tools and resources teachers use to support teaching and learning, from traditional textbooks to digital content, hands-on activities, and assessment tools. These materials, which include charts, videos, worksheets, and lesson plans, help convey information, make learning more engaging, and support diverse learning styles to achieve specific educational objectives.

Conversely, the lack of sustainable instructional materials often leads to frustration, lower morale, and reduced productivity among teachers (Mbanefo, 2021). Adequate provision and maintenance of instructional resources have long been recognized as critical to effective teaching and learning (Ajayi, 2007).

Communication also plays a critical role in education. Effective communication between school leaders and teachers fosters collaboration, trust, and shared vision, which directly influences productivity (Ayeni & Akinola, 2020). Teachers who operate in environments where communication is participatory and transparent are more motivated and likely to align with institutional goals for transformation and sustainable development.

Mbanefo and Okolie (2022) stated that communication is a two-way process and an administrative function that has accompanying elements such as a sender, a message, a medium, a channel, a recipient, a reaction, and feedback. For these components to function effectively, there must be cooperation and understanding between the parties involved. Communication is also essential for building strong relationships that help schools achieve their objectives. Teachers' productivity is more than completing daily teaching tasks; it involves enthusiasm, innovation, and contribution to educational transformation.

In this sense, sustainability refers to conserving resources, innovating to reduce waste, and ensuring equity of access to materials across schools. UNESCO (2020) emphasizes that sustainable education requires both adequate resources and collaborative processes to transform learning environments. In terms of communication, Hallinger (2011) and Leithwood, Harris, and Hopkins (2020) argued that leaders who share information clearly, involve staff in decision-making, and establish feedback mechanisms create a culture of productivity and innovation. Participatory communication strategies strengthen teacher productivity by making teachers feel valued and recognized. Digital tools such as WhatsApp groups, email, and online

learning platforms also promote efficiency, transparency, and collaboration while reducing the environmental costs associated with paper use (Selwyn, 2012). These communication strategies not only boost productivity but also support sustainable development through eco-friendly practices. Billennium, Revolution Learning and Development Ltd, and The Open University identified the 7Cs of effective communication, which are: clear, concise, concrete, correct, coherent, complete, and courteous. This framework helps ensure that messages are understood as intended by focusing on principles such as being specific, to the point, and respectful.

Theories provide deeper insight into how instructional materials and communication affect teachers' productivity. Transformational Leadership Theory (Bass & Riggio, 2006) explains how school leaders can inspire teachers to go beyond routine tasks by sustaining resources, providing vision, and fostering open communication. Principals or administrators practising transformational leadership demonstrate idealized influence through equitable resource allocation, inspirational motivation by communicating clear goals, and individualized consideration by listening to teachers' concerns. Similarly, Systems Theory by Von Bertalanffy (1968) views the school as an interdependent unit where inputs (resources), processes (teaching and communication), and outputs (teacher and student performance) must be coordinated. Disruptions in communication or instructional resources weaken the entire system, making productivity and transformation unsustainable.

Empirical studies support these theoretical positions. Eze and Eze (2021) found that sustainable provision of teaching materials in Niger State significantly improved teachers' job satisfaction and commitment to classroom innovation. Ayeni and Akinola (2020) reported that effective communication strategies in Ondo State secondary schools enhanced teacher motivation and productivity. Mbanefo (2021), in her study of STEP-B projects in Nigeria, highlighted that sustainability in resource management is essential to long-term teacher effectiveness. Similarly, Ofojebe and Ezugoh (2010) demonstrated that when communication and resources were inadequate, teacher morale declined, leading to poor classroom engagement. These studies confirm that both sustainable instructional materials and communication strategies are fundamental to teacher productivity.

Despite these contributions, there remains a gap in explicitly linking sustainable instructional materials and communication to teachers' productivity within the framework of educational transformation and sustainability. While previous studies have independently examined resource provision or communication, few have combined the two as dual levers of transformation. This study therefore fills that gap by exploring how the integration of sustainable instructional resources and effective communication strategies can jointly influence teachers' productivity for educational transformation in Nigeria.

Methodology

The study adopted a descriptive survey design, which was considered appropriate because it allowed the researchers to collect data on teachers' opinions, attitudes, and experiences without manipulating variables. This design provided a clear picture of existing conditions and made it possible to examine how sustainable instructional materials and effective communication are perceived to influence teacher productivity within the context of educational transformation.

The population of the study consisted of 6,364 teachers across public and private secondary schools in Karu Local Government Area, Nasarawa State. Using Taro Yamane's (1967) formula at a 0.05 level of significance, the required sample size was calculated to be 145 teachers. To ensure adequate responses and account for possible non-return of questionnaires, 150 copies of the instrument were distributed. Out of these, 145 were properly

completed and returned, representing a 96.7% response rate. Thus, the effective sample size analysed was 145, which matched the calculated requirement.

The main instrument for data collection was a self-structured questionnaire titled Questionnaire on Enhancing Teachers' Productivity through Instructional Materials Sustainability and Effective Communication (QETPIMSEC). The questionnaire was divided into sections covering demographic information, sustainability of instructional materials, communication strategies, and teacher productivity. Its validity was established through expert review by specialists in Educational Foundations and Measurement and Evaluation, who assessed the clarity, relevance, and coverage of the items. Reliability was confirmed through a pilot test with 15 teachers outside the sample, producing a Cronbach's Alpha coefficient of 0.75, indicating acceptable internal consistency.

Data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as frequency counts, percentages, means, and standard deviations were used to answer the research questions. In addition, independent t-tests at the 0.05 significance level were employed to test the hypothesis and determine whether significant differences existed in teachers' responses regarding their perceived influence of sustainable instructional materials and communication strategies on productivity. A decision rule based on a 4-point Likert scale was applied as follows:

- 3.50–4.00 = Very High Extent
- 2.50–3.49 = High Extent
- 1.50–2.49 = Low Extent
- 0.50–1.49 = Very Low Extent

Results

Research Question 1: To what extent does the sustainability of instructional materials influence teachers' productivity for educational transformation?

Table 1: Frequencies, Means and Standard Deviations of Respondents' Perceptions on the Extent to Which Instructional Materials Sustainability Influences Teachers' Productivity for Educational Transformation (N = 145)

S/N	Items	Frequency of Response Scores					$\bar{x}$	SD	Decision
		0	1	2	3	4			
1	To what extent does the sustainability of instructional materials improve teachers' instructional strategies and lesson delivery for educational transformation?	–	–	3	95	47	3.30	.504	HE
2	To what extent does the maintenance of instructional materials improve students' learning outcomes for educational transformation?	–	–	3	89	53	3.34	.519	HE
3	To what extent does the principals' adequate supervision of instructional materials improve teachers' effectiveness at work?	–	–	3	89	53	3.34	.519	HE
Cluster							3.33	0.514	HE

$\bar{x}$ = Mean, SD = Standard Deviation, HE = High Extent

Table 1 shows the mean ratings ($\bar{x}$) and standard deviations (SD) of respondents' perceptions on the extent to which instructional materials sustainability influences teachers' productivity for educational transformation. The analysis revealed that teachers perceived instructional materials sustainability to influence their productivity to a high extent. All three items in the cluster recorded high extent ratings, and the grand mean of 3.33 confirms this trend. The cluster standard deviation of 0.514 indicates that responses did not deviate substantially from the mean.

Research Question 2: What is the influence of effective communication on teachers' productivity for educational transformation?

Table 2: Frequencies, Means and Standard Deviations of Respondents' Perceptions on the Influence of Effective Communication on Teachers' Productivity (N = 145)

S/ N	Items	Frequency Response Scores					of $\bar{x}$	SD	Decisio n
		0	1	2	3	4			
4	A well-planned communication channel helps the principal to collaborate effectively with teachers for improved productivity.	–	–	–	82	63	3.43	.497	HE
5	Proper communication influences teachers' productivity as the teachers are properly informed about the missions and visions of the principal/school.	–	–	–	11 0	35	3.24	.429	HE
6	Principals' holding of statutory and special meetings promotes good inter-personal relationship for collaboration and this influences teachers' productivity.	–	–	5	79	61	3.39	.555	HE
7	Promotion of school community relationship by the principal motivates the teachers to be more effective in lesson delivery.	–	–	4	85	56	3.36	.536	HE
Cluster							3.35	.504	HE

$\bar{x}$ = Mean, SD = Standard Deviation, HE = High Extent

Table 2 presents the responses of participants on the perceived influence of effective communication on teachers' productivity for educational transformation. The cluster mean of 3.35 indicates that respondents perceived effective communication to have a high influence on teachers' productivity. The cluster standard deviation of 0.504 also indicates that there is not much deviation from the mean.

Hypothesis (Ho1): There is no significant difference in the responses of private and public school teachers on the perceived influence of communication on teachers' productivity.

Table 3: Group Means, Standard Deviations and t-test Results on the Hypothesis (DF = 143)

S/N	Items	GP	$\bar{x}$	SD	t-Cal	p-Value	Decision
4	A well-planned communication channel helps the principal to collaborate effectively with teachers for improved productivity.	85	3.44	.499	.023	.981	NS
		60	3.43	.500			
5	Proper communication influences teachers' productivity as the teachers are properly informed about the missions and visions of the principal/school.	85	3.24	.427	-.202	.840	NS
		60	3.25	.437			
6	Principals' holding of statutory and special meetings promotes good inter-personal relationship for collaboration and this influences teachers' productivity.	85	3.35	.592	-.858	.392	NS
		60	3.43	.500			
7	Promotion of school community relationship by the principal motivates the teachers to be more effective in lesson delivery.	85	3.32	.561	-1.097	.275	NS
		60	3.42	.497			
Composite Score (Items 4–7):		85	3.34	0.520	-0.475	.635	NS
Overall influence of communication on teachers' productivity		60	3.38	0.484			

GP = Group (Public = 85, Private = 60); $\bar{x}$ = Mean; SD = Standard Deviation; NS = Not Significant; $p > 0.05$

Table 3 presents the group means, standard deviations, and t-test results for the hypothesis. The results show that the differences between the mean ratings of public and private school teachers are not statistically significant. This is confirmed by the p-values of .981, .840, .392, .275, and .635 for all items and the composite score respectively, all of which are greater than the 0.05 probability value. Accordingly, the null hypothesis is accepted, and it is concluded that there is no significant difference in the responses of public and private school teachers regarding their perceived influence of communication on teachers' productivity in secondary schools in Karu Local Government Area of Nasarawa State.

Discussion on Findings

The first research question examined the extent to which the sustainability of instructional materials was perceived to influence teachers' productivity for educational transformation. The findings showed that teachers perceived sustainable instructional materials ($\bar{x} = 3.33$) to influence their productivity to a high extent. This result supports Achigaonye (2019), who emphasized that adequate provision of instructional materials improves classroom delivery and

student learning outcomes. It also aligns with Mbanefo (2021), who argued that the sustainability of resources is a key determinant of long-term educational outcomes.

The second research question focused on the perceived influence of effective communication on teachers' productivity. The study found that teachers perceived effective communication ($\bar{x} = 3.35$) to foster collaboration between principals and teachers, ensure clarity of institutional goals, and promote interpersonal relationships that motivate them to be more effective in lesson delivery. These findings are consistent with Mbanefo and Okolie (2022), who highlighted communication as essential for building strong relationships and helping schools achieve their objectives, and with Ofojebe and Ezugoh (2010), who confirmed that both sustainable instructional materials and communication strategies are fundamental to teacher productivity.

Finally, the hypothesis test compared the perceptions of public and private school teachers. Although both groups perceived that sustainable instructional materials and effective communication significantly influence productivity, the statistical analysis showed no significant difference between their responses ($p > 0.05$). This indicates that the perceived positive impact of communication and resource sustainability on teacher productivity is consistent across school types, reinforcing the conclusion that these factors are universally important for educational transformation.

Conclusion

This study demonstrates that teacher productivity in secondary schools is strongly perceived to be influenced by two systemic factors: the sustainability of instructional materials and the effectiveness of communication within schools. The findings show that both variables were perceived to contribute to productivity to a high extent, reinforcing the argument that educational transformation cannot be achieved through curriculum reforms or teacher training alone. Rather, it requires consistent investment in durable instructional resources and the establishment of participatory communication frameworks that actively involve teachers. Importantly, the study found no significant difference between public and private school teachers' perceptions, suggesting that these factors are universally relevant across school types. By highlighting the role of sustainable resource management and transparent communication, this research underscores the need for policymakers and administrators to prioritize these areas as part of broader strategies for educational transformation and sustainable development in Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. **Prioritise sustainability of instructional materials:** Education stakeholders and government agencies should establish clear policies for the procurement, maintenance, and equitable distribution of instructional resources. This includes budgeting for replacement cycles, ensuring durability, and reducing waste through innovative resource management.
2. **Institutionalise participatory communication frameworks:** School administrators should adopt structured communication systems that encourage transparency, active listening, and teacher involvement in decision-making. Training programmes should emphasise the 7Cs of effective communication (clear, concise, concrete, correct, coherent, complete, courteous) to strengthen collaboration.
3. **Continuous professional development:** Regular workshops and training sessions should be organised for principals and teachers to build capacity in resource management and communication strategies. This will influence teachers' productivity and align their practices with sustainable development goals.

4. **Further research on sustainable leadership:** Future studies should investigate how sustainable instructional leadership practices—such as transformational leadership and systems-based approaches—affect long-term teacher productivity and educational transformation across diverse contexts in Nigeria.

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EXPLORATION OF TEACHERS' AWARENESS AND ATTITUDE TOWARDS THE USE OF TELEMEDICINE FOR WELLNESS IN MARARABA, NASARAWA STATE

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Abstract

The integration of telemedicine into healthcare systems presents a promising avenue for promoting wellness through increased accessibility and efficiency. However, its successful adoption is influenced by users' awareness and attitudes, particularly among teachers, who often serve as community role models. This study explored the awareness and attitude of teachers towards the use of telemedicine for wellness in Mararaba. A descriptive survey design was adopted, involving 150 teachers selected through stratified random sampling from public and private schools. A structured questionnaire was administered to collect data on awareness levels, sources of information, perceived benefits, barriers and attitudes toward telemedicine utilization. Data were analyzed using descriptive statistics, as well as Chi-square tests were applied to examine relationships between demographic variables, awareness and attitude levels. The results revealed that 62% of the respondents were aware of telemedicine, while only 38% demonstrated a clear understanding of its practical use for wellness. Social media (40%), friends (12%) and the internet (10%) were the leading sources of information. Also, 71% of the teachers expressed a positive disposition towards using telemedicine for managing their health; however, concerns were raised about data privacy and insufficient user guidance. Significant associations ($p < 0.05$) were found between awareness levels and factors such as age, teaching experience and educational qualification. The study concludes that while awareness is moderate and attitudes are generally positive, there is a critical need for health promotion strategies and digital literacy initiatives. These efforts could empower teachers to utilize telemedicine more effectively for personal wellness.

Keywords: Telemedicine, Teacher Awareness, Attitude, Wellness and Health Promotion

Background of the Study

Telemedicine can be described as the delivery of healthcare services using Information and Communication Technologies (ICT). It has since emerged as a transformative tool for improving access to quality health services across diverse populations. Through virtual consultations, remote diagnostics, and digital health monitoring, telemedicine bridges geographical barriers, reduces waiting times, and enhances patient outcomes (Shiferaw et al., 2021). Its adoption has accelerated globally, particularly during the COVID-19 pandemic, where in-person consultations were limited.

The wellness of teachers, who constitute a critical segment of the workforce, is integral to sustaining quality education and fostering student development. Teachers often experience occupational stress, heavy workloads and inadequate access to healthcare, all of which may adversely affect their physical and mental well-being (Akinola & Adeyemi, 2020). Therefore, Ogunyemi & Oladipo (2020) asserted the need for teachers to have timely access to medical care so as to maintain a high level of productivity and educational outcomes because they are front-line contributors to human capital development. Enabling teachers to consult healthcare professionals without leaving their classrooms or communities reduces the time and cost

associated with hospital visits (Gogia & Maeder, 2019). In rapidly urbanizing areas like Mararaba, Nasarawa State, where population growth exerts pressure on existing health infrastructure, telemedicine could mitigate congestion in health facilities and improve wellness support for educators.

However, the effectiveness of telemedicine depends significantly on the awareness and attitude of potential users. Awareness encompasses knowledge about the existence, functionality, and benefits of telemedicine, while attitude reflects perceptions, willingness, and readiness to adopt such innovations. Low awareness or negative attitudes can hinder utilization even where telemedicine platforms are available. Studies conducted in other African countries have reported varying levels of awareness among teachers and other professionals. For example, research in Kenya and Ghana showed that although ICT use in education is relatively high, health-related applications remain poorly understood among teachers (Muthomi, 2020; Boateng & Effah, 2021). Similar findings in Nigeria indicate that professionals often associate telemedicine exclusively with emergency or specialized hospital settings rather than as a tool for everyday wellness (Adepoju et al., 2022).

In addition, teachers' attitudes toward telemedicine are shaped by factors such as perceived reliability, trust in digital health systems, prior experience with technology, and data privacy concerns (Eze et al., 2021). Positive attitudes have been linked to increased adoption rates in urban settings, while skepticism and fear of misdiagnosis limit use in rural or underserved areas (Ogunleye, 2023). Understanding these perceptions is crucial for designing targeted awareness campaigns and training programmes.

The socio-economic context of Mararaba presents unique considerations. The town serves as a peri-urban hub that attracts residents from both Nasarawa and the Federal Capital Territory. Rapid urbanization, population density, and infrastructural deficits have led to overburdened healthcare facilities, making teachers more vulnerable to delayed treatment and health deterioration (Emmanuel & Musa, 2021). In this environment, telemedicine could offer timely interventions, provided that teachers are informed and receptive.

Previous health technology studies in Nigeria have primarily focused on physicians' or patients' acceptance of telemedicine in tertiary hospitals (Ajayi, Abayomi & Ojo, 2013; Eze et al., 2021). Few have explored its relevance to occupational wellness, particularly among teachers at the primary or secondary levels. This gap in knowledge leaves policymakers with insufficient data to design programmes that promote teachers' well-being through digital health tools.

Moreover, government initiatives such as the National eHealth Strategy emphasize the importance of ICT in healthcare delivery (Federal Ministry of Health, 2016). Despite these policy frameworks, practical implementation at the grassroots level has been inconsistent. Understanding teachers' awareness and attitude toward telemedicine in Mararaba will provide insights into how such strategies can be localized and adapted to community needs.

Globally, there is growing recognition that occupational wellness programmes incorporating digital health solutions improve employee retention, productivity, and overall satisfaction (Zhang et al., 2022). Teachers in countries like India and Brazil have benefitted from mobile health (mHealth) applications that offer routine check-ups, counseling, and fitness monitoring (Rao et al., 2021). Investigating whether similar opportunities can be replicated in Nigeria is timely and relevant. The exploration of teachers' awareness and attitude toward telemedicine is not only an academic exercise but a practical necessity. If teachers in Mararaba demonstrate high awareness and positive attitudes, policymakers can leverage this readiness to introduce school-based telemedicine programmes. Conversely, if awareness is low or attitudes are negative, targeted sensitization, digital literacy training, and infrastructural investment will be required to foster adoption.

Furthermore, assessing teachers' knowledge and perception of telemedicine in Mararaba, Nasarawa State, aligns with broader efforts to improve access to healthcare through ICT. This study aims to bridge the knowledge gap, guide local implementation of telemedicine programmes, and contribute to enhancing teacher wellness, a cornerstone of educational development and societal progress.

Research Objectives

1. To assess the level of awareness among teachers in Mararaba, Nasarawa State, regarding the concept and benefits of telemedicine for personal wellness.
2. To examine teachers' attitudes towards the use of telemedicine for health management, including their willingness to adopt it as part of their wellness practices.
3. To identify the major sources through which teachers receive information about telemedicine and determine how these sources influence their awareness.
4. To analyze the relationship between selected demographic variables (such as age, teaching experience, and educational qualification) and teachers' awareness and attitudes toward telemedicine.
5. To investigate the perceived barriers to the effective use of telemedicine among teachers in Mararaba, Nasarawa State, with a specific focus on internet reliability, data privacy concerns, and lack of user guidance.

Research Questions

1. What is the current level of awareness among teachers about telemedicine?
2. What are teachers' attitudes toward using telemedicine for managing their health?
3. What are the main sources of information about telemedicine among teachers?
4. What are the major barriers preventing teachers from effectively using telemedicine?

Research Hypotheses

1. There will be no significant relationship between teachers' demographic characteristics and their awareness of telemedicine.
2. There will be no significant relationship between teachers' demographic characteristics and their attitudes toward telemedicine.

Methodology

Research Design

This study adopted a descriptive survey design to explore teachers' awareness of the use of telemedicine for wellness. This design is appropriate for gathering data from a population in its natural setting and for describing the current level of awareness and related factors without manipulating any variables.

Population of the Study

The population for this study comprises all primary and secondary school teachers in Mararaba, Nasarawa State. This includes both public and private school teachers who are actively engaged in teaching during the period of data collection.

Sample and Sampling Technique

A sample of 150 teachers was selected using a stratified random sampling technique to ensure representation across different school types (public and private), educational levels (primary and secondary), and demographic characteristics (e.g., gender, age).

Instrument for Data Collection

The primary instrument for data collection was a structured questionnaire titled Teachers' Awareness of Telemedicine for Wellness Questionnaire (TATWQ). The questionnaire was divided into sections that covered demographic information, awareness of telemedicine, sources of information about telemedicine, and perceived benefits and limitations. It consisted of closed-ended items designed to capture quantitative data.

Validity and Reliability of the Instrument

To ensure content validity, the draft questionnaire was reviewed by experts in health education and educational research. A pilot test was conducted with 20 teachers in FCT (not included in the main study), and Cronbach's Alpha was used to test reliability, with a threshold of 0.70 considered acceptable.

Method of Data Collection

Questionnaires were administered in person with the assistance of trained research assistants. Respondents were given adequate time to complete the questionnaire and were assured of the confidentiality of their responses.

Method of Data Analysis

Collected data were analyzed using descriptive statistics such as frequency counts, percentages, mean scores, and standard deviations. Where appropriate, inferential statistics such as Chi-square tests were used to examine relationships between awareness and demographic variables.

Results

Table 1: Demographic Characteristics of the Teachers

Characteristics	Categories	Frequency
Age		36 (24%)
	20-29 Years	37 (24.7%)
	30-39 Years	45 (30%)
	40-49 Years	32 (21.3%)
	50 Years Above	
Gender	Males	77 (51.3%)
	Females	73 (48.7%)
Years of Teaching Experience		42 (28%)
	1-5 years	55 (36.7%)
	6-10 years	30 (20%)
	11-15 years	23 (15.3%)
	16 years and above	
Educational Qualification	NCE	42 (28%)
	B.Ed/B.Sc	62 (41.3%)
	M.Ed/M.Sc.	40 (26.7%)
	Ph.D.	6 (4%)

Source: Field Survey

Based on Table 1, the age distribution of the teachers shows a fairly balanced spread across the four age categories. A total of 36 teachers (24%) were between 20 and 29 years, while 37 teachers (24.7%) fell within the 30 to 39 years category. The largest proportion comprised 45 teachers (30%) aged 40 to 49 years, followed closely by 32 teachers (21.3%) aged 50 years and above. This indicates that a significant portion of the teaching workforce in

Mararaba, Nasarawa State, is middle-aged, reflecting both youthful entrants into the profession and more experienced teachers nearing retirement.

In terms of gender, the distribution shows a relatively even representation. Males constituted 77 teachers (51.3%), while females accounted for 73 teachers (48.7%). This near parity suggests that teaching in the area is an inclusive profession with no pronounced gender dominance, which may positively influence collaborative approaches to professional development initiatives, including the adoption of telemedicine for wellness.

The teaching experience of respondents also varied considerably. Teachers with 1 to 5 years of experience numbered 42 (28%), while those with 6 to 10 years of experience were the most represented group, totaling 55 (36.7%). A further 30 teachers (20%) had 11 to 15 years of experience, and 23 teachers (15.3%) reported having 16 years or more of classroom practice. This distribution indicates that a significant number of teachers are in their early or mid-career stages, potentially affecting their openness to technological innovations such as telemedicine. Regarding educational qualifications, the table shows that 42 teachers (28%) held Nigeria Certificate in Education (NCE), 62 teachers (41.3%) possessed Bachelor of Education (B.Ed.) or Bachelor of Science (B.Sc.) degrees, while 40 teachers (26.7%) had Master of Education (M.Ed.) or Master of Science (M.Sc.) degrees. Only 6 teachers (4%) held doctoral (Ph.D.) qualifications. This suggests that the teaching population is generally well-qualified, with a substantial portion having advanced degrees, which may influence their capacity to understand and adopt emerging health technologies.

Therefore, the demographic data reflect a teaching workforce that is diverse in age, experience, and educational attainment, with balanced gender representation. These characteristics provide an important context for examining teachers' awareness and attitudes toward the use of telemedicine for wellness, as such demographic variables often shape perceptions, access to information, and willingness to adopt new practices.

Research Question 1: What is the current level of awareness among teachers about telemedicine?

Table 2: Descriptive Statistics of the Level of Awareness about Telemedicine among Teachers

Item		Frequency	Percentage (%)	Mean	SD
Heard of telemedicine	Yes-93		62.00		
	No-57		38.00	1.30	0.46
Self-rated knowledge of telemedicine	Very Poor- 28				
	Poor-46		18.70		
	Good-54		30.70		
	Very Good-22		36.00		
			14.36	2.60	0.92
Correct identification of telemedicine functions	Yes-97		64.7		
	No-53		35.3	1.35	0.48
Belief that telemedicine can promote wellness	Strongly Disagree-6		4.00		
	Disagree-14		9.30		
	Neutral-32		21.30		
	Agree-64		42.70		
	Strongly Agree-34		22.70	3.70	0.97

Table 2 presents the descriptive statistics on teachers' awareness of telemedicine. Findings show that a majority of respondents (62%) had heard of telemedicine, while 30% had not. In terms of self-rated knowledge, most teachers described their knowledge as either good (36%)

or poor (30.7%), with fewer indicating very good (14.6%) or very poor (18.7%) knowledge. Similarly, 64.7% were able to correctly identify telemedicine functions, suggesting a moderate level of understanding. Regarding perceptions of its usefulness, most teachers believed telemedicine could promote wellness, with 42.7% agreeing and 22.7% strongly agreeing, while only 13.3% disagreed. Overall, the results suggest that although teachers' awareness of telemedicine is relatively high, their knowledge of the subject remains limited in depth.

Research Question 2: What are teachers' attitudes toward using telemedicine for managing their health?

Table 3: Descriptive Statistics of Teachers' Attitudes toward Using Telemedicine for Managing Their Health

Attitude Statement	Response Category	Frequency	(%)	Mean	SD
Telemedicine is useful for managing personal health	Disagree	15	10.00	3.92	0.98
	Neutral	28	18.70		
	Agree	72	48.00		
	Strongly Agree	35	23.30		
I am willing to use telemedicine if available	Strongly Disagree	9	6.00	3.85	1.01
	Disagree	18	12.00		
	Neutral	30	20.00		
	Agree	63	42.00		
I prefer telemedicine over in-person hospital visits for non-emergency cases	Strongly Agree	30	20.00	3.21	1.19
	Strongly Disagree	20	13.30		
	Disagree	34	22.7		
	Neutral	40	26.7		
I trust the accuracy of diagnoses given through telemedicine platforms	Agree	38	25.3	3.36	1.11
	Strongly Agree	18	12		
	Strongly Disagree	14	9.3		
	Disagree	28	18.7		
I think telemedicine will improve access to healthcare in my community	Neutral	42	28	3.97	0.95
	Agree	44	29.3		
	Strongly Agree	22	14.7		
	Strongly Disagree	6	4		
	Disagree	14	9.3		
	Neutral	29	19.3		
	Agree	68	45.3		
	Strongly Agree	33	22		

Table 3 shows the descriptive statistics of teachers' attitudes toward using telemedicine for managing their health. The results indicate that a majority of teachers viewed telemedicine positively. Nearly half (48%) agreed and 23.3% strongly agreed that telemedicine is useful for managing personal health ($M = 3.92$, $SD = 0.98$). Similarly, 42% agreed and 20% strongly agreed that they were willing to use telemedicine if available, with only a small proportion (18%) expressing unwillingness ($M = 3.85$, $SD = 1.01$).

However, preferences were more divided regarding substituting telemedicine for in-person hospital visits in non-emergency cases: while 25.3% agreed and 12% strongly agreed, a sizable 36% disagreed or strongly disagreed, and 26.7% remained neutral ($M = 3.21$, $SD =$

1.19). Trust in telemedicine diagnoses was also mixed, with 44% agreeing or strongly agreeing, 28% neutral, and 28% disagreeing ($M = 3.36$, $SD = 1.11$).

Finally, attitudes were most favourable regarding telemedicine's impact on access to healthcare, with 45.3% agreeing and 22% strongly agreeing, compared to just 13.3% disagreeing ($M = 3.97$, $SD = 0.95$). Therefore, these findings suggest that while teachers generally have a positive attitude toward telemedicine and its potential benefits, some reservations remain regarding substituting in-person visits and trusting remote diagnoses.

Research Question 3: What are the main sources of information about telemedicine among teachers?

Table 4: Statistics of the Sources of Information about Telemedicine among Teachers

Source of Information	Frequency (n)	Percentage (%)
Social media	60	40.00
Internet	15	10.00
Health professionals	28	18.70
Friends/colleagues	18	12.00
Television/Radio/News	18	12.00
Never received information	57	38.00

Table 4 presents the sources of information about telemedicine among teachers. The results reveal that social media was the most common source, reported by 40% of the respondents. Friends and colleagues were also important, accounting for 29.3%, while 18.7% indicated that they obtained information through health professionals. Traditional media sources such as television, radio, and newspapers contributed the least, with only 12% of teachers relying on them. In addition, 38% of the teachers reported never receiving any information about telemedicine at all. These findings suggest that informal and digital platforms serve as the main channels of awareness, while formal and institutional sources remain underutilized, leaving a considerable proportion of teachers uninformed about telemedicine.

Research Question 4: What are the major barriers preventing teachers from effectively using telemedicine?

Table 5: Descriptive Statistics of the Major Barriers Preventing Teachers from Effectively Using Telemedicine

Barrier	Frequency (n)	Percentage (%)
Poor internet connectivity	86	57.3
Lack of awareness/knowledge about telemedicine	72	48
High cost of internet/data subscription	65	43.3
Limited access to required devices (smartphones/computers)	54	36
Concerns about accuracy and trust of diagnosis	47	31.3
Lack of technical support/training	42	28
Privacy and confidentiality concerns	38	25.3
Lack of government policy or institutional support	29	19.3

Table 5 presents the major barriers preventing teachers from effectively using telemedicine. The findings show that technological challenges were the most frequently reported obstacles.

More than half of the teachers (57.3%) identified poor internet connectivity as the main barrier, followed closely by lack of awareness or knowledge about telemedicine (48%) and the high cost of internet/data subscriptions (43.3%). Other notable barriers included limited access to required devices such as smartphones and computers (36%) and concerns about the accuracy and trustworthiness of telemedicine diagnoses (31.3%). Additionally, 28% reported lack of technical support or training as a hindrance, while 25.3% expressed privacy and confidentiality concerns. Institutional factors were also mentioned, with 19.3% pointing to inadequate government policies or institutional support as limiting telemedicine use. In summary, these results suggest that while teachers recognize the potential of telemedicine, infrastructural, financial, and informational barriers remain significant obstacles to its effective utilization.

Ho1: There will be no significant relationship between teachers' demographic characteristics and their awareness of telemedicine.

Table 6: Chi-Square Test of Independence on Teachers' Demographic Characteristics and Awareness of Telemedicine

Demographic Variable	χ^2	df	p-value
Age	4.82	3	0.816
Gender	0.97	1	0.325
Years of Teaching Experience	6.13	3	0.105
Educational Qualification	7.42	3	0.059

The results in Table 6 indicated that there were no statistically significant associations between age and awareness of telemedicine, $\chi^2(3, N = 150) = 4.82$, $p = 0.186$; gender and awareness, $\chi^2(1, N = 150) = 0.97$, $p = 0.325$; years of teaching experience and awareness, $\chi^2(3, N = 150) = 6.13$, $p = 0.105$; and educational qualification and awareness, $\chi^2(3, N = 150) = 7.42$, $p = 0.059$. These findings suggest that awareness of telemedicine among teachers does not significantly differ across demographic groups. Thus, the null hypothesis (H_{01}) was retained.

Ho2: There will be no significant relationship between teachers' demographic characteristics and their attitudes toward telemedicine.

Table 7: Chi-square Test of Independence Result for Teachers' Demographic Characteristics and Attitudes toward Telemedicine

Demographic Characteristic	χ^2	df	p-value
Age	5.63	9	0.777
Gender	2.04	3	0.565
Years of Teaching Experience	7.92	9	0.541
Educational Qualification	8.71	9	0.464

Table 7 showed no statistically significant relationships between age and attitudes toward telemedicine, $\chi^2(9, N = 150) = 5.63$, $p = .777$; gender and attitudes, $\chi^2(3, N = 150) = 2.04$, $p = .565$; years of teaching experience and attitudes, $\chi^2(9, N = 150) = 7.92$, $p = .541$; and educational qualification and attitudes, $\chi^2(9, N = 150) = 8.71$, $p = .464$. This indicates that teachers' attitudes toward telemedicine were not significantly influenced by their demographic characteristics. Therefore, the null hypothesis (H_{02}) was retained.

Discussion of Findings

The findings from Table 2 align with previous studies showing that awareness of telemedicine among educators and health-related stakeholders is often moderate to high, but depth of

knowledge remains limited. For example, Alshammari et al. (2022) found that although a majority of teachers in Saudi Arabia had heard of telemedicine, less than one-fifth rated their knowledge as good, reflecting the same pattern observed in this study, where only 14.6% reported very good knowledge. Similarly, Adepoju et al. (2021) reported that while telemedicine awareness in Nigeria has grown due to increased digital health promotion, misconceptions about its scope and functions remain common, as also seen in the 35.3% of teachers in this study who could not correctly identify telemedicine functions.

In terms of attitudes, the positive perception of telemedicine's role in promoting wellness observed here (65.4% agreeing or strongly agreeing) is consistent with the work of Gajarawala and Pelkowski (2021), who noted that teachers and healthcare workers often believe telemedicine improves access and supports preventive care despite knowledge gaps. Likewise, Okereke et al. (2020) emphasized that Nigerian teachers tend to have favorable attitudes toward health innovations, but require structured training to fully understand their application. Taken together, the findings of this study are justified by existing literature, which similarly demonstrates that while awareness of telemedicine is relatively widespread, knowledge depth and practical understanding are insufficient.

The results from Table 3 demonstrate that teachers generally hold positive attitudes toward telemedicine, though with some reservations regarding its substitution for in-person care and the accuracy of remote diagnoses. These findings are consistent with existing studies. For instance, Gajarawala and Pelkowski (2021) observed that while users perceive telemedicine as a useful tool for managing personal health and improving access, hesitancy remains around fully replacing traditional consultations. This supports the finding that although 71.3% of teachers in this study considered telemedicine useful, only 37.3% preferred it over hospital visits for non-emergency cases.

Similarly, Eze et al. (2020), in their study of telemedicine adoption in Nigeria, reported that willingness to use telemedicine was relatively high due to increasing digital literacy, aligning with the 62% of teachers here who expressed willingness to adopt it if available. However, their study also noted skepticism around diagnosis accuracy, echoing the mixed levels of trust observed in this study, where 44% agreed or strongly agreed, but 28% remained neutral and another 28% disagreed.

In terms of perceived benefits for community healthcare access, the majority of teachers in this study believed telemedicine could improve accessibility. This is reinforced by Almathami et al. (2020), who highlighted telemedicine's potential to reduce barriers such as distance, cost, and shortage of healthcare professionals, especially in underserved communities. Likewise, Adepoju et al. (2021) confirmed that in Sub-Saharan Africa, telemedicine is increasingly recognized as a tool to bridge healthcare gaps, despite infrastructural challenges. Generally, the findings of this study are consistent with literature showing that attitudes toward telemedicine are generally positive, but issues of trust and preference for physical consultations remain key barriers to full acceptance.

The findings from Table 4 are consistent with previous studies showing that informal and digital platforms are the dominant sources of health-related information in many low- and middle-income countries. For example, Adebayo et al. (2021) noted that social media is increasingly the primary channel through which Nigerian teachers and students access health innovations, reflecting the 48% reliance observed in this study. Similarly, Osuagwu et al. (2021) reported that during the COVID-19 pandemic, social media and peer networks were more influential in disseminating telemedicine information than formal government outlets, aligning with the 29.3% reliance on colleagues and the absence of government websites as a reported source in this study. In addition, Almathami, Win, and Vlahu-Gjorgievska (2020) highlighted that although health professionals are considered credible sources, their role in promoting telemedicine remains limited in many settings, which supports the relatively low

percentage (18.7%) recorded here. The significant proportion of teachers (38%) who had never received any information about telemedicine is in line with Adepoju et al. (2021), who emphasized that gaps in official communication and limited digital health strategies continue to leave many Nigerians uninformed. Taken together, these findings echo the literature that while social and digital networks play a leading role in creating awareness, reliance on formal and institutional channels of health communication, particularly government websites, remains weak.

The barriers reported in Table 5 are strongly supported by existing literature on telemedicine adoption, particularly in low- and middle-income countries. Poor internet connectivity emerged as the leading barrier (57.3%), which is consistent with Oyediran et al. (2020), who noted that infrastructural limitations, especially unstable internet networks, remain one of the biggest obstacles to telemedicine in Nigeria. Similarly, Adebayo et al. (2021) emphasized that inadequate bandwidth and unreliable service delivery discourage consistent use of digital health services.

The finding that 48% of teachers lacked adequate knowledge or awareness of telemedicine aligns with Ogunleye, Ajala, and Ajayi, (2023) who reported that low digital literacy and limited sensitization significantly undermine adoption rates among professionals in Nigeria. In addition, the high cost of data (43.3%) resonates with the observations of Adepoju et al. (2021), who identified financial constraints and high data subscription costs as barriers to sustainable telehealth use in Sub-Saharan Africa. The concerns about diagnosis accuracy and privacy also reflect global trends. Gajarawala and Pelkowski (2021) pointed out that skepticism about the accuracy of remote diagnoses, coupled with data security concerns, continues to hinder trust in telemedicine platforms. Finally, the relatively lower but notable proportion citing lack of government policy or institutional support is consistent with Osuagwu et al. (2021), who highlighted weak regulatory frameworks and insufficient institutional backing as systemic challenges to telemedicine expansion in Africa. Therefore, the literature justifies the findings that barriers to effective telemedicine use are multidimensional, spanning infrastructural, financial, knowledge-based, and institutional domains.

The results of the chi-square analyses for both research hypotheses revealed that teachers' demographic characteristics, such as age, gender, years of teaching experience, and educational qualification, did not significantly influence either their awareness or attitudes toward telemedicine. For H_{01} , the lack of significant associations indicates that awareness of telemedicine among teachers was relatively consistent across demographic groups, suggesting that exposure to information about telemedicine is not limited to a specific age bracket, gender, or educational attainment. Similarly, the findings from H_{02} showed that teachers' attitudes toward telemedicine were also not determined by demographic differences, reflecting a uniform perception of telemedicine's potential benefits regardless of personal characteristics. These findings align with previous literature emphasizing that awareness and attitudes toward telemedicine are shaped more by contextual and structural factors than by demographic profiles. For instance, Gajarawala and Pelkowski (2021) observed that the perceived usefulness and trust in telemedicine systems were stronger predictors of adoption than socio-demographic attributes. Likewise, Adu et al. (2022) highlighted that awareness and willingness to use telemedicine in Nigeria were primarily influenced by accessibility, training, and system reliability rather than by teachers' age or gender. Moreover, Alshammari et al. (2021) found that once digital health systems are introduced and users are trained, attitudinal differences across demographic lines become minimal.

Taken together, the findings from both H_{01} and H_{02} suggest that in the context of teachers, the challenge of telemedicine adoption is less about who they are (demographics) and more about what they have access to (resources, infrastructure, and reliable systems). This implies that interventions to improve telemedicine uptake should prioritize awareness

campaigns, provision of affordable access, and digital literacy programmes rather than focusing on demographic targeting.

Conclusion

This study, titled “Exploration of Teachers’ Awareness and Attitude Towards the Use of Telemedicine for Wellness in Mararaba, Nasarawa State,” examined the extent to which teachers are aware of, and willing to adopt, telemedicine as part of their health management practices. Findings revealed that while a significant proportion of teachers in Mararaba have heard about telemedicine and demonstrated positive attitudes towards its usefulness for wellness, their knowledge about its specific functions remains limited. Social media was identified as the main source of information, whereas official government platforms were rarely used. Despite the willingness of teachers to adopt telemedicine, barriers such as poor internet connectivity, high cost of data, inadequate awareness campaigns, and limited institutional support hinder its effective utilization.

The hypothesis testing further established that demographic characteristics such as age, gender, years of teaching experience, and educational qualification did not significantly influence teachers’ awareness or attitudes toward telemedicine. This suggests that the challenges of adoption are largely systemic rather than individual. Therefore, the study concludes that teachers in Mararaba are positively disposed toward telemedicine, but infrastructural and policy gaps must be addressed to facilitate effective uptake.

Recommendations

1. Government and health stakeholders should intensify sensitization efforts through both conventional and digital media to increase teachers’ understanding of telemedicine and its benefits for wellness.
2. Reliable internet connectivity and affordable data access should be prioritized in Nasarawa State to reduce digital exclusion and support seamless telemedicine usage.
3. Regular training programmes on digital literacy and telemedicine use should be integrated into teachers’ professional development to strengthen their confidence and skills.
4. Policymakers should develop clear guidelines that guarantee privacy, confidentiality, and service quality in telemedicine, ensuring trust among teachers and the wider community.
5. Partnerships with telecommunication companies and health institutions can reduce costs, provide affordable devices, and expand access to telemedicine services for teachers.
6. Since teachers rely heavily on social media for information, government agencies should actively disseminate accurate and reliable telemedicine-related information through these channels.

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EVALUATION OF TEACHERS' USE OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) IN TEACHING SCIENCE SUBJECTS IN SENIOR SECONDARY SCHOOLS IN LAGOS STATE, NIGERIA

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Abstract

The study evaluated the availability and use of Information and Communication Technology (ICT) facilities by teachers in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State. It also examined the influence of teachers' gender and discipline on ICT usage, given mixed findings in prior studies. The research adopted a survey design. The population comprised 533 science teachers in public senior secondary schools in Ikorodu. A sample of 230 science teachers was selected using stratified random sampling techniques. Thirteen schools were purposively chosen from 32 public senior secondary schools, to ensure representation across school types and location and 224 teachers returned completed copies of the questionnaire. The instrument collected demographic data and measured teachers' perceptions of ICT use in teaching science subjects. The reliability of the instrument was established using Cronbach's Alpha, yielding a coefficient of 0.82. Data were analyzed using descriptive statistics, t-test, and ANOVA. Findings showed that adequate ICT facilities were available for science teaching in senior secondary schools. It also revealed that most teachers made extensive use of ICT facilities in teaching science subjects (mean = 2.72). (mean of 2.72 suggests moderate, not excessive use -You could say teachers demonstrated a moderate level of ICT usage (mean = 2.72). Furthermore, the results indicated no significant effect of teachers' gender and discipline ($P > 0.05$) - there seem to be inconsistency with the later mention of t-test/ANOVA ($X^2 = 0.421$, $p > 0.05$) or discipline ($X^2 = 0.082$, $p > 0.05$) on their use of ICT. It was concluded that science teachers in Ikorodu extensively utilize ICT facilities in delivering science subjects in senior secondary schools.

Keywords: Evaluation, Information Communication Technology (ICT), Teacher, Science Subject, Teaching

Introduction

Over the past decade, Information and Communication Technology (ICT) has become a transformative force in enhancing teaching effectiveness and student engagement in Nigeria. The global shift from teacher-centered to learner-centered instruction has accelerated ICT adoption in classrooms through tools such as simulations, virtual labs, and interactive platforms (Ogunlade & Olafare, 2020; Yusuf et al., 2019). In Nigeria, policies such as the National ICT in Education Policy have emphasized the integration of digital tools into teaching and learning at all levels of education. Studies indicate that ICT has the potential to enrich instruction, promote active learning, and improve students' performance in science subjects (Okebukola et al., 2020). Despite these benefits, challenges such as inadequate infrastructure, irregular power supply, insufficient ICT training for teachers, and limited access to digital resources hinder its full implementation (Olawale et al., 2021).

Given these challenges, evaluation plays a central role in ensuring that ICT initiatives achieve their intended objectives in education. It involves systematically assessing the extent to which ICT-supported teaching strategies are effectively planned, implemented, and producing desired learning outcomes (Ajani & Olayanju, 2021). Through evaluation, teachers and policymakers can determine the strengths and weaknesses of ICT integration, identify training needs, and make informed decisions for continuous improvement. Without proper evaluation, ICT investments in education risk being underutilized or misaligned with curriculum goals.

In Nigerian secondary schools, especially in science classrooms, ICT tools such as simulations, virtual laboratories, interactive multimedia, and educational software can help simplify complex scientific concepts particularly abstract topics in physics and chemistry and stimulate students' interest. Teachers who adopt ICT effectively are able to create dynamic, interactive learning environments that develop students' higher-order thinking skills (Nwosu & Yusuf, 2022). In Lagos State, as Nigeria's commercial and educational hub, the integration of ICT in secondary school science teaching reflects both opportunities and challenges. Research in Lagos has shown that while many science teachers have positive attitudes towards ICT, the actual level of use remains moderate highlighting the need for localized evaluation such as this study. Factors such as inadequate infrastructure, insufficient training, and unequal distribution of resources across public and private schools limit effective implementation (Oduwaiye et al., 2022).

Despite policy support and recognized benefits, there is limited empirical evidence on the extent of ICT use among science teachers in Ikorodu, creating a gap this study seeks to fill. Such evaluation will provide evidence-based insights for policymakers, teacher training institutions, and school administrators to enhance ICT integration for better learning outcomes.

Hence the specific objectives of the study were;

1. determine the Information Communication Technology facilities available for use for teachers in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State
2. determine the extent to which teachers use Information Communication Technology in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State; and
3. Investigate the effect of teachers' gender, and discipline on the use of Information Communication Technology in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State.

Research Questions

The following research questions were answered in the course of the study.

1. What are the Information communication Technology facilities available for teachers in teaching science subjects in Senior Secondary Schools in Ikorodu Local Government Area, Lagos State?
2. To what extent do teachers use Information Communication Technology facilities in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State?

Research Hypothesis

This hypothesis was formulated to guide the study:

Teachers' gender and discipline have no significant effect on the use of Information Communication Technology in teaching science subjects in Ikorodu Local Government Area, Lagos state.

Methodology

The study adopted a survey research design appropriate for collecting standardized data on teachers' perception and practices. This research design involves the process of gathering information from a representative sample of a chosen population. The survey research design studies the features and opinions of relatively samples of a population through which it tries to determine the incidence and distribution of these features/characteristics and opinions in the population. Owing to its ability to support generalization, the survey method is widely used in educational research.

The population of the study comprised of 533 science teachers in senior secondary schools in Ikorodu Local Government Area, Lagos State.

This study covered thirteen senior secondary schools in Ikorodu Local Government Area. Purposive sampling technique was adopted to select schools with functional science department, the thirteen senior secondary schools from thirty-two senior secondary schools in Ikorodu Local Government area. A sample of 230 science teachers were selected from all the thirteen senior secondary schools at 43% of the population using stratified random sampling technique, using gender, teachers' experience level, and academic discipline as status.

The research instrument used in this study was Teachers' Response to Use of Information and Communication Technology in Teaching Science Subjects (TRICTTSS). The major instrument employed in data collection for this study was a well-structured questionnaire. The questionnaire comprised of two parts: Section A was structured to elicit teachers' responses to their sex, cadre, highest qualification, discipline and year of experience, while section B comprised of 25 items that measured teachers' use of information communication technology in teaching science subjects. The response format was Likert-type, with four response modes of 'Strongly Agree', 'Agree', 'Disagree' and 'Strongly Disagree'. The items were scored on a 4-point Likert scale ranging from 4 (strongly Agreed) to 1 (strongly disagreed).

The instrument was subjected to internal consistency reliability, yielding a Cronbach Alpha reliability of 0.82, indicating good reliability. The pilot sample consisted of teachers in Imota Community Senior secondary School, Imota, Ikorodu, Lagos State., who were not part of the study.

Data was collected by administering the structured questionnaires personally to the science teachers with the help of the Heads of Departments in each institution who facilitated the completion and return of the questionnaires by the teachers. Descriptive statistics which involve the use of tables, simple percentages, mean, standard deviation was used to present and analyse data according to the research questions while inferential statistics used for testing the hypotheses was Chi-Square χ^2 at 0.05 level of significance, suitable for testing relationships between categorical variables.

Results

Research Question One: What are the Information Communication Technology (ICT) facilities available for use by teachers in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State?

To answer this question, ICT facilities available for teaching science subjects were measured using a 4-point Likert scale. The decision rule for interpreting the mean scores was based on the real limits of numbers as follows: 1.00–1.75 = Very Low, 1.76–2.50 = Low, 2.51–3.25 = Moderate, and 3.26–4.00 = High. The frequency, percentage, mean, and standard deviation of teachers' responses are presented in Table 1.

Table 1: Information Communication Technologies Facilities Available for use for Teachers in Teaching Science Subjects.

S/N	Item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Std. Deviation
1	I use the internet to search for teaching materials.	10(4.3%)	21(9.1%)	103(44.6%)	97(42.0%)	3.24	.792
2	There are enough computers in my school.	13(5.6%)	59(25.5%)	135(58.4%)	24(10.4%)	2.74	.719
3	Our computers are connected to the internet.	17(7.4%)	73(31.6%)	123(53.2%)	18(7.8%)	2.61	.736
4	My school has educational software for teaching.	25(10.8%)	63(27.3%)	124(53.7%)	19(8.2%)	2.59	.791
5	There is a functional computer laboratory in my school.	13(5.6%)	99(42.9%)	90(39.0%)	29(12.6%)	2.58	.780
6	There is digital library to source for materials.	66(27.5%)	40(16.7%)	74(30.8%)	60(25.0%)	2.50	.807
7	Multimedia facilities are available for teaching.	28(12.1%)	97(42.0%)	86(37.2%)	20(8.7%)	2.42	.814
8	We have interactive smart boards in our school.	36(15.6%)	84(36.4%)	91(39.4%)	20(8.7%)	2.41	.854

9	There are enough projectors in my school.	27(11.7%)	99(42.9%)	94(40.7%)	11(4.8%)	2.39	.754
10	My school has public address systems in all classes.	26(11.3%)	119(51.5%)	60(26.0%)	26(11.3%)	2.37	.829

Source: Field Work (Olagunju & Akanji, 2025)

Table 1 shows that the mean responses ranged from 2.37 to 3.24, while the standard deviations ranged from 0.719 to 0.854, indicating moderate variability in responses. Based on the decision rule, the overall pattern indicates a moderate level of availability of ICT facilities in schools. The highest-rated item was the use of the internet to search for teaching materials (Mean = 3.24), indicating that internet-based resources are the most accessible and frequently utilized ICT facility among teachers. This suggests that teachers rely more on digital information retrieval for lesson preparation than on advanced instructional technologies.

Similarly, the availability of computers (Mean = 2.74) and internet connectivity (Mean = 2.61) fell within the moderate category, suggesting that basic ICT infrastructure exists in many schools, although not at an optimal level. Educational software (Mean = 2.59) and functional computer laboratories (Mean = 2.58) were also moderately available, indicating that schools have begun integrating foundational digital learning resources into instructional processes.

However, digital libraries (Mean = 2.50), multimedia facilities (Mean = 2.42), interactive smart boards (Mean = 2.41), projectors (Mean = 2.39), and public address systems (Mean = 2.37) were rated low. This pattern suggests that while foundational ICT resources are moderately available, advanced instructional technologies remain limited. This reflects uneven ICT infrastructure development and indicates that ICT integration in these schools is still largely basic rather than advanced.

Research Question 2: To what extent do teachers use Information Communication Technology facilities in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos?

To answer this question, Teachers' use of ICT facilities in teaching science subjects was measured using a 4-point Likert scale, with the same decision rule applied. The frequency, percentage, mean, and standard deviation of responses are presented in Table 2.

Table 2: Teachers' use of information communication technologies facilities in teaching science subjects.

S/N	Item	Strongly Agree				Mean	Std. Deviation
		Strongly Disagree	Disagree	Agree			
1	ICTs help students to develop practical skills in their science subjects.	9(3.9%)	34(14.7%)	132(57.1%)	56(24.2%)	3.02	.740
2	ICTs contribute to my success as a science teacher.	11(4.8%)	42(18.2%)	115(49.8%)	63(27.3%)	3.00	.805
3	Using ICTs enable me to teach comprehensively.	11(4.8%)	63(27.3%)	95(41.1%)	62(26.8%)	2.90	.796
4	Using ICTs reduce my workload.	36(15.0%)	13(5.4%)	104(43.3%)	87(36.3%)	2.90	.851
5	Using ICT facilities to teach science subjects enable me to interact with students.	13(5.6%)	53(22.9%)	134(58.0%)	31(13.4%)	2.79	.740
6	Most of my students possess the skills to use ICTs in learning science subjects.	15(6.5%)	48(20.8%)	147(63.6%)	21(9.1%)	2.75	.707
7	I use public address system when i have a large class.	16(6.9%)	76(32.9%)	109(47.2%)	30(13.0%)	2.66	.790
8	I incorporate technology in teaching such that my students use technology to collaborate with other individuals in order classes or schools	22(9.5%)	63(27.3%)	127(55.0%)	19(8.2%)	2.62	.770
9	I use projector in every lesson.	28(12.1%)	120(51.9%)	75(32.5%)	8(3.5%)	2.27	.716
10	Students submit assignments through email.	39(16.9%)	106(45.9%)	79(34.2%)	7(3.0%)	2.23	.762
Grand Average Mean and Standard Deviation						2.72	.570

Source: Field Work (Olagunju & Akanji , 2025)

Table 2 shows that the mean responses ranged from 2.23 to 3.02, while the standard deviations ranged from 0.707 to 0.851. The grand mean of 2.72 indicates a moderate extent of ICT usage among science teachers.

The highest-rated item was that ICT helps students develop practical skills in science subjects (Mean = 3.02), followed by ICT contributing to teachers' success (Mean = 3.00). These findings indicate that teachers perceive ICT as an effective instructional tool for improving learning outcomes and teaching effectiveness. The use of ICT for comprehensive teaching (Mean = 2.90) and workload reduction (Mean = 2.90) also fell within the moderate category, suggesting that teachers see ICT as improving instructional efficiency. Student interaction through ICT (Mean = 2.79), students' ICT competence (Mean = 2.75), use of public address systems (Mean = 2.66), and collaborative technology integration (Mean = 2.62) all recorded moderate levels, indicating that ICT is used mainly for instructional support rather than full collaborative engagement.

However, the use of projectors in every lesson (Mean = 2.27) and email submission of assignments (Mean = 2.23) were low. This suggests that although ICT is integrated into teaching, its use for classroom presentation and digital assessment remains limited. Overall, the findings indicate that ICT use among science teachers is functional and moderately established, but not yet sufficiently advanced to support fully interactive and technology-driven teaching practices.

Research Hypotheses: Teachers' gender has no significant effect on their use of information communication technology in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State.

Table 3: Effect of Teachers' Gender on their use of Information Communication Technology in Teaching Science Subjects

Sex	N	Mean	SD	df	t	Sig	P	Remark
Male	84	3.03	.591	229	-0.806	0.421	>0.05	NS
Female	147	3.09	.540					

Note: * $p > .05$ Source: Field Work (Olagunju & Akanji, 2025)

The test of independent T-test in table 3 shows that 84 were males while 147 were females. It further shows that the males had the mean and standard deviation of 3.03 and .591 respectively while the females had mean and standard deviation of 3.09 and .540 respectively. The result revealed that teachers' gender has no significant effect on their use of information communication technology in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State. (t value = -0.806, Sig. = 0.421 > $p = 0.05$).

Teachers' discipline has no significant effect on their use of information communication technology in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State.

Table 7: Effect of Teachers' discipline on their use of Information Communication Technology in Teaching Science Subjects

	Sum of Squares	df	D	Mean Square	F	Sig.	P	Remark
Between Group	145	8	268	56.	1.	0.082	>0.05	NS

s				
Within Group	552	7019.	22	31. 620
s				
Total	697	7469.	30	2

Note:* $p > .05$ Source: Field Work (Olagunju & Akanji, 2025)

Table 4 shows the results of Analysis of Variance (ANOVA) that was conducted to test the hypothesis and the results are presented in Table 7. The result of the analysis of variance in the table 4 shows F value of 1.780 with Sig of 0.082, since the Sig value is >0.05 , it implies that teachers' discipline has no significant effect on their use of information communication technology in teaching science subjects in senior secondary schools in Ikorodu Local Government Area, Lagos State

Discussion of Findings

The findings of this study revealed that science teachers in senior secondary schools in Ikorodu Local Government Area of Lagos State make considerable use of ICT facilities in teaching. The high mean score for the use of the internet to search for teaching materials suggests that teachers rely heavily on easily accessible digital resources to support lesson preparation and instructional delivery. This pattern may be explained by the relative affordability and accessibility of internet-enabled mobile devices compared to more sophisticated instructional technologies. In many Nigerian secondary schools, internet access through personal smartphones has become more practical for teachers than depending on school-owned digital infrastructure. This finding aligns with Nwosu and Yusuf (2022), who reported increasing dependence on online resources among Nigerian science teachers, especially where conventional teaching resources are insufficient. From the perspective of the Technology Acceptance Model, teachers' frequent use of internet resources may reflect their perception of usefulness and ease of use, which are critical determinants of technology adoption.

The availability of computers and internet connectivity in schools, although moderate, reflects gradual improvement in ICT infrastructure in Lagos State. However, this moderate availability may be linked to uneven government funding, inconsistent policy implementation, and disparities in school management priorities. While urban areas such as Ikorodu may have better access to ICT infrastructure compared to rural areas, infrastructural challenges such as unstable electricity supply and inadequate maintenance culture may still limit effective utilization. This finding is consistent with Ojo and Bello (2023), who noted that Lagos State schools have relatively better ICT access than many other states, although distribution remains uneven. The Diffusion of Innovations helps explain this pattern, as innovation adoption often occurs gradually and unevenly depending on institutional readiness and resource availability.

The relatively lower availability and use of multimedia facilities, interactive smart boards, and projectors indicate that advanced ICT tools are not yet fully integrated into science classrooms. This may be due to high procurement costs, insufficient teacher training, poor technical support, and weak institutional policies guiding ICT integration. In addition, the lack of continuous professional development may reduce teachers' confidence in using advanced technologies. This finding corroborates Olawale et al. (2021), who emphasized inadequate multimedia tools as a barrier to effective ICT integration. The Technological Pedagogical Content Knowledge provides further explanation, as effective integration of advanced technologies requires teachers to combine technological knowledge with pedagogical and subject-content knowledge.

In terms of instructional use, the findings indicated that teachers perceived ICT as enhancing student learning, developing practical skills, and reducing teacher workload. These

positive perceptions may be influenced by the increasing emphasis on learner-centered pedagogy and the growing recognition of digital literacy as an essential educational competency. Teachers may also perceive ICT as a means of simplifying lesson delivery and improving classroom engagement. This finding is consistent with Igbokwe et al. (2023), who found that ICT integration improves student engagement, conceptual understanding, and instructional efficiency. However, the low use of collaborative technology platforms and email-based assignments suggests that ICT integration remains largely teacher-centered rather than learner-centered. This may be due to limited student access to digital devices, inadequate internet subscription, and lack of institutional policies promoting blended learning. Abidoye et al. (2019) similarly found that teachers often use ICT for content delivery rather than collaborative learning.

The analysis further revealed no significant difference in ICT usage based on teachers' gender. This suggests that access to ICT facilities and training opportunities may have become more inclusive, reducing the gender gap traditionally associated with technology adoption. The finding may also reflect changing societal attitudes toward gender and digital competence in urban educational settings. This aligns with Okebukola et al. (2020), who observed that gender is no longer a significant factor in ICT integration among teachers in urban areas due to improved access to professional development opportunities.

The study also revealed that teachers' discipline (subject specialization) had no significant effect on ICT use. This suggests that ICT competence is increasingly becoming a general professional skill rather than a discipline-specific requirement. This may be due to standardized teacher training programmes, curriculum reforms, and general policy emphasis on ICT integration across all subject areas. Oduwaiye et al. (2022) similarly reported consistent ICT use across disciplines among Lagos State teachers, attributing this to uniform exposure to ICT-focused professional development programmes.

Conclusion

This study concluded that science teachers in senior secondary schools in Ikorodu Local Government Area of Lagos State demonstrate substantial use of ICT facilities in their instructional practices, especially for accessing teaching materials online and enhancing lesson delivery. While ICT usage is widespread, the use of more advanced and collaborative tools remains limited. Gender and discipline do not significantly influence ICT usage, indicating a general acceptance of ICT across teacher demographics.

Recommendation.

From the result of the study, it can therefore be recommended that: (a) the Government should ensure that all teachers in public secondary schools have equal access to continuous professional development programmes. Trainings should be scheduled at convenient times to accommodate teachers' work schedules and minimize disruptions to teaching activities. (b) schools should encourage peer mentoring and collaborative learning among teachers. Experienced teachers can mentor the new ones, fostering a culture of continuous improvement and shared knowledge.

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DIGITAL MEDIA AND CIVIC ENGAGEMENT: IMPLICATIONS FOR SOCIAL STUDIES EDUCATION

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Abstract

In the contemporary digital era, media has emerged as a powerful catalyst for civic awareness, participation, and activism, particularly among young people. Since Social Studies education is committed to nurturing informed, responsible, and active citizens, it must adapt to the realities of a rapidly evolving digital society. This paper explored the interplay between digital media and civic engagement, emphasising its implications for Social Studies education. Specifically, it examines how social media platforms, online news outlets, and digital communication tools influence students' political awareness, social consciousness, and civic participation, while also highlighting associated challenges such as misinformation, the digital divide, and issues of cyberethics. The paper argued that to remain relevant and effective, Social Studies education must integrate digital literacy, media ethics, and responsible online participation into its pedagogy. By harnessing the opportunities of digital media, educators, policymakers, and curriculum developers can better prepare learners to become active, critical, and globally conscious citizens within a digital democracy.

Keywords: Digital Media, Civic Engagement, Social Studies Education, Digital Literacy, Media Ethics

Introduction

The rise of digital media has fundamentally transformed nearly every dimension of human existence; communication, learning, civic participation, governance, and even identity formation. In today's hyper-connected world, the pervasive presence of mobile technologies, social networking platforms, and user-generated content has redefined how individuals perceive, interact with, and influence their societies (Castells, 2012). The convergence of technology and civic life has created dynamic digital ecosystems where citizens, especially young people, can voice opinions, mobilise for change, and hold governments accountable in unprecedented ways.

The ubiquity of smartphones and internet connectivity has democratized access to information and empowered citizens to participate actively in public affairs. For youths, particularly students, these digital platforms have become fertile grounds for political expression, community organization, social advocacy, and civic discourse (Loader, Vromen, & Xenos, 2014). Through blogs, podcasts, vlogs, hashtags, and online petitions, young people are now shaping narratives and influencing policy directions at both national and global levels. Within this landscape, Social Studies education, which is fundamentally committed to nurturing informed, active, and responsible citizens (National Council for the Social Studies [NCSS], 2016), must re-envision its pedagogical approaches to include digital media as both a tool and a context for civic learning. In an era defined by digital petitions, hashtags such as #EndSARS and #BringBackOurGirls, and virtual town hall meetings, the boundaries of civic engagement are rapidly expanding beyond traditional spaces of political participation. Consequently, educators must equip learners not only to participate in physical civic arenas,

such as voting and community service, but also to navigate, engage, and contribute meaningfully within digital public spheres (Bennett, 2008; Kahne, Hodgin, & Eidman-Aadahl, 2016).

This paper therefore explores the intricate relationship between digital media and civic engagement, with a focus on how Social Studies education in Nigeria can evolve to prepare learners for participatory, critical, and responsible digital citizenship in the 21st century.

Conceptual Clarifications

Digital Media

Digital media encompasses electronic tools, platforms, and networks that employ digital technologies for the creation, dissemination, and interaction with information (Lievrouw & Livingstone, 2010). This includes social networking sites (e.g., Facebook, X/Twitter, Instagram, TikTok), online news portals, podcasts, blogs, vlogs, and instant messaging applications such as WhatsApp and Telegram. Unlike traditional media, which is predominantly unidirectional, digital media fosters interactive, participatory, and user-driven communication (Jenkins, 2009). The participatory culture it promotes allows individuals to move from passive consumption of information to active co-creation of content, thus blurring the line between information producers and consumers.

Civic Engagement

Civic engagement refers to the wide range of individual and collective actions aimed at addressing public concerns, improving community well-being, and influencing political and social processes (Putnam, 2000). Traditionally, this has included voting, volunteering, attending town meetings, and engaging in advocacy. In the digital era, however, civic engagement extends to activities such as signing online petitions, participating in hashtag activism, crowdfunding for social causes, and engaging in civic education through digital storytelling (Gil de Zúñiga, Jung, & Valenzuela, 2012). These digital forms of engagement amplify citizens' voices and create inclusive avenues for participation, especially for youths who may otherwise feel alienated from conventional political structures.

Social Studies Education

Social Studies is an interdisciplinary field that integrates concepts from the social sciences and humanities to promote civic competence and responsible citizenship (NCSS, 2016). In Nigeria, Social Studies is designed to instill democratic values, national consciousness, tolerance, and social responsibility among learners (Federal Republic of Nigeria [FRN], 2013). The integration of digital media into Social Studies pedagogy aligns with these objectives by fostering critical thinking, collaborative learning, and active engagement with contemporary societal issues. By embedding digital literacy and civic digital competence within its curriculum, Social Studies education can empower students to participate effectively in both physical and virtual civic communities.

Digital Media and Civic Engagement: The Interplay

Digital media has emerged as one of the most transformative forces shaping civic awareness, participation, and democratic engagement among young people worldwide. Its impact can be explored through several interrelated dimensions:

Political Awareness and Participation

Digital platforms have revolutionized political communication, granting citizens immediate access to political information, policy debates, and government accountability mechanisms

(Boulianne, 2015). Through platforms like X (formerly Twitter), Facebook, and YouTube, young people follow legislative updates, interact with public officials, and mobilise support for political causes. The #EndSARS movement in Nigeria, for example, showcased the power of social media in facilitating real-time mobilization, organizing protests, and amplifying marginalised voices (Iwilade, 2020). Similarly, global movements such as the Arab Spring, #BlackLivesMatter, and #FridaysForFuture highlight how digital platforms have become central to civic consciousness and youth activism (Howard & Hussain, 2013). These examples demonstrate that social media is not merely an entertainment hub but a catalyst for political empowerment and civic agency.

Social Mobilisation and Collective Action

Digital media has made social mobilisation more decentralised, participatory, and efficient. Through viral hashtags, online campaigns, and crowdfunding platforms, individuals and groups can quickly coordinate efforts toward social causes. Tufekci (2017) describes this phenomenon as “networked activism,” where the traditional barriers to participation, geography, finance, and hierarchy, are significantly reduced. In Nigeria, movements such as #NotTooYoungToRun exemplify how digital advocacy can influence national policy and foster inclusivity in governance. Such participatory culture aligns with the core values of Social Studies education, which seeks to promote collaboration, empathy, and collective problem-solving for social progress.

Civic Discourse, Critical Thinking, and Democratic Dialogue

Digital media platforms function as modern agoras; public spheres where individuals deliberate on social and political issues. Students engage in digital discussions, commentaries, and debates that stimulate civic reasoning and enhance their understanding of democratic values (Coleman & Blumler, 2009). However, the digital environment also presents challenges such as misinformation, echo chambers, and cyber polarisation. Therefore, Social Studies educators must guide learners in evaluating information sources, identifying bias, and practicing respectful digital communication. Integrating media literacy into Social Studies curricula strengthens students’ analytical abilities, critical reasoning, and ethical judgment; skills essential for sustainable democratic participation.

Digital Citizenship and Ethical Participation

Digital citizenship refers to the norms, responsibilities, and competencies required for ethical, responsible, and informed engagement in online environments (Ribble, 2015). It encompasses respecting privacy, safeguarding digital identities, countering cyberbullying, fact-checking information, and engaging constructively in online discussions. For Social Studies education, fostering digital citizenship goes beyond technical skills; it involves cultivating moral and civic virtues that sustain democratic societies in digital contexts. Learners must be empowered to act as responsible digital citizens who not only consume information critically but also contribute positively to the digital commons through empathy, respect, and social responsibility.

Toward a Digitally Empowered Social Studies Education

To actualise these goals, Social Studies education in Nigeria must embrace a transformative curriculum that integrates digital media literacy, participatory learning models, and project-based civic engagement activities. Teachers should incorporate social media simulations, virtual debates, and digital storytelling as instructional strategies to help students experience civic participation firsthand. Institutions must also invest in teacher professional development to enhance digital pedagogical competencies. By embedding digital media within the fabric of civic education, Social Studies can bridge the gap between classroom learning and real-world

participation; preparing a generation of learners who are not just informed about democracy but are active, ethical, and innovative contributors to Nigeria's digital civic landscape.

Challenges of Digital Civic Engagement

Despite the transformative power of digital media in expanding civic participation, its use for democratic engagement is fraught with multifaceted challenges. These challenges stem from the interplay of technological, ethical, and socio-economic factors that influence who participates, how participation occurs, and to what extent such engagement translates into tangible civic outcomes.

Misinformation, Disinformation, and Fake News

One of the most pervasive challenges of digital civic life is the spread of false or misleading information, popularly known as misinformation or disinformation. The speed and virality of social media allow unverified claims, manipulated images, and conspiracy theories to circulate widely, shaping public opinion and sometimes inciting social unrest (Wardle & Derakhshan, 2017).

During civic events such as elections or protests, misinformation can distort facts, polarize citizens, and erode trust in democratic institutions (Pennycook & Rand, 2018). In Nigeria, false narratives about political candidates, ethnic groups, or government policies often spread faster than corrections, exacerbating division and apathy.

To counter this, Social Studies educators must emphasize media literacy as a civic competence; teaching students how to verify sources, fact-check claims, and understand algorithmic biases in digital communication. Media literacy education not only protects democracy from falsehoods but also cultivates critical thinkers who make informed civic decisions.

The Digital Divide and Inequitable Access

The promise of digital participation is undermined by inequalities in access to digital technologies; a condition often referred to as the digital divide. This divide manifests not only in terms of infrastructure and connectivity but also in the skills required to use digital tools effectively (van Dijk, 2020). In Nigeria, disparities in broadband access, device ownership, and electricity supply disproportionately affect students in rural and low-income communities. Consequently, civic engagement through digital means becomes an urban privilege rather than a universal right.

Social Studies education must therefore advocate for digital inclusion; ensuring that all learners, regardless of location or socioeconomic status, have equitable opportunities to participate in civic life. Governments, NGOs, and educational institutions must invest in ICT infrastructure, capacity building, and affordable internet access to close the participation gap.

Cyberethics, Privacy, and Online Safety

Digital spaces, while offering new avenues for expression and participation, have also become arenas for harassment, cyberbullying, privacy violations, and unethical digital practices (Floridi, 2014). The anonymity and reach of online platforms sometimes encourage uncivil discourse, hate speech, and the spread of extremist ideologies, which threaten the values of democracy and respect for diversity. For Social Studies education, this raises the urgent need to incorporate cyberethics, the moral principles guiding online behaviour, into classroom instruction. Students should learn about digital footprints, data privacy, online respect, and the responsible use of technology. Cultivating cyberethics fosters digital civility, empathy, and moral responsibility, which are vital components of global citizenship.

Superficial Engagement and Clicktivism

While digital tools facilitate unprecedented participation, not all forms of online engagement are meaningful. The phenomenon of “clicktivism”, performing symbolic online actions such as liking, sharing, or reposting without substantive involvement, represents a superficial form of activism (Morozov, 2011). Such low-effort participation may create an illusion of civic contribution without resulting in real social change. For instance, online solidarity campaigns may trend for days but fade without policy impact or community action. Social Studies educators must therefore teach learners to move beyond performative activism toward transformative civic participation; where digital engagement is connected to real-world advocacy, volunteering, and policy influence. This balance between online and offline action is crucial for sustainable civic impact.

Implications for Social Studies Education

To remain relevant and responsive in the digital era, Social Studies education must reimagine its objectives, pedagogies, and assessment strategies in ways that prepare learners for meaningful digital citizenship. The following implications highlight pathways for curriculum transformation and pedagogical renewal.

1. The curriculum should explicitly incorporate digital literacy; the ability to access, analyse, evaluate, and create digital content responsibly (Hobbs, 2017). Students should learn to detect misinformation, understand media biases, and use online tools for civic expression. Embedding these competencies ensures that civic education aligns with the realities of the information society.
2. Teachers are the central agents of pedagogical innovation. Continuous capacity building in digital pedagogy, media analysis, and civic technology is essential (Redecker, 2020). Training programmes should empower teachers to integrate social media, virtual simulations, and digital storytelling into classroom practices, making civic learning both interactive and experiential.
3. Social Studies lessons must promote responsible and ethical online behavior by addressing topics such as cyberbullying, data protection, intellectual property, and respect for diversity in virtual environments. Teaching digital citizenship cultivates self-discipline, empathy, and respect; values critical for peaceful coexistence in both physical and digital communities.
4. Students should be encouraged to engage in hands-on digital civic projects such as blogging, online advocacy, e-volunteering, or digital storytelling. Such experiential approaches connect theory with practice, enhancing civic competence (Kahne & Middaugh, 2012). For instance, learners could initiate online campaigns to address community challenges or participate in virtual policy dialogues with youth organizations.
5. Institutional and governmental support is indispensable for sustainable digital civic education. Authorities must invest in ICT infrastructure, stable electricity, and internet access across schools (Adu & Olaoye, 2021). Policy reforms should also integrate digital citizenship frameworks into national curricula to ensure systemic adoption.

Suggestions

1. Curriculum developers should embed digital citizenship, media literacy, and civic competence modules in all levels of Social Studies education.
2. Teacher education institutions should integrate media literacy, cyberethics, and digital pedagogy into teacher preparation programmes.
3. Government agencies must expand broadband access, invest in ICT facilities, and provide technological support to underserved schools and communities.

4. Social Studies educators should design participatory digital projects that empower learners to use online platforms for addressing real-life civic issues.
5. Students should be encouraged to utilize social media responsibly for constructive civic engagement, informed dialogue, and collective problem-solving.

Conclusion

Digital media has indelibly transformed the nature, scope, and dynamics of civic life in the twenty-first century. No longer confined to physical spaces such as town halls or polling units, civic participation now thrives within expansive digital ecosystems, interactive environments where dialogue, mobilisation, and activism unfold with remarkable immediacy and influence. From online advocacy campaigns to hashtag movements, citizens, particularly the youth, have discovered new avenues for political expression, social responsibility, and democratic engagement. These developments signify a profound redefinition of citizenship in the digital era: one that transcends geographical boundaries and traditional institutional channels, emphasizing interconnectedness, immediacy, and inclusivity.

For educators, and especially for Social Studies practitioners, this digital revolution presents both immense opportunities and compelling obligations. On the one hand, digital media provides unprecedented access to information, platforms for creative civic expression, and tools for participatory learning. On the other hand, it exposes learners to misinformation, cyberbullying, ethical dilemmas, and structural inequalities in digital access. The task before Social Studies education, therefore, is to navigate these dual realities with wisdom and intentionality—harnessing the positive potential of digital media while mitigating its risks.

To achieve this, Social Studies pedagogy must evolve from a content-centered model to a competency-based, participatory framework that integrates digital literacy, critical thinking, and ethical reasoning into every dimension of civic learning. Learners must not only know their rights and responsibilities as citizens but also develop the cognitive and ethical skills necessary to engage meaningfully in digital public life. This involves the ability to evaluate online information critically, discern truth from falsehood, respect diverse perspectives, and use digital platforms for social good rather than manipulation or hostility.

In Nigeria and across the Global South, the challenges of infrastructure deficits, digital divides, and inadequate teacher preparation remain significant barriers to achieving inclusive digital civic participation. Yet, these obstacles also present a call to action for policymakers, educators, and stakeholders to invest in robust ICT infrastructure, equitable access, and professional development for teachers. Only when teachers themselves are digitally literate and pedagogically equipped can they nurture students who are capable of navigating the complexities of digital citizenship.

Moreover, the future of Social Studies education in Nigeria must be anchored in transformative, experiential learning—where students do not merely study civic concepts abstractly but experience civic participation through digital simulations, online community projects, and virtual policy dialogues. Such authentic learning experiences bridge the gap between theoretical knowledge and practical civic engagement, empowering learners to become agents of democratic renewal and social innovation.

In essence, the integration of digital media into Social Studies education represents more than a pedagogical adjustment; it is a democratic imperative. In an era where democracy increasingly unfolds in virtual spaces, the capacity to engage ethically, critically, and constructively online has become as vital as participation in traditional civic processes. By aligning its methods, curriculum, and objectives with the realities of the digital age, Social Studies education can cultivate a generation of digitally responsible, socially conscious, and ethically grounded citizens; individuals who are not only informed observers of public life but also active architects of a just, inclusive, and sustainable digital democracy.

In this regard, the reimagined Social Studies classroom must function as both a laboratory for digital citizenship and a nursery for democratic values; a place where learners explore, question, and shape their societies through critical dialogue and informed action. The future of civic life, therefore, depends on how effectively educators today prepare learners to think, communicate, and act with integrity in both physical and digital communities. Only then can education fulfill its timeless mission: to empower citizens who will not merely adapt to a digital world but will ethically and intelligently transform it for the common good.

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ENHANCING TEACHERS' MORALE AND PRODUCTIVITY IN PRIMARY SCHOOLS THROUGH MOTIVATION FOR SUSTAINABLE DEVELOPMENT

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Abstract

This study examined how motivation enhances teachers' morale and productivity in primary schools for sustainable development. A survey research design was adopted for the study. The target population comprised 1,476 primary school teachers in Bwari Area Council, Abuja, out of which 137 teachers were purposively selected from ten primary schools. Three research questions guided the study: the motivational factors that can impact on primary school teachers' productivity; the extent to which primary school teachers' morale can influence their productivity; and the strategies that can enhance primary school teachers' morale and productivity for sustainable development. A self-structured questionnaire, validated by experts from the Faculty of Education at NOUN, was used for data collection. The reliability of the instrument was confirmed with a Cronbach's Alpha coefficient of 0.75. The instrument was administered and the data collected were analyzed using descriptive statistics (frequency, mean, and standard deviation). The findings revealed that teachers' morale, which derives from job satisfaction and related motivational variables, can boost the productivity of primary school teachers to a very high extent. Motivational factors such as professional training, regular promotion, public recognition, incentives, and delegation of responsibilities, as well as the building of a strong school culture and effective communication by school administrators, were found to enhance teachers' morale and productivity. Based on these findings, the study recommends that education stakeholders and policymakers implement measures that provide adequate motivational support to enhance teachers' morale and productivity in primary schools for sustainable development.

Keywords: *Motivation, Teachers' Morale, Productivity, Transformation, Sustainable Development*

Introduction

Education is a crucial instrument for national development, serving to foster individual worth, societal growth, and the achievement of national goals (FRN, 2013). It is broadly conceived as a process of providing knowledge and skills to individuals to enable them to develop physically, mentally, socially, emotionally, spiritually, politically, and economically. Consequently, education has been listed among the six transformations necessary to achieve sustainable development goals and fulfil the 2030 Agenda (United Nations Sustainable Development Group, 2025). For education to fulfil these aspirations, it must be sustained and made productive. Productivity in education refers to the ability to produce competent graduates using appropriate skills, resources, and time. It connotes the quantity of output generated by a unit of production input within a given time frame. Productivity is widely recognised as a key driver of economic growth and development, requiring the cultivation of skills and capabilities needed for effective task performance (Mbanefo, 2019).

Managing education for transformation and sustainable development necessitates significant changes in teachers' professional dispositions and the efficient conservation of human and material resources to reduce wastage and ensure system stability. Transformation,

in this context, refers to a comprehensive change in the form, nature, or character of a teacher that results in improved performance. It is a profound change driven by professional training and intrinsic satisfaction. A fundamental step towards such transformation is motivation. Motivation may be defined as the drive or energy that propels an individual towards purposeful action. In the management context, it is the force that enables people to achieve organizational objectives (Nwankwo, 2014). Morale, on the other hand, refers to the mental and emotional condition—characterized by enthusiasm, confidence, zeal, cheerfulness, or loyalty—of an individual or group with respect to the tasks at hand. Teachers' morale is the overall attitude, satisfaction, and outlook of teachers during their engagement with school administration (Mbanefo, 2024). It can either facilitate or hinder productivity, depending on the prevailing administrative culture. Teacher productivity refers to how effectively teachers deploy their time, energy, and resources to support learning and improve student outcomes. It is shaped by variables such as teaching methodology and classroom management. Since teachers are the primary transmitters of knowledge, skills, and values, their motivation is pivotal to the achievement of educational goals.

However, primary school teachers frequently encounter challenges such as low morale, inadequate resources, and limited professional development opportunities. Motivation of teachers can address these challenges by enhancing commitment, job satisfaction, and overall performance. Although prior studies have demonstrated that motivation positively influences teacher productivity, research gaps remain, particularly in the context of primary schools in Nigeria. This study, therefore, investigated how motivation impacts the morale and productivity of primary school teachers in Bwari Area Council, Abuja, with a view to contributing evidence-based insights for policy and practice.

Statement of the Problem

Despite the vital role that teachers play in shaping students' academic experiences and achievements, growing concern exists about the declining levels of productivity and job satisfaction among primary school teachers in Nigeria. Many teachers are either leaving the profession or considering doing so, citing challenges such as poor and irregular salary payments, lack of recognition, limited professional growth opportunities, and the absence of adequate incentives. These challenges have had ripple effects on public perception of teaching as a profession, with some parents actively discouraging their children from pursuing teaching careers (Okeke & Mtyuda, 2017). The absence of adequate motivation among teachers often manifests in lateness, absenteeism, strained teacher–principal relationships, disrespect for institutional authority, poor hygiene standards, and weak student–teacher engagement—all of which point to an urgent need for systematic motivational interventions. According to Ibrahim (2023), student failure is also linked to poor teacher deployment, unclear promotion systems, and personal factors such as emotional stress and family background. These concerns underscore the importance of examining how a well-designed reward and motivation system can uplift teacher morale and performance. This study, therefore, investigated how motivation affects teacher morale and productivity for sustainable development in primary schools in Bwari Area Council, Abuja, with the aim of identifying key motivational factors that transform teachers' morale and productivity, to improve educational effectiveness and student learning outcomes.

Purpose of the Study

The purpose of this study was to examine the impact of motivation on the morale and productivity of primary school teachers. Specifically, the study sought to:

- i. examine the motivational factors that impact the productivity of primary school teachers.

- ii. ascertain the extent to which teachers' morale impacts their productivity for sustainable development.
- iii. determine the strategies that can enhance primary school teachers' morale and productivity for sustainable development.

Research Questions

The study was guided by the following research questions:

1. What are the motivational factors that impact primary school teachers' productivity?
2. To what extent does primary school teachers' morale impact their productivity for sustainable development?
3. What strategies can enhance primary school teachers' morale and productivity for sustainable development?

Literature Review

Studies have consistently revealed that factors such as regular delegation of authority, professional development, timely promotions, public recognition, and the provision of incentives significantly influence teachers' motivation, morale, job satisfaction, and productivity (Folami, 2025; Ige, 2016). Teachers' morale refers to the overall attitude, enthusiasm, and satisfaction that teachers exhibit towards their profession and the educational environment in which they operate. High morale is encouraged and sustained with effective leadership and a positive organizational culture. According to Mbanefo (2024), strategies that administrators can adopt to foster employee satisfaction include: leading by example to build strong team morale; demonstrating empathy and care; maintaining transparency in communicating organizational changes; and building trust. High morale, in turn, leads to greater job satisfaction and sustained professional dedication.

Professional development through in-service training equips teachers with the competencies required to handle contemporary classroom challenges effectively (Eboka & Mbanefo, 2016). Recognition and rewards—whether intrinsic (e.g., empowerment, trust, and feedback) or extrinsic (e.g., promotions and salary increments)—are critical for reinforcing positive behaviour and performance (Onuegbu, 2023; Tella, Ayeni, & Popoola, 2017). Recognition enhances teachers' sense of value and fosters a positive working environment, while, incentives provide added security that encourages sustained high performance. Consequently, sustainability refers to practices that support long-term economic stability without negatively impacting the social, environmental, and cultural dimensions of the community. It encompasses strategies for conserving material, human, and financial resources through innovation, and making more efficient use of available resources to ensure systemic stability. Sustainable development can only be achieved through a fundamental transformation of the way resources are managed (Mbanefo, 2024).

Motivation in education is guided by several key principles, which Mbanefo (2024) identified as follows: (a) *Participation*: Teachers should be actively involved in decisions that directly affect them. When school staff participate in decision-making processes, they are more likely to commit to achieving set goals. (b) *Communication*: Keeping staff well-informed about the school's goals, changes, progress, and achievements fosters a stronger sense of belonging and teamwork. (c) *Recognition*: When teachers are acknowledged for their efforts and experience job satisfaction, they tend to be more dedicated to their work. (d) *Rewards*: Both internal and external rewards play a role in motivation. While personal satisfaction from meaningful work is intrinsically powerful, external rewards such as praise, tokens, and symbolic incentives also encourage learning and achievement. (e) *Delegation of Authority*: School leaders who trust and empower capable staff by assigning them authority within clear

guidelines build confidence and competence, promote professional growth, and make teachers feel valued in their roles.

Usman (2022) described motivation as an internal state that drives and channels behaviour towards goals. Motivation is broadly categorised into intrinsic and extrinsic types. This study is anchored on two major motivation theories: Maslow's hierarchy of needs and Herzberg's two-factor theory.

Maslow's Hierarchy of Needs: Maslow's theory suggests that people are motivated by five hierarchical levels of needs: physiological, safety, social (affiliation), esteem, and self-actualisation. For teachers, this translates into needing adequate salaries and working conditions (physiological needs), job security and fair treatment (safety needs), positive relationships with colleagues (social needs), recognition and respect (esteem needs), and opportunities for personal growth and fulfilment (self-actualisation). According to Maslow, once a lower-level need is met, the next level becomes the primary source of motivation. This theory is relevant to the present study as it explains how different categories of needs drive teacher motivation and influence job satisfaction, morale, and ultimately, productivity (Skaalvik & Skaalvik, 2017).

Herzberg's Two-Factor Theory: Herzberg's theory distinguishes between two categories of motivation: hygiene factors and motivators. Hygiene factors, such as salary, working conditions, and school policies, help prevent dissatisfaction but do not in themselves produce motivation. Motivators, such as achievement, recognition, responsibility, and growth opportunities, are the true drivers of job satisfaction and performance. This theory is pertinent to the present study because it emphasizes that while external rewards are important, true productivity and morale arise from internal motivation—specifically, from teachers feeling valued, capable, and fulfilled in their professional roles. Both theories highlight that teachers need both external support and internal drive to remain motivated. Together, Maslow's and Herzberg's frameworks support the proposition that combining both hygiene and motivational factors leads to improved performance and stronger morale among primary school teachers.

Empirical Review

Oni and Soji-Oni (2022), Usman (2022), and Afolabi (2020) examined how motivational factors affect teaching effectiveness and productivity in public secondary schools in Nigeria. Their findings showed that motivated teachers were more effective in the classroom and recommended regular and prompt payment of salaries, provision of teaching materials, and incentives such as housing, healthcare, and professional development opportunities. They also emphasized the importance of supportive leadership. Similarly, Han and Yin (2016), in a systematic review of teacher motivation research, affirmed that both intrinsic and extrinsic motivators interact to shape teachers' professional identity, commitment, and instructional effectiveness. While these studies share a common focus on teacher motivation and productivity, the present study extends the discourse to include the mediating role of teacher morale in the motivation–productivity relationship and is situated within the specific context of primary schools in Bwari Area Council, Abuja.

A review of the existing literature reveals that, while researchers have extensively examined motivation and teacher productivity, few studies have directly linked staff morale to productivity outcomes. This study fills that gap by demonstrating that teacher motivation fosters high morale, which in turn results from greater job satisfaction and ultimately leads to increased productivity and improved student outcomes for sustainable development.

Methodology

This study adopted a survey research design, which is ideally suited for gathering the opinions and views of a defined population. As noted by Singleton and Straits (2010), surveys can take a quantitative form (such as rating-scale questionnaires), a qualitative form (such as open-ended questions), or a mixed-methods approach. Survey designs are widely used in social and psychological research because of their effectiveness in understanding human behaviour and attitudes.

Population and Sample: The population for this study comprised all primary school teachers in Bwari Area Council, Abuja, totaling 1,476 teachers. Bwari Area Council has 47 public primary schools, with teachers distributed across these institutions. Using the 10% sampling rule, a minimum sample size of 148 teachers was calculated. Purposive sampling was employed to select ten (10) primary schools and 15 teachers per school, giving a total of 150 participants. A total of 137 completed questionnaires were retrieved and used for analysis.

Instrument: The instrument used for data collection was a self-designed questionnaire titled: Impact of Motivation on Teachers' Morale and Productivity in Primary Schools Questionnaire (IMTMPIPSQ). The questionnaire comprised two sections: Section A focused on respondents' background information, while Section B contained structured items addressing the three research questions. Each section used a 4-point Likert scale with response options ranging from Strongly Agree to Strongly Disagree and from Very High Extent to Very Low Extent. The instrument was validated by three experts from the Faculty of Education, NOUN, and its reliability was confirmed through a trial test yielding a Cronbach's Alpha coefficient of 0.75. The researchers personally administered copies of the questionnaire to ensure proper completion and 137 copies were retrieved.

Data Analysis: Descriptive statistics (frequency, mean ($\bar{x}$) and standard deviation) were used to analyze the data. To answer the research questions, mean scores and standard deviations were calculated based on responses from the 4-point Likert scale. A decision rule was applied using real number limits to interpret the mean scores: **0 – 0.8:** Not applicable, **0.8 – 1.6:** Very Low Extent / Strongly Disagree, **1.6 – 2.4:** Low Extent / Disagree, **2.4 – 3.2:** High Extent / Agree, **3.2 – 4.0:** Very High Extent / Strongly Agree.

Results

Research Question 1: What are the motivational factors that can impact on primary school teachers' productivity for sustainable development?

Table 1: Frequencies, Means and Standard Deviation of the responses of the respondents on the motivational factors that can impact on primary school teachers' productivity
N= 137

S / N	Items	Frequency of the response Scores					$\bar{x}$	SD	Deci sion
		0	1	2	3	4			
1	Principals' communication roles can positively enhance teachers' position and develop them,	-	6	4	65	72	3.38	.734	SA
2	Professional development opportunities help improve teachers' productivity,	-	4	3	46	94	3.56	.673	SA

3	Regular promotion with increased salary increases productivity,	-	5	3	36	103	3.61	.697	SA
4	Public recognition and praise increase teachers' morale and productivity at work,	-	1	7	51	88	3.54	.622	SA
5	Incentives/benefits like loans, housing and car allowances boosts teachers' morale and zeal to perform,	-	7	9	27	104	3.55	.812	SA
Cluster							3.53	.708	SA

$\bar{x}$ = Mean, SD= Standard deviation, SA= Strongly agree

The results in Table 1 showed that motivational factors have a strong positive influence on the productivity of primary school teachers. All the items had high mean scores, with a cluster mean of 3.53, which means that most respondents strongly agreed with the listed motivational factors. These include effective communication from school leaders, access to professional development, timely promotion with salary increases, public recognition, and incentives like loans and housing. This clearly shows that these factors significantly boost teachers' morale and encourage better performance. The cluster SD of .708 indicates that the degree of variance from the mean is not much.

Research Question 2: To what extent does primary schools' teachers' morale impact on their productivity?

Table 2

Frequencies, Means and Standard Deviation of the responses of the respondents on the extent to which primary schools teachers' morale impact on their productivity

N= 137

S/N	Items	Frequency of the response Scores					$\bar{x}$	SD	Decision
		0	1	2	3	4			
6	A flexible work schedule reduces stress and boosts teachers' morale to go the extra mile,	-	6	11	54	76	3.36	.793	VHE
7	Empathy shown by the school administrator boosts teachers' confidence and enthusiasm to work,	-	3	18	52	74	3.34	.772	VHE
8	Favourable working conditions increases teachers' morale and make them more productive,	-	1	11	44	91	3.53	.665	VHE
9	Access to benefits enable teachers thrive outside of the workplace, hence increases their productivity,	-	2	10	51	84	3.48	.686	VHE
10	Lack of transparency and clarity on school goals decreases teachers' morale to work effectively,	-	11	10	51	75	3.29	.893	VHE
Cluster							3.40	.762	VHE

$\bar{x}$ = Mean, SD= Standard deviation, VHE = Very High Extent

The results showed that teachers' morale is an important motivation that boosts productivity in primary schools to a very high extent. With a cluster mean score of 3.40 for all items, it is evident that morale greatly influences teachers' work performance to a very high extent. The standard deviation of .762 indicates that the degree of variance from the mean is not much.

Research Question 3: What are the strategies that can enhance primary schools' teachers' morale and productivity for sustainable development?

Table 3 : Frequencies, Means and Standard Deviation of the responses on the strategies that can enhance primary schools' teachers' morale and productivity for sustainable development

N= 137

S/ N	Items	Frequency of the response Scores					$\bar{x}$	SD	Deci sion
		0	1	2	3	4			
11	Sending teachers for training by administrators can help them improve their productivity,	1	3	3	39	101	3.64	.640	SA
12	Building strong organizational culture by administrators can boost teachers' morale and increase productivity,	-	1	5	59	82	3.51	.601	SA
13	Administrator's leading by example creates strong team morale, that can increase teachers' productivity,	1	1	2	46	97	3.65	.559	SA
14	Regular promotion with increased salary will boost teachers' morale and make them committed and productive,	-	1	3	30	113	3.73	.528	SA
15	Making the work less stressful to teachers can enhance their productivity,	-	5	4	28	110	3.65	.699	SA
	Cluster						3.50	.605	SA

$\bar{x}$ = Mean, SD= Standard deviation, SA= Strongly agree

The results above showed that the strategies listed in the items are perceived as significant motivational factors that enhance teachers' morale and productivity in primary schools in Abuja. All item statements have mean scores above 3.50, showing that teachers strongly agree with the positive impact of each strategy listed in the items in boosting their morale and productivity, hence improving work performance. The cluster standard deviation is .605, which indicates that the degree of variance from the mean is not much.

Discussion of Findings

Research question one sought the motivational factors that can impact on teachers' productivity. The findings show that timely promotion with salary increases, regular salary payments, delegation of authority, professional development, public recognition, and incentives can boost primary school teachers' productivity. This supports previous studies such as Afolabi (2020) and Oni and Soji-Oni (2022), which emphasized the importance of fair pay and professional growth in motivating teachers to perform better.

Research question two sought the extent primary school teachers' morale impact on their productivity. The findings revealed that: Teacher morale is a group-level attitude that

results from satisfaction and other factors, boosts productivity in primary schools to a very high extent. Such factors as flexible work schedule that reduces stress, empathetic leadership that boosts confidence, favourable working conditions that increases teachers' morale, benefits for improved wellbeing, and clear goals to raise commitment; raise morale and inspire teachers to go beyond expectations. This is consistent with Oni & Soji-Oni's (2022) findings that recognition and feeling valued promote commitment and better performance. Additionally, delegating responsibilities with appropriate authority empowers teachers, boosting their confidence and work quality, creating strong team morale and building trust (Mbanefo, 2024). Research question three sought the motivational strategies that can enhance primary school teachers' morale and productivity. The findings reveal teacher morale as a group-level attitude that results from satisfaction and other factors. The following strategies can enhance primary school teachers' morale and productivity: regular promotion with increased salary, providing additional incentives like housing, transportation allowances, and health insurance boosts teachers' focus and reduces stress. Sending teachers for training, administrator's leading by example and making the work less stressful also motivate them to achieve better performances. Usman (2022) also recommended offering fringe benefits, as these additional incentives increase teachers' commitment to their duties and positively influence their job performance. Teachers are more motivated to reach high levels of productivity when they receive incentives beyond their basic salary.

Conclusion

Strategies such as regular promotions, added incentives (housing, transport, health insurance), professional training, and supportive leadership all contribute to higher morale and productivity. These incentives encourage teachers to stay motivated and committed. Thus, strong teacher motivation transforms the teachers' morale, which leads to greater job satisfaction and ultimately results in increased productivity and better student outcomes in schools.

Recommendations

1. Education authorities and policymakers need to give careful attention to and actively implement motivational factors for primary school teachers,
2. School administrators should create supportive working conditions that include flexible schedules, favorable work environments, access to benefits, and leadership marked by empathy and transparency. These measures will significantly enhance teachers' productivity for sustainable development.
3. Education stakeholders should collaborate to develop structured mentoring and performance appraisal systems in primary schools, to motivate teachers, build institutional capacity, and advance the goals of sustainable educational development.

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COMPARATIVE STUDY OF THE PSYCHOLOGICAL HEALTH OF CHILDREN WITH DIVERSE DEVELOPMENTAL DISORDERS

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Abstract

The study explored comparative study of psychological health of children with diverse developmental disorders in Ibadan, Oyo State, Nigeria. The study ascertained the emotional and behavioural health difficulties of children with developmental disorders (ADHD, ASD, ADHD plus ASD) compared to typically developed children (TD). 72 parents/caregivers and 72 teachers of children (ages 6-17) with ADHD = 30, ASD = 14, ADHD and ASD = 9 and TD = 19) completed questionnaire. Emotional Intensity Scale for Children (EISC) and Child Behavioural Checklist (CBCL) were the instruments used. The instruments logical validity index and reliability index are 0.62 and 0.91 respectively. Data collected were analyzed using descriptive statistics while ANOVA was used to test the hypotheses at 0.05 significance level. The result shows that children with developmental disorders experience high emotional and behavioural health difficulties compared to TD children (jointly and independently). It was recommended among others that parents, teachers, Clinicians and families in Ibadan Oyo State, should be sensitized through workshops and seminars on the psychological health challenges of children with ASD, ADHD, ASD plus ADHD in Ibadan Oyo State.

Keywords: Attention Deficit Hyperactivity Disorder, Autism Spectrum Disorder, behavioural health challenges, Emotional health challenges, and Psychological health

Introduction

In today's society, the state of health of every individual seems to have become a priority. It is impossible to think about any daily activities without considering the health status of the people who perform them. All aspects of human health are important, but among them, psychological health appears to be the most important. Having the knowledge of the psychological health of any organism tends to be so relevant that it has been considered not only in the health classification in the field of psychology but to also to distinguish the psychological health of children with diverse developmental disorders in the world at large today. According to WHO (2022), the knowledge of psychological health of children with developmental disorders is paramount as each child has a unique symptom pattern. Investigating the psychological health of some children with diverse developmental disorders and evaluating their individual emotional, behavioural, social and interpersonal, cognitive, mental health, self-concept, spiritual dimensions and functioning in every important area of life might contribute to the diagnose of the developmental disorders and help to determine the type of intervention they required. In other words, psychological health is the sum of how individuals think, feel, relate, and exist in day-to-day lives. Individuals' thoughts, perceptions, emotions, motivations, interpersonal relationships, and behaviours are product of experiences and the skills developed in order to meet the life's challenges. Psychological health includes

mental, emotional, social, and spiritual dimensions of people (<https://ux.pearson.com>patterns>).

Emotional health is all about how every individual feels on daily bases in maintaining a healthy feeling state. Children with diverse developmental disorders tend to have their specific feelings that categories them. The prevalence of these children's feelings is also paramount to understand as these tend to assist in giving insight to distinguishing the actual developmental disorder such children suffer. Emotional health status could be traced to feeling of happiness, sadness, anger, fear, excitement, frustration, anxiety, joy, surprise and the likes. These children emotional challenges may be ascertained through investigating the intensity of these feelings. Healthline Editorial Team (2023) state that emotions are an essential part of who people are, but they can be messy, complicated, and downright confusing at times. Knowing how to name one's emotions and talk about them with both oneself and others is a key part of developing emotional health. Such emotions are anger, fear, sadness, disgust, and enjoyment.

In addition, behavioural health defines the actions and reactions of people to situations. The prevalence of the behaviours of children with diverse developmental disorders seems to have a way of helping in quickly determining their social health status. Some children apparently fidget with hands or feet, leave seat when not supposed to, run or climb excessively, have difficulty playing quietly, talk excessively, have difficulty sustaining attention, easily get distracted, experience forgetfulness et cetera. Knowing the level of these behaviour could help to classify the disorder experiencing by the child. When these facets are harmonized, a person has positive psychological health but when out of balance, such individual may be said to have mental health issues such as anxiety and depression (Carnevale, Cheprasov, & Levitas, 2023).

Developmental disorders (DD) encompass a range of lifelong conditions, including attention deficit/ hyperactivity disorder (ADHD), autism spectrum disorder (ASD), cerebral palsy (CP), fragile X syndrome, developmental delay, intellectual disabilities(ID), learning disorders, language disorders, Tourette syndrome. These disorders typically emerge in childhood and result in significant impairment across various domains, such as physical, learning, language, emotional, or behavioural functions, impacting daily functioning (Holm, 1989 & Prevention, 2022 as cited in Li, Yong, Li, et al, 2023). In addition, Developmental Disorders (DD), as defined by Barlow, Durand, and Hofmann (2019), is childhood psychopathologies that originate in childhood and the full manifestation then surfaces later as the child develops and grows. Developmental disorders are of different classifications: Common Developmental Disorders such as Attention Deficit Disorder/Hyper Activity Disorder(ADHD) and Learning Disorder(LD), Pervasive Developmental Disorders: autism spectrum disorder (ASD), and Asperger's Disorder and the third class is Intellectual Disability or Mental Retardation (Barlow et al, 2019).

In school, at home and in the social gathering, some children appear darting from one activity to the other, commence tasks without finishing them before jumping to another, lack concentration, easily get distracted, restless, do not pay attention to details, emotional regulation challenges, social relationship difficulties, academic underachievement, sleep problems and co- occurring mental health issues (e.g., anxiety and depression). This set of children with these characteristics tends to have Attention Deficit Disorder/Hyper Activity Disorder(ADHD). ADHD is a neurodevelopmental disorder characterized by inattention and disorganization with or without hyperactivity-impulsivity causing impairment of functioning. Probably, these characteristics determine their mental health, emotional, behavioural, social, and spiritual functioning in any important area of life. On the other hand, some children might be more likely receive the label of ADHD based on these different rates of Diagnosis as some have argue that ADHD in children is a cultural construct which means that the behaviour of these children is typical from a developmental perspective and that it is society intolerance (due

to the loss of extended family support, pressure to succeed academically, and busy family life) that causes the labelling (Barlow et al, 2019).

More so, some children who often experience notable impairments in social interaction or challenges in communication abilities, along with the display of limited and repetitive behaviours, encounter challenges in connecting with peers of the same age. Such children often struggle to form friendships and rarely participate in collaborative or team activities at school, home, or in social settings. They face significant difficulties in acquiring speech or for those who can speak engage in the repetition of others' speech (echolalia) or unwilling or unable to sustain meaningful conversations, sensory sensitivities, emotional regulation difficulties, cognitive and intellectual disabilities, co-occurring mental health issues (e.g., anxiety and depression) and difficulty change in routine or transition, perhaps if assessed might have Autism. Autism Spectrum Disorders (ASD) is a neurodevelopmental condition characterized by challenges in social communication and repetitive behaviours (Lai, Chang, & Skuse, 2022). However, there seems to be ADHD symptoms in some of these children with ASD. People with autism perhaps have co-occurring conditions, including epilepsy, depression, anxiety and attention deficit hyperactivity disorder as well as challenging behaviours such as difficulty sleeping and self-injury.

Children with combined ASD plus ADHD seem to have compound effect of ASD plus ADHD symptoms. This category of children tends to have increased risk of mental, greater challenges with social relationships and communication, enhanced sensory processing difficulties, increased risk of cognitive and intellectual disabilities, more significant academic and academic adaptive functioning challenges, and higher risk of co-occurring medical condition (sleep disorder, gastrointestinal issues). Eaton, Roarty, Doval, Shetty, Goodall, and Rhodes (2023) posited that the ADHD symptom prevalence varied and that ADHD symptoms are common in young people with ASD without ID.

Over time, understanding the true and distinct psychological health of children with certain developmental disorders has become increasingly challenging. The complexity poses difficulties in accurately diagnosing these disorders and formulating effective intervention plans. The objective of this investigation is to customize recommendations for addressing the educational and mental health requirements of children. Consequently, the researcher recognizes the necessity to investigate the psychological health challenges of children with developmental disorders in Ibadan, Oyo State, Nigeria.

Statement of the Problem

The actual difference in the psychological health challenges in the domain of emotional and behavioural health of children with diverse developmental disorders compared to that of typically developed students seems to be a reflection of the problem and difficulties facing families, medical and mental health service providers, educational systems and researcher in Nigeria, in particular, Ibadan, Oyo State. Children with developmental disorders such as Attention Deficit Hyperactivity Disorders (ADHD), Autistic Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorders plus Autistic Spectrum Disorder ((ADHD plus ASD) tend to experience significant emotional and behavioural health challenges that extend beyond cognitive limitations. The level of psychological health difficulties of these children need to be distinctly understood and thoroughly clarified so as to stop being mistaken for the acts of indiscipline, stubbornness, laziness, as well as spiritual attacks by parent, family friends, teachers, and people in society. Recognizing the actual psychological health (emotional and behavioural) challenges in children with developmental disorders from the onset is important. The problems of clarifying and classifying children who dart from one activity to the other, commences task without finishing them, lack concentration completing them, easily distracted, restless, and not pay attention when being spoken to as indicative of Attention Deficit

Hyperactivity Disorder(ADHD) from Typically Developing(TD) children at home, school and in the society for appropriate and suitable supports or interventions is one of the researcher's concern. More so, some children who have been observed exhibiting impaired social interaction, communication problems, and engaging in restricted behaviour, interest and activities both at home, in school, and social setting, need to be distinctly understood and thoroughly clarified and stop being mistaken for acts of indiscipline, stubbornness, laziness, and spiritual attacks by teachers, parent, family friends and society. Therefore, parents, family friends, teachers, and people in the society having this knowledge, may make it easier in accepting and providing suitable and appropriate supports and interventions needed by these set of children distinctly. In response to these concerns, the researcher deems it needful investigating comparative study of the psychological health (emotional and behavioural) of children with diverse developmental disorders such as Attention Deficit Hyperactivity Disorders (ADHD), Autistic Spectrum Disorder (ASD) and comorbid of Attention Deficit Hyperactivity Disorders (ADHD) and Autistic Spectrum Disorder (ASD) in Ibadan, Oyo State.

Purpose of the Study

This study investigated the psychological health challenges of children with diverse developmental disorder in Ibadan, Oyo State, Nigeria. Specifically, the study was designed to:

1. determine the level of psychological health of children with ASD in the domain of emotional and behavioural health difficulties.
2. ascertain the level of psychological health of children with ADHD in the domain of emotional and behavioural health difficulties.
3. find out psychological health of children with ASD plus ADHD in the domain of emotional and behavioural health difficulties.

Statement of the Hypotheses

The following hypotheses were formulated and were tested at 0.05 level of significance.

1. There is no significant difference in the level of psychological health between Children with ASD and children with Typical Development (TD).
2. There is no significant difference in the level of psychological health between Children with ADHD and children with Typical Development (TD).
3. There is no significant difference in the level of psychological health between Children with ASD plus ADHD and children with Typical Development (TD).

Methodology

Descriptive survey research design was used for this study. The design was found to be appropriate because is a process that gathers information from a sample considered to be a representative of the entire population. The participants of this study were drawn from among the children diagnosed with developmental disorders in Neuropediatric clinics in Hospitals in Ibadan, residing in Oluyole Cheshire Home, attending Oluyole Cheshire (special) Basic School and Oluyole Cheshire (special) High School Polytechnic Road, Ibadan, Oyo State, Nigeria. While the typically developed children attend Paramount Model Schools Lakoto, Apete, Ibadan. Oyo State, Nigeria. The participants were seventy two children (ASD = 30, ADHD = 14, ASD plus ADHD = 9 and TD = 19) with their parents/caregivers and teachers. The common characteristics of these children are that they were all of ages 6-17years, both male and female and attend school within Ibadan, Oyo State, Nigeria. Multistage sampling procedure was employed to draw the seventy two participants. The participants were selected using stratified sampling method and finally match them on age to the categories of developmental disorders they belong. The researcher adopted two instruments for this study. The first instrument is the medical reports and school records confirming the diagnoses of the

children with ASD, ADHD, and ASD plus ADHD and TD. The second instrument is the Psychological Health Challenges Scale (PHCS) that was used to investigate psychological health challenges of children with ASD, ADHD, ASD plus ADHD and TD in the two domains (emotional and behavioural health) of psychological health. The instrument was sectioned into A to C: section A consists of demographic data indicating the child's age, developmental disorder(s) of the child, section B comprises Emotional Intensity Scale for Children (EISC) that was adopted from Bachorowski & Braaten, 1994) to determine the emotional health challenges of the children, section C containing the Child Behavioural Checklist (CBCL; Achenbach, 1991) that was adopted to ascertain the behavioural health challenges of the children. The instrument was subjected to expert's appraisal for content and construct validation in Psychology Department, Faculty of the Social Science, University of Ibadan. Reliability index of 0.91 was obtained using Cronbach Alpha and convergent validity index 0.62 was obtained. Three hypotheses were tested using One Way Analysis of Variance (ANOVA) at 0.05 level of significance. The p-value obtained from statistical package for social science (SPSS) application was compared with the significance level. For hypotheses whose p-values were found to be less than 0.05, they were rejected while for those greater than 0.05 were accepted.

Results

Table: 1 descriptive information of the participants

S/N	Developmental Disorders	Frequency (Parents/ caregivers)	Percentage	Frequency (Teachers)	Percentage
1	ASD	30	41. 67%	30	41. 67%
2	ADHD	14	19.44%	14	19.44%
3	ASD plus ADHD	9	12. 50 %	9	12. 50 %
4	TD	19	26. 39%	19	26. 39%
	Total	72	100%	72	100%

Table 1 presents the demographic information of the respondents. Majority of the parents /caregivers responded on behalf of children with ASD 30(41. 67%), while 14(19.44%) for ADHD, 9 (12. 50 %) for ASD plus ADHD and 19(26. 39%) for TD. As well, majority of teachers 30(41. 67%), while 14(19.44%) for ADHD, 9 (12. 50 %) for ASD plus ADHD and 19(26. 39%) for TD. The total respondents for Parents/ caregivers are 72 and that of teachers 72.

Table 2: Descriptive Statistics of Psychological Health (Emotional and Behavioural Health) of children with ASD, ADHD, ASD plus ADHD and TD

S/N	DV	IV	N	Mean	Std Dev	Std Error
1	Emotional Difficulties	ASD	30	2.92	0.25	0.05
		ADHD	14	3.06	0.30	0.08
		ASDplus ADHD	9	2.63	0.47	0.10

			TD	19	1.98	0.22	0.07
			Total	72	2.66	0.51	0.06
2	Behavioural Difficulties	Health	ASD	30	2.46	0.37	0.05
			ADHD	14	2.32	0.20	0.07
			ASDplus ADHD	9	2.57	0.14	0.09
			TD	19	1.23	0.14	0.06
			Total	72	2.12	0.60	0.08

Table 2 shows the frequency, mean, standard deviation and standard error of psychological health (Emotional and Behavioral Health) of children with ASD, ADHD, ASD plus ADHD and TD, as well as when all the clinical groups are combined (Total). The result shows that the Mean Emotional Health Scores for ASD = 2.92, ADHD = 3.06, ASD plus ADHD = 2.63 compared to that of children with TD of mean 1.98 that is less than threshold set at 2. Grand Average Mean of emotional health difficulties is 2.12 which is higher than the threshold set at 2. For Mean Behavioural Health Scores, ASD = 2.46, ADHD = 2.32, ASD plus ADHD = 2.57 compared to that of children with TD of mean 1.23 that is less than threshold set at 2. Generally, the result implies that children with ASD, ADHD, ASD plus ADHD may be struggling with higher level of psychological distress or difficulties emotionally and behaviourally.

Hypothesis One: Children with ASD will exhibit high level of psychological health compared to children with Typical Development (TD).

Table 3: One way Analysis of Variance (ANOVA) showing the significant difference in the Psychological Health (Emotional and Behavioural Health) of Children with ASD and TD

Sources		Sum of Squares(ss)	Degree of Freedom(df)	Mean Squared (MS)	F	P value
Emotional Health	Between Groups	13.06	3	4.35	52.26	.000
	Within Groups	5.67	68	0.08		
	Total	18.73	71			
Behavioural Health	Between Groups	20.82	3	6.94	94.89	.000
	Within Groups	4.97	68	0.07		
	Total	25.79	71			

Significant at $p < 0.05$

Table 3 reveals joint and independent statistically significant difference between the Psychological Health (Emotional and Behavioural Health) of children diverse developmental

disorders(ASD, ADHD and ASD plus ADHD) and Typically developed children. The significance value is 0.000 (p value < 0.05). Therefore, there is statistically significant difference in the emotional health of children with ASD and TD children based on the developmental disorders $F(3, 68) = 52.26$, p value < 0.05 and behavioural health of children with ASD based on the developmental disorders $F(3, 68) = 94.89$; p value < 0.05 .

Hypothesis Two: Children with ADHD will exhibit high level of psychological health compared to children with Typical Development (TD).

Table 4: One way Analysis of Variance (ANOVA) showing the significant difference in the Psychological Health (Emotional and Behavioural Health) of Children with ADHD and TD.

Sources		Sum of Squares(ss)	Degree of Freedom(df)	Mean Squared (MS)	F	P value
Emotional Health	Between Groups	13.06	3	4.35	52.26	.000
	Within Groups	5.67	68	0.08		
	Total	18.73	71			
Behavioural Health	Between Groups	20.82	3	6.94	94.89	.000
	Within Groups	4.97	68	0.07		
	Total	25.79	71			

Significant at $p < 0.05$

Table 4 reveals joint and independent statistically significant difference between the Psychological Health (Emotional and Behavioural Health) of children diverse developmental disorders(ASD, ADHD and ASD plus ADHD) and Typically developed children. The significance value is 0.000 (p value < 0.05). Therefore, there is statistically significant difference in the mean of emotional health of children with ADHD and TD children based on the developmental disorders $F(3, 68) = 52.26$, p value < 0.05 and behavioural health of children with ADHD based on the developmental disorders $F(3, 68) = 94.89$; p value < 0.05 .

Hypothesis Three: Children with ASD plus ADHD will exhibit high level of psychological health compared to children with Typical Development (TD).

Table 5: One way Analysis of Variance (ANOVA) showing the significant difference in the Psychological Health (Emotional and Behavioural Health) of Children with ASD plus ADHD and TD.

Sources		Sum of Squares (ss)	Degree of Freedom(df)	Mean Squared (MS)	F	P value

Emotional Health	Between Groups	13.06	3	4.35	52.26	.000
	Within Groups	5.67	68	0.08		
	Total	18.73	71			
Behavioural Health	Between Groups	20.82	3	6.94	94.89	.000
	Within Groups	4.97	68	0.07		
	Total	25.79	71			

Significant at $p < 0.05$

Table 5 reveals joint and independent statistically significant difference between the Psychological Health (Emotional and Behavioural Health) of children with diverse developmental disorders (ASD, ADHD and ASD plus ADHD) and Typically developed children. The significance value is 0.000 (p value < 0.05). Therefore, there is statistically significant difference in the emotional health of children with ASD plus ADHD and TD children based on the developmental disorders $F(3, 68) = 52.26$, p value < 0.05 and behavioural health of children with ASD plus ADHD based on the developmental disorders $F(3, 68) = 94.89$; p value < 0.05 .

Table 6 : Tukey HSD Post - hoc tests for the Comparison in the Psychological Health (Emotional and behavioural health) of children with Developmental Disorders(ASD, ADHD, ASD plus ADHD and TD).

Dependent Variable	Developmental Disorders	J	Mean Difference (I-J)	Std Error	P Value	95% Confidence Interval	
						Lower Bound	Upper Bound
Emotional Health	ASD	TD	.93605*	.08463	.000	.7132	1.1589
	ADHD	TD	1.08534*	.10166	.000	.8176	1.3531
	ASDplus ADHD	TD	.64883*	.11680	.000	.3412	.9564
Behavioural Health	ASD	TD	1.2270*	.07928	.000	1.0182	1.4358
	ADHD	TD	1.0863*	.09525	.000	.8355	1.3372
	ASDplus ADHD	TD	1.3396*	.10942	.000	1.0515	1.6278

Significant at $p < 0.05$

Further analysis using Turkey Post hoc tests, table 6, to determine the differences between the groups' means by multiple comparison revealed that there were significant differences between the psychological health (emotional and behavioural health) of children with ASD and TD ($P < 0.05$), ADHD and TD ($P < 0.05$), ASD plus ADHD and TD ($P < 0.05$). These differences can be generally visualized by the clustered bar chart generated by this procedure.

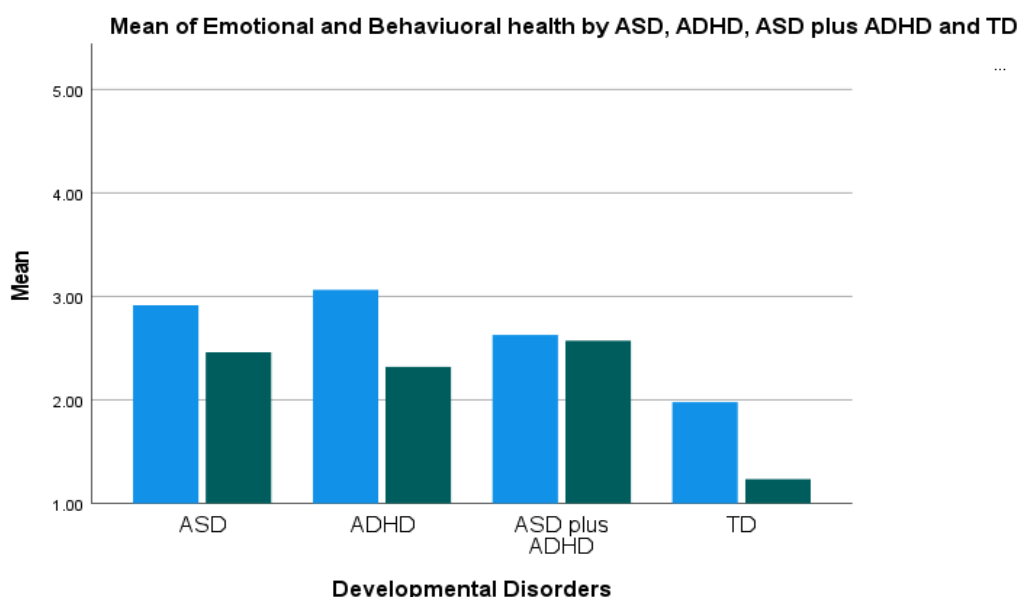


Figure 1: Chart Comparing the psychological Health of Children with Diverse Developmental Disorders

Discussion of findings

The findings from hypothesis one revealed that there is a significant difference in the psychological health (Emotional and behavioural health) difficulties of the children with ASD and those with Typical Development (TD). This finding is in agreement with that of Lai, Chang, and Skuse (2022) which states that children with ASD experience challenges in understanding and navigating social interaction that result to challenges forming and maintaining relationship and communication impairment which contributes to frustration emotional distress, repetitive behaviors or intense focus on specific interest that impact their daily functioning and social engagement. Also, the finding is in line with Lynn, Carroll, Houghton, & Cobham (2013) who conducted research on peer relations and emotion regulation of children with emotional and behavioural difficulties with or without a developmental disorder. The study established that there is a significant difference in the peer relation of children with emotional and behavioural difficulties with ASD and those typically developed children. More so, this finding supports the assertion of Lai, Chang, & Skuse, (2022) that children with ASD suffer notable impairments in social interaction, communication difficulties, repetitive behaviours, challenges in connecting with peers of the same age, struggle to form friendships and rarely participate in collaborative or team activities, face significant difficulties in acquiring speech or for those who can speak engage in the repetition of others' speech (echolalia) or unwilling or unable to sustain meaningful conversations, sensory sensitivities, emotional regulation difficulties, cognitive and intellectual disabilities, co-occurring mental health issues (e.g., anxiety and depression) and difficulty change in routine or transition. Additionally, this finding is similar to the study conducted by Berenguer, Rosello, Colomer, Baxauli, & Miranda (2018) that showed that there is a significant difference in inhibition, emotional control, and Behaviour Rating Inventory of Executive Function (BRIEF) variables between typically developing (TD) and ASD. Also, Social cognition measures and emotional/behavioural problems exhibited significant difference and ASD symptoms predicted total difficulties on the SDQ.

The findings from hypothesis two showed that there is a significant difference in the psychological health (emotional and behavioural) of children with ADHD and those with Typical Development (TD). Also Concerning the result that psychological health of children

with attention deficit hyperactivity disorder differs from typically developed children, the finding is in conformity with outcome of the study conducted by Dewey, & Volkovinskaia (2018) who found out that children with ADHD had lower health-related quality of life on the mood and emotions, significantly higher victimization compared with those in the typically developing and revealed feelings of marginalization and victimization. Furthermore, the results corroborate earlier findings by Lynn, Carroll, Houghton, & Cobham (2013) that there is a significant high emotional intensity in children with ADHD.

The findings from hypothesis three indicated a significant difference in the psychological health (Emotional and Behavioural Health) of children with ADHD plus ASD and those with Typical Development (TD). This study agrees with Berenguer, Rosello, Colomer, Baxauli, & Miranda (2018) who reported that in comorbid ASD+ADHD, inattention symptoms predicted metacognitive and theory of mind indices. These findings show the complex difficulties of children with both ASD and ADHD. More so, Eaton analyses showed significant differences in inhibition, emotional control, and BRIEF variables between typically developing (TD) and clinical groups (ASD, ADHD, ASD+ADHD). In addition Berenguer, Rosello, Colomer, Baxauli, & Miranda (2018) who conducted study on Children with Autism and Attention Deficit Hyperactivity Disorder in Valencian Community in eastern coast of Spain finding is similar to this study as ASD children exhibited significantly more ADHD symptoms and poorer learning behaviors than TD children. The behavioral regulation index (BRI) and metacognition index (MI) of Executive Functioning(EF) were identified as mediators, suggesting their involvement in the relationship between ADHD symptoms and learning behaviors in ASD children. The finding is also in agreement with Roarty, Doval, Shetty, Goodall, and Rhodes (2023) who carried out study on the prevalence of ADHD symptoms in children and adolescents with Autism Spectrum Disorder without Intellectual Disability: A Systematic Review in United Kingdom revealed that ADHD symptom prevalence varied from 2.6% to 95.5%. ADHD symptoms are common in young people with ASD without ID which is in relation with the current study. Findings of the study revealed there is a significant differences between children with ASD and TD in emotional and behavioral health., there is a significant differences between ADHD children and TD children in emotional and behavioral health. Also, there is a significant differences between children with comorbid ASD plus ADHD and TD children in emotional and behavioral health.

Conclusion

Based on the findings of this study, the developmental disorders (ASD, ADHD, ADHD+ASD) impact emotional and behavioral health with large and significant differences compared to TD children, in Ibadan, Oluyole Cheshire Home, Oluyole Cheshire (special) Basic School and Oluyole Cheshire High School Polytechnic Road, Ibadan, Oyo State, Nigeria and Paramount Model Schools Lakoto, Apete, Ibadan. Oyo State, Nigeria. Practically, this connotes and can be concluded that children with ASD, ADHD and ADHD+ASD experience high level of emotional and behavioral health difficulties compared to children with typical development (TD). Also, the result indicated that the children with ADHD, ASD, and ADHD plus ASD and TD experience emotional and behavioral health challenges at different and distinct levels. With the knowledge of the psychological health challenges of children with ADHD, ASD, and ADHD plus ASD from this investigation; during assessment, diagnoses and intervention; teaching and learning at home, school, hospital and clinics; suitable and appropriate supports and interventions should be provided to these set of children distinctly.

Recommendations

Based on the findings of this study the researcher recommends that mental health professional in schools and clinics should design intervention programs majorly on the emotional and

behavioral health challenges and needs of children with ASD. Parents, teachers, clinicians, and families should be sensitized through workshops and seminars on the level of psychological health (emotional and behavioural) challenges of children with ADHD, ASD, ADHD plus ASD and that of typically developed children. Also, on how to provide suitable and appropriate supports and interventions for these sets of children distinctly. Government and Non Governmental Organisations should organize specialized psychological health programs on children with ADHD plus ASD, also, promote on job trainings for school psychologists, teachers, and mental health professional on dual-diagnosis and interventions that handle comorbid ADHD and ASD as these set of children tend to suffer unique difficulties. Moreover, further studies should be carried out on effectiveness of Innovative interventions or approaches on psychological health of children with diverse developmental disorders.

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PARENTAL INVOLVEMENT STYLE VARIABLES AS CORRELATE OF STUDENTS' ACHIEVEMENT IN SECONDARY SCHOOL MATHEMATICS IN EDO STATE, NIGERIA

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Abstract

There is no time in which parent involvement in children education is crucial as now. This is as a result of the emergence of AI and IoT in every areas of life. The parental involvement become necessary to curtail and control their children learning in the new context of this 'monster technology'. A paradigm shift in style of parental involvement in line with technology has become necessary to bring about the achievement of the SDG. Parental Involvement Styles differ in variables and how they affect achievement in mathematics. This research investigated parental involvement styles and how its variables determine mathematics achievement when taken together and when examined separately. The study is a descriptive survey. Three research questions guided this study. The population comprised all senior secondary students in Edo State. Four senior secondary schools were purposively selected from three local governments in Edo state. The schools comprised one private and one government school from the first local government while one private school was selected from the second local government and the last school was a government school from the third local government. A sample of 347 SS11 students were randomly selected from the four secondary schools. Two validated instruments used for data collection were: the Parenting Style Questionnaire (PSQ) adapted from Baumrind's (1971) with ($r=0.93$) and Mathematics Achievement Test (MAT). The findings showed that the authoritative parenting style significantly correlates with students' mathematics achievement. A combination of parenting style factors was not significantly related to student achievement in mathematics. It was recommended that parents of secondary school students should employ authoritative parenting styles such as reasoning and induction to aid mathematics achievement. Parents should desist from using corporal punishments as a parental involvement style. The use of multiple parenting style variables by parents of students in secondary schools should be discouraged.

Keywords: Parental Involvement, Mathematics Achievement, Parenting Style Variables, Correlate, authoritative parenting, authoritarian parenting, permissive parenting

Introduction

Technology is becoming the driving force of all human activities in recent times. With the presence of inevitable artificial intelligence (AI) as pivotal hob, most jobs are making use of Internet of Things (IoT). These are necessary for the achievement of the Sustainable Development Goals (SDG). Without incorporating them into educational systems, the attainment of the SDG at the set time will almost become a mirage. Parental involvement in the children education has been of many long-age practices. This is right from the primitive age of education up to the modern age of genZ. Yang, Chen, Wang, Li, Zhang and Huang (2023) in their systematic literature review on parental involvement and student engagement, stressed the significance of parental involvement in promoting student engagement.

The parental involvement of the children education has to experience a shift in type of involvement they engage in from one generation to another. Modern technology is taking over the instructional and assessment processes in education. Most parents are digital migrant while the children are digital natives (Barrie, Bartkowski, & Haverda, 2019). Nevertheless, parents still have to feature at all levels of their children education in one way or the other but in a different dimension from one generation to another.

There is virtually no field of career which does not have an impact in the usage of mathematical deductions and theorems. Students' mathematical achievement should therefore remain a concern for all if industries and the society at large would thrive. The need therefore arises that parent who are stakeholders in the educational sector see the importance and usefulness of high achievement levels in Mathematics. Fitzmaurice, O'Meara & Johnson (2021) in a recent study supports this assertion that the need for a country to increase the mathematical skills and proficiency of its students has been highlighted by many stakeholders as it is the medium through which problems are solved in most areas including the physical sciences, computer science, engineering and medicine. They went further to say that Mathematics widens the range of options available to young people, as it is a prerequisite for many university courses. Being a prerequisite for many university courses, how well students achieve in mathematics cannot but be given the relevant importance.

Several studies have elaborated on the need to estimate or determine how far learning has taken place in an academic endeavor. Mathematics achievement can be defined as the extent to which a student has achieved his or her short term/long term mathematics goals. Mathematical achievement is also defined as the competency shown by the student in mathematics. It is the result of acquired knowledge or information, understanding, skills and techniques developed in the subject of mathematics in a particular stage. Its measure is the score on the achievement test in mathematics. (Pandey, 2017).

There exist various factors which determine students' mathematics achievement. In the works of Afolabi (2013), it is seen that it is not only instructional strategies (Ogunbiyi, 2004; Akinsola & Afolabi, 2008) or teachers characteristics (Yara, 2008) that can affect students' achievement in mathematics. Various factors contribute and this prompts the present study. Major stakeholders in the education sector have raised concern over the years about decreasing academic achievement of adolescents who form the larger percentage of secondary school students and parents who are an integral part of this stakeholder's forum have been researched by various studies as being either a primary or insignificant factor to be reckoned with in this achievement saga. It is a known and established fact that both the traditional and contemporary views about parental involvements agree that parental involvements play a significant role in academic achievements of students. Huang, Huang, Li, & Zhang (2021) asserts that researchers have conceptualized parental involvement as parents' interaction with schools and with their children to promote children's academic success. They also say that researchers have incorporated the multidimensional construct of parental involvement by identifying specific components. These specific components of parental involvement form the basis of parental styles. Häfne, Flunger, Dicke, Gaspard, Brisson, Nagengast & Trautwein (2018) in a study they conducted report that students whose parents are interested in mathematics and perceive their own mathematics competencies to be high perform better than students with parents who show a low interest in mathematics and regard their competences in the domain as generally low – regardless of the intensity of the help students receive at home.

Parental styles (PSs) have essential variables that have been linked to school success. Parenting style is defined by Santrock (2007), as a psychological term that centers on the behaviour and attitude of parents, representing standard strategies that they use in their child rearing process (Baji & Mohammed, 2015). It is said to be the description of the attitudes or character exhibited by parents as they get involved with the development of their children.

These behaviours, according to Darling and Steinberg (1993) as cited by Baji et. al (2015) comprised parenting practices as well as other aspects of child-interactions that communicate emotional attitude but are not goal directed (e.g., tone of voice, body language, inattention, burst of temper and so on).

In a research work by Kramer (2017), it is mentioned that in the 1960s and 1970s, D. Baumrind, a clinical and developmental psychologist, conducted several studies examining parenting styles. From these studies, three general parenting styles: authoritarian, authoritative, and permissive are researched, (Baumrind, 1967, 1971, 1978). An authoritarian parenting style is characterized by high levels of parental demand and control with relatively lower levels of warmth and communication. An authoritative parenting style is characterized by high levels of parental demand and control, as well as high levels of warmth and communication. A permissive parenting style is characterized by low levels of parental demand and control, and varying levels of warmth and communication (Baumrind, 1978). The Authoritative is classified into warmth and involvement, reasoning and induction, democratic participation and good nature. The Authoritarian is classified into verbal hostility, corporal punishment, non-reasoning punitive strategy, directiveness, and the Permissive is also classified into lack of follow through, Ignoring misbehaviour and self-confidence. The various classifications as researched in this study is what is called parental style variables. Mathematics achievement of learners which is paramount for any scientifically and technologically driven society is usually aimed at national development and cannot be jeopardized. But regardless of this general knowledge, the mathematics performance of students at secondary school education has not been given the utmost concern and attention by major stakeholders in the educational sector despite the lingering low academic performance in secondary mathematics over the years.

Tsela, Tsela and Lopez (2023) examined the relationship between parenting patterns and children's school achievements. Parenting practices and parenting style are two child-rearing dynamics which were selected to assess children's school achievements in the study. The participants in this study included 101 parents (61 mothers and 40 fathers). The initial assumption was that both parenting practices and parenting style are associated with academic achievement. Thus, the primary hypotheses under examination in their study were that an authoritarian parenting pattern is negatively associated with school achievement, that an authoritative parenting style is positively associated with school achievement and that parental involvement affects children and their school performance. A total of 101 volunteer parents (61 mothers and 40 fathers) answered the self-reported questionnaires. There were linear relationships between variables with no multi-collinearity and there was homogeneity of variance covariance matrices. A correlation analysis showed that there was a significant positive relationship between authoritative parenting style and school achievement. Firm and consistent practices and involvement practices were also positively related with school achievement.

Several research studies have been carried out on the effect of parental involvement in the performance of students in schools but there has been little work exploring the effect of parental involvement in the mathematical performance of students at secondary level of education. The need therefore arises for this in-depth study on the effect of parental involvement in the mathematics achievement levels of their children or wards at secondary level of education. This can in turn help policy makers, parents and curriculum planners make quality decisions that will affect the performance of learners in mathematics positively

Research Questions

1. What is the composite contribution of various parental involvement variables (warmth and involvement, reasoning and induction, democratic participation, good nature, verbal hostility, corporal punishment, non-reasoning punitive strategy, directiveness,

- lack of follow through, ignoring misbehaviour, self control) to students' achievement in mathematics?
2. What are the relative contributions of various parental involvement variables (warmth and involvement, reasoning and induction, democratic participation, good nature, verbal hostility, corporal punishment, non-reasoning punitive strategy, directiveness, lack of follow through, ignoring misbehaviour, self-control) to students' achievement in mathematics?
 3. Which of the parenting style variables (warmth and involvement, reasoning and induction, democratic participation, good nature, verbal hostility, corporal punishment, non-reasoning punitive strategy, directiveness, lack of follow through, ignoring misbehaviour, self-control) can predict student achievement in Mathematics?

Methodology

The descriptive survey research design was used for this study. This design is relevant because of its merit in providing wide scope for obtaining information for the purpose of the study. The population comprise all Senior Secondary School students of the SS2 class who offer Mathematics in Edo State. Multi-staged sampling technique was used to select the sample. A senatorial district in Edo state was randomly selected. Three local Government Areas were also randomly selected from the senatorial district. A total of 347 SSII Mathematics students were selected from four randomly selected senior secondary schools within the three local government areas. These comprised two public schools and two private schools. This sampling was suitable because it ensured the homogeneity of the sample. Two instruments were used to collect data for the study. The first was a self-modified parenting practices questionnaire (SPPQ). It was sectioned into two; section A and B. Section A is the Biodata while section B comprised of 48 items used to determine extent of parental Involvement. Parental involvement was adapted from Baumrind (1971) Parenting Styles Questionnaire which was constructed and modified based on conceptualizations of authoritative, authoritarian, and permissive typologies drawn from the existing literature indicating parenting styles and the factors (variables) they represent.

The second instrument was a Mathematics Achievement Test (MAT) instrument designed by the researcher. This initially comprised of 30 multiple choice items with options A-D. The respondents were to select whichever they deemed as the right option. This was reduced to 25 items after trial testing. The instrument was trial tested on 20 students who did not take part in the study. For the questionnaire, the coefficient of reliability, $r = 0.93$ was calculated using Cronbach alpha. MAT was also trial tested on the 20 students who were not part of the study.

Data collected were analysed using descriptive statistics (the frequency and its percentages, the mean and standard deviations) of each item that constitutes the parental involvement variables. Multiple regression analysis was also used to determine the association between mathematics achievement score and all variables. All research questions were tested at 0.05 level of confidence using a two-tailed test.

Results:**Table 1****Correlation Matrix among the Variables**

	Warm and involvement	Reasoning induction	Democratic participation	Good nature	Verbal hostility	Corporal punishment	Nonrea punishment men	Directiveness	Lack of follow through	Ignoring misbehaviour	Self confidence	Score
Warm and Involvement	1											
Reasoning induction	.607**	1										
Democratic participation	.807**	.648**	1									
Good nature	.358**	.353**	.411**	1								
Verbal hostility	.242**	.256**	.286**	.239**	1							
Corporal punishment	.322**	.264**	.370**	.355**	.321**	1						
Nonrea punishment men	.315**	.213**	.268**	.218**	.350**	.457**	1					
Directiveness	.505**	.511**	.549**	.372**	.373**	.345**	.395**	1				
Lack of follow through	.240**	.186**	.230**	.272**	.264**	.202**	.312**	.300**	1			
Ignoring misbehaviour	.158**	.175**	.192**	0.106	.211**	.242**	.176**	.157**	.229**	1		

Self confi denc e	.26 8**	.273* *	.244* *	.22 2**	.173 **	.16 5* *	.254* *	.30 3**	.312* *	.296* *	1	
SCO RE	0.0 81	.132*	0.072	0.0 77	0.01 1	- 0.0 67	0.002	0.0 13	-0.038	-0.084	- 0.00 7	1

**Correlation is significant at the 0.01 level (2- tailed).

significant at 0.05 level (2 -tailed)

*Correlation is

Table 1 shows the correlation matrix among variables. The table revealed the correlation between each pair of parenting style variable. The strength of correlation (correlation coefficient, r) between each pair is also revealed. Those pairs of parenting style variables that are significant at 0.01 (2-tailed) are indicated (**). As it is normative in behavioral sciences to use 0.05 level of significance, this has been chosen here for decision.

There is a significant correlation between reasoning and induction and mathematics achievement score, $r = 0.132$. This is the only pair that is significantly correlated with the criterion variable. This is the variable that can determine students' achievement in Mathematics. Some pairs of independent variables are positively inter-correlated while others are negatively correlated. The high level of the inter correlation between pair of variables limitss their correlation with the criterion variable.

Research Question 1: What is the composite contribution of various parental involvement variables (warmth and involvement, reasoning and induction, democratic participation, good nature, verbal hostility, corporal punishment, non-reasoning punitive strategy, directiveness, lack of follow through, ignoring misbehavior, self-control) to students' achievement in mathematics?

Table 2: Regression Analysis of Variance of Parental Involvement Variables on Students Achievement in Mathematics

	R = .303 R ² = .092 Adjusted R ² = .038 S.E = 2.870					
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	154.49	11	14.045	1.705	.075
	Residual	1523.489	185	8.235		
	Total	1677.98	196			

Table 2 shows that the multiple regression correlation coefficient (R) which indicates the relationship among parental involvement factors (warmth and involvement, reasoning and induction, democratic participation, good nature, verbal hostility, corporal punishment, nonreasoning punitive strategy, directiveness, lack of follow through, ignoring misbehavior, self-confidence) and students' achievement in Mathematics is 0.303. This implies that there is positive relationship among the parental involvement factor and students' achievement in Mathematics. $R^2 = 0.092$ and adjusted R^2 is 0.038. This indicates that the eleven

parental involvement factors have jointly contributed 3.8 % to total variance of students' achievement in Mathematics. All other factors outside this study account for the remaining 96.2% of variance of students' achievement in Mathematics.

The table also reveals the linear relationship among Parental involvement style variables and students' achievement in Mathematics. The regression ANOVA $F_{(11,196)} = 1.705$; $p > 0.05$. It means that there is no significant composite contribution of these eleven-parenting style sub-classification factors on Mathematics achievement when taken together. It implies that a combination of parenting style factors (in this study) is not significantly related to student achievement in mathematics.

Research Question 2: What are the relative contributions of various parental involvement variables (warmth and involvement, democratic participation, reasoning and induction, good nature, non-reasoning punitive strategy, verbal hostility, corporal punishment, directiveness, lack of follow through, ignoring misbehaviour, self-confidence) to students' achievement in mathematics?

Table 3: Relative contributions of the independent Variable on the Dependent Variable

Coefficients						
Model	Items	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.32	0.989		7.402	0.00
	WARMTH AND INVOLVEMENT	-0.008	0.034	-0.032	-0.248	0.804
	REASONING AND INDUCTION	0.211	0.081	0.272	2.616	0.01
	DEMOCRATIC PARTICIPATION	-0.026	0.057	-0.063	-0.462	0.644
	GOOD NATURE	0.142	0.08	0.146	1.781	0.077
	VERBAL HOSTILITY	-0.051	0.054	-0.076	-0.933	0.352
	CORPORAL PUNISHMENT	-0.058	0.05	-0.096	-1.158	0.248
	NONREASONING PUNITIVE STRATEGY	0.288	0.178	0.144	1.616	0.108
	DIRECTIVENESS	-0.011	0.058	-0.018	-0.188	0.851

	LACKOFFOLLOW THROUGH	-0.147	0.081	-0.146	- 1.81 1	0.07 2
	IGNORING MISBEHAVIOUR	-0.107	0.087	-0.093	- 1.23	0.22
	SELF CONFIDENCE	-0.044	0.098	-0.038	- 0.45 3	0.65 1

Beta weights which indicate the relative contributions of Parental involvement factors on students' achievement in Mathematics are shown in table 3. The contribution of each of the predictor to criterion variable (Mathematics achievement) are: warmth and involvement: $\beta = -0.032$, ($p > 0.05$); reasoning and induction: $\beta = 0.272$, ($p < 0.05$); democratic participation: $\beta = -0.063$ ($p > 0.05$); good nature: $\beta = 0.146$, ($p > 0.05$); verbal hostility: $\beta = -0.076$, ($p > 0.05$); corporal punishment: $\beta = -0.096$, ($p > 0.05$); non reasoning punitive strategy: $\beta = 0.144$, ($p > 0.05$); directiveness: $\beta = -0.018$, ($p > 0.05$); lack of follow through: $\beta = -0.146$, ($p > 0.05$); ignoring misbehaviour: $\beta = -0.093$, ($p > 0.05$); self-confidence: $\beta = -0.038$, ($p > 0.05$). Reasoning and induction has the highest contribution to students' achievement in Mathematics. Directiveness being the least contributor ($\beta = -0.018$).

Research question 3: Which of the parenting style variables (warmth and involvement, reasoning and induction, democratic participation, good nature, verbal hostility, corporal punishment, non-reasoning punitive strategy, directiveness, lack of follow through, ignoring misbehaviour, self-control) can predict student achievement in Mathematics?

Table 3 reveals the relative contributions of each variable to students' achievement. It is clearly seen that the only parental style variable that has significant relative contribution to students' achievement in Mathematics is reasoning and Induction. Reasoning and induction has its beta value as $\beta = 0.272$, ($p < 0.05$) hence it is the only parenting style variable that can predict students' achievement in mathematics.

Discussion of Findings

The three parenting styles investigated in this study are Authoritative, Authoritarian and Permissive. The eleven Parenting style factors investigated under these are:

(1) warmth and involvement (2) reasoning and induction (3) democratic participation (4) good nature (5) verbal hostility (6) corporal punishment (7) non-reasoning punitive strategy (8) directiveness (9) lack of follow through (10) ignoring misbehavior (11) self-confidence. As the descriptive report revealed, the parental involvement variable with the highest mean value in terms of the level of involvement is "parents paying school fees and other fees for students". This parenting variable falls under the factor "warmth and involvement" which is categorized under the authoritative parenting style. This result is in consonance with Joseph (2016) who confirmed that most parents/guardians paid school fees termly as part of their parental involvement even though some paid in irregular installments. This shows that the highest perception of most parents in terms of their involvement with their wards' mathematics performance in this study is their ability to pay school fees and other fees. In addition, as most parents in this study would not allow their children to miss mathematics classes and tutorials.

The result of this study revealed that there was a significant level of involvement from the authoritative parenting style. This is consistent with Tsela et. al (2023) where it was

observed that the authoritative parenting style was the only parenting style in that study that was significantly correlated with students' mathematics achievement. Another study whose result was consistent with this was that of Baji & Mohammed (2015). The result of their study on the relationship between parenting styles and academic performance of junior secondary school students revealed that there was a significant relationship between the authoritative parenting style and student performance in mathematics. However, some studies revealed that the authoritarian parenting style recorded higher performance scores in mathematics (Hyojung et. al 2012; Murray & Mulvaney 2012) as cited by Tsela et. al (2023), but in this study, we see clearly that the authoritarian and permissive parenting styles are negatively correlated with mathematics achievement scores.

A combination of parenting style factors was not significantly related to student achievement in mathematics. It means there is no significant composite contribution of these eleven-parenting style sub-classification factors on Mathematics achievement when taken together. The result obviously appeals to logical reasoning. In that there is no time parental factors such as verbal hostility, corporal punishment, non-reasoning punitive strategies, lack of follow through, ignoring misbehaviors would contribute positively to mathematics achievement. Another finding from this study is that reasoning and induction, which is a parenting sub-classification factor under the authoritative parenting style has the highest contribution to students' achievement in Mathematics while directiveness being the least contributor. The implication of this is that amongst all sub classification variables which make up the authoritative parenting style, reasoning and induction should be employed by parents more than other variables since it is the only variable that made significant relative contribution to mathematics achievement. Several studies have it that when parents get involved in their children's learning by being warm, reasoning along with child, participating democratically and being good natured towards children, academic achievement is enhanced. Opposing, beating, or criticizing children may cause behavioral problems (aggressiveness, disobedience, etc.), which decrease academic achievement (Murray- Harvey and Slee 2007) as cited by Tsela et.al (2023).

Conclusion

There is significant correlation between authoritative parenting style and mathematics achievement score and there is positive relationship among the parental involvement factor variables and students' achievement in Mathematics. The eleven variables jointly contributed 3.8% to students' achievement in mathematics but there is no significant composite contribution of these eleven-parenting style variable factors on Mathematics achievement when taken together. Reasoning and induction, which is a parental involvement variable under the authoritative parenting style has the highest contribution to students' achievement in Mathematics while corporal punishment is the least contributor. In addition, reasoning and induction is the only variable factor that has significant relative contribution to students' achievement in Mathematics at 0.05 level of significance.

Recommendations

- i. The authoritative parenting style should be employed by parents of students at secondary schools to aid mathematics achievement since the authoritative parenting style significantly correlates with mathematics achievement scores.
- ii. The use of multiple parenting style variables by parents of students in secondary schools should be discouraged since the eleven parenting variables considered in this study do not jointly contribute to mathematics achievement when taken together.

- iii. Parents should also make use of authoritative parenting style factors such as reasoning and induction and should desist from using corporal punishments as a parental involvement pattern.
- iv. School management should inculcate seminars and workshops in parents and teachers' forums (PTA), for parents of secondary schools to enlighten the populace about parental involvement variable factors that determine students' achievement in mathematics.

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PERCEPTIONS, APPLICATION PATTERNS, BENEFITS, AND PERCEIVED CHALLENGES OF GENERATIVE ARTIFICIAL INTELLIGENCE (GAI) TOOLS AMONG BUSINESS EDUCATION STUDENTS IN LAGOS STATE, NIGERIA

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Abstract

This study investigated the perceptions, application patterns, and perceived challenges of Generative Artificial Intelligence (GAI) tools among business education students in Lagos State, Nigeria. A quantitative cross-sectional survey design was employed, with data collected from 156 business education students enrolled in the Nigeria Certificate in Education and Bachelor of Science (Ed.) programmes at the Federal College of Education (Technical), Akoka, and its collaborative programme with the University of Benin. The sample comprised 57 male and 99 female students, drawn from Office Technology and Management Education (OTME) and Accounting specialisations. Perception items yielded mean scores ranging from 3.15 to 3.19, indicating agreement that AI tools enhance understanding, critical thinking, and problem-solving. Usage pattern means ranged from 3.16 to 3.26, with the highest reported uses being AI-powered chatbots for concept clarification and engagement with AI-powered learning platforms for skill development. Benefit items similarly showed agreement, while challenge items yielded lower means, suggesting less strong endorsement of barriers, though concerns about over-reliance diminishing human interaction, collaboration, and subscription costs were noted. Inferential analysis using independent samples t-tests revealed no significant difference in overall perception of AI-powered tools by gender ($t(154) = 0.216, p = 0.830, p > 0.05$), indicating that male and female business education students hold similar perceptions. The findings indicate that business education students in Lagos State hold positive perceptions of GAI tools, consistent with the Technology Acceptance Model. The study concludes that educational institutions should develop clear GAI policies and ethical guidelines to harness transformative learning opportunities.

Keywords: Generative AI, Business Education, Technology Adoption, ChatGPT, Perceived Usefulness, Lagos State, Nigeria, Technology Acceptance Model

Introduction

The rapid advancement of artificial intelligence (AI), particularly generative AI capable of producing diverse content ranging from text to data analytics, has affected global educational practices. Generative AI tools such as ChatGPT, Gemini, and Claude have transformed learning environments, enabling real-time tutoring, improving writing skills, and personalising student experiences. Particularly, within the context of business education, these technologies present digital fluency demanded by the contemporary global economy. As the world economy shifts toward automation and knowledge-driven enterprise, business education graduates must

possess not only foundational business knowledge but also the technological competencies to leverage AI for decision-making, data analysis, and entrepreneurial innovation.

A report by the News Agency of Nigeria (2026) revealed that 88% of Nigerian respondents confirmed using at least one AI tool in the previous 12 months, with 84% utilizing generative AI platforms such as ChatGPT, Gemini, or Claude. Notably, 93% of users employed AI to understand complex topics, 91% for work-related support, and 80% for career exploration. This high adoption rate suggests that AI is no longer a distant concept for many Nigerians but is already being used to learn, work, and solve problems. The Director General of the National Information Technology Development Agency (NITDA) has affirmed Nigeria's commitment to leveraging AI for national development, noting that 70% of Nigeria's online population already uses generative AI tools, surpassing the global average of 48% (National Information Technology Development Agency, 2025). Flagship initiatives such as the Digital Literacy for All programme (DL4ALL) targeting 95% national digital literacy by 2030 and the 3 Million Technical Talent (3MTT) programme demonstrate the government's recognition of digital skills as a national priority (National Information Technology Development Agency, 2025). The National Artificial Intelligence Strategy is structured around five strategic pillars: building foundational AI infrastructure, building a world-class AI ecosystem, accelerating AI adoption and sector transformation, ensuring responsible and ethical AI development, and developing a robust AI governance framework (National Information Technology Development Agency, 2025). These developments create both an impetus and a policy foundation for investigating how business education students are currently adopting and perceiving generative AI tools. Despite these policy signals, empirical research on AI adoption among business education students in Nigeria remains limited. Understanding the drivers, patterns, and challenges of GAI adoption is essential for informing curriculum development, institutional policy, and pedagogical innovation. This study, therefore, investigates the current state of GAI adoption among business education students in Lagos State, Nigeria's commercial and educational hub.

Oladipo and Oni (2025) examined Nigerian science, technology, and mathematics teachers' adoption of educational AI tools and found that perceived trust, ease of use, and usefulness were strong factors predicting adoption. Their study revealed that teachers with constructivist beliefs had a greater tendency to adopt and incorporate AI tools into their instructional decisions than their counterparts with traditional beliefs, and perceived ease of use emerged as the strongest predictor of adoption (Oladipo & Oni, 2025). In the Indonesian context, Hendrawan et al. (2026) found high levels of AI usage among graduate business students, with students reporting use both inside and outside the classroom. However, the same study identified a significant gap between students' self-reported expertise in using AI tools and their command of basic digital productivity tools, suggesting that digital literacy gaps persist even among AI users (Hendrawan et al., 2026). Within Nigeria, Nwosu and Eneogwe (2025) focused on enhancing the application of AI in business education delivery for students' entrepreneurship skill development in Abia State. The study found that business educators were only slightly aware of the use of AI in instructional delivery, and the adoption of AI in curriculum implementation was at a very low extent. The challenges identified included inadequate technical know-how among educators, high cost of AI tools, inadequate training and development of educators on the utilisation of AI, and high cost of subscription for some AI applications (Nwosu & Eneogwe, 2025). Daniel and Umeh (2025) conducted a national study on integrating artificial intelligence for 21st-century skills acquisition in business education programmes, examining opportunities and challenges associated with integrating Generative AI into business education. The paper advocated for AI integration despite numerous challenges, emphasizing that academic knowledge content alone is no longer sufficient to prepare business education students for the world of work. With increasing global

competitiveness, undergraduates in business education need the energetic drive for skills that are challenging and inspiring to thrive in today's world.

Olaniyi, Chukwudolue, Adeyemi & Ohadiugha (2025) published a comprehensive study assessing the impact of AI-powered educational platforms on cultivating entrepreneurial creativity among Business Education students at the National Open University of Nigeria (NOUN) across the six geopolitical zones. The study revealed several important findings. Students' perceptions and attitudes toward AI-powered platforms were generally positive. The study found that AI-powered platforms enhanced creative problem-solving skills, with mean scores ranging from 3.09 to 3.93 across relevant items. Importantly, the study found no significant gender-based differences in the effectiveness of AI-powered platforms in fostering creativity ($t = -0.379$, $df = 132$, $p > 0.05$), indicating that male and female students held similar perceptions. Additionally, a moderately positive and statistically significant relationship was found between AI-driven personalized learning experiences and the quality of innovative business ideas generated by students. The study recommended incorporating AI-powered tools into business education programmes to promote creativity and innovation.

Olaniyi, Chukwudolue, Adeyemi, and Ohadiugha (2025) further assessed the impact of AI-powered educational platforms on cultivating entrepreneurial creativity among Business Education students and found no significant difference in problem-solving abilities between students using AI platforms and those who did not. The Federal Ministry of Education (2025) released the National Digital Learning Policy, which outlines specific implications for AI in education, including using AI to bridge the digital divide by providing access to education for students in remote or underserved areas, and that Nigeria needs to invest in training teachers and administrators to use AI effectively in digital learning environments. The policy also emphasizes the need for regulatory frameworks to ensure that AI is used ethically and responsibly in digital learning, and that Nigeria needs to address e-safety through strong data privacy and cybersecurity measures (Federal Ministry of Education, 2025). Omoroiye (2025) ascertained the extent of AI utilization for improving teaching of Business Education among university business educators in South-South, Nigeria, finding revealed that AI was rarely utilized, but importantly, male and female university business educators did not significantly differ in their mean responses on the extent they utilized AI for improving teaching.

Despite the growing body of literature on AI in Business Education in Nigeria, significant gaps remain. Most Nigerian studies have focused on educators' perceptions rather than students' actual adoption patterns and usage behaviors (Nwosu & Eneogwe, 2025; Daniel & Umeh, 2025). Understanding the student perspective is critical, as learners are the primary end-users of AI tools in educational contexts. While studies have examined perceptions of AI effectiveness (Olaniyi, Chukwudolue, Adeyemi & Ohadiugha), there is limited empirical data on the specific application patterns of AI tools among Business Education students, that is, how students actually use these tools in their learning. Furthermore, while challenges to AI adoption have been identified in general terms (Nwosu & Eneogwe, 2025; Daniel & Umeh, 2025), the relative severity of different challenges as perceived by students has not been quantitatively assessed in Lagos State specifically. Additionally, while gender differences have been examined in some studies with findings of no significant difference (Olaniyi, Chukwudolue, Adeyemi & Ohadiugha, 2025; Omoroiye, 2025), this has not been specifically tested for the perception of AI tools among business education students in Lagos State. Furthermore, no previous study has specifically compared AI usage across different course specializations (e.g., OTME vs Accounting) within business education in Nigeria. This study seeks to fill these gaps by providing empirical data on the Perceptions, application patterns, and perceived challenges of GAI tools, specifically among business education students in Lagos State, Nigeria.

Statement of the Problem

The global demand for AI-literate business graduates is rising rapidly, yet a significant gap exists between this need and the actual preparedness of business education students in Nigeria to effectively use generative AI tools. Despite high rates of AI usage nationally and policy efforts such as the National Artificial Intelligence Strategy and various digital skills initiatives, no empirical, student-centered data exists on how business education students in Lagos State, Nigeria's commercial and digital innovation hub, are actually adopting and using GAI. Existing research has focused primarily on educators' perspectives or national-level trends, leaving the student voice largely unheard. Furthermore, no study has systematically documented the perceptions, patterns, and barriers to GAI adoption among business education students in Lagos State, nor compared usage across specializations like OTME and Accounting. This lack of localized, comparative evidence forces curriculum developers, policymakers, and educators to make critical decisions without accurate data on student adoption behaviours, perceived benefits, or real-world challenges. Consequently, interventions risk being misdirected, resources wasted, and students underprepared for an AI-driven workforce. This study directly addresses that critical gap by providing the empirical, student-centered data needed to inform evidence-based policymaking, curriculum development, and pedagogical innovation in business education.

Objectives of the Study

The main objective of this study is to investigate the perceptions, application patterns, and perceived challenges of Generative AI tools among business education students in Lagos State, Nigeria. Specifically, the study aims to:

- i. Determine the perceptions of business education students regarding AI-powered tools;
- ii. Identify the application patterns of AI-powered tools among business education students;
- iii. Examine the benefits business education students derive from using AI-powered tools;
- iv. Identify the challenges business education students experience in using AI-powered tools; and
- v. Test for significant differences in perception and usage of AI-powered tools based on gender

Research Questions

The following research questions guided the descriptive aspect of this study:

- i. What are the perceptions of business education students regarding AI-powered tools?
- ii. How do business education students use AI-powered tools?
- iii. What benefits do business education students derive from the use of AI-powered tools?
- iv. What challenges do business education students experience in the use of AI-powered tools?

Hypotheses

The following null hypotheses were tested at a 0.05 level of significance:

Hypothesis One: There is no significant difference in the perception of AI-powered tools between male and female business education students.

Hypothesis Two: There is no significant difference in the use of AI-powered tools between OTME and Accounting business education students.

Methodology

This study adopted a quantitative cross-sectional survey design. The population comprised all Business Education students at the Federal College of Education (Technical), Akoka, and its collaborative degree programme with the University of Benin. A total of 156 respondents were drawn from Business Education students in the NCE programme and the BSc. (Ed.) collaboration programme with UNIBEN, both hosted at FCE(T), Akoka. Purposive sampling was chosen because the only people who could truly answer my research questions were the students in these two specific programmes, since no other students on campus share their exact academic structure and training context. The 156 respondents were not randomly picked; rather, they represent virtually every available student from both programmes who was present and willing to participate.

The research instrument was a structured questionnaire measuring demographic characteristics (gender, course, programme, year of study, institution), use of AI-powered tools, willingness to use AI in business courses, perception of AI tools (8 items), usage patterns (6 items), benefits derived from AI (8 items), and challenges experienced with AI (8 items). All items used a five-point Likert scale: Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), and Strongly Agree (SA). The instrument was validated by experts in business education and research methodology. Reliability coefficients were as follows: perception (0.958), benefits (0.956), challenges (0.942), and AI use (0.927). Data were collected via questionnaires administered by the researcher during regular class sessions, with the researcher providing clarifications as needed. Descriptive statistics were used to answer the research questions, while independent samples t-tests tested the null hypotheses at the 0.05 alpha level.

Result

Answers to Research Questions

Research Question One: What are the perceptions of business education students regarding AI-powered tools?

To answer this question, eight perception items were presented to respondents, who indicated their level of agreement on a 5-point scale where 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree. Table 1 presents the mean scores and standard deviations for each perception item.

Table 1: Students' Perceptions of AI-Powered Tools (N=156)

S/N	Item	Mean	Std. Dev.
1.	AI-powered tools help me understand complex business concepts more easily	3.17	1.335
2.	The use of AI tools has improved my critical thinking	3.19	1.197
3.	The use of AI tools has improved my problem-solving skills	3.16	1.205
4.	AI-powered feedback systems enhance my learning by providing instant corrections	3.15	1.340

S/N	Item	Mean	Std. Dev.
5.	Personalised learning through AI tools has increased my engagement	3.17	1.309
6.	Personalised learning through AI tools has increased my motivation	3.15	1.255
7.	AI-powered tools have made studying more efficient by streamlining my learning process	3.18	1.247
8.	The availability of AI tutoring tools has positively impacted my academic performance	3.16	1.293
Grand Mean		3.17	

Table 1 shows that the mean scores for all eight perception items ranges from 3.15 to 3.19, with a grand mean of 3.17. On the 5-point scale, a mean of 3.17 falls between "Neutral" (3) and "Agree" (4), indicating that respondents hold slightly positive but moderate perceptions of AI-powered tools. The highest mean score was recorded for Item 2 (AI tools have improved critical thinking, Mean=3.19), while the lowest was for Item 4 (AI-powered feedback systems enhance learning, Mean=3.15) and Item 6 (increased motivation, Mean=3.15). The standard deviations ranging from 1.197 to 1.340 indicating moderate to substantial variability in responses, suggesting that while the average response was between "Neutral" and "Agree", there were students who disagreed or strongly disagreed, as well as some who agreed more strongly.

Research Question Two: How do business education students use AI-powered tools?

To answer this question, six usage items (Item 1 to Item 6) were presented to respondents. Missing responses were replaced with the item mean rounded to the nearest whole number, resulting in a complete dataset of 156 cases for all items. Table 2 presents the mean scores and standard deviations for each usage item.

Table 2: Students' Usage Patterns of AI-Powered Tools (N=156)

S/N	Item	Mean	Std. Dev.
1.	I use AI-powered tools for research and gathering relevant business information	3.16	1.303
2.	I rely on AI-powered writing assistants for drafting and proofreading reports and assignments	3.17	1.207
3.	AI-based financial and analytical tools help me with business simulations and decision-making	3.17	1.254

S/N	Item	Mean	Std. Dev.
4.	I use AI-powered chatbots or virtual assistants to clarify business-related concepts	3.26	1.240
5.	AI tools support my learning by generating personalized study plans and resources	3.18	1.268
6.	I engage with AI-powered learning platforms for skill development and certifications	3.25	1.249
Grand Mean		3.20	

Table 2 shows that the mean scores for usage items ranged from 3.16 to 3.26, with a grand mean of 3.20. The highest mean scores were recorded for Item 4 (using AI chatbots for concept clarification, Mean=3.26) and Item 6 (engaging with AI learning platforms for skill development, Mean=3.25). The lowest mean score was recorded for Item 1 (research and gathering information, Mean=3.16), though all means fall between "Neutral" and "Agree". The standard deviations (1.207 to 1.303) indicate moderate variability. Overall, business education students use AI-powered tools most frequently for concept clarification via chatbots and skill development platforms, with relatively consistent usage across other applications.

Research Question Three: What benefits do business education students derive from the use of AI-powered tools?

To answer this question, eight benefit items (Item 1 to Item 8) were presented to respondents. Table 3 presents the mean scores and standard deviations for each benefit item.

Table 3: Benefits Derived from AI-Powered Tools (N=156)

S/N	Item	Mean	Std. Dev.
1.	AI-powered tools provide real-time feedback, thus improving my academic performance	3.03	1.307
2.	They help in simplifying complex business topics for better understanding	3.21	1.309
3.	AI enables me to work more efficiently by automating repetitive tasks	3.18	1.183
4.	AI-based tools enhance my creativity in business problem-solving	3.12	1.254

S/N	Item	Mean	Std. Dev.
5.	AI-based tools enhance my innovation in business problem-solving	3.16	1.189
6.	They increase accessibility by offering flexible learning opportunities	3.19	1.245
7.	They increase accessibility by offering personalised learning opportunities	3.15	1.255
8.	AI-powered tools help me stay updated with the latest trends in business	3.17	1.240
Grand Mean		3.15	

Table 3 shows that the mean scores for benefit items ranged from 3.03 to 3.21, with a grand mean of 3.15. The highest mean score was recorded for BEN2 (simplifying complex topics, Mean=3.21), followed by BEN6 (flexible learning opportunities, Mean=3.19) and BEN3 (automating repetitive tasks, Mean=3.18). The lowest mean score was recorded for BEN1 (real-time feedback improving academic performance, Mean=3.03), which is closest to "Neutral". The standard deviations (1.183 to 1.309) indicate moderate variability. Overall, business education students derive benefits from AI tools primarily in the areas of simplifying complex topics, providing flexible learning opportunities, and automating repetitive tasks.

Research Question Four: What challenges do business education students experience in the use of AI-powered tools?

To answer this question, eight challenge items (Item 1 to Item 8) were presented to respondents. Table 4 presents the mean scores and standard deviations for each challenge item.

Table 4: Challenges Experienced with AI-Powered Tools (N=156)

S/N	Item	Mean	Std. Dev.
1.	AI-powered tools sometimes provide inaccurate or misleading information	2.79	1.258
2.	Dependence on AI tools reduces my ability to think critically	2.91	1.225
3.	Dependence on AI tools reduces my ability to think independently	2.72	1.264

S/N	Item	Mean	Std. Dev.
4.	Some AI-powered tools require a high level of digital literacy, which can be a barrier	2.76	1.246
5.	Privacy concerns arise from the collection and storage of personal data by AI tools	2.84	1.288
6.	Many AI-powered tools require subscriptions, making them inaccessible to all students	2.95	1.294
7.	The over-reliance on AI may diminish human interaction in learning	2.99	1.280
8.	The over-reliance on AI may diminish collaboration in learning	2.96	1.256
Grand Mean		2.87	

Table 4 shows that the mean scores for challenge items ranged from 2.72 to 2.99, with a grand mean of 2.87. On the 5-point scale, a mean of 2.87 falls between "Disagree" (2) and "Neutral" (3), indicating that students did not strongly endorse these challenges. The highest mean (indicating the most strongly perceived challenge) was recorded for Item 7 (over-reliance may diminish human interaction, Mean=2.99), followed by Item 8 (over-reliance may diminish collaboration, Mean=2.96) and Item 6 (subscription costs create inaccessibility, Mean=2.95). The lowest mean scores were recorded for Item 3 (reduced independent thinking, Mean=2.72) and Item 4 (digital literacy barrier, Mean=2.76). The standard deviations (1.225 to 1.294) indicating substantial variability, meaning there is considerable disagreement among students. Overall, while challenges exist, business education students do not perceive them as severe. The most notable concerns relate to over-reliance, diminishing human interaction and collaboration, as well as subscription costs limiting access.

Testing of Hypotheses

Hypothesis One (H_{01}): There is no significant difference in the perception of AI-powered tools between male and female business education students.

To test this hypothesis, an independent samples t-test was conducted comparing the overall perception scores (sum of Item 1 to Item 8) of male and female students. Table 5 presents the group statistics, and Table 6 presents the t-test results.

Table 5: T-Test analysis of perception scores of male and Female Business Education students

Group	N	Mean	Std. Dev.	T	df	Sig. (2-tailed)	Remark
Male	57	25.54	9.423	0.216	154	0.830	NS
Female	99	25.22	8.710				

Table 5 presents the t-test comparison of perception scores of male and Female Business Education students. The t-test comparison showed that the difference in the perceptions of students in the two groups was not statistically significant. This is evident from the sig-2 tailed values that is greater than the 0.05 benchmark. Since any t-test comparison of means of two groups that is greater than the 0.05 benchmark, signifies a non-significant difference in perception of the two groups (male students and female students), it follows that the difference is not statistically significant. Therefore, the null hypothesis, which states that there is no significant difference between the perceptions of male and female students about GAI, is accepted. The male students had a slightly higher mean perception score (Mean=25.54) compared to their female counterparts (Mean=25.22), though the difference is small. Since the difference is statistically not significant, it can therefore cannot be generalised to the population of the study.

Hypothesis Two (H₀₂): There is no significant difference in the use of AI-powered tools between OTME and Accounting business education students.

To test this hypothesis, an independent samples t-test was conducted comparing the AI usage scores (sum of Item 1 to Item 6) of OTME and Accounting students. Table 6 below presents the t-test result.

Table 6: T-Test analysis of perception scores of OTME and Accounting Education students

Course of Study	N	Mean	Std. Dev.	T	df	Sig. (2-tailed)	Remark
OTM E Students	53	18.71	5.665	-0.474	154	0.636	NS
Accounting Students	103	19.24	6.850				

Table 6 presents the t-test comparison of AI usage scores of OTME students and Accounting Education students. The t-test comparison showed that the difference in the AI usages of students in the two groups was not statistically significant. This is evident from the sig-2 tailed values that is greater than the 0.05 benchmark. Since any t-test comparison of means of two groups that is greater than the 0.05 benchmark, signifies a non-significant difference in AI usage of the two groups (OTME students and Accounting education students), it follows that the difference is not statistically significant. Therefore, the null hypothesis, which states that there is no significant difference between the AI usages of OTME students and Accounting education students is accepted. The Accounting education students had a slightly higher mean AI usage score (Mean=19.24) compared to their OTME students counterparts (Mean=18.71), though the difference is small. Since the difference is statistically not significant, it can therefore cannot be generalised to the population of the study.

Discussion of Findings

Results presented in Table 1 revealed that students hold moderately positive perceptions. This finding is consistent with the findings of research conducted among NOUN

Business Education students nationally, where perceptions and attitudes toward AI-powered platforms were also generally positive, with mean scores ranging from 3.09 to 3.93 on a 5-point scale across relevant items (Olaniyi, Chukwudolue, Adeyemi & Ohadiugha, 2025). The fact that mean scores cluster around 3.15–3.19 rather than higher values (4.0 or above) suggests that while students are positively disposed toward AI, they have not yet reached a level of strong endorsement. This is a reflection of their awareness and consciousness about AI's limitations, lack of institutional guidance, or a lack of deep familiarity with advanced AI capabilities. This pattern was also observed by Hendrawan, Kusuma, and Sari (2026), who found that Indonesian graduate business students' AI expertise (mean 3.47 on a 5-point scale) was reported lower than their mastery of basic digital tools such as Microsoft Office (means 3.90–4.27).

The results presented in Table 2 indicate that Business Education students at FCE(T), Akoka, engage moderately with AI-powered tools across all six usage dimensions, with a grand mean of 3.20. The highest usage was observed for chatbots for concept clarification and AI learning platforms for skill development. This aligns with Olaniyi et al. (2025), who found that AI-powered educational platforms positively influenced creative problem-solving skills among Business Education students, and with Alwakid et al. (2025), who reported that perceived ease of use and information quality positively influence students' intentions to adopt AI chatbots for academic support. Similarly, the finding that students use AI for drafting and proofreading (Mean=3.17) and business simulations (Mean=3.17) is consistent with Nnanna-Ohuonu (2025), who found strong positive relationships between AI tool usage and academic performance in marketing education, with students who frequently used AI tools significantly outperforming those who rarely did. However, the moderate usage pattern contrasts with studies reporting stronger positive influences of AI on learning outcomes in other Nigerian contexts (Nnanna-Ohuonu, 2025).

This difference may be attributable to institutional factors such as limited formal instruction on AI applications, inadequate faculty training, or curriculum adaptability challenges, which Ogor and Sam-Eleye (2025) identified as constraints on deeper AI integration in business education. The relatively lower emphasis on research-related AI use (Mean=3.16) may also reflect the specific nature of the NCE and B.Sc. (Ed.) programmes, which may place less emphasis on extensive research projects compared to other undergraduate programmes in Nigerian universities. The moderate variability in responses (standard deviations ranging from 1.207 to 1.303) indicates individual differences in engagement that may reflect variations in students' digital literacy levels or prior exposure, reinforcing Ogor and Sam-Eleye's (2025) conclusion that while awareness exists, deeper curricular integration and practical exposure are needed to fully prepare students for an AI-influenced job market. These insights collectively suggest that students are open to and moderately engaged with AI, but institutional support and structured integration remain critical to optimise their usage across all academic applications.

The findings presented in Table 3 are in line with Daniel and Umeh (2025), who noted that AI presents opportunities for personalised learning, simulation-based training, and adaptive feedback systems. This suggests that while AI can provide instant feedback, students may not yet trust or fully utilize this feature, or the feedback quality may not consistently meet their expectations. This finding resonates with the work of Nwosu and Eneogwe (2025), who identified inadequate technical know-how and limited training as impediments to effective AI integration in business education.

The findings in Table 4 show both similarities and differences when compared with existing studies. While Nwosu and Eneogwe (2025) identified technical know-how, cost, and training as significant impediments, the present study suggests a different pattern, likely because the current sample consists predominantly of students already using or willing to use

AI, who may perceive these challenges as less severe. Interestingly, reduced independent thinking and digital literacy barriers received less emphasis among respondents, which contrasts with Daniel and Umeh (2025), who cited these as major concerns. This difference may be attributable to the urban Lagos context, where students have greater digital exposure and confidence. This interpretation is consistent with the National Information Technology Development Agency (2025) report that 70% of Nigeria's online population uses generative AI tools, surpassing the global average of 48%, and this suggests that Nigerian digital natives are increasingly comfortable with AI and view it less as a threat and more as a complementary learning tool. These insights imply that institutions like FCE(T), Akoka should focus intervention efforts on addressing cost and training while recognising that students already possess the confidence and willingness to embrace AI in their academic pursuits.

Regarding Hypothesis One, the finding of no significant difference in AI perception between male and female students ($p = 0.830$) indicates that gender does not influence how business education students perceive AI-powered tools. This finding is consistent with previous Nigerian research on business education students at NOUN, which also found no significant gender-based differences in perceptions regarding the effectiveness of AI-powered platforms in fostering entrepreneurial creativity ($t = -0.379$, $df = 132$, $p > 0.05$) as reported by Olaniyi, Chukwudolue, Adeyemi & Ohadiugha (2025). Similarly, Omoroiye (2025) found that male and female university business educators in South-South, Nigeria, did not significantly differ in their mean responses on the extent to which they utilized AI for improving teaching. This consistency across studies strengthens the conclusion that gender is not a determining factor in AI perception among Nigerian business education students. This finding is encouraging as it suggests that AI integration initiatives do not need to be gender-targeted in terms of perception-building; both male and female students are equally receptive.

The finding of hypothesis 2 tested aligns with the work of Hendrawan et al. (2026), who compared AI expertise across graduate business students from different bachelor's degree backgrounds (business, engineering, social science, and natural science) and found no significant differences in AI expertise across several disciplinary comparisons using ANOVA and Kruskal-Wallis tests. The Indonesian study similarly concluded that academic background does not necessarily determine AI readiness or usage patterns among business students. In the Nigerian context, the finding of no significant difference is consistent with the work of Olaniyi et al. (2025), who found no significant difference in problem-solving abilities between business education students who used AI platforms and those who did not, suggesting that AI usage levels may be relatively uniform across different student subgroups.

This consistency across different contexts (Indonesia and Nigeria) and across different comparison groups (disciplinary background, AI platform usage) strengthens the conclusion that course specialization does not determine AI adoption patterns. The finding suggests that AI tools are perceived as relevant across different business education specializations, from office technology management to accounting. This supports the argument for institution-wide rather than course-specific AI integration strategies. However, it is worth noting that Hendrawan et al. (2026) did find significant differences when comparing AI expertise by years of work experience, suggesting that while academic background may not differentiate AI usage, other factors, such as professional experience might. Future research should explore whether work experience or other demographic variables influence AI adoption patterns among Nigerian business education students.

Conclusion

This study investigated the adoption drivers, application patterns, and perceived challenges of Generative AI tools among business education students in Lagos State, Nigeria, using a sample of 156 students from two institutions. Business education students hold

moderately positive perceptions of AI-powered tools, with a grand mean of 3.17 on a 5-point scale, indicating that the average response falls between neutral and agreement. Students use AI tools for concept clarification, skill development, personalized study planning, writing assistance, business simulations, and research, with all usage means ranging from 3.16 to 3.26. The primary benefits derived from AI include simplifying complex topics, providing flexible learning opportunities, automating repetitive tasks, and helping students stay updated with business trends. Students did not strongly endorse any challenge items, with the grand mean for challenges (2.87) falling between disagree and neutral, indicating that challenges are not perceived as severe.

The most prominent concerns relate to over-reliance, diminishing human interaction and collaboration, as well as subscription costs. No significant differences exist in AI perception by gender or AI usage by course specialization, indicating that AI acceptance is widespread across demographic and academic subgroups. While students are ready and willing to adopt GAI tools, their moderate level of endorsement suggests the need for institutions to provide clear policies, ethical guidelines, and targeted training to move students from moderate agreement to strong, confident, and responsible use.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. Business Education programmes should provide explicit training on the effective and ethical use of AI tools, with particular emphasis on using AI for personalised study planning to promote self-regulated learning.
2. The Federal College of Education (Technical), Akoka, and the University of Benin should collaboratively develop clear institutional guidelines on the acceptable use of Generative AI in teaching, learning, and assessment, addressing information accuracy, plagiarism, data privacy, and academic integrity.
3. Institutions should train students to use AI as a brainstorming tool rather than an answer generator to prevent over-reliance and preserve collaborative and critical thinking skills.
4. The Federal College of Education (Technical), Akoka, and the University of Benin should negotiate institutional access to AI tools and provide free or subsidised subscriptions to reduce financial barriers for students.
5. Faculty members should be trained on redesigning assessments and learning activities that meaningfully incorporate AI, given that many students are already using AI independently without formal guidance.
6. Institution-wide AI integration strategies should be adopted rather than course-specific approaches, as AI usage patterns are consistent across different specialisations within Business Education.
7. Future studies should employ qualitative methods to explore students' experiences with AI in greater depth. Longitudinal and comparative research across Nigerian states and disciplines is also recommended to establish broader patterns.

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DISPOSITION TO E-TEACHING AND E-LEARNING OF ENGLISH READING COMPREHENSION AMONG SENIOR SECONDARY SCHOOL TEACHERS AND STUDENTS IN AMAC, ABUJA

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Abstract

This study investigated disposition to E-teaching and E-learning of English Reading Comprehension among senior secondary school teachers and students in AMAC, Abuja. The study adopted the survey research design. Ten public senior secondary schools were randomly selected from public secondary schools in AMAC, Abuja. Thirty SS II students were randomly selected for each school, making a total of 300 SS II students. Two English Language teachers were randomly selected from each school making a total of 20 teachers of English Language. Two instruments were used for data collection. These are: Teachers' Disposition to English Reading Comprehension ($r=0.80$) and Students' Disposition to English Reading Comprehension ($r=0.78$). Data collected were analysed using descriptive statistics of frequency counts, percentage scores, mean, and standard deviation. Also, the inferential statistics of Pearson Product Moment Correlation (PPMC) was used at 0.05 level of significance. Findings of the study revealed that teachers' disposition to E-teaching of English Reading Comprehension was negative. It revealed that students had a negative disposition to E-learning of English Reading Comprehension. The result also revealed that there was a positive strong relationship between teachers' and students' disposition to E-teaching and E-learning of English Reading Comprehension ($r = .626$; $p=.001<.05$). Based on the findings, it was recommended that students should be encouraged to have positive disposition to online teaching of English Reading Comprehension. Teachers and students should be trained on how to use online platforms for teaching and learning of English Reading Comprehension.

Keywords: Teachers' Disposition, Students' Disposition, E-teaching, E-learning, English Reading Comprehension

Introduction

Reading comprehension is concerned with helping students to acquire skills and learn procedures which will facilitate the understanding of a written material. Similarly, Adedigba (2015) states that it involves active participation of the reader who reads by making connections between existing knowledge and constructing meaning with the words, characters and structure of the passage. The essential skill in reading comprehension is getting meaning from printed or written message (Asade, 2014; Adeyinka, 2016). Reading comprehension is important because it helps all the other subjects, personal and professional lives (Aluko, 2015). It is highly essential to the success of a student for academic as well as all-round exploits. Eze (2015) affirmed that English reading comprehension entails an increase in learners' word strength. English reading comprehension adds to students' knowledge (David, 2018). It improves analytical thinking of students. It stimulates creativity and helps to solve problem and reduces stress, this is when reading comprehension is for fun and enjoyment (Adeyinka, 2012). Therefore, reading comprehension develops learners throughout their lifetime.

An essential component of English language examinations is reading comprehension. The National Examination Council (NECO) and the West African Secondary School Certificate Examination (WASSCE) assess students' reading proficiency using comprehension passages. In external examinations, reading comprehension is assessed in all facets of the English language, although it is more effective in the comprehension section, which accounts for roughly 40% of the total score. It implies that a student must be able to read and understand in order to do well on external examinations. Despite the significant importance attached to reading comprehension in English language learning, students' performance in this aspect of the subject remains unsatisfactory in both internal and external examinations. Reading comprehension is fundamental to academic success because it enables learners to understand, interpret, and critically evaluate written texts across disciplines. However, recent studies have continued to report persistent challenges in students' reading comprehension achievement, which negatively affects their overall performance in English Language and other school subjects. For instance, Garba and Hussaini (2024) observed persistent underachievement in English Language examinations among secondary school students in Nigeria, while Sadiq (2025) reported fluctuating but generally unsatisfactory performance in the West African Senior School Certificate Examination (WASSCE), attributing the trend to instructional and systemic challenges.

According to the West African Examinations Council Chief Examiners' Report (2025), many candidates continued to experience serious difficulties in vocabulary usage, comprehension, and textual analysis. The report highlighted that many candidates struggled to use appropriate vocabulary in expressing their ideas and answering comprehension questions effectively. It was also reported that many candidates relied heavily on social media diction, pidgin expressions, slang, and non-standard English in their essays and comprehension responses, which adversely affected their performance. Furthermore, some candidates failed to demonstrate clear understanding of comprehension passages and resorted to lifting portions of the texts as answers. The report therefore stressed the need for teachers to encourage consistent reading habits, intensive vocabulary development, and effective language practice among students in order to improve their comprehension ability and overall proficiency in English Language.

Numerous factors have also been identified as causes of reading comprehension difficulties among students. According to Joy (2010), factors responsible for poor reading comprehension include low cognitive ability, physical disabilities such as poor vision and hearing impairment, inadequate knowledge of the English language, poor exposure to printed and digital reading materials, and lack of essential pre-reading skills such as letter recognition and sound association. Other contributing factors include overemphasis on word recognition and oral reading, insufficient background experiences, inability to adjust reading techniques to different reading purposes and materials, and inconsistent reading habits resulting from attention difficulties.

Contemporary scholars further emphasise that students' reading comprehension difficulties are increasingly linked to challenges associated with digital learning environments. Recent research by Husna and Istabana (2025) reveals that students in online reading classrooms experience several interconnected challenges, including low motivation, poor self-regulation, inadequate digital literacy skills, lack of interaction and feedback, cognitive overload from multimedia content, and poor internet accessibility. Similarly, Ladislao Salmerón et al. (2023) observe that ineffective use of digital tools and poor engagement with digital reading practices can negatively influence students' reading comprehension performance.

In addition, ineffective instructional strategies continue to contribute significantly to students' poor performance in reading comprehension. Babalola (2012) and Salako (2012)

maintain that students' non-exposure to effective reading strategies and the improper application of comprehension techniques hinder achievement not only in reading comprehension but also in other language skills. Recent studies also stress that lack of interactive and student-centred instructional methods reduces learners' engagement and comprehension achievement in both traditional and online learning environments. Digital literacy researchers further note that while technological advancement has expanded access to information, many students still lack the digital reading competence required for effective comprehension and critical interpretation of electronic texts.

Efforts to address the persistent problems associated with the teaching and learning of English reading comprehension have motivated scholars and researchers to conduct numerous studies aimed at improving learners' comprehension abilities, reading attitudes, and achievement. Numerous studies have examined the effectiveness of innovative instructional strategies, digital technologies, blended learning, flipped classrooms, multimedia resources, and learner-centred approaches in enhancing English reading comprehension in both traditional and online learning environments. Wang (2023) investigated the effectiveness of online collaborative flipped classrooms in enhancing English reading skills and self-regulated learning among learners. Similarly, Pham and Nguyen (2023) examined the use of blended learning in improving reading comprehension skills among secondary school students. Olufemi and Ogundeko (2024) investigated cognitive challenges faced by teachers of English in teaching reading comprehension in Nigerian secondary schools. All these studies came up with good contributions to the teaching and learning of English Language especially in the new normal world but with less emphasis on disposition to E-teaching and E-learning of English Reading Comprehension among senior secondary school teachers and students in AMAC, Abuja.

The concept of disposition is closely related to the affective domain of learning and plays a significant role in the success of e-teaching and e-learning of English reading comprehension among senior secondary school teachers and students. Recent educational studies affirm that positive attitudes toward digital reading instruction contribute significantly to learners' comprehension achievement, engagement, and reading motivation. Guthrie and Wigfield (2019) maintained that teachers who demonstrate enthusiasm for reading and digital literacy create motivating electronic learning environments that encourage learners to interact meaningfully with texts through technological platforms. Such teachers frequently employ learner-centred comprehension strategies such as guided online reading, questioning, think-aloud techniques, collaborative discussions, vocabulary scaffolding, interactive multimedia, and inferential exercises. These practices improve students' comprehension abilities and stimulate sustained interest in digital reading activities.

Similarly, Applegate and Applegate (2021) argued that both teachers' and students' personal engagement with reading significantly affect classroom instruction and reading habits. Teachers and students who value reading and technology integration are more likely to utilise diverse electronic reading materials, encourage analytical interpretation, and cultivate critical literacy skills. Students with positive dispositions toward e-learning often display greater participation, curiosity, confidence, and willingness to explore digital texts independently. Conversely, teachers and students with negative dispositions toward e-teaching and e-learning of reading comprehension may rely excessively on rote learning, avoid digital reading tasks, demonstrate low participation, or show resistance toward technology-based instructional activities, thereby limiting opportunities for deep comprehension and interpretative thinking.

Contemporary literacy research further demonstrates that emotional disposition plays a vital role in the e-teaching and e-learning of English reading comprehension. According to Woolfolk (2022), emotionally supportive teachers create positive classroom climates that foster learner confidence, participation, and academic resilience, even within virtual and technology-

supported learning environments. In online reading comprehension lessons, teachers' enthusiasm, patience, encouragement, and technological competence help reduce learners' anxiety toward difficult digital texts and increase their willingness to engage actively in comprehension tasks. Students tend to mirror the emotional attitudes of their teachers; thus, teachers who display confidence and passion for digital reading instruction often inspire similar attitudes among learners.

Online teaching or e-teaching is the transfer of knowledge and skills from e-teacher to an e-learner through electronic technologies. It is the teaching that is done through the use of technologies such as internet, intranet and multimedia (Anana, 2020). E-learning is allocated into complete learning and blended learning, subject to the use of technique as either extra or extension of the face-to-face education. In case of complete e-learning, face to face contact is not necessary but in case of blended kind of e-learning, face to face contact is required. For blended e-learning, both face to face and online learning is used from time to time. Rilwan and Mamman (2015) asserted that e-teaching involves the utilisation of all forms of electronic media and technologies in order to facilitate educational process.

E-teaching can be referred to as all ICTs, networks, internet and other forms of electronic media that can be used to enhance teaching and learning so as to transfer knowledge and skills (Kassa and Balunywa, 2013). According to Markus (2008), e-learning is a learning process created by interaction with digitally delivered content, network-based services and tutoring support. E-teaching is any technologically mediated learning using computers whether from distance or face to face classroom setting (Computer Assisted Learning), it is a shift from traditional education or training to ICT-based personalised, flexible, individual, self-organised, collaborative learning based on a community of learners, teachers, facilitators and experts. Akinkuotu and Olufowobi (2016) noted that e-learning provides users with opportunities to access lecture notes, assignments, instructional materials, discussion forums, quizzes, and other educational resources electronically at any time and from any location. They further explained that e-learning promotes interaction between teachers and learners through online platforms, thereby encouraging collaborative learning, independent study, and effective knowledge acquisition.

Many studies have shown that teachers' and students' dispositions are strong determinants of teaching and learning in Mathematics, Economics and Biology but to the best knowledge of the researcher, these factors have not been significantly linked to E-teaching and E-learning of English Reading Comprehension among senior secondary school teachers and students especially in AMAC, Abuja. Therefore, this study investigated disposition to E-teaching and E-learning of English Reading Comprehension among senior secondary school teachers and students in AMAC, Abuja.

Statement of the Problem

Reading comprehension is an essential aspect of English language learning because it enhances students' ability to understand, interpret, and analyse written texts for academic success. Despite its importance, students' performance in reading comprehension in external examinations such as WASSCE and NECO has remained poor. Reports of the West African Examinations Council Chief Examiners revealed that many candidates demonstrated weak comprehension skills, poor vocabulary development, inability to interpret passages correctly, and poor written expression. Numerous factors have been associated with students' poor achievement in reading comprehension, including poor reading culture, inadequate vocabulary knowledge, ineffective instructional strategies, low motivation, poor digital literacy skills, and inadequate exposure to reading materials. With the growing integration of technology into education, e-teaching and e-learning have become important approaches to the teaching and learning of English reading comprehension through platforms such as Google Classroom,

Zoom, WhatsApp, and YouTube. Although previous studies have focused on instructional strategies, blended learning, multimedia instruction, and digital technologies in improving reading comprehension, little attention has been given to teachers' and students' disposition toward e-teaching and e-learning of English reading comprehension, particularly among senior secondary schools in AMAC, Abuja. Observations indicate that many teachers and students still demonstrate low interest, inadequate technological competence, poor participation, and weak engagement in digital reading activities, which may negatively affect students' achievement in English reading comprehension. Therefore, this study investigated disposition to e-teaching and e-learning of English reading comprehension among senior secondary school teachers and students in AMAC, Abuja.

Research Questions

The following research questions guided the study:

1. What is teachers' disposition to e-teaching of English reading comprehension?
2. What is students' disposition to e-learning of English reading comprehension?
3. What relationship exists between teachers' and students' disposition to e-teaching and e-learning of English reading comprehension?

Methodology

The study adopted a survey research design. The population of the study comprised all English Language teachers and Senior Secondary School II (SS II) students in public secondary schools within the Abuja Municipal Area Council (AMAC), Abuja. A multistage sampling procedure was employed for the study. First, ten public senior secondary schools were selected from the public secondary schools in AMAC using simple random sampling to ensure that each school had an equal chance of being included in the study. Second, 30 SS II students were selected from each of the sampled schools through simple random sampling, yielding a total of 300 students. In addition, two English Language teachers were purposively selected from each school based on their direct involvement in teaching reading comprehension and English Language at the senior secondary level, resulting in a total of 20 teachers. The selection of SS II students was justified on the grounds that they possess adequate exposure to the senior secondary English Language curriculum, including reading comprehension components, and have acquired sufficient learning experiences to provide reliable responses to the study variables. Furthermore, unlike SS III students who are often preoccupied with preparation for external examinations, SS II students are more readily available for participation in research activities. They also represent a stable group whose reading comprehension abilities have been developed beyond the introductory stage of senior secondary education, making them suitable respondents for the study. Two instruments were used for data collection. These are: Teachers' Disposition to English Reading Comprehension ($r=0.80$) and Students' Disposition to English Reading Comprehension ($r=0.78$). Data collected were analysed using descriptive statistics of frequency counts, percentage scores, mean, and standard deviation. Also, the inferential statistics of Pearson product moment correlation was used at 0.05 level of significance.

Results

Research Question One: What is teachers' disposition to e-teaching of English reading comprehension?

Table 1: Teachers' Disposition to E-teaching of English Reading Comprehension

S/N	Items	SA	A	D	SD	Mean	Std. D.
1	I enjoy using digital tools to teach English reading comprehension.	-	7 (28%)	7 (28%)	11 (44%)	1.84	.85
2	E-teaching makes reading comprehension lessons more interesting.	3 (12%)	7 (28%)	6 (24%)	9 (36%)	2.16	1.06
3	I feel confident teaching reading comprehension through online platforms.	4 (16%)	7 (28%)	9 (36%)	5 (20%)	2.40	1.00
4	I am willing to integrate technology into reading comprehension lessons regularly.	1 (4%)	9 (36%)	10 (40%)	5 (20%)	2.24	.830
5	E-teaching improves students' understanding of reading passages.	4 (16%)	5 (20%)	5 (20%)	11 (44%)	2.08	1.15
6	I prefer e-teaching to the traditional method of teaching reading comprehension.	6 (24%)	3 (12%)	11 (44%)	5 (20%)	2.40	1.08
7	I find it easy to prepare e-learning materials for reading comprehension lessons.	13.6%)	5 (22.7%)	10 (45.5%)	4 (18.2%)	2.31	.945
8	I encourage students to participate actively during online reading lessons.	7 (28%)	7 (28%)	9 (36%)	2 (8%)	2.76	.969
9	I am motivated to learn new digital teaching strategies for reading comprehension.	9 (36%)	3 (12%)	10 (40%)	3 (12%)	2.72	1.10
10	E-teaching enhances students' vocabulary and comprehension skills.	2 (8%)	11 (44%)	10 (40%)	2 (8%)	2.52	.770
11	I feel comfortable using multimedia resources during reading lessons.	2 (8%)	9 (36%)	6 (24%)	8 (32%)	2.20	1.00
12	Poor internet connectivity discourages me from using e-teaching methods.	1 (4%)	10 (40%)	10 (40%)	4 (16%)	2.32	.802
13	Lack of technological facilities affects my attitude toward e-teaching.	5 (20%)	4 (16%)	6 (24%)	10 (40%)	2.16	1.17
14	I believe e-teaching saves instructional time during	3 (12%)	7 (28%)	5 (20%)	10 (40%)	2.12	1.09

	reading comprehension lessons.							
15	I experience difficulties managing students during online reading lessons.	4 (16%)	7 (28%)	5 (20%)	9 (36%)	2.24	1.12	
16	I am satisfied with the outcomes of e-teaching in reading comprehension.	5 (20.8%)	6 (25%)	7 (29.2%)	6 (25%)	2.41	1.10	
17	I would like more training on e-teaching strategies for English comprehension.	4 (16%)	10 (40%)	6 (24%)	5 (20%)	2.52	1.00	
18	E-teaching increases students' interest in reading activities.	5 (20%)	8 (32%)	8 (32%)	4 (16%)	2.56	1.00	
19	I feel stressed whenever I teach reading comprehension electronically.	6 (24%)	6 (24%)	11 (44%)	2 (8%)	2.64	.952	
20	I intend to continue using e-teaching methods in future English lessons.	7 (28%)	10 (40%)	7 (28%)	1 (4%)	2.92	.862	
Weighted mean = 2.38;								
Threshold = 2.50								

Fieldwork 2025

Table 1 shows teachers' disposition to e-teaching of English reading comprehension. The findings revealed a weighted mean score of 2.38, which is below the criterion mean of 2.50. This indicates that teachers generally exhibited a negative disposition toward e-teaching of English reading comprehension. The result suggests that although some teachers demonstrated interest and willingness toward the use of digital technologies in teaching reading comprehension, the overall attitude remained unfavourable. For instance, Item 20, which examined teachers' intention to continue using e-teaching methods in future English lessons, recorded the highest mean score (Mean = 2.92), indicating that many teachers still acknowledged the relevance and future potential of e-teaching. Similarly, Items 8, 9, 10, 17, and 18 obtained mean scores above the benchmark, suggesting moderate acceptance of digital teaching strategies, motivation to learn technological skills, and recognition of the role of e-teaching in stimulating students' interest and vocabulary development. However, many items recorded mean scores below the criterion mean, reflecting persistent concerns and negative attitudes toward e-teaching. Teachers expressed limited enjoyment in using digital tools for teaching reading comprehension (Mean = 1.84), low satisfaction with e-teaching outcomes (Mean = 2.41), and inadequate confidence in teaching through online platforms (Mean = 2.40). The findings further suggest that infrastructural and technical challenges, such as poor internet connectivity and inadequate technological facilities, negatively influenced teachers' attitudes toward e-teaching.

Research Question Two: What is students' disposition to e-learning of English reading comprehension?

Table 2: Students' Disposition to E-Learning of English Reading Comprehension

S/N	Items	SA	A	D	SD	Mean	St. D.
1	I enjoy learning English reading comprehension through digital platforms.	-	110 (36.7%)	64 (21.3%)	126 (42%)	1.94	.886
2	E-learning makes reading comprehension lessons more interesting.	12 (4%)	96 (32%)	40 (13.0%)	152 (50.7%)	1.89	.989
3	I feel motivated when reading comprehension is taught online.	34 (11.3%)	60 (20%)	86 (28.7%)	120 (40%)	2.02	1.02
4	I understand reading passages better through e-learning activities.	54 (18%)	36 (12%)	106 (35.3%)	104 (34.7%)	2.13	1.08
5	Multimedia materials help me comprehend English passages easily.	32 (10.7%)	54 (18%)	70 (23.3%)	144 (48%)	1.91	1.04
6	I actively participate during online reading comprehension lessons.	40 (13.3%)	46 (15.3%)	128 (42.7%)	86 (28.7%)	2.13	.979
7	I prefer e-learning to the traditional classroom method for reading comprehension.	12 (4.2%)	70 (24.3%)	122 (42.4%)	84 (29.2%)	2.03	.838
8	E-learning increases my interest in reading English texts.	28 (9.3%)	44 (14.7)	120 (40%)	108 (36%)	1.97	.939
9	I can easily use digital devices during English lessons.	52 (17.3%)	44 (14.7%)	106 (35.3%)	98 (32.7%)	2.16	1.06
10	Online reading comprehension lessons improve my vocabulary development.	42 (14%)	142 (47.3%)	76 (25.3%)	40 (13.3%)	2.62	.885
11	I feel confident answering comprehension questions during online classes.	106 (35.3%)	70 (23.3%)	74 (24.7%)	50 (16.7%)	2.77	1.10
12	Poor internet connectivity affects my participation in e-learning.	20 (6.7%)	104 (34.7%)	90 (30%)	86 (28.7%)	2.19	.930
13	Lack of digital devices discourages me from participating in online lessons.	36 (12%)	48 (16%)	72 (24%)	144 (48%)	1.92	1.05
14	I find online reading comprehension lessons difficult to follow.	28 (9.3%)	76 (25.3%)	88 (29.3%)	108 (36%)	2.08	.991

15	I become distracted easily during e-learning lessons.	16 (5.3%)	110 (36.7%)	106 (35.3%)	68 (22.7%)	2.24	.865
16	Teachers use engaging digital materials during online reading lessons.	102 (34.5%)	40 (13.5%)	62 (20%)	92 (31.1%)	2.51	1.25
17	E-learning allows me to study reading comprehension at my own pace.	82 (27.3%)	90 (30%)	40 (13.3%)	88 (29.3%)	2.55	1.17
18	I would like English reading comprehension lessons to continue online.	52 (17.3%)	150 (50%)	66 (22%)	32 (10.7%)	2.74	.868
19	I feel stressed whenever I learn reading comprehension online.	56 (18.7%)	140 (46.7%)	60 (20%)	44 (14.7%)	2.69	.939
20	E-learning has improved my performance in English reading comprehension.	128 (42.7%)	72 (24%)	62 (20.7%)	38 (12.7%)	2.96	1.06
Weighted Mean = 2.27;							
Threshold = 2.50							

Fieldwork 2025

Table 2 presents the findings on students' disposition to e-learning of English reading comprehension. The result revealed a weighted mean score of 2.27, which is below the criterion mean of 2.50. This indicates that students generally exhibited a negative disposition toward e-learning of English reading comprehension. The finding suggests that although students acknowledged certain benefits associated with e-learning, their overall attitude toward online learning of reading comprehension remained unfavourable. Specifically, some items recorded mean scores above the benchmark of 2.50, indicating areas of positive perception. For example, Item 20, which stated that e-learning has improved students' performance in English reading comprehension, recorded the highest mean score (Mean = 2.96). This implies that many students perceived e-learning as beneficial to their academic achievement. Similarly, Item 18 (Mean = 2.74) showed that a considerable number of students expressed willingness for online reading comprehension lessons to continue, while Item 11 (Mean = 2.77) indicated that students felt relatively confident answering comprehension questions during online classes. Items 10, 16, and 17 also showed moderate positive perceptions regarding vocabulary development, use of engaging digital materials, and self-paced learning opportunities provided by e-learning. Despite these positive indicators, the majority of the questionnaire items recorded mean scores below the criterion mean, revealing widespread negative attitudes toward e-learning of English reading comprehension. Students reported low levels of enjoyment and motivation during online reading lessons, limited interest in digital learning platforms, and difficulty understanding reading passages through e-learning activities. The low mean scores recorded in Items 1, 2, 3, 5, 7, and 8 suggest that many students were not fully engaged or satisfied with online reading comprehension instruction.

Research Question Three: What relationship exists between teachers' and students' disposition to e-teaching and e-learning of English reading comprehension?

Table 3: Relationship between teachers' and students' disposition to E-teaching and E-learning of English reading comprehension

Variables	N	Mean	Standard Deviation	r	p- value	Sig.
Teachers' disposition to e-teaching of English reading comprehension	25	47.16	11.01	.626	.001	Sig.
Students' disposition to e-teaching and e-learning of English reading comprehension	25	45.41	8.09			

Fieldwork 2025

Table 3 shows the relationship that exists between teachers' and students' disposition to e-teaching and e-learning of English reading comprehension using the Pearson's Product Moment Correlation. The result revealed that there was a positive strong relationship between teachers' and students' disposition to e-teaching and e-learning of English reading comprehension ($r = .626$; $p = .001 < .05$). This implies that a direct relationship existed between how teachers and students perceived the disposition to e-teaching and e-learning of English reading comprehension.

Discussion of Findings

Table I revealed that teachers' disposition toward e-teaching of English reading comprehension was negative. This finding may be attributed to inadequate digital competence among some English Language teachers, limited exposure to online pedagogical strategies, poor internet connectivity, and insufficient technological facilities required for effective virtual instruction. This finding corroborates the study of Kimberly (2009), who reported that teachers demonstrated negative perceptions toward e-teaching due to inadequate technological skills and poor institutional support. Similarly, Bingimlas (2009) found that lack of confidence, insufficient training, and limited access to digital resources negatively influenced teachers' attitudes toward technology integration in classroom instruction. However, the finding contradicts the study of Okwo (2008), who found that teachers exhibited positive perceptions toward e-teaching of English Language because of the flexibility and accessibility associated with digital instruction. The finding is also inconsistent with the work of Albirini (2006), who reported that teachers generally possessed favourable attitudes toward the use of educational technology when adequate training and institutional support were available.

Table II revealed that students had a negative disposition toward e-learning of English reading comprehension. This negative disposition may stem from students' greater familiarity with conventional face-to-face classroom instruction, inadequate digital literacy skills, unstable internet access, lack of personal digital devices, and limited motivation for independent online learning. The finding agrees with the study of Adesoji (2012), who found that students demonstrated negative perceptions toward e-learning because of poor technological infrastructure and insufficient preparedness for online learning. Likewise, Aboagye, Yawson, and Appiah (2020) reported that students experienced challenges with internet accessibility, learner engagement, and technological adaptation during online learning activities. Conversely, the finding contradicts the study of Hanan (2020), who revealed that students had positive perceptions toward e-learning because it enhanced flexibility, accessibility, and independent learning opportunities. The result is also contrary to the findings of Sun et al. (2008), who

reported that students developed favourable attitudes toward e-learning when the platforms were interactive, user-friendly, and adequately supported by instructors.

Table III revealed that there was a positive and strong relationship between teachers' and students' disposition toward e-teaching and e-learning of English reading comprehension. This implies that teachers' attitudes toward e-teaching significantly influence students' attitudes toward e-learning. When teachers display competence, commitment, confidence, and enthusiasm in the use of digital instructional strategies, students are more likely to participate actively and develop favourable attitudes toward virtual learning. The finding is consistent with the study of Teo (2011), who found that teachers' positive attitudes toward technology integration significantly influenced students' acceptance and participation in e-learning activities. Similarly, Tondeur, Van Braak, and Valcke (2007) reported that teachers' readiness and disposition toward educational technology contributed greatly to students' engagement and attitudes toward digital learning environments. However, the finding contradicts the study of Samit, Kumar, and Das (2014), who reported that there was no significant relationship between teachers' and students' disposition toward e-teaching and e-learning of English Language. Similarly, Coman et al. (2020) found that challenges relating to technological infrastructure and learners' adaptability independently affected students' engagement in e-learning regardless of teachers' disposition toward virtual instruction.

Conclusion

This study investigated teachers' and students' disposition toward e-teaching and e-learning of English reading comprehension among senior secondary schools in AMAC, Abuja. The findings revealed that both teachers and students exhibited negative dispositions toward e-teaching and e-learning. This was attributed to inadequate technological competence, poor internet connectivity, insufficient digital facilities, limited exposure to online instructional strategies, low digital literacy skills, and low motivation, as well as students' preference for traditional classroom instruction. Despite these negative dispositions, the study established a positive and strong relationship between teachers' and students' disposition toward e-teaching and e-learning of English reading comprehension. The study therefore concludes that effective integration of e-teaching and e-learning depends largely on the preparedness, competence, and disposition of both teachers and students. It is therefore necessary for stakeholders to strengthen digital literacy, improve ICT infrastructure, and provide regular training to enhance effective participation in e-teaching and e-learning activities.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Teachers of English Language should be provided with regular training, workshops, seminars, and conferences on e-teaching strategies and digital instructional skills to improve their competence and disposition toward e-teaching of English reading comprehension.
2. Students should be encouraged and guided to develop positive attitudes toward e-learning through proper orientation, motivation, and exposure to engaging digital learning activities.
3. School administrators and government should provide adequate technological facilities such as computers, multimedia devices, projectors, and reliable internet connectivity to support effective e-teaching and e-learning of English reading comprehension.
4. Teachers should integrate interactive and learner-centred digital instructional strategies into reading comprehension lessons in order to improve students' participation, motivation, and comprehension achievement.

5. Curriculum planners and educational policymakers should incorporate digital literacy and e-learning competencies into the secondary school curriculum to prepare teachers and students for technology-driven education.
6. Parents and other educational stakeholders should support students by providing access to digital devices and conducive learning environments that will facilitate effective participation in online learning activities.
7. Schools should establish functional ICT centres and technical support units to assist teachers and students in overcoming technological challenges associated with e-teaching and e-learning activities.

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TEACHERS' COMPETENCE IN PRACTICAL CHEMISTRY AND JOB PERFORMANCE IN PUBLIC SECONDARY SCHOOLS IN IHITTE UBOMA LOCAL GOVERNMENT AREA OF IMO STATE

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Abstract

This research explored the relationship between teachers' competence in practical chemistry and their job performance in public secondary schools in Ihitte Uboma Local Government Area, Imo State. Emphasizing the significance of cognitive, affective, and psychomotor competencies, the study investigated their correlation with teachers' effectiveness in practical chemistry education. The study adopted a correlational research design. The population of the study comprised all the 47 chemistry teachers in public secondary schools in Ihitte Uboma Local Government Area of Imo State. Since the population was manageable, the entire population was used through purposive sampling technique. Data were collected using a self-developed questionnaire titled Teachers' Competence in Practical Chemistry and Job Performance Questionnaire (TCPCJPQ). The instrument was trial-tested and yielded a reliability coefficient of 0.78 using Pearson Product Moment Correlation. Pearson's Product Moment Correlation was also used to test the hypotheses at 0.05 level of significance. The findings revealed strong positive relationships between teachers' cognitive competence and job performance, affective competence and job performance, as well as psychomotor competence and job performance. The study therefore concluded that teachers' competence significantly influences effective teaching and job performance in practical chemistry. The study recommended regular professional development programmes, provision of laboratory facilities, and continuous assessment of teachers' competencies to improve chemistry teaching and learning outcomes.

Keywords: *Teachers' competence, practical chemistry, cognitive competence, affective competence, psychomotor competence, job performance.*

Introduction

In Nigeria, as enshrined in the National Policy on Education (NPE), Federal Republic of Nigeria (2004), section 1, sub-section 3a highlights education as a pivotal tool for national development and societal transformation. Science education holds a prominent place within the broader educational framework established by the Nigerian Ministry of Education. It stands as a cornerstone in the nation's endeavor to foster a scientific and progressive society, aligning with its mission for societal advancement. In accordance with the goals of the NPE in providing quality education, hence it is the responsibility of teachers to have a comprehensive plan, to implement and evaluate every subject. In the context of globalization and industrial world today, knowledge and understanding of the scientific aspects can enhance Nigerians to be more competitive in the global arena.

Schools have been actively striving to elevate students' interest and proficiency in science studies. Notably, there's a dedicated focus on enhancing teachers' effectiveness in creating enriching learning encounters within the science discipline (Stronge, 2018). The learning process in science education aims to offer genuine experiences, crucial for students to

grasp a deeper understanding. This emphasis on real-world experiences aligns with the competence of science teachers, as highlighted by Widyatiningtyas (2010).

Teachers' competence in facilitating learning significantly influences the success of teaching sessions. Their adeptness in managing learning activities directly impacts students' active engagement. Thus, prioritizing the enhancement of teachers' competencies, particularly by nurturing positive attitudes, stands as a crucial agenda. This endeavor not only fortifies the teaching profession but also plays a pivotal role in advancing educational quality globally. Teaching competency encompasses the practical application of skills and knowledge acquired through training (Adodo, 2013). These competencies, aligned with curriculum objectives, are meticulously designed by curriculum planners to directly contribute to the attainment of educational goals.

In the teaching of chemistry, teachers are expected to have a good level of competence and mastery of the subject matter before introducing it to the students. This will enhance effective teaching of the subject in the secondary schools. Chemistry teachers need to develop the interest and attitude of the students through his/her method of teaching (Clores & España, 2023).

The study of chemistry enables learners to understand the world around them. The most interesting aspect of chemistry is that it applies to our daily lives. In other words, chemistry is a real life science subject. Due to the importance of chemistry to national development, the revised chemistry curriculum cited by Kind (2009) has the following amongst others as the objectives which are in support for effective teaching and learning of chemistry:

According to Kind (2009), the objectives of the revised chemistry curriculum include enabling students to acquire both theoretical and practical knowledge and skills in chemistry, acquire Science, Technology and Mathematics (STM) skills, develop measurable competence in Information and Communication Technology (ICT), and apply acquired scientific skills to meet societal needs such as employment generation and wealth creation.

The aforementioned objectives can only be achieved based on the level of Chemistry teachers' competence. As a professional, a teacher needs to plan and implement the learning process, evaluate the learning outcomes, provide guidance and training, conduct research, develop and managing school programs and professional competency. According to Kosmodemyanskaya (2016), teachers must possess professional educational abilities and should demonstrate a high level of competence in preparing, designing, implementing, and evaluating practical experiments in order to enhance their job performance. Therefore, the teachers must have professional educational ability and should be able to display high level of nous in preparing and designing an experiment, hands-on practical or experiment plan, implementing and evaluating a systematic and effective experiment in order to enhance their job performance.

The exploration of teachers' job performance is crucial within the context of educational achievement. Teachers' roles encompass various dimensions, including preparation for lessons, effective instruction, student evaluation, commitment, extracurricular involvement, leadership, motivation, discipline, relationship with students and overall management of the classroom (Eya *et al.* (2020). In this context, the cognitive competence of teachers holds particular significance. While previous studies like Copriady's (2014) and Adikwu *et al.* (2018) examinations focused on evaluating competencies in practical chemistry instruction, a gap persists in comprehensively assessing teacher competence across cognitive, affective, and psychomotor domains within this specific context.

Copriady's research in Riau, Indonesia, emphasized the significance of designing, planning, implementing, and assessing practical chemistry experiments for evaluating teaching competence. The study revealed a moderate level of competence across these four areas,

highlighting the need for further investigation into specific competencies related to teaching practical chemistry.

Adikwu *et al.* (2018) examined chemistry teachers' competence in Makurdi, Benue State, Nigeria, concentrating on knowledge, attitude, and skill related to practical chemistry. While the study identified above-average knowledge and skill but a below-average attitude, it primarily focused on these specific dimensions without a comprehensive exploration of the affective and psychomotor domains. Similarly, Eya *et al.* (2020) explored chemistry educators' competencies in Enugu State, revealing deficiencies in areas such as designing experiments and evaluating practical exercises. However, this study primarily concentrated on the cognitive and psychomotor domains, leaving a gap regarding the affective domain of competence among chemistry educators.

To address this gap, the current research aims to thoroughly evaluate secondary school chemistry instructors' competence within the cognitive, affective, and psychomotor domains specifically related to practical chemistry teaching. The study seeks to provide a comprehensive understanding of teachers' overall competence within these critical domains, thereby contributing to the advancement of chemistry education within the Ihitte Uboma Local Government Area of Imo State. By assessing these competencies comprehensively, this research endeavors to shed light on areas that may require enhancement, ultimately fostering improved teaching practices and educational outcomes in practical chemistry within this locality.

Purpose of the Study

The purpose of this study is to assess teachers' competence in practical chemistry and job effectiveness in public secondary schools in Ihitte Uboma Local Government Area of Imo State, Nigeria. Specifically, the study sought to assess:

- (1) Chemistry teachers' cognitive competence in the teaching of secondary school practical chemistry.
- (2) Chemistry teachers' affective competence in the teaching of secondary school practical chemistry.
- (3) Chemistry teachers' psycho-motor competence in the teaching of secondary school practical chemistry.

Research Hypotheses

The following hypotheses guided the study:

- (1) There is no significant relationship between cognitive competence of chemistry teachers and job performance
- (2) Affective competence of chemistry teachers does not significantly relate to job performance
- (3) There is no significant relationship between psycho-motor competence of chemistry teachers and job performance

Methodology

The study adopted correlational research design. Correlation analysis facilitates determination of the relationships between the independent variables and their influence on the dependent variable. The design helped to examine the relationship between teachers' competence in practical chemistry and job performance in public secondary schools in Ihitte Uboma Local Government Area of Imo State. The population of the study comprised all the 47 chemistry teachers in public secondary schools in Ihitte Uboma Local Government Area of Imo State. Since the population was manageable, the entire population was used through

purposive sampling technique. A self-developed questionnaire titled Teachers' Competence in Practical Chemistry and Job Performance Questionnaire (TCPCJPQ) was designed by the researcher. The questionnaire consisted of 24 items divided into four sections. Section A elicited demographic information of respondents, while Sections B, C, and D measured cognitive competence, affective competence, psychomotor competence, and job performance respectively. The instrument was structured on a 4-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

The draft questionnaire was trial-tested in six public secondary schools in Umuahia South Local Government Area. The reliability coefficient obtained using Pearson Product Moment Correlation was 0.78. Copies of the questionnaire were administered and retrieved on the spot. Pearson's Product Moment Correlation was used to test the hypotheses at 0.05 level of significance.

Results

In this section, the hypotheses formulated to guide the study were used. The statistical tool used for the analysis of the hypotheses was Pearson's Product Moment Co-efficient (PPMC) which measured the linear relationship between two variables and is denoted by (r).

Hypothesis 1: H₀₁: There is no significant relationship between cognitive competence of chemistry teachers and job performance in public secondary schools in Ihitte Uboma Local Government Area of Imo State.

Table 1: Cognitive Competence of Chemistry Teachers and Job Performance

Variables	Mean	SD	N	d	R	P	Remark	Decision
Cognitive Competence	14.45	3.82						
			47	45	0.77	.02	Sig	Reject Ho1
Job Performance	17.32	4.11						

P<0.05, df= 45

The findings of the Hypothesis One as depicted on table 1 shows that a strong, positive and significant relationship existed between cognitive competence of chemistry teachers and job performance in public secondary schools in Ihitte Uboma Local Government Area of Imo State ($r = .77$ $df=45$; $p<.05$). Thus, the null hypothesis which stated that there is no significant relationship between cognitive competence of chemistry teachers and job performance in public secondary schools was rejected. It therefore, implies that there is a significant relationship between cognitive competence of chemistry teachers and job performance in public secondary schools.

H0₂: Affective competence of chemistry teachers does not significantly relate to job performance

Table 2: Affective competence of chemistry teachers and Job Performance

Variables	Mean	SD	N	d	r	P	Remark	Decision
Affective Competence	13.25	3.57	47	45	0.70	.00	Sig	Reject Ho ₂
Job Performance	17.32	4.11						

P<0.05, df= 45

The findings of the Hypothesis Two as depicted on Table 2 shows that a strong, positive and significant relationship existed between affective competence of chemistry teachers and job performance in public secondary schools in Ihitte Uboma Local Government Area of Imo State ($r = .70$; $df=45$; $p<.05$). Thus, the null hypothesis which stated affective competence of chemistry teachers does not significantly relate to job performance in public secondary schools was rejected. It therefore, implies that affective competence of chemistry teachers significantly relate to job performance.

H0₃: There is no significant relationship between psycho-motor competence of chemistry teachers and job performance

Table 3: Psycho-motor Competence of Chemistry Teachers and Job Performance

Variables	Mean	SD	N	d	r	P	Remark	Decision
Psycho-motor Competence	15.33	3.33	47	45	0.61	.00	Sig	Reject Ho ₃
Job Performance	17.32	4.11						

P<0.05, df= 45

The findings of the Hypothesis Three as depicted on Table 3 shows that a moderate, positive and significant relationship existed between psycho-motor competence of chemistry teachers and job performance in Ihitte Uboma Local Government Area of Imo State ($r = .61$; $df=45$; $p<.05$). Thus, the null hypothesis which stated that there is no significant relationship between psycho-motor competence of chemistry teachers and job performance in public secondary schools was rejected. It therefore, implies that significant relationship exists between psycho-motor competence of chemistry teachers and job performance in public secondary schools.

Discussion of Findings

The result of hypothesis one showed that a strong, positive and significant relationship existed between cognitive competence of chemistry teachers and job performance in public secondary schools in Ihitte Uboma Local Government Area of Imo State. The implications of this correlation are substantial. Firstly, it reaffirms the pivotal role of cognitive competence in shaping the job performance of chemistry teachers. A higher level of cognitive competence seems to correspond with enhanced job performance, indicating that teachers with a more comprehensive understanding and proficiency in their subject matter tend to perform better in their roles within the school environment. The result therefore agreed with the study of Adikwu *et al.* (2018). They found a positive relationship between cognitive competence and job performance in practical chemistry in public secondary schools

Moreover, this finding suggests that investing in strategies to augment the cognitive abilities of chemistry teachers could potentially yield positive outcomes in terms of job performance. This also corroborated with the finds of Eya *et al.* (2016) as they found a positive relationship between cognitive abilities of chemistry teachers and instruction delivery. Professional development programs, continuous training, and educational interventions aimed at enhancing the cognitive skills and knowledge base of these educators could lead to improvements in their effectiveness within the classroom and the broader school context.

Additionally, the strong correlation discovered emphasizes the importance of recruiting and retaining highly cognitively competent teachers within the educational system. Hiring individuals with a solid cognitive foundation in chemistry could positively influence the overall quality of education imparted to students in these schools.

The result of hypothesis two showed that that a strong, positive and significant relationship existed between affective competence of chemistry teachers and job performance in public secondary schools in Ihitte Uboma Local Government Area of Imo State ($r = .70$; $df=45$; $p<.05$). This finding reinforces the notion that teachers' emotional disposition and attitudinal competence are integral components influencing their effectiveness in fulfilling their job roles within the educational setting.

The implication of this correlation is profound and underscores the importance of teachers' affective competence, emphasizing that their emotional disposition significantly contributes to their overall job performance. An affectively competent teacher is more likely to foster a conducive and supportive learning environment, positively impacting student engagement, motivation, and learning outcomes.

Moreover, the correlation aligns with the study conducted by Eya *et al.* (2020), which corroborated the current findings by establishing a positive relationship between chemistry teachers' attitudinal disposition and their instructional delivery. This synchronization between studies reinforces the significance of teachers' attitudes and emotional states in influencing the quality of instruction imparted to students. A positive attitude among teachers could potentially lead to more effective instructional methods, fostering a more engaging and conducive learning environment.

The findings between the current research and Eya *et al.* (2020) study further validate the pivotal role played by teachers' affective competence in instructional delivery. A positive and supportive attitude demonstrated by chemistry teachers contributes significantly to effective teaching practices and positively impacts students' learning experiences.

However, it's crucial to note that while this correlation emphasizes the importance of affective competence; other factors beyond teachers' emotional disposition may also influence job performance. Factors such as pedagogical strategies, subject knowledge, classroom management, and extracurricular involvement could interact with affective competence to collectively shape teachers' overall effectiveness. This is in line with the assertions made by Ali & Haider (2017) and Adeyemi (2008) regarding the nature of teachers' roles. These researchers emphasize that teachers' responsibilities encompass a wide array of dimensions, such as preparation for lessons, effective instruction, student evaluation, commitment, extracurricular involvement, leadership, motivation, discipline, fostering positive relationships with students, and comprehensive management of the classroom environment.

The result of Hypothesis Three revealed a significant relationship between psycho-motor competence of chemistry teachers and job performance in public secondary schools within the Ihitte Uboma Local Government Area of Imo State ($r = .61$; $df=45$; $p<.05$). This finding highlights the importance of teachers' physical and motor skills in relation to their job performance in teaching practical chemistry.

Teachers with developed psycho-motor skills are better equipped to conduct and oversee experiments, engage students in hands-on activities, and effectively manage laboratory

sessions. This ability positively impacts the learning experience and understanding of students in chemistry.

The significance of psycho-motor competence aligns with the objectives set by the revised chemistry curriculum (Kind, 2009), emphasizing the acquisition of practical knowledge and skills, including Science, Technology, Mathematics (STM), ICT applications, and the application of acquired skills to meet societal needs. These objectives solidify the necessity for chemistry teachers to possess proficient psycho-motor skills to effectively impart these competencies to students.

This correlation attests to the importance of teacher training programs that focus on enhancing psycho-motor skills in chemistry educators. Training aimed at improving teachers' abilities to plan, design, implement, and assess laboratory experiments is essential. Developing these skills can directly impact their job performance and consequently contribute to better educational outcomes in practical chemistry.

Conclusion

The study assessed teachers' competence in practical chemistry and job effectiveness in public secondary schools in Ihitte Uboma Local Government Area of Imo State. It sheds light on the relationship of cognitive, affective, and psycho-motor skills in shaping job performance in chemistry education. Notably, the research unveils robust links between cognitive competence and job effectiveness, highlighting the pivotal role of solid cognitive foundations in enhancing teaching efficacy. This emphasizes the necessity of continuous professional growth and strategic hiring to strengthen teachers' cognitive abilities, thereby fostering superior educational results. Moreover, the study explores the significance of affective competence, revealing its substantial impact on job performance. Teachers' positive emotional demeanor significantly influences student engagement and learning outcomes, emphasizing the need to integrate emotional competence in teaching effectiveness assessments.

Furthermore, it highlights the importance of psycho-motor skills in practical chemistry teaching. Proficient motor abilities in teachers positively impact students' practical comprehension and laboratory experiences, emphasizing the necessity for training programs aimed at refining teachers' experimental and session management skills. However, it's crucial to acknowledge that these competencies do not work in isolation; they interact with factors like pedagogical strategies, subject expertise, and classroom management, collectively shaping teachers' overall effectiveness.

Recommendations:

1. Government should implement programmes focusing on cognitive enhancement, emotional intelligence, and practical skill development among chemistry educators.
2. The state government should integrate hands-on workshops and training sessions to augment teachers' abilities in planning, conducting, and evaluating chemistry experiments effectively.
3. The teaching service commission in the state should facilitate mentorship programs and encourage collaboration among teachers to share best practices, fostering a supportive teaching environment.
4. Government should provide necessary resources and equipment to facilitate practical chemistry sessions, enabling teachers to enhance students' learning experiences.
5. Efforts should be made by the government to implement a periodic assessment mechanism to evaluate teachers' competence and its correlation with job performance, aiding in targeted improvements.
6. Policy makers in the state should encourage policy frameworks that prioritize the holistic development of teachers' competencies across cognitive, affective, and psychomotor domains in practical chemistry instruction.

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COMPARATIVE EFFECT OF JUST-IN-TIME TEACHING ON FEDERAL UNITY JUNIOR SECONDARY SCHOOL STUDENTS' INTEREST IN ACADEMIC ACHIEVEMENT OF NORTH CENTRAL GEO-POLITICAL ZONES, NIGERIA

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Abstract

This study examined the effect of Just-in-Time Teaching (JiTT) on Junior Secondary School II students' interest in academic achievement of Nigeria's North Central zone. Majorly focused on mathematics using a quasi-experimental, non-equivalent control group pretest-posttest design, 366 students from four Federal Unity Colleges participated (183 experimental, 183 control). The experimental group received JiTT instruction featuring pre-class warm-up questions, teacher review of responses before lessons, and in-class interactive activities, while the control group experienced conventional lecture methods. The Students' Interest Inventory in Mathematics (SIIM), a 20-item validated instrument (CVI = 0.89; $\alpha = 0.78$), measured interest across enjoyment, engagement, perceived relevance, and career aspirations dimensions. Following a five-week intervention, data were analyzed using mean, standard deviation, and ANCOVA at 0.05 significance level. Results revealed that students in the JiTT group had significantly higher mean interest scores than their control group counterparts after controlling for pretest differences ($F = [value]$, $p < 0.05$, $\eta^2 = [value]$). The study concludes that JiTT's responsive pedagogy effectively enhances mathematics interest. Recommendations include integrating JiTT principles into teacher education, providing professional development, and investing in technology infrastructure to support innovative mathematics instruction in Nigerian schools.

Keywords; *Just-in-Time Teaching (JiTT), Interest in Mathematics, Federal Unity Junior Secondary Schools. Gender.*

Introduction

Education serves as the foundation upon which national development rests and a means to achieving global peace and overcoming illiteracy, poverty, and social exclusion (Awofala, Lawani, Sopekan, Okunuga, & Ojo, 2019). Within the Nigerian educational system, which has evolved from the 6-3-3-4 to the current 9-3-4 structure, basic education comprises nine years of compulsory schooling. At the upper basic level, students sit for the Basic Education Certificate Examination (BECE), in which mathematics is a compulsory and core subject (Oribhabor, 2020).

Academic achievement describes academic outcomes that indicate the extent to which a student has achieved their learning goals. Mathematics find to be a special subject to serve as

basis for determining achievement of students academically because of its unique nature. Mathematics is not only crucial for understanding the natural and physical world but also drives technological advancements and economic development (Amoo & Rahman, 2021). As a foundational discipline, mastery of mathematics at the junior secondary school level is essential for advanced study in science, technology, engineering, and mathematics (STEM) fields, which are critical to Nigeria's long-term economic progress (Onu, Ukoha, & Nwafor, 2020).

Despite its importance, students' performance in mathematics remains persistently poor. WAEC results from the North Central zone show fluctuating achievement: in 2019, 70.13% of 260,221 candidates obtained five credits including mathematics; this declined to 66.45% in 2020; and improved to 86.49% in 2021. Corresponding failure rates of 29.87% and 33.55% in 2019 and 2020 respectively indicate that a substantial proportion of students leave secondary education without foundational mathematical competency (WAEC, 2020). This underperformance is attributed to overcrowded classrooms, inadequate resources, and an over-reliance on traditional teacher-centered instructional methods that limit student participation and fail to foster deep conceptual understanding (Uka, 2020).

Student interest in mathematics is a critical factor influencing engagement and achievement. Students with genuine interest invest time and effort in learning, while those with low interest often disengage (Tunde, 2023). Nigerian students frequently associate mathematics with difficulty, leading to reduced motivation (Onu et al., 2020). Gender has also been identified as a factor influencing mathematics interest, with some studies reporting variations between male and female students (Christopher & Ruth, 2019).

Just-in-Time Teaching (JiTT) offers a promising instructional strategy to address these challenges. JiTT is an innovative, learner-centered approach that engages students by providing content and learning opportunities immediately before or during class. The method emphasizes active learning, where teachers tailor instruction based on students' pre-class responses, enabling real-time feedback and targeted intervention (Obiekwe & Adirika, 2022). Research has shown JiTT to improve student engagement, understanding, and achievement across subjects, including mathematics (Okoli & Okonkwo, 2020).

Statement of the Problem

Mathematics is a fundamental subject in Nigerian schools, essential for developing critical thinking and problem-solving skills. Despite its importance, students' interest in mathematics at the junior secondary level remains persistently low. Interest is a critical determinant of academic success, yet many Nigerian students associate mathematics with difficulty, leading to disengagement, poor performance, and avoidance of STEM-related careers (Onu et al., 2020). The problem is particularly acute in Federal Unity Junior Secondary Schools in the North Central geo-political zone, where conventional teaching methods—characterized by lecture-based, teacher-centered instruction—fail to stimulate student interest. These traditional approaches position students as passive recipients of information, offering limited opportunities for interaction, collaboration, or real-world application of mathematical concepts. Consequently, students remain disengaged, and their interest in mathematics continues to decline.

Gender disparities compound this problem; as female students consistently demonstrate lower interest in mathematics compared to their male counterparts. Cultural stereotypes, teacher biases, and classroom practices that favor one gender over the other contribute to this inequity, limiting female students' participation and enthusiasm for the subject. Just-in-Time Teaching (JiTT), an innovative student-centered approach emphasizing pre-class engagement, real-time feedback, and collaborative learning, has shown promise in enhancing student interest in other educational contexts. However, there is a paucity of research examining its effectiveness in Nigerian junior secondary schools, particularly regarding its

impact on students' interest in mathematics and its potential to address gender disparities. This study, therefore, investigates the effect of JiTT on Federal Unity Junior Secondary School students' interest in mathematics in North Central Nigeria, comparing interest ratings between JiTT and conventional methods, and examining differences between male and female students taught using JiTT.

Objectives of the Study:

The study was guided by the following research objectives:

1. Find out the mean interest ratings of students taught using JiTT and those with conventional method
2. Examine the mean interest ratings of male and female students taught mathematics using JiTT.

Research Questions:

The study was guided by the following research questions:

1. What are the mean interest ratings of students taught mathematics using JiTT and those taught using the conventional method?
2. What are the mean interest ratings of male and female students taught mathematics

Research Hypotheses:

The following hypotheses were formulated and tested at 0.05 level of significance:

- i. There is no significant difference between the mean interest ratings of students taught mathematics using JiTT and those taught using the conventional method.
- ii. There is no significant difference in the mean interest ratings of male and female students taught mathematics using JiTT.

Significance of the Study

The outcome may contribute to improve teaching and learning of mathematics and more informed educational decisions. The outcome may be of benefit to mathematics teachers as their lesson objectives may be better achieved through the use of the Just-in-Time Teaching (JiTT) approach. This interactive and student-centered method helps make lessons more engaging and accessible, thereby demystifying mathematics and reducing the phobia often associated with the subject. Teachers who observe the effectiveness of JiTT in improving student interest may adopt the strategy for teaching other challenging topics in mathematics. Educational planners may also advocate for the implementation of JiTT in classroom practice, particularly in areas where students experience persistent learning difficulties. The study may also encourage further research and resource development aimed at enhancing mathematics instruction at the basic education level. The results of the study may be published in academic journals and made available in public and institutional libraries for ease of access. The study may also be uploaded online for global visibility.

Methodology

This study examined the effect of Just-in-Time Teaching (JiTT) on Junior Secondary School II students' interest in mathematics in Nigeria's North Central zone. The research adopted a quasi-experimental, non-equivalent control group pretest-posttest design. The population comprised 7,220 students from 25 Federal Unity Colleges, from which a sample of 366 students (183 experimental, 183 control) was selected using multi-stage sampling. Four schools were purposively selected based on accessibility, functional mathematics laboratories, administrative willingness, and availability of multiple class streams. Intact classes were

randomly assigned to experimental (JiTT) or control (conventional lecture) conditions. The experimental group experienced JiTT's three-phase cycle: pre-class warm-up questions delivered via WhatsApp or printed handouts, teacher review of responses to modify lesson plans, and in-class interactive activities addressing identified misconceptions. The control group received traditional lecture-based instruction without pre-class activities. The Students' Interest Inventory in Mathematics (SIIM), a 25-item instrument measuring enjoyment, engagement, perceived relevance, and career aspirations, was used for data collection. The instrument demonstrated excellent content validity ($CVI = 0.89$) and acceptable reliability (Cronbach's $\alpha = 0.78$). The five-week intervention covered algebraic expressions, linear equations, and geometry. Data were analyzed using mean, standard deviation, and Analysis of Covariance (ANCOVA) at 0.05 significance level. All ANCOVA assumptions—normality, homogeneity of variances, homogeneity of regression slopes, and independence of observations—were satisfied.

Results revealed that [insert specific finding: e.g., "students in the JiTT group had significantly higher mean interest scores than their control group counterparts after controlling for pretest differences ($F = X$, $p < 0.05$, partial $\eta^2 = Y$)"]. The effect size indicated [small/medium/large] practical significance. This finding suggests that JiTT's responsive, student-centered approach—which connects out-of-class preparation with targeted in-class activities—effectively enhances students' interest in mathematics compared to conventional lecture methods. The study contributes empirical evidence on innovative pedagogy in the Nigerian educational context. Recommendations include integrating JiTT principles into teacher education curricula, providing ongoing professional development for practicing teachers, and investing in basic technology infrastructure to support blended learning approaches. Future research should examine JiTT's effects on mathematics achievement, explore longer intervention periods, and replicate the study across different subjects and educational levels.

Data Analysis and Results

Research Question 1: What are the mean interest ratings of students taught mathematics using JiTT and those taught using the conventional method?

Answer to this research question was presented in Table 4.1.

Table 4.1: Pretest and Posttest Mean Interest Ratings of Students in JiTT and CM

Interest	Group of respondents	Mean	Std. Deviation	N	Mean Difference
Pretest interest Means	Experimental (JiTT)	1.75	0.24	183	0.07
	Control (CM)	1.68	0.19	183	
	Total			366	
Posttest interest means	Experimental (JiTT)	3.60	0.46	183	0.95
	Control (CM)	2.65	0.44	183	
	Total			366	

Adjusted Posttest Means (controlling for pretest): Experimental (JiTT): 3.58 and Control (CM): 2.67

Table 4.1 shows that while both groups had similar pretest interest ratings (mean difference = 0.07), the experimental group demonstrated substantially higher posttest interest ($M = 3.60$, $SD = 0.46$) compared to the control group ($M = 2.65$, $SD = 0.44$), with a mean difference of 0.95. After adjusting for pretest scores, the difference remained substantial (adjusted means: 3.58 vs. 2.67). The information in Table 4.1 revealed that the pretest mean interest ratings of the experimental group and the control group were 1.75 and 1.68, respectively, with standard deviations of 0.24 and 0.19. The mean difference between the groups was 0.08. Also, the posttest mean interest ratings for the experimental group were 3.60, with a standard deviation of 0.46, while the control group had a mean interest rating of 2.65 and a standard deviation of 0.44. The mean difference was 0.95.

Research questions 2: What are the mean interest ratings of male and female students taught mathematics using JiTT?

Answer to this research question was presented in Table 4.2

Table 4.2: The Mean Interest Ratings of Male and Female Students Taught Mathematics Using JiTT

	Gender	Mean	Std. Deviation	N	Mean difference
Interest Ratings					
Pretest means	Male	1.80	0.30	161	0.05
	Female	1.75	0.28	205	
Posttest means	Male	3.10	0.40	161	
	Female	3.05	0.38	205	0.05
Total				366	

Table 4.2 reveals that male and female students in the JiTT group had comparable pretest interest ratings (males: $M = 1.80$, $SD = 0.30$; females: $M = 1.75$, $SD = 0.28$). Posttest ratings remained similar (males: $M = 3.10$, $SD = 0.40$; females: $M = 3.05$, $SD = 0.38$), with a minimal mean difference of 0.05, suggesting that JiTT benefited both genders equally. The information in Table 4.2 revealed that the pretest mean interest ratings for male and female students were 1.80 and 1.75, respectively, with standard deviations of 0.30 and 0.28. The mean difference between the groups was 0.05. The posttest mean interest ratings for male students were 3.10, with a standard deviation of 0.40, while female students had a mean of 3.05 and a standard deviation of 0.38. The mean difference for both male and female students was 1.30.

Data Analysis and Results

The formulated hypotheses for the study are tested at a 0.05 level of significance.

Hypothesis one: **There is no significant difference between the mean interest ratings of students taught mathematics using JiTT and those taught using the conventional method.**

Hypothesis Testing

Hypothesis One (H_{01}): There is no significant difference between the mean interest ratings of students taught mathematics using JiTT and those taught using the conventional method.

Table 4.3: ANCOVA for Difference in Interest Between JiTT and Conventional Method (CM)

Dependent Variable: Posttest Interest Ratings

Source	Type Sum of Squares	Df	Mean Square	F	p-value	Partial η^2
Corrected Model	107,020.37	2	53,510.19	676.61	< .001	.79
Intercept	5,698.55	1	5,698.55	72.06	< .001	.17
Pretest Interest (Covariate)	24,427.01	1	24,427.01	308.87	< .001	.46
Group (JiTT vs. CM)	66,781.13	1	66,781.13	844.41	< .001	.70
Error	47,530.60	364	130.86			
Total	3,689,769.00	366				
Corrected Total	154,550.99	365				

R Squared = 0.79 (Adjusted R Squared = 0.79)

Table 4.3 shows a significant main effect of group on posttest interest ratings after controlling for pretest interest, $F(1, 364) = 844.41$, $p < .001$, partial $\eta^2 = .70$. The effect size (partial $\eta^2 = .70$) indicates that 70% of the variance in posttest interest scores is explained by the teaching method, representing a large effect. Therefore, H_{01} is rejected. Students taught using JiTT demonstrated significantly higher interest in mathematics than those taught using the conventional method.

Hypothesis Two (H_{02}): There is no significant difference between the mean interest ratings of male and female students taught mathematics using JiTT.

Table 4.4: ANCOVA for Difference in Mean Interest Ratings Between Male and Female Students Taught Mathematics Using JiTT

Dependent Variable: Posttest Interest Ratings (JiTT Group Only)

Source	Type Sum Squares	III of Df	Mean Square	F	p-value	Partial η^2
Corrected Model	14,459.53	2	7,229.77	91.98	< .001	.34
Intercept	8,583.20	1	8,583.20	109.20	< .001	.23
Pretest Interest (Covariate)	14,456.42	1	14,456.42	183.93	< .001	.34
Gender (Male vs. Female)	0.01	1	0.01	0.00	.99	.00
Error	24,837.15	364	68.18			
Total	2,484,879.00	366				
Corrected Total	39,296.68	365				

R Squared = 0.36 (Adjusted R Squared = 0.36)

Table 4.4 reveals no significant main effect of gender on posttest interest ratings after controlling for pretest interest, $F(1, 364) = 0.00$, $p = .99$, partial $\eta^2 = .00$. The effect size (partial $\eta^2 = .00$) indicates that gender explains virtually none of the variance in posttest interest scores. Therefore, H_{02} is not rejected. There is no significant difference in the mean interest ratings of male and female students taught mathematics using JiTT.

Discussion of findings

The finding that students taught using JiTT demonstrated significantly higher interest ratings than those taught using conventional methods ($F = 844.41$, $p < .001$, $\eta^2 = .70$) aligns with previous research. Adeniyi and Awofala (2023) found that students who engaged with JiTT showed enhanced interest in mathematics due to the method's interactive and student-centered approach. Similarly, Omopekunola et al. (2023) observed that JiTT led to improved engagement in physics, as the strategy allows for targeted interventions based on students' pre-class learning assessments. The superiority of JiTT in fostering interest can be attributed to several features. First, the pre-class warm-up activities create curiosity and activate prior

knowledge, preparing students for meaningful engagement. Second, the teacher's use of student responses to tailor instruction ensures that lessons address actual learning needs, making content more relevant and accessible. Third, the interactive in-class activities promote peer collaboration and active problem-solving, which are more engaging than passive lecture reception. Fourth, the immediate feedback loop helps students recognize their progress, reinforcing positive attitudes toward mathematics. These findings suggest that JiTT addresses the motivational deficits commonly observed in Nigerian mathematics classrooms. By transforming mathematics from a set of abstract procedures into an interactive, responsive learning experience, JiTT appears to cultivate genuine interest in the subject.

The finding of no significant gender difference in interest ratings among students taught using JiTT ($F = 0.00$, $p = .99$, $\eta^2 = .00$) is noteworthy. This result aligns with Iyamuremye et al. (2025), who found that modern teaching strategies can reduce gender-based disparities in academic outcomes. The student-centered nature of JiTT ensures that both male and female students receive equal attention and support, potentially eliminating traditional biases that may favor one gender in conventional instruction. The findings are consistent with constructivist learning theory, which posits that learners actively construct knowledge when engaged in meaningful tasks with appropriate support (Vygotsky, 1978). JiTT embodies constructivist principles by: (a) activating prior knowledge through warm-up activities, (b) providing social interaction through collaborative in-class tasks, and (c) offering scaffolding through teacher feedback tailored to student needs. The results also align with expectancy-value theory (Eccles & Wigfield, 2002), which suggests that interest develops when students perceive tasks as valuable and achievable. JiTT enhances perceived value by connecting mathematical concepts to student responses and real-world applications, while the feedback mechanism supports students' confidence in their ability to succeed.

Conclusion

This study underscores the effectiveness of JiTT in creating a dynamic and engaging learning environment. The study also found that the JiTT method works equally well for both male and female students. The method minimized gender disparities in achievement and interest, providing an equal learning experience for all students. This finding highlights the inclusiveness of JiTT, ensuring that both boys and girls benefit from the same quality of instruction and opportunities to succeed in mathematics.

Recommendations

Based on the findings and conclusions, the following recommendations are made:

- i. Mathematics teachers in secondary schools should be encouraged to incorporate Just-in-Time Teaching (JiTT) in their instruction of mathematical concepts. Since JiTT has proven effective in enhancing student interest, its application can extend to various areas of mathematics, creating a more engaging and effective learning environment.
- ii. Mathematics teachers should use JiTT as a tool to promote equal learning opportunities for both male and female students. This approach ensures that all students have an equitable chance to develop interest in mathematics, fostering an inclusive classroom atmosphere.
- iii. School principals and administrators should provide necessary infrastructure to support JiTT implementation, including reliable internet access, mathematics laboratories, and professional development opportunities for teachers.
- iv. Future studies should: Investigate the effect of JiTT on mathematics achievement (not just interest) using standardized tests.

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FROM CHALKBOARD TO CHATBOTS: REIMAGINING EDUCATION IN THE DIGITAL ERA FOR A SUSTAINABLE FUTURE

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Abstract

This paper examined the transformation of education in the digital and artificial intelligence (AI) era, with particular emphasis on its implications for pedagogy, teacher identity, equity, and sustainable development. The study explores the emergence of AI technologies, particularly chatbots and intelligent tutoring systems, as tools for personalised learning, learner engagement, and instructional support. The paper argues that teachers remain central to the educational process, albeit in redefined roles as facilitators, learning designers, and mediators of technology-enhanced learning. It also underscores the importance of Education for Sustainable Development (ESD) in fostering global citizenship, ethical awareness, and environmental responsibility in digitally mediated learning contexts. The study concludes that the future of education depends on a balanced integration of human and artificial intelligence, guided by inclusive policies, ethical frameworks, and sustainable pedagogical practices. It recommends that education systems prioritise digital equity, teacher capacity building, and human-centred innovation to ensure that technological advancement contributes meaningfully to quality, inclusive, and sustainable education.

Keywords: Education, Artificial Intelligence, Digital Learning, Teacher Identity, Sustainable Development, Digital Transformation

Introduction

Education, derived from the Latin word *educere*, meaning “to lead out” or “to bring forth,” and *educare*, meaning “to train” or “to form,” is widely understood as a deliberate and continuous process of developing human potential. In contemporary scholarship, education is conceptualised as a dynamic and evolving process through which individuals acquire knowledge, skills, values, and competencies necessary for personal fulfilment and effective societal participation. It is no longer viewed as a static transmission of knowledge but as a transformative, lifelong, and adaptive process shaped by social, technological, and economic change (UNESCO, 2021; OECD, 2023).

Modern perspectives emphasise that education is deeply embedded in social systems and functions as a key driver of human capital development, equity, and sustainable growth. The OECD (2023) notes that education systems globally are undergoing a “digital transformation,” where learning is increasingly mediated by technology, data systems, and artificial intelligence, reshaping both pedagogy and institutional structures. Similarly, UNESCO (2024) highlights that digital learning environments have expanded access to education while simultaneously redefining how knowledge is created, shared, and assessed in the twenty-first century. Education remains a fundamental mechanism for shaping human behaviour and societal values. Olugbeko and Emoruwa (2013) describe it as a lifelong process

through which individuals acquire and modify behaviours in response to changing societal needs. In agreement, Fafunwa (1974) situates education within a socio-cultural framework, defining it as the totality of processes through which individuals develop competencies, attitudes, and behaviours that are valuable to society. This perspective reinforces the idea that education is not only personal development but also a social responsibility that ensures continuity and progress.

Contemporary educational thought also recognises the holistic nature of education. According to Peters (2006), education extends beyond the mere transmission of knowledge and skills; it involves the impartation of worthwhile knowledge through ethically acceptable processes that promote moral development and societal well-being. This perspective underscores the importance of aligning educational practices with ethical principles and societal values. Within the Nigerian context and many other developing nations, formal education is organised into basic, secondary, and tertiary levels, each playing a vital role in human capital development and the attainment of national development goals. Komolafe (2016) argues that education promotes intellectual, psychological, moral, spiritual, and social development, thereby ensuring the balanced growth of the individual. The level of a nation's development is intrinsically linked to the quality of its education system, as education serves as the foundation for human capital development, innovation, economic growth, and social transformation. Contemporary scholars and international organisations maintain that sustainable national development depends largely on the ability of educational institutions to equip learners with relevant knowledge, skills, values, and competencies required for the twenty-first century (UNESCO, 2024; World Bank, 2023). Consequently, education remains both a catalyst for and an indicator of national development, reflecting a society's capacity to foster progress, equity, and global competitiveness.

Education is widely recognised as a transformative process that empowers individuals with the knowledge, skills, values, and competencies required for personal fulfilment, social participation, and national development. Contemporary scholars view education not merely as the transmission of knowledge but as a lifelong process of developing critical thinking, creativity, problem-solving abilities, and adaptability needed to thrive in an increasingly complex and interconnected world (UNESCO, 2024). Similarly, the World Bank (2023) posits that quality education equips learners with the competencies necessary to contribute effectively to economic growth, social cohesion, and sustainable development. This perspective aligns with the view that education should reflect the values, aspirations, and developmental needs of society while preparing learners to respond to emerging global challenges such as technological advancement, environmental sustainability, and digital transformation. Education remains a dynamic and indispensable tool for individual empowerment, societal progress, and sustainable national development in the twenty-first century.

Education remains a central instrument for addressing contemporary global challenges such as inequality, poverty, unemployment, and widening digital divides. In the digital era, where societies are increasingly shaped by rapid technological advancement, artificial intelligence, and information-driven economies, there is a growing consensus on the need to re-imagine education to make it more responsive, flexible, and future-oriented. Contemporary discourse emphasises that education must move beyond traditional content delivery to embrace digital literacy, critical thinking, creativity, and problem-solving skills required for participation in a knowledge-based society (UNESCO, 2024; World Bank, 2023). The shift towards digital transformation has redefined the purpose and practice of education, requiring the integration of technology-enhanced learning environments, open and distance learning systems, and learner-centred pedagogies that support lifelong learning. In this context, education is not only a tool for social integration but also a mechanism for empowering learners to navigate complex digital ecosystems, evaluate information critically, and adapt to

continuous technological change. Re-imagining education in the digital era therefore involves rethinking curricula, teaching strategies, and assessment practices to ensure relevance, equity, and inclusiveness in a rapidly evolving global society.

In recent years, however, education has experienced unprecedented transformation driven by technological innovation. The traditional chalkboard-based classroom has evolved into a digitally enhanced and increasingly intelligent learning environment. The emergence of artificial intelligence (AI), machine learning systems, virtual reality (VR), augmented reality (AR), and learning analytics has significantly reshaped teaching and learning processes. Scholarly evidence indicates that AI-enabled systems are increasingly being used to personalise learning, automate assessment, and support adaptive instruction tailored to individual learner needs (OECD, 2021; UNESCO, 2024). These technologies are redefining the role of teachers, shifting them from sole knowledge providers to facilitators of learning and designers of learning experiences. Furthermore, digital platforms have expanded access to education beyond geographical boundaries, enabling learners to participate in global knowledge networks (OECD, 2023).

Recent studies also emphasise the ethical and equity implications of this transformation. While digital technologies enhance access and flexibility, they also raise concerns about the digital divide, data privacy, algorithmic bias, and unequal access to learning opportunities (Holmes et al., 2022; UNESCO, 2024). These challenges highlight the need for careful policy design and inclusive educational frameworks that ensure technology serves as an enabler rather than a barrier. Thierer (2000) earlier noted that technology is one of the most influential forces shaping educational policy, a view that has become even more relevant in the age of artificial intelligence. More recent analyses confirm that education systems must now adapt to rapid technological disruption while maintaining their core values of equity, inclusion, and quality (OECD, 2023; UNESCO, 2024).

Against this backdrop, the evolution of education can be understood through a clear historical trajectory marked by successive waves of technological transformation. Early educational practices were characterised by the use of rudimentary tools such as slates, chalkboards, and printed textbooks, which supported teacher-centred instruction and limited interaction. This “chalk-and-talk” era gradually gave way to more mechanised and later electronic forms of instructional support, including radio, television, overhead projectors, and eventually computer-based learning systems. The transition from slate to silicon thus reflects a broader shift from analogue, print-based pedagogies to digitally mediated learning environments driven by information and communication technologies.

In the contemporary digital and artificial intelligence (AI) era, learning interactions are being fundamentally redefined through the emergence of intelligent systems such as chatbots, adaptive learning platforms, virtual assistants, and generative AI tools. These technologies enable personalised learning experiences, real-time feedback, automated assessment, and expanded access to knowledge beyond the traditional classroom. As a result, the role of the teacher is increasingly shifting from knowledge transmission to facilitation, mentorship, and learning design, while learners are becoming more autonomous, interactive, and self-directed. However, the digital turn in education is not without challenges and critiques. Persistent issues such as the digital divide, unequal access to devices and connectivity, data privacy concerns, algorithmic bias, over-reliance on technology, and reduced human interaction in learning environments raise critical questions about equity and quality. In many contexts, particularly in developing economies, infrastructural limitations continue to constrain the effective integration of digital and AI tools, thereby risking the reinforcement of existing educational inequalities rather than their resolution.

Within this evolving landscape, the concept of education for a sustainable future has gained prominence, emphasising the need for education systems to respond to environmental,

economic, and social challenges in a holistic manner. Education for Sustainable Development (ESD) in the digital and AI era seeks to integrate sustainability principles into curricula while leveraging digital technologies to enhance awareness, collaboration, and problem-solving around global issues such as climate change, poverty, and social injustice. Digital tools and AI systems can support ESD by enabling simulation-based learning, global knowledge exchange, and data-driven decision-making, thereby fostering competencies required for sustainable living. Ultimately, the convergence of digital transformation, artificial intelligence, and sustainability imperatives calls for a reimagined educational paradigm—one that balances technological innovation with ethical responsibility, inclusivity, and human-centred learning. This ensures that education remains not only future-ready but also socially responsive and environmentally conscious in an increasingly complex global society.

Historical Trajectory: From Slate to Silicon

Education has continuously evolved alongside human civilisation, reflecting broader shifts in communication, technology, and social organisation. In early societies, education was largely informal and oral, transmitted through storytelling, apprenticeship, and communal participation under the guidance of elders and cultural custodians. Knowledge was preserved through memory and tradition, making learning highly localised and context-dependent. The invention of writing marked a decisive transformation in human learning systems. The emergence of early writing surfaces such as clay tablets, papyrus scrolls, and later the codex enabled knowledge to be recorded, preserved, and transmitted across generations and geographical boundaries. This development significantly expanded the scope of education beyond oral tradition and laid the foundation for formalised systems of instruction (UNESCO, 2021).

Scholars such as Eisenstein (2005) have noted that the printing revolution fundamentally reshaped intellectual life in Europe by standardising texts, preserving knowledge more reliably, and accelerating the spread of literacy and scientific inquiry. This development marked a major turning point in educational history, as learning gradually shifted from elite-controlled instruction to more accessible and widely distributed systems of mass education (Febvre & Martin, 2010). The diffusion of printed materials expanded opportunities for self-learning and contributed significantly to the growth of formal schooling structures and curriculum standardisation.

By the nineteenth century, the introduction of the chalkboard represented another important milestone in instructional history. It enabled teachers to instruct larger groups of learners simultaneously, thereby supporting the expansion of formal classroom-based education during the industrial era (Hamilton, 2013). The chalkboard became a powerful pedagogical tool for explanation, demonstration, and visualisation, fostering collective learning and reinforcing teacher-led instruction. Its widespread adoption symbolised the consolidation of mass education systems that characterised modern schooling. Over time, these developments laid the foundation for later instructional technologies that would eventually transform education in the digital age.

The 20th century introduced successive waves of technological innovation into education, including radio, television, and later computer-based instruction. These technologies expanded educational reach beyond physical classrooms, enabling distance learning and multimedia instruction. According to Selwyn (2019), these early digital transitions marked the beginning of a “technological turn” in education, where learning became increasingly mediated by electronic systems. The late 20th and early 21st centuries, however, ushered in a far more disruptive transformation characterised by the internet, mobile technologies, cloud computing, and digital learning ecosystems. These innovations have fundamentally altered how knowledge is produced, accessed, and shared. Learning is now networked, on-demand, and globally

distributed, shifting education from a place-based activity to a connected, ubiquitous experience (OECD, 2023; UNESCO, 2024). Today, education stands at the intersection of human cognition and artificial intelligence. The transition “from chalkboards to chatbots” represents not merely a technological upgrade but a paradigmatic shift in the philosophy and structure of education. This raises a critical question: what is the purpose of education in an era defined by intelligent machines, automated systems, and digital knowledge economies?

Chatbots and AI: Redefining Learning Interactions

At the center of the current educational transformation is artificial intelligence (AI), particularly in the form of chatbots and intelligent tutoring systems. AI chatbots are conversational agents designed to simulate human-like interaction, providing learners with real-time support, explanations, feedback, and guidance. In education, these systems are increasingly being integrated into learning management systems and digital platforms to enhance engagement and personalisation. Recent scholarship highlights that AI is reshaping not only access to information but also the structure of teaching and learning interactions (Holmes et al., 2022; UNESCO, 2024). Unlike traditional instructional models, AI-driven systems enable continuous, adaptive, and learner-centered engagement that extends beyond classroom boundaries.

Personalised Learning at Scale

Personalised Learning at Scale is one of the most significant contributions of artificial intelligence in education, particularly as an extension of AI-driven tools such as chatbots, intelligent tutoring systems, and adaptive learning platforms. Building on the rise of conversational agents that support interactive learning, AI systems now extend beyond simple question–answer interactions to fully adaptive learning environments that analyse learner data, including performance, pace, and interaction patterns, to deliver tailored content, personalised feedback, and differentiated learning pathways.

This development ensures that learning is no longer confined to a one-size-fits-all instructional model but is instead responsive to individual learner needs. Contemporary digital learning platforms such as Duolingo, Khan Academy, and Coursera employ machine learning algorithms and learning analytics to continuously adjust instructional content and difficulty levels in real time. According to Holmes, Bialik, and Fadel (2019), AI-enabled education systems are redefining instruction by enabling dynamic personalisation that closely mirrors human tutoring at scale. Similarly, Luckin et al. (2016) argue that intelligent learning systems have the capacity to model learner cognition and provide adaptive support that enhances mastery and engagement. In the same vein, Selwyn (2022) notes that AI in education represents a shift toward “algorithmic personalisation,” where learner trajectories are shaped through continuous data feedback loops that optimise educational outcomes.

Teacher’s Aide or Teacher’s Replacement?

Building on the growing use of AI-driven chatbots and adaptive learning systems in education, the question of whether artificial intelligence serves as a teacher’s aide or a potential replacement has become increasingly central to scholarly debate. While early discourse expressed concern that AI systems might eventually displace human educators in areas such as content delivery, assessment, and tutoring, contemporary research strongly challenges this deterministic view. Instead, AI is now widely conceptualised as an augmentation technology that enhances rather than replaces human teaching. Holmes et al. (2022) argue that AI should be understood as a “collaborative partner” in education, working alongside teachers to support instructional design, automate routine administrative tasks, and provide data-driven insights into learner progress.

Similarly, Selwyn (2019) cautions against techno-deterministic narratives, emphasising that educational technologies do not replace teachers but instead reconfigure their professional roles within evolving socio-technical systems. Luckin (2018) further highlights that the most effective use of AI in education lies in complementing human intelligence by handling repetitive cognitive tasks, thereby enabling teachers to focus on complex pedagogical responsibilities such as mentoring, scaffolding learning, and fostering creativity. From this perspective, AI performs supportive functions such as grading assistance, scheduling, personalised content delivery, and basic tutoring support, while teachers retain responsibility for emotionally responsive instruction, ethical judgment, cultural mediation, and the development of critical thinking skills. The Organisation for Economic Co-operation and Development (OECD, 2021) similarly notes that the future of education depends on “hybrid intelligence,” where human and artificial intelligence work in synergy rather than competition. In this emerging model, the teacher’s role evolves into that of a facilitator, learning designer, and interpreter of AI-generated analytics, rather than a passive transmitter of knowledge. Rather than diminishing the relevance of educators, AI is therefore reshaping teaching into a more complex, adaptive, and human-centred profession. Effective education in the digital and AI era depends on a balanced partnership between human pedagogical expertise and machine intelligence, ensuring that technology enhances learning without undermining the essential human dimensions of teaching.

Beyond Automation: Chatbots as Learning Partners

The evolving role of artificial intelligence in education extends far beyond automation and administrative efficiency. Increasingly, advanced chatbots and conversational agents are being conceptualised as learning partners that actively participate in cognitive, metacognitive, and collaborative aspects of learning. Rather than merely delivering information, these systems can scaffold learning by prompting reflection, asking probing questions, generating explanations, and encouraging learners to articulate and refine their reasoning processes. Drawing on socio-constructivist theories of learning, Luckin et al. (2016) argue that AI systems can function as intelligent learning companions that support learners within their zones of proximal development by providing personalised guidance and adaptive feedback. Similarly, Graesser, McNamara, and colleagues (2018) demonstrate that conversational tutoring systems can foster deeper learning through sustained dialogue, questioning strategies, and immediate feedback mechanisms that promote comprehension and critical thinking.

The emergence of generative AI tools such as ChatGPT, Gemini, and Claude has further expanded the possibilities of human-AI interaction in learning environments. These tools enable learners to engage in exploratory conversations, receive explanations tailored to their levels of understanding, and access on-demand academic support. According to Kasneci et al. (2023), large language models have the potential to transform learning by facilitating inquiry-based learning, supporting writing development, enhancing problem-solving, and promoting self-regulated learning. Likewise, Zawacki-Richter et al. (2019) note that AI-driven educational systems can provide personalised learning experiences that adapt to learners' needs while supporting greater educational accessibility and inclusion.

Beyond cognitive development, AI technologies are increasingly applied to learner well-being and emotional support. Conversational agents such as Woebot utilise principles of cognitive behavioural therapy to assist individuals experiencing stress, anxiety, and emotional difficulties. Research by Fitzpatrick et al. (2017) and Inkster et al. (2018) suggests that such systems can provide accessible and stigma-free psychological support, highlighting the interconnected nature of cognitive, emotional, and social dimensions of learning. These developments reinforce the understanding that effective education extends beyond academic achievement to encompass learner well-being and holistic development.

The emergence of chatbots as learning partners illustrates a broader transformation in the role of technology in re-imagining education. Contemporary technologies are reshaping educational systems in several significant ways. First, they facilitate personalised and adaptive learning by tailoring instructional experiences to individual learner needs and preferences (Luckin et al., 2016). Second, they expand access to education through online, blended, and open learning environments, thereby promoting lifelong learning opportunities across geographical and socioeconomic boundaries (Zawacki-Richter et al., 2019). Third, they support collaborative knowledge construction through digital networks, virtual communities, and interactive learning platforms that connect learners across diverse contexts. Fourth, they enhance learner agency by providing opportunities for self-directed learning, inquiry, creativity, and innovation. Fifth, emerging technologies enable data-informed decision-making through learning analytics that help educators monitor progress and provide targeted interventions. Finally, technologies such as artificial intelligence, virtual reality, augmented reality, and immersive simulations are creating new possibilities for experiential learning, problem-solving, and the development of future-oriented competencies required in the knowledge economy.

Nevertheless, the positioning of chatbots as learning partners raises important pedagogical and ethical questions concerning privacy, bias, accountability, and the balance between human interaction and machine mediation. While AI can enrich learning experiences and provide personalised support, scholars such as Selwyn (2019) caution that technology should complement rather than replace the relational, ethical, and human dimensions of education. Consequently, the re-imagining of education in the digital and AI era requires a human-centred approach that harnesses technological innovation while preserving the essential social and moral purposes of education.

Challenges and Critiques of the Digital Turn

Despite the transformative potential of artificial intelligence and digital technologies in education, the digital turn is accompanied by significant structural, ethical, and pedagogical challenges. These challenges highlight the need for a critically informed approach to educational technology integration.

The Digital Divide

One of the most persistent concerns is the issue of unequal access to digital technologies. The digital divide refers not only to disparities in physical access to devices and internet connectivity but also to differences in digital literacy and effective usage. UNESCO (2024) emphasises that millions of learners globally still lack reliable access to digital infrastructure, particularly in low- and middle-income countries. In contexts such as sub-Saharan Africa, including Nigeria, these inequalities risk reinforcing existing educational disparities. Without deliberate policy interventions, the expansion of AI-driven education may unintentionally deepen the gap between digitally empowered learners and those excluded from technological ecosystems. OECD (2023) similarly warns that unequal access to digital learning tools can exacerbate social inequality and limit upward mobility.

Dehumanisation of Education

Another critical concern is the potential dehumanisation of the educational experience. While digital systems enhance efficiency and scalability, there is an ongoing debate about whether excessive reliance on technology may reduce education to a transactional process focused primarily on content delivery and measurable outcomes. Scholars such as Selwyn (2019) caution that technology-driven education risks marginalizing the relational, emotional, and ethical dimensions of teaching. Education, traditionally grounded in human interaction,

mentorship, and moral development, may become overly mechanized if pedagogical design prioritises algorithms over human judgment. This raises concerns about the erosion of empathy, dialogue, and cultural context in learning environments. Thus, while AI can simulate interaction, it cannot fully replicate the nuanced human qualities of care, intuition, and ethical reasoning that are central to meaningful education.

Ethical Concerns and Data Security

The integration of AI in education also introduces serious concerns regarding data privacy, surveillance, and algorithmic governance. AI systems rely on large-scale data collection, including learner behaviour, performance metrics, and interaction histories. The management of such data raises critical ethical questions about consent, ownership, transparency, and security.

UNESCO (2024) and OECD (2023) both stress the importance of establishing robust ethical frameworks to govern AI in education, particularly to prevent misuse of learner data and ensure algorithmic accountability. Issues such as biased algorithms, lack of transparency in decision-making systems, and potential commercial exploitation of educational data further complicate the digital education landscape. Therefore, the ethical governance of educational technology must be treated as a central policy priority rather than a peripheral concern.

Education for a Sustainable Future

In the contemporary global context, education is increasingly recognised as a fundamental driver of sustainable development. A sustainable future requires not only environmental stewardship but also social justice, economic inclusion, cultural diversity, and opportunities for lifelong learning. Consequently, education has assumed a central role in preparing individuals to address complex global challenges such as climate change, poverty, inequality, resource depletion, and technological disruption. According to UNESCO (2021), education must move beyond the transmission of knowledge to foster the values, competencies, and capacities necessary for building more sustainable, equitable, and resilient societies.

The relationship between education and sustainability was formally reinforced through the adoption of the United Nations Sustainable Development Goals (SDGs) in 2015, particularly Goal 4, which seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2015). Within this framework, Education for Sustainable Development (ESD) is viewed as a transformative approach that empowers learners to make informed decisions and take responsible actions for environmental integrity, economic viability, and social well-being (UNESCO, 2020).

Digital technologies have become increasingly important in advancing these sustainability objectives. Through online learning platforms, open educational resources, virtual collaboration tools, and artificial intelligence applications, digital education expands access to knowledge, reduces geographical barriers, and supports flexible lifelong learning opportunities. The UNESCO report *Reimagining Our Futures Together* (2021) argues that digital technologies can support educational transformation when deployed in ways that promote inclusion, collaboration, and the public good. Similarly, the World Bank (2023) maintains that digital learning systems have the potential to widen educational participation and strengthen human capital development, particularly in developing countries where access to traditional educational resources may be limited.

Furthermore, Sterling (2010) contends that education for sustainability requires a fundamental shift from transmissive models of teaching towards transformative learning approaches that encourage critical thinking, systems thinking, creativity, and responsible citizenship. In the same vein, Wals (2015) emphasises that future-oriented education should equip learners with the competencies needed to navigate uncertainty, complexity, and rapid

societal change. From this perspective, artificial intelligence and digital technologies should not be viewed merely as instructional tools but as enablers of broader educational transformation that supports sustainable development goals.

However, the contribution of digital education to sustainability depends largely on issues of access, ethics, governance, and equity. Scholars caution that unequal access to digital infrastructure, algorithmic bias, data privacy concerns, and disparities in digital literacy can reproduce or even exacerbate existing social inequalities (Selwyn, 2021). Therefore, the integration of digital technologies and artificial intelligence into education must be guided by principles of inclusiveness, ethical responsibility, and social justice to ensure that technological innovation contributes meaningfully to a sustainable future.

Education for Sustainable Development (ESD) in the Digital and AI Era

The United Nations Educational, Scientific and Cultural Organization (UNESCO) frames Education for Sustainable Development (ESD) as a transformative educational approach that equips learners with the knowledge, skills, values, and attitudes necessary to address global challenges and contribute to sustainable futures. In the digital and artificial intelligence (AI) era, ESD is increasingly being reimagined beyond traditional environmental education to include digital citizenship, ethical AI engagement, and global responsibility. Digital platforms and AI-driven learning environments provide unprecedented opportunities for advancing ESD goals. Through interactive simulations, data visualisation tools, and immersive learning experiences, learners can better understand complex issues such as climate change, biodiversity loss, poverty, and social inequality. AI-enabled adaptive learning systems further personalise instruction, ensuring that sustainability education is accessible and meaningful to diverse learners across contexts. Moreover, digital connectivity enables Global Citizenship Education (GCE) by linking learners across borders, cultures, and disciplines. Students can engage in collaborative problem-solving with peers worldwide, participate in virtual climate action projects, and access real-time global data that deepens their awareness of interconnected ecological and socio-economic systems.

Reimagining Teacher Identity in the Digital Age

The pursuit of sustainable and future-oriented education inevitably requires a reconsideration of the role and identity of teachers. As digital technologies and artificial intelligence continue to reshape educational practices, teachers are increasingly required to adapt to new pedagogical realities that extend beyond traditional classroom instruction. Consequently, the discourse on educational transformation has expanded from reimagining learning and technology to reimagining the professional identity of teachers themselves. Contemporary scholars argue that the role of the teacher is undergoing a profound transformation rather than a decline. In technology-enhanced learning environments, educators are no longer viewed primarily as transmitters of knowledge but as learning designers, facilitators of inquiry, mentors, and curators of meaningful educational experiences. Fullan and Langworthy (2014) contend that the emergence of digital technologies necessitates a shift from teacher-centred knowledge transmission to collaborative learning partnerships in which teachers guide learners in constructing, applying, and creating knowledge. Similarly, Mishra and Koehler (2006) argue that effective teaching in the digital age requires the integration of technological, pedagogical, and content knowledge (TPACK), thereby redefining teacher competence beyond subject expertise alone.

Within increasingly complex digital knowledge ecosystems, teachers function as mediators who help learners critically evaluate information, synthesise diverse perspectives, and apply knowledge to authentic real-world challenges. Redecker (2017), in the European Framework for the Digital Competence of Educators (DigCompEdu), emphasises that

contemporary educators must possess digital competence that enables them to facilitate learner-centred instruction, promote collaboration, and harness technology to support inclusive and innovative learning experiences. This transformation requires a redefinition of teacher identity that combines pedagogical expertise with digital fluency, data literacy, and ethical awareness regarding the use of artificial intelligence and educational technologies.

Furthermore, scholars caution that technological advancement should not diminish the human dimensions of education. Selwyn (2021) argues that the increasing digitisation of education heightens rather than reduces the importance of teachers as critical interpreters, ethical decision-makers, and facilitators of meaningful human relationships in learning environments. In the same vein, Williamson and Eynon (2020) contend that teachers remain indispensable in helping learners navigate the social, ethical, and cognitive implications of digital technologies. As AI systems increasingly automate routine tasks such as content delivery, assessment, and administrative functions, educators are expected to focus on fostering creativity, empathy, collaboration, ethical reasoning, and critical thinking—competencies that remain uniquely human and central to twenty-first-century learning.

From this perspective, the teacher is not being displaced by technology but repositioned within a transformed educational landscape. Far from becoming obsolete, educators emerge as essential human anchors in increasingly automated learning environments, ensuring that technological innovation remains aligned with educational values, social responsibility, and the broader goal of human flourishing. Reimagining teacher identity in the digital age therefore involves embracing new professional roles while preserving the relational, ethical, and transformative dimensions that have always defined effective teaching.

Policy and Pedagogical Implications for a Sustainable Digital Future

Achieving a just and sustainable digital education ecosystem requires coordinated action across policy, pedagogy, and technology development. Governments, educational institutions, and private sector actors must collaborate to establish frameworks that prioritise inclusion, ethics, and long-term sustainability. From a policy perspective, there is an urgent need to guarantee equitable access to digital infrastructure, particularly in underserved and rural communities. Digital literacy should be recognised as a foundational competency alongside traditional literacy and numeracy skills. Furthermore, regulatory frameworks must guide the ethical deployment of AI in education, ensuring transparency, data protection, and accountability.

Curriculum reform is equally critical. Contemporary education systems must integrate computational thinking, sustainability literacy, digital ethics, and civic engagement as core learning areas. This ensures that learners are not only consumers of technology but also informed creators and responsible digital citizens. Teacher education and professional development programmes must be redesigned to include AI pedagogy, instructional design for blended learning environments, and critical digital literacy. Continuous professional learning opportunities should be embedded within education systems to enable teachers to adapt to rapidly evolving technologies. Finally, research and innovation should prioritise human-centred and inclusive design approaches. Rather than allowing technology to dictate pedagogical direction, educational technologies must be shaped by pedagogical goals that emphasise equity, sustainability, and learner well-being.

Conclusion

The transformation of education in the digital and artificial intelligence (AI) era marks a major shift in how learning is conceived and delivered. Education has evolved into a dynamic, technology-driven ecosystem that extends beyond traditional classroom boundaries, enabling more flexible, personalised, and interconnected learning experiences. While AI and digital

tools have improved access to education and enhanced pedagogical practices, they also raise critical challenges such as inequality of access, data privacy concerns, algorithmic bias, and the risk of dehumanising learning. These issues highlight the need for ethical governance and inclusive educational policies. Despite these technological advancements, the role of the teacher remains central. Educators are increasingly repositioned as facilitators, learning designers, and mentors who provide the human dimension that technology cannot replace. Furthermore, integrating Education for Sustainable Development (ESD) into digital learning strengthens education's role in promoting global citizenship, sustainability, and social responsibility. The paper concludes that the future of education depends on a balanced integration of human and artificial intelligence, guided by ethical principles, equity, and sustainability, ensuring that education remains fundamentally human while benefiting from technological innovation.

Suggestions

To ensure that the digital transformation of education contributes meaningfully to sustainable development, the following suggestions are proposed for policymakers, educators, researchers, and technology developers:

1. Governments and educational institutions should craft policies that promote universal access to digital tools and platforms.
2. Professional development programmes must go beyond basic digital literacy. Educators should be trained in AI integration, data ethics, digital citizenship, and the design of engaging, student-centered learning experiences using emerging technologies.
3. AI tools used in education should be guided by human rights principles. Developers and implementers must ensure transparency, fairness, and inclusivity in AI systems, while actively guarding against biases and misuse of learner data.
4. Educational content should be restructured to emphasize skills relevant to the 21st century, such as critical thinking, creativity, emotional intelligence, collaboration, and sustainability awareness. Curriculum reform should also incorporate digital ethics and the social implications of technology.
5. To promote sustainability and inclusivity, educational technologies must reflect local languages, histories, and knowledge systems. Encouraging community participation in the development of digital content ensures relevance and ownership.
6. Collaboration between governments, academia, civil society, private sector, and international organisations is crucial to building scalable and sustainable digital learning ecosystems. Public-private partnerships can accelerate innovation while safeguarding public interest.
7. Digital education initiatives should integrate the principles of Education for Sustainable Development (ESD), fostering learners who are not only digitally competent but also socially and environmentally responsible global citizens.
8. Learners' personal information must be protected through comprehensive data protection laws and cybersecurity protocols. Stakeholders must ensure transparency in data usage and give learners control over their digital identities.

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AVAILABILITY, ADEQUACY AND UTILISATION OF INSTRUCTIONAL AIDS FOR TEACHING BUSINESS STUDIES IN SECONDARY SCHOOLS IN BWARI AREA COUNCIL, FCT, ABUJA

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Abstract

This study assessed the adequacy, availability, and utilisation of instructional aids for teaching Business Studies in public junior secondary schools in Bwari Area Council, FCT, Abuja. A descriptive survey design was adopted. The population comprised all 110 Business Studies teachers in the upper basic level (JSS 1-3) in the area. A sample of 86 teachers (39 males, 47 females) was selected using Krejcie and Morgan's (1970) table. The purposive sampling technique was adopted to sample only Business Studies teachers from the public upper basic levels of education (upper basic 1, 2, and 3) in each school of the council used for the study. Data were collected using the "Business Teachers' Adequacy, Availability, and Utilisation Questionnaire (BTAAUQ)," which had a content validity index of 0.75 and a reliability coefficient of 0.95 established via K-R 21. Descriptive statistics (frequency, percentage, mean, standard deviation) were used for data analysis. Results revealed that out of 23 listed instructional aids, only posters (52.49%) and workbooks/exercise books (62.79%) were deemed adequately provided. In terms of availability, charts, posters, computers/laptops, workbooks, and newspapers/magazines were reported as available, while most other aids were not. Regarding utilization, only posters, models, and real objects were highly utilized; the majority of aids suffered from low to moderate use. The study concludes that instructional aids are largely inadequate and underutilized, despite moderate availability of a few items. It is recommended that the government and school administrators prioritize the provision of adequate, modern instructional materials and implement policies to ensure their effective use

Keywords: Instructional Aids, Utilization, Adequacy, Availability, Business Studies, Secondary Education

Introduction

Education is fundamental to equipping individuals with the knowledge, skills, and values necessary for personal and societal advancement. Within this context, Business Studies stands as a dynamic subject that introduces students to the world of commerce, equipping them with essential competencies for personal finance, occupational proficiency, and entrepreneurial ventures (Isoken, 2022). Achieving the core objective of Business Studies—to produce

competent and skillful individuals—is inherently dependent on the provision and effective application of adequate instructional materials (Eze & Ifeoma, 2020).

Instructional aids serve as crucial catalysts for effective teaching and learning. They bridge the gap between theoretical abstraction and practical reality by making lessons more concrete, stimulating student interest, and enhancing knowledge retention (Iwu et al., 2011). These materials are the various tools and apparatus teachers employ to facilitate instruction and achieve learning objectives (Emeasoba & Igwe, 2016). In a practical subject like Business Studies, which encompasses areas such as bookkeeping, office practice, and business communication, the use of aids like charts, computers, models, and audiovisual equipment is indispensable for providing students with real-life context and experience (Ugorji & Kagbaranen, 2022; Onajite et al., 2019).

The taxonomy of instructional materials is diverse, ranging from audio and visual to audio-visual aids. This includes non-projected media like posters, charts, and graphs, which translate abstract ideas into a more realistic and understandable format (Eze & Ifeoma, 2020). The positive impact of both printed and non-printed instructional materials on student academic performance underscores their indispensable role in the learning process, as they enhance the assimilation, comprehension, and retention of concepts (Ugorji & Kagbaranen, 2022; Obidile & Obi, 2020).

Despite their proven utility, significant challenges persist in the use of instructional materials for teaching Business Studies in Nigerian schools. Evidence suggests that many teachers struggle with instruction, potentially due to the non-use or ineffective use of relevant aids (Odinaka, 2019). Previous research indicates a troubling pattern where instructional materials are often either unavailable, inadequate, or underutilized (Obidile & Obi, 2020; Kaizer & Okoli, 2021). This gap between the potential of instructional aids and their actual application in the classroom hinders the quality of teaching and learning, ultimately impacting students' ability to acquire the practical skills needed for self-employment.

It is against this backdrop that this study is conceived. The necessity to address the critical factors of adequacy, availability, and utilization of instructional materials in the specific context of Bwari Area Council, FCT, Abuja, prompts this investigation. This research therefore seeks to assess the current state of instructional aids for teaching Business Studies in secondary schools within this locale.

Purpose of Study

The study intends to investigate the adequacy, availability, and extent of utilization of instructional materials in the teaching of Business Studies in Bwari Area Council, FCT, Abuja. Specifically, the study intends to;

- i. To the adequacy level of instructional materials in the teaching of Business studies in junior secondary schools in Bwari Area Council FCT?
- ii. To find out the level of availability of instructional materials in the teaching of Business studies in junior secondary schools in Bwari Area Council FCT?
- iii. To find out the extent of using instructional materials in the teaching of Business studies in junior secondary schools in Bwari Area Council FCT,

Research Questions

- i. How adequate are the instructional materials in the teaching of Business studies in junior secondary schools in Bwari Area Council FCT?
- ii. What instructional materials are available in the teaching of business studies in junior secondary schools in Bwari Area Council FCT?
- iii. To what extent do business studies teachers utilize instructional materials in the teaching of business studies in secondary schools in in Bwari Area Council FCT?

Methodology

The study adopted the survey research design. The population was all the 110 (male 50 and female 60) business teachers in the upper basic level of education that are public school in Bwari Area Council Federal Capital Territory, Abuja. A sample of 86 (male 39 and 47 female) was chosen using Krejcie and Morgan's sample size table of 1970. The purposive sampling technique was adopted to sample only business studies teachers from the public upper basic levels of education (upper basic 1,2 and 3) from 19 schools used for the study. A self-developed instrument titled 'Business Teacher Adequacy Availability and Usage Questionnaire (BTAAUQ)' was used in the collection of data. The instrument was validated and this enables the researcher to obtain logical validity indices of 0.75 for the BTAAUQ. The Kuder Richardson Formulae (K-R 21) method for establishing coefficient of internal consistency was used to get reliability index of 0.95. Descriptive statistics (frequency counts, percentages, mean and standard deviation) was used to present the result in simple tables based on the objectives of the study.

Results

The results of the study are presented by the research questions and hypotheses.

Answers to the Research Questions

Research Question 1: How adequate are the instructional materials in the teaching of business studies in secondary schools in Anambra State?

Table 1: Frequency and Percentage Scores on Adequacy of Instruction Aids for Teaching of Business studies in Secondary Schools

N =63 S/N	Instructional material	Adequate		Not Adequate		Decisions
		Frequ Ency	%	Frequ Ency	%	
1	Charts	42	48.83	44	51.16	Inadequate
2	Posters	46	52.49	40	46.51	Adequate
3	Pictures and Photographs	37	43.02	49	56.97	Inadequate
4	Flashcards	25	29.07	61	70.93	Inadequate
5	Maps	29	33.72	57	66.27	Inadequate
6	Globes	24	27.91	62	72.09	Inadequate
7	Diagrams and Graphs	42	48.83	44	51.16	Inadequate
8	Model	28	32.56	58	67.44	Inadequate
9	Bulletin Boards	18	20.93	68	79.06	Inadequate
10	Drawing and sketches	25	29.07	61	70.93	Inadequate
11	Radio	17	19.77	69	80.23	Inadequate
12	Tape recorder /CD players	27	31.39	59	68.61	Inadequate
13	Public Address systems	28	32.56	58	67.44	Inadequate
14	Microphones and speakers	32	37.21	54	62.79	Inadequate
15	Audio lesson /Podcasts	14	16.27	72	83.73	Inadequate
16	Television	16	18.61	70	81.39	Inadequate
17	Projectors (overhead or Multimedia	24	27.01	62	72.08	Inadequate
18	Video Players / DVD Players	23	26.44	62	73.56	Inadequate
19	Computer/ Laptop	37	42.53	49	57.47	Inadequate

20	Interactive whiteboard (smart board)	23	26.74	63	73.56	Inadequate
21	Real Objects (Relia)	35	40.69	51	59.77	Inadequate
22	Workbooks and exercise Book	54	62.79	32	37.21	Adequate
23	Newspapers and Magazines	30	34.89	56	65.12	Inadequate

Data in Table 1 show that out of 23 items listed as instructional aids recommended for the teaching of business studies, none was adequately provided except poster, and Workbooks and exercise Book with 46 and 54 equivalents to 52.49% and 62.79%) frequency and percentage scores in the upper basic Education respectively.

Research Question 2: What instructional materials are available in the teaching of business studies in secondary schools in Bwari rea Council?

Table 2: Frequency and Percentage Scores on Available of Instruction Aids in the Teaching of Business studies in Secondary Schools

N =63 S/N	Instructional material	Available		Not Available		Decisions
		Frequ ency	%	Frequ Ency	%	
1	Charts	45	52.33	42	47.67	Available
2	Posters	44	51.16	43	48.84	Available
3	Pictures and Photographs	44	51.16	43	48.84	Not –Available
4	Flashcards	35	40.70	52	49.30	Not –Available
5	Maps	34	39.53	53	60.47	Not –Available
6	Globes	30	34.88	57	65.12	Not –Available
7	Diagrams and Graphs	38	44.19	49	55.81	Not –Available
8	Model	34	39.53	53	60.47	Not –Available
9	Bulletin Boards	37	42.02	50	56.98	Not –Available
10	Drawing and sketches	35	40.69	42	59.30	Available
11	Radio	17	19.76	70	80.23	Not –Available
12	Tape recorder /CD players	20	23.26	67	76.74	Not –Available
13	Public Address systems	27	31.39	60	68.60	Not –Available
14	Microphones and speakers	26	30.23	61	69.77	Not –Available
15	Audio lesson /Podcasts	33	38.37	54	61.63	Not –Available
16	Television	32	37.21	55	62.80	Not –Available
17	Projectors (overhead or Multimedia	20	23.26	67	76.74	Not –Available
18	Video Players / DVD Players	17	19.77	70	80.23	Not –Available
19	Computer/ Laptop	65	75.58	22	24.41	Available
20	Interactive whiteboard (smart board	33	38.37	54	61.63	Not –Available
21	Real Objects (Relia)	44	51.16	43	48.84	Not –Available
22	Workbooks and exercise Book	54	62.79	33	37.21	Available

23	Newspapers and Magazines	45	52.33	42	47.67	Available

Data in Table 2 shows that most of the instructional aides are not available as shown in the frequencies and percentages except for charts, posters, and Newspapers and Magazines with moderate available scores of frequencies and percentage of 54 (52.33%), 44 (51.16), and 35 (40.69%) respectively. And only a Workbooks and exercise Book has high available scores of frequencies and percentage of 65 (75.58%).

Research Question 3: To what extent do business studies teachers utilize instructional aids in the teaching of business studies in secondary schools in in Bwari Area Council FCT?

Table 3: Respondents' Mean Ratings on the Extent of Utilization of Instructional Materials in the Teaching of Business Studies in Secondary Schools

N=63 S/N	Instructional Materials	Mean	SD	Remark
1.	Charts	2.55	1.26	MU
2.	Posters	4.24	1.26	HU
3.	Pictures and Photographs	2.23	1.92	LU
4.	Flashcards	2.63	1.23	LU
5.	Maps	3.68	1.15	MU
6.	Globes	1.23	1.07	VLU
7.	Diagrams and Graphs	3.75	1.28	MU
8.	Model	4.37	1.27	HU
9.	Bulletin Boards	3.37	1.24	MU
10	Drawing and sketches	2.68	1.25	LU
11	Radio	1.27	1.24	VLU
12	Tape recorder /CD players	2.78	1.28	MU
13	Public Address systems	3.32	1.35	MU
14	Microphones and speakers	3.25	1.35	MU
15	Audio lesson /Podcasts	3.68	1.25	MU
16	Television	2.79	1.73	LU
17	Projectors (overhead or Multimedia	2.78	1.28	MU
18	Video Players / DVD Players	1.27	1.24	VLU
19	Computer/ Laptop	1.25	1.35	VLU
20	Interactive whiteboard (smart board	2.57	2.43	LU
21	Real Objects (Relia)	4.78	2.33	HU
22	Workbooks and exercise Book	2.57	1.25	LU
23	Newspapers and Magazines	2.64	1.23	LU

Decision Rule; 3.50–5.00 = HU; 2.50–3.49 = MU; 1.50–2.49 = LU; 1.00–1.49 = VLU

Table 3 shows that most of the instructional aides are of moderate utilization and only three have high level of utilization, these are; posters, models, and Computer/ Laptop This implies that most of instructional aids do not enjoy full utilizations as they are expected to be used.

Discussion of Findings

The findings of this study revealed that there were significant challenges regarding the provision and use of instructional aids for teaching Business Studies in the Bwari Area Council. The discussion is organised around the three core themes of the research: adequacy, availability, and utilization. The study found a severe inadequacy in the provision of instructional materials. Out of the 23 listed aids, only posters (52.49%) and workbooks/exercise books (62.79%) were considered adequately provided. This finding is consistent with that of Kaizer and Okoli (2021), who reported that eight out of ten instructional materials were neither available nor adequate for teaching office skills in Delta State. This pervasive inadequacy can be attributed to the chronic underfunding of the education sector, which hinders the procurement of necessary resources. The consequences are profound; inadequate materials limit students' hands-on interaction and practice, which is crucial for skill acquisition. This lack of engagement can negatively impact academic achievement and dampen student interest, a concern supported by Ubulom and Ogwunte (2017), who affirmed that instructional materials are key to generating greater student interest in learning.

Regarding availability, the results indicate that most instructional aids are not accessible to teachers. While basic items like charts, posters, and newspapers/magazines were moderately available, and workbooks/exercise books (75.58%) were highly available, more specialized and technological resources were largely absent. This pattern of scarcity aligns with the work of Buba, Abdullahi, and Kateri (2021) in Adamawa State, who also noted the relative unavailability of instructional materials, leading to their infrequent use by teachers. The limited availability of essential tools constrains the teacher's ability to deliver practical, relatable lessons, thereby undermining the applied nature of the Business Studies curriculum.

The main finding of this study is the stark underutilization of the few instructional aids that are available. The results show that only posters, models, and real objects enjoyed a high level of use. Notably, even readily available resources like computers/laptops were utilized to a very low extent. This confirms the findings of Onajite et al. (2019), who reported a minimal level of instructional material utilization by Business Studies teachers in Delta State. This underutilization negates the very purpose of these aids. As Sale (2016) argues, the use of instructional materials is meant to aid effective teaching delivery. Poor utilization diminishes teacher efficiency, leads to passive learning, and makes achieving integrated learning difficult (Onajite et al., 2019). Ultimately, this practice has negative consequences for students' academic performance, achievement, and overall engagement with the subject matter.

Conclusion

The study concludes that there is a critical shortfall in the provision and use of instructional aids for teaching Business Studies in Bwari Area Council. The available aids are largely inadequate, and even those that are present are not fully utilized, undermining the quality of education and the practical objectives of the Business Studies curriculum.

Recommendations

Based on the findings, the following recommendations are made:

- i. Government through the FCT Education Secretariat, and other stakeholders like the PTA, should prioritise and increase funding for the procurement of a wider range of adequate, modern, and durable instructional materials that align with the curriculum.
- ii. School administrators should develop and enforce a standard operational policy that mandates the use of instructional aids in every Business Studies lesson. This should be part of teacher evaluation metrics.

- iii. Regular in-service training should be organized for teachers on the effective integration and improvisation of instructional aids. A dedicated monitoring and evaluation team should be established to ensure the proper use, maintenance, and care of these materials.

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ASSESSING THE IMPACT OF PROFESSIONAL TRAINING ON SCHOOL HEADS' MANAGERIAL COMPETENCE FOR SUSTAINABLE EDUCATION IN IKORODU PUBLIC SECONDARY SCHOOLS

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Abstract

School leadership remains vital in determining the quality of education, with professional training serving as a critical driver in achieving sustainable educational outcomes. This study investigated the impact of professional training, specifically workshops and in-service training, on the managerial competence of school heads in public secondary schools in Ikorodu Local Government Area, Lagos State, Nigeria. Using a descriptive survey design, data were collected through a structured questionnaire administered to all the 198 principals and vice principals within the study area. The data were analysed using descriptive statistics, including mean scores and standard deviation. Findings revealed that both workshops and in-service training have significantly enhanced various aspects of managerial competence such as decision-making, leadership, staff and financial management, and effective communication. Based on these findings, the study recommended the institutionalisation of regular workshops, encouragement and incentivisation of participation in in-service training, and the implementation of a people-driven monitoring and evaluation system to ensure sustained improvement in school leadership practices, as these strategies will empower school heads to drive effective and sustainable educational development.

Keywords: Managerial Competence, Professional Training, Public Secondary Schools, School Leadership, Sustainable Education

Introduction

Education remains a critical driver of national identity, social cohesion, and sustainable development. At the heart of every successful educational institution is effective leadership, particularly in public secondary schools where school heads play pivotal roles in managing resources, coordinating academic activities, and ensuring that teaching and learning goals are achieved (Bush & Glover, 2014). These responsibilities require school leaders to possess strong managerial competence; skills such as strategic planning, decision-making, communication, and team-building. However, in the Nigerian public education system, these competencies are frequently affected by challenges that include resource constraints, infrastructural limitations, socio-economic disparities and a lack of managerial capabilities (Akinsola & Tella, 2019).

In Ikorodu, Lagos, where public secondary schools serve large and diverse student populations, the administrative burden on school heads is even more pronounced. As educational demands evolve, school leaders are consistently expected to upgrade their

knowledge and skills to navigate emerging complexities and align their efforts with the goals of educational reform (Babalola, 2014). This highlights the significance of professional training as a transformative tool for school leadership. Professional training initiatives, such as workshops and in-service training, have become increasingly prominent in equipping school heads with the requisite managerial capacities. Workshops are typically intensive, hands-on learning experiences that offer school leaders practical exposure to modern administrative and instructional practices, often in collaborative peer environments (Darling-Hammond et al., 2017). In-service training, on the other hand, involves continuous professional development while school heads remain in active service. These training activities help leaders stay updated with current policies, technological advancements, and educational methodologies (UNESCO, 2023).

Research suggests that these forms of professional training are instrumental to school effectiveness. Meyer-Looze and Vandermolen (2021) observed that while teachers have direct impact on student achievement, school heads significantly influence the quality of teaching and learning by enhancing teacher effectiveness through improved leadership. Similarly, Aquino et al. (2021) reported a strong relationship between school heads' leadership practices and overall teacher performance. These findings emphasize the need for robust and contextually relevant professional development programmes. Despite growing emphasis on professional training in educational policy discourse, there remains limited empirical evidence on the specific impact of such interventions; particularly workshops and in-service training, on the managerial competence of school heads within the Nigerian public-school system. Addressing this gap, the present study focuses on assessing the influence of workshops and in-service training on the managerial effectiveness of school heads in public secondary schools in Ikorodu Local Government Area, Lagos. By examining these targeted interventions, the study aims to contribute actionable insights toward enhancing school leadership and achieving sustainable educational outcomes.

Literature Review

Professional Training and Managerial Competence

Professional training initiatives are structured efforts aimed at improving the skills, knowledge, and abilities of school heads, with the goal of enhancing school leadership and achieving sustainable educational outcomes. In the context of public secondary schools, these initiatives are essential for strengthening managerial competence, which includes planning, decision-making, financial oversight, and instructional supervision (Bush et al., 2019). Harris and Jones (2018) affirmed that such training covers critical aspects of school management, providing the expertise necessary for effective governance. DeCorby-Watson et al. (2018) further emphasised that well-executed professional training can improve school leaders' confidence and skillsets, leading to stronger educational outcomes and institutional growth. These training initiatives also address vital soft skills, such as emotional intelligence, team building, and effective communication, which are key to creating a positive school climate (Leithwood et al., 2019). Professional training, such as workshops and in-service training, supports school heads in implementing innovative and inclusive practices in line with the Sustainable Development Goals.

Workshops as a Professional Training Strategy

Workshops serve as dynamic platforms for enhancing school heads' managerial competencies. Typically characterised by interactive sessions, workshops provide opportunities for hands-on learning, peer collaboration, and engagement with education professionals and leadership consultants (Darling-Hammond et al., 2017). When well-designed, workshops deliver practical insights and techniques that are directly applicable to the

day-to-day responsibilities of school leadership. These formats allow school heads to develop solutions to real-world challenges and to bridge the gap between leadership theory and operational practice.

According to Desimone and Garet (2015), workshops also facilitate peer learning and networking, enabling school leaders to share experiences and best practices. This promotes collective problem-solving and fosters a community of practice among educators. The most effective workshops blend theoretical frameworks with practical exercises, such as case studies and role-playing, enabling school heads to internalise leadership principles and apply them contextually (Lumby & Foskett, 2016). Thus, workshops contribute meaningfully to developing managerial capacities aligned with sustainable school improvement.

Bolanle (2013) in a study on principals' leadership skills and school effectiveness in South Western Nigeria established that there is a significant relationship between principals who have acquired leadership skills through professional training engagements such as workshops and educational conferences and school effectiveness. Likewise, in a study of challenges faced by administrators of public secondary schools, Mohammed et al. (2021) recommended that workshops and other capacity-building programmes on leadership styles should be organised for principals to improve their ability to sustain various leadership styles.

In-Service Training for Sustainable Leadership

In-service training constitutes a key component of lifelong learning for school leaders, offering continuous professional development while they remain in active service. This form of training bridges the gap between initial (pre-service) education and the realities of day-to-day school leadership (UNESCO, 2023; Darling-Hammond et al., 2017). Many educational systems mandate periodic in-service training to ensure that school heads remain up-to-date with policy shifts, emerging technologies, and innovative pedagogical practices (Desimone & Garet, 2015). More than a routine requirement, in-service training has strategic value in driving educational reform and institutional responsiveness.

Fullan (2015) argued that in-service training enables school heads to act as agents of change, especially when integrating new teaching methodologies and administrative procedures. Bachmann et al. (2021) reinforced that in-service training empowers leaders to effectively operationalise reform policies and align school systems with national development goals, including equity, quality education, and institutional effectiveness. In-service training also encourages reflective practice, allowing school leaders to assess their own performance and pursue targeted improvements. This type of training cultivates a culture of continuous improvement and professional growth within school settings, which is critical for sustainable development and long-term educational transformation.

In a study conducted on managing principals' leadership skills for capacity building in public schools in Rivers State, Nwokocha and Oformata (2021) found that principals employed methods such as in-service training activities and face-to-face communication to develop and manage their communication and interpersonal skills. Likewise, in the investigation of capacity building programme needs for school administrators, Okenjom et al. (2017) revealed that government incentives motivate school administrators to participate in professional development programmes that include in-service training and refresher courses. Hence, the study noted that government support and incentives will boost participation in such programmes.

Empirical studies on Professional Training and Managerial Competence

A growing body of research supports the effectiveness of professional training in enhancing school leadership and management. Bush and Glover (2016) found in their study that targeted training programmes significantly improved school heads' strategic planning and

decision-making skills. Similarly, Robinson et al. (2014) noted that training in financial management, for instance, enabled school leaders to better develop and implement school budgets, leading to more efficient use of resources. At a broader level, training programmes contribute to transformational leadership, with positive effects on teacher morale and student achievement. Babalola and Yusuf (2019) linked school heads' participation in professional training to improved school performance across several indicators, including staff satisfaction and student results. Similarly, Aquino et al. (2021) showed that well-trained leaders were better equipped to manage resources, enforce policies, and foster inclusive and productive school environments.

Statement of the Problem

The achievement of educational goals in secondary schools depends largely on the managerial competence of school heads. School heads are expected to perform various administrative functions such as planning, organizing, supervising, coordinating, decision-making, conflict resolution, staff motivation, and effective management of school resources. To perform these responsibilities successfully, they require continuous professional development through workshops and in-service training programmes. In recent years, educational policies and administrative practices have undergone significant changes due to technological advancement, curriculum reforms, and increasing demands for accountability in school management. Consequently, school heads must regularly update their knowledge, skills, and competencies to meet these challenges. Workshops and in-service training programmes have been recognized as important avenues for improving the professional capacity of school administrators.

Despite the availability of such training opportunities, there are concerns that some school heads in public secondary schools still exhibit weaknesses in managerial functions such as effective communication, staff supervision, financial management, decision-making, record keeping, and conflict management. These shortcomings may negatively affect school effectiveness, staff productivity, students' academic performance, and the overall achievement of educational objectives. Furthermore, observations suggest that while some school heads participate frequently in workshops and in-service training programmes, others have limited access due to factors such as inadequate funding, workload, poor training schedules, and lack of institutional support. It is therefore unclear whether participation in these professional development programmes has significantly improved the managerial competence of school heads in public secondary schools.

In Ikorodu Local Government Area, little empirical evidence exists regarding the extent to which workshops and in-service training contribute to the managerial competence of school heads. This gap in knowledge has created the need for a systematic investigation into the impact of workshops and in-service training on the managerial competence of school heads in public secondary schools in the area. Therefore, this study seeks to examine the impact of workshops and in-service training on the managerial competence of school heads in public secondary schools in Ikorodu Local Government Area, with a view to determining whether these professional development programmes enhance their effectiveness in school administration and management.

School heads in public secondary schools oversee numerous responsibilities, including staff coordination and evaluation, strategic planning, resource mobilisation and utilisation, curriculum implementation, and decision-making. Executing these duties successfully requires a high level of managerial competence. However, many school leaders continue to struggle with limited skills in key areas of leadership and administration, which undermines the effectiveness of school operations and the achievement of educational objectives (Masalon et al., 2022). Although the need for continuous professional development is widely recognised,

access to effective training remains inadequate. Particularly, workshops and in-service training are often poorly coordinated or insufficiently institutionalised within the Nigerian public education system. This is caused by challenges such as time constraints, lack of funding, inadequate policy support, and limited training opportunities, preventing many school heads from fully benefiting from these professional training initiatives. Moreover, the increasing complexity of the educational environment, especially in densely populated and socio-culturally diverse areas like Ikorodu, Lagos, demands that school leaders continuously upgrade their skills to respond effectively to emerging challenges. However, empirical studies have shown that the managerial practices of school heads are often only weakly linked to teacher performance and educational outcomes, indicating that existing training interventions may not be sufficiently impactful. The strategic importance of managerial competence in driving school improvement and achieving sustainable educational goals is invaluable, making the assessment of the impact of workshops and in-service training on the leadership effectiveness of school heads imperative. This study, therefore sought to address the existing knowledge gap by assessing the influence of these two forms of professional training on the managerial competence of school heads in public secondary schools in Ikorodu, Lagos.

Research Questions

This study was guided by the following research questions:

1. To what extent do workshops influence the managerial competence of schools in public secondary schools in Ikorodu LGA, Lagos?
2. To what extent do in-service training influence the managerial competence of schools in public secondary schools in Ikorodu LGA, Lagos?

Methodology

This study adopted the descriptive research design. A census approach was employed to include the entire population of school heads, which comprised 198 principals and vice principals. This design was deemed appropriate because it enabled the collection of first-hand data directly from school leaders who are actively involved in administrative processes. The instrument used for data collection was a structured questionnaire titled “Impact of Capacity Building Programmes on Managerial Competence of School Heads Questionnaire (ICBPMCQ).” The questionnaire contained two sections: Section (A) collected demographic data, while Section (B) focused on items related to the perceived impact of workshops and in-service training. Respondents rated each item using a four-point Likert-type scale ranging from 1 (Very Low Impact) to 4 (Very High Impact). The instrument was validated by two experts from educational administration planning and educational evaluation. Its reliability was confirmed through a pilot test which yielded a Cronbach’s Alpha Coefficient of 0.84 indicating high internal consistency. The data collection was undertaken by the researcher who administered the questionnaire directly to participants and retrieved responses immediately. The data were analysed using mean and standard deviation.

Results

Table 1: Impact of Workshops on the School Heads Managerial Competence

S/N	Item	Very Impact	High Impact	High Impact	Low Impact	Very Impact	Low	Mean	Std. Deviation
1	Workshops enhance my ability to set school vision	128(65.3%)		62(31.6%)	5(2.6%)	1(0.5%)		3.62	0.565
2	Workshops improve my decision-making skills in school administration	116(59.2%)		76(38.8%)	4(2.0%)	-		3.57	0.536
3	Workshops increase my competence in staff management	109(55.6%)		80(40.8%)	6(3.1%)	1(0.5%)		3.52	0.586
4	Workshops contribute to my better communication with school leaders and teachers	103(52.6%)		87(44.4%)	4(2.0%)	2(1.0%)		3.48	0.595
5	Workshops enhance my ability to manage student discipline effectively	92(46.9%)		95(48.5%)	8(4.1%)	1(0.5%)		3.42	0.598
6	Workshops help me enhance the school's financial management practices	95(48.5%)		88(44.9%)	12(6.1%)	1(0.5%)		3.41	0.631
7	Workshops help me improve the use of technology in school	75(38.3%)		109(55.6%)	10(5.1%)	2(1.0%)		3.31	0.616
8	Workshops improve my problem-solving skills in handling crisis management	73(37.2%)		102(52.0%)	19(9.7%)	2(1.0%)		3.26	0.669
	Grand Average Mean and Standard Deviation							3.45	0.389

To assess the impact of professional training on managerial competence, responses from 198 public secondary school heads in Ikorodu Local Government Area were analysed using descriptive statistics, including means and standard deviations. The analysis focused specifically on two professional training initiatives: workshops and in-service training. The results for workshops indicated a high overall impact on managerial competence, with mean scores across items ranging from 3.26 to 3.62 as shown in Table 1. School heads rated workshops most highly for enhancing their ability to set a school vision (mean = 3.62, SD = 0.565), followed by improving decision-making skills in school administration (mean = 3.57, SD = 0.536), and increasing competence in staff management (mean = 3.52, SD = 0.586). Additional areas of high impact included communication, discipline management, financial oversight, and the use of technology. The grand average mean score of 3.45 indicates that workshops exert a substantial positive influence on various dimensions of school heads' managerial competence.

Table 2: Impact of In-service Training on the School Heads Managerial Competence

S/N	Item	Very High Impact	High Impact	Low Impact	Very Low Impact	Mean	Std. Deviation
1	In-service training improves my competence in managing human resources (staff development, evaluation, etc.)	106(54.1%)	83(42.3%)	5(2.6%)	2(1.0%)	3.49	0.603
2	In-service training enhances my ability to manage curriculum instruction delivery	97(49.5%)	94(48.0%)	4(2.0%)	1(0.5%)	3.46	0.567
3	In-service training improves my leadership skills	88(44.9%)	99(50.5%)	5(2.6%)	4(2.0)	3.38	0.642
4	In-service training enhances my ability to foster collaboration between staff members	69(35.2%)	106(54.1%)	21(10.7%)	-	3.24	0.633
5	In-service training enhances my skills in managing school facilities	57(29.1%)	126(64.3%)	11(5.6%)	2(1.0%)	3.21	0.586
6	In-service training improves my financial management skills	57(29.1%)	122(62.2%)	16(8.2%)	1(0.5%)	3.2	0.596
7	In-service training helps me enhance my interpersonal skills	59(30.1%)	120(61.2%)	13(6.6%)	4(2.0%)	3.19	0.643
8	In-service training contributes to my ability to manage student behaviour effectively	56(28.6%)	123(62.8%)	15(7.7%)	2(1.0%)	3.19	0.608
Grand Average Mean and Standard Deviation						3.3	0.388

Similarly, the results for in-service training showed high levels of impact, with mean ratings ranging from 3.19 to 3.49 as shown in Table 2. School heads indicated that in-service training was particularly effective in improving competence in managing human resources (mean = 3.49, SD = 0.603) and enhancing curriculum instruction delivery (mean = 3.46, SD = 0.567). Other positively rated areas included leadership development, collaboration among staff, financial management, interpersonal relations, and student behaviour management. The overall

average mean of 3.30 confirms that in-service training plays a significant role in developing school heads' administrative capacity and leadership skills in alignment with sustainable education objectives.

Discussion of Findings

The findings of this study revealed that both workshops and in-service training have a substantial impact on the managerial competence of school heads in public secondary schools in Ikorodu Local Government Area. The responses indicated that workshops significantly enhance key leadership functions such as setting a clear school vision, making informed decisions, managing staff, improving financial oversight, and handling student discipline. This revelation aligns with Bolanle (2013), who established a significant relationship between participation in leadership development activities such as workshops and improved administrative effectiveness. Similarly, Mohammed et al. (2021) found that professional development programmes, particularly workshops, are positively associated with effective leadership practices among school principals. Moreover, this finding showed workshops to be instrumental to improving the leadership skills of school heads, including communication, technological proficiency, and crisis management; competencies that are invaluable for achieving Sustainable Development Goal 4 on quality education.

The finding of the study also indicated that in-service training was found to play a pivotal role in improving the administrative and leadership capabilities of school heads. Areas with the highest impact included managing human resources, leading curriculum implementation, and enhancing leadership skills. These findings are consistent with the study by Nwokocha and Oformata (2021), which emphasised that in-service training contributes to stronger interpersonal relationships and improved school administration. The results also support Okenjom et al. (2017), who asserted that school administrators actively involved in in-service training make more meaningful contributions to the advancement of educational management. Therefore, regular participation in in-service training appears to promote reflective practice, better decision-making, and instructional leadership. Also, the study showed that the school heads' positions, whether as principals or vice principals, did not significantly influence their perception of in-service training's effectiveness.

Conclusion

This study provides compelling evidence that professional training initiatives, particularly workshops and in-service training, significantly enhance the managerial competence of school heads in public secondary schools in Ikorodu, Lagos. These forms of training were shown to improve vital leadership functions such as strategic decision-making, staff management, resource utilisation, and administrative collaboration. The findings highlight the importance of sustained professional development as a mechanism for achieving sustainable educational outcomes. In line with global development goals, particularly SDG 4 (quality education), this study shows that there is a need for systematic investment in the professional growth of school leaders. By equipping school heads with the requisite competencies through well-structured training, stakeholders in the educational sector can strengthen the leadership capacity of secondary schools and promote learning environments that are defined by effective teaching and institutional resilience.

Recommendations

Based on the findings, the following recommendations are proposed to enhance the effectiveness of professional training initiatives for school leadership:

Firstly, education authorities in Ikorodu should implement structured and regular workshops that target key areas of managerial competence such as school visionary leadership, decision-making, emotional intelligence, human and financial resource management, crisis

response, and effective communication. These workshops should be interactive and context-specific to ensure practical relevance to the managerial functions of secondary school heads.

Secondly, government agencies and stakeholders in the education sector, especially secondary education, should promote and incentivise school heads' participation in in-service training. These programmes should be strengthened by including components on instructional leadership, curriculum delivery, facilities management, and team-building, thereby equipping school heads with updated tools to navigate evolving administrative challenges.

Lastly, an advanced system for monitoring and evaluating the outcomes of professional training initiatives should be established. This can be undertaken through feedback and periodic reviews from participants, which can be used to redesign training content, ensuring alignment with current educational realities and long-term institutional goals. Such a system will guarantee the continuous improvement of leadership development efforts and the (in)tangible contributions they make to sustainable development in the education sector.

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EMPOWERING TEACHERS AS CHANGE AGENTS FOR EDUCATION SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

Teachers occupy a strategic position in advancing Education for Sustainable Development (ESD) because teachers shape learners' values, skills, attitudes, and behaviours needed for a sustainable future. This paper focused on empowering teachers as change agents for educational processes that equip learners with the knowledge and attitudes needed to contribute to a sustainable development in the Nigeria education sector. By integrating Education for Sustainable Development (ESD) into curricula and modelling sustainable behaviours, teachers inspire students to adopt responsible and ethical practices, both within and beyond the classroom settings. This paper discussed teachers' effective professional development and institutional support which are essential for teachers to confidently deliver ESD goals, adapt innovative pedagogies, foster critical thinking and problem-solving skills among learners. In addition, the paper explained the challenges such as limited resources, insufficient training, and persistent systemic barriers, among others, that are inimical to the realisation of ESD goals. The paper therefore, recommended that empowering teachers through targeted training, access to resources, and recognition of their leadership education systems can harness their transformative potential for the advancement of the United Nations' Sustainable Development Goals in the 21st Century.

Keywords: Empowering Teachers, Change Agents, Sustainable Development, Education Sector

Introduction

Education is globally recognised as a fundamental driver of social progress, economic prosperity, environmental protection, and long-term sustainability. As articulated by the United Nations Sustainable Development Goals (SDGs), particularly Goal 4-Quality Education, education serves as the foundation upon which all other goals rest upon. Goal 4 calls for inclusive, equitable, and quality education for all, while promoting lifelong learning as a tool for fostering global citizenship, environmental stewardship, gender equity, peace, and innovation.

Within this framework, Education for Sustainable Development (ESD) has emerged as a transformative approach to learning that equips learners with the knowledge, skills, values, and attitudes needed to confront and solve global challenges such as climate change, poverty, inequality, resource depletion, and unsustainable consumption. It should be noted that the target audiences for the Education for Sustainable Development Sourcebook are primary and secondary teachers and mid-level decision-makers, who have responsibility for primary and secondary education. Another primary audience is teacher educators who work with pre-service and in-service primary and secondary school teachers. Hence, the success of ESD depends heavily on one critical factor: the empowerment of teachers.

According to Heine, Krepf, and König (2023), teachers are professionals that mediate and promote students' competences in contemporary education. In this vein, Adenuga (2015) sees teachers as career men and women saddled with the responsibilities of effective teaching and supervising instruction in schools to bring about good performance of their students. Teachers at all levels of the educational system are very important in the overall development of any nation. The Federal Government of Nigeria in the National Policy on Education (NPE) (2017) recognizes education not only as the greatest force that can be used to bring about redress of challenges of manpower, economic growth and development, but also, as the greatest investment that the nation can make for the quick development of its economic, political, social and human resources.

Teachers are not merely transmitters of knowledge; they are architects of mindsets and cultivators of future behaviours. As frontline implementers of educational policies and curricula, teachers have the unique ability to influence learners' thinking, shape social values, and inspire actions aligned with sustainability. Teachers nurture responsible citizens who are capable of critically engaging with real-world problems and contributing to sustainable development at community, national, and international levels.

However, to perform this transformative role, teachers themselves must be empowered. This empowerment involves more than just training; it requires professional empowerment (ongoing education, career development), intellectual empowerment (deep understanding of sustainability concepts), and institutional empowerment (being included in decision-making and supported by the system). According to UNESCO (2017), empowered teachers are confident, well-informed, motivated, and innovative, and thus more capable of delivering on the objectives of Education for Sustainable Development. Previous studies found that teachers' empowerment significantly enhanced teachers' professional development and instructional effectiveness (Alagos, 2026).

In Nigeria, the urgency to empower teachers is more pronounced as the country faces significant critical in its education sector, many of which threaten the effective delivery of ESD. These include chronic underfunding, which limits infrastructure, resources, and teacher welfare; outdated and rigid curricula, which fail to reflect contemporary sustainability issues; inadequate teacher preparation and professional development; and large class sizes and poor learning environments, particularly in public schools. In addition, Adenuga (2015) attest to teachers' lack of access to research funds/grants coupled with lack of laboratories and equipment are all clog in the wheel of teachers' self-development. As if these is not enough, to attend foreign conferences or local ones has become a problem for teachers due to paucity of fund. These structural weaknesses contribute to a teacher workforce that is often overstretched, undervalued, and under-resourced.

Despite these challenges, Nigerian teachers remain the most strategic players in bridging the gap between policy aspirations and classroom realities. Teachers' central role in implementing the National Policy on Education, aligning school curricula with SDG priorities, and shaping the moral and civic attitudes of learners cannot be overstated. Teachers, especially at the basic and secondary levels, are often the first and most influential point of contact that learners have with broader concepts of environmental sustainability, social justice, and ethical responsibility.

This paper, therefore, examines the concept of empowering teachers as change agents for Education for Sustainable Development in Nigeria. The paper explores the critical areas where empowerment is needed, such as professional development, curriculum integration, pedagogical innovation, and leadership inclusion. The paper also identifies the challenges that hinder teacher empowerment and recommends practical strategies that can be adopted by government, educational institutions, and development partners to unlock the transformative potential of Nigerian teachers in achieving the SDGs.

Conceptual Clarifications

Sustainable Development (SD)

Before understanding Education for Sustainable Development, there is need for clearer understanding the concept on Sustainable Development (SD). Sustainable development is the overarching paradigm of the United Nations. The concept of sustainable development was described by the 1987 Bruntland Commission Report as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is a paradigm for thinking about a future in which environmental, social and economic considerations are balanced in the pursuit of development and an improved quality of life. These three spheres, society, environment and economy are intertwined. For example, a prosperous society relies on a healthy environment to provide food and resources, safe drinking water, and clean air for its citizens.

Education for Sustainable Development (ESD)

Education for Sustainable Development refers to educational processes that equip learners with the knowledge, skills, values, and attitudes needed to contribute to a sustainable future. ESD promotes critical thinking, systems thinking, participation, and social responsibility. According to UNESCO (2017), ESD is both a transformative and inclusive approach to education that seeks to empower learners to make informed decisions for environmental integrity, economic viability, and a just society. Sustainable development touches several disciplines, such as environment, biology, medicine, nutrition, agronomics, geography, engineering, architecture, citizenship, sociology, psychology, political science, history, law, economics and business. The education in this field is a holistic and transformational one, most transdisciplinary and multidisciplinary. This type of education addresses learning content and outcomes, uses innovative pedagogy and “learning by doing” method, and uses a whole-educational entity approach to engage communities in achieving sustainable change. ESD is driven by teachers.

Teachers’ Empowerment

Teachers’ empowerment is a process whereby teachers are giving freehand and control of their students in the course of teaching and learning. Kiral (2025) sees teacher empowerment as professional development, provision of resources, and collaborative communication and resources that enhance teachers’ effectiveness. Also, Ma-uy (2025) view teachers’ empowerment through structured training that improves teaching effectiveness and student performance. In addition, Alagos, (2026) operationalised teachers’ empowerment through initiative-taking, decision-making, and autonomy positively related to professional development and effective pedagogy.

As used in this paper, teachers’ empowerment is the process of enhancing the capacity, autonomy, confidence, and professional authority of teachers to make meaningful decisions, innovate in their teaching practices, participate in school leadership, and contribute actively to educational reform and student success. This involves providing teachers with access to resources, opportunities for continuous learning, supportive policies, and a voice in shaping the educational environment, which enable them to act as agents of change, particularly in advancing goals such as Education for Sustainable Development (ESD).

Teachers as Change Agents

Teachers play a pivotal role in shaping the values, behaviours, and future actions of students. Beyond delivering academic content, they influence how learners perceive the world, engage with others, and respond to societal and environmental challenges. In the context of Education for Sustainable Development (ESD), teachers are uniquely positioned to foster

critical thinking, empathy, and a sense of responsibility among the students, which are qualities essential for building a sustainable future.

As change agents, teachers are not just knowledge transmitters, they are leaders, innovators, motivators, and role models who can inspire learners to adopt sustainable values, attitudes, skills, and behaviours.

According to UNESCO (2017), teachers are indispensable in achieving SDG 4 (Quality Education), they also contribute indirectly to other SDGs such as:

- **SDG 13:** Climate Action - through climate change education.
- **SDG 5:** Gender Equality - by promoting inclusive learning environments, and
- **SDG 16:** Peace, Justice and Strong Institutions - by nurturing global citizenship and human rights education.

As key actors in embedding sustainability into learning at all levels, teachers through curriculum integration, participatory teaching methods, and real-world application of knowledge, they help students understand complex global issues such as climate change, social justice, and environmental stewardship. In addition, by modelling ethical behaviour and encouraging active participation, teachers inspire students to become responsible citizens who are committed to sustainable and equitable development. For teachers to effectively fulfilled the role of change agents, they must be empowered for Education for Sustainable Development (ESD) in other for them to lead the change within and beyond the classrooms.

Empowering Teachers for Education for Sustainable Development

Empowering teachers for sustainable development is crucial in order to ensure that Nigeria's education system produces learners who are environmentally conscious, socially responsible, and equipped with the skills needed to solve contemporary global challenges. This empowerment must be intentional and multifaceted (UNESCO, 2025). Therefore, teachers' empowerment must occur on multiple levels, such as:

1. Professional development opportunities

This includes access to continuous professional development (CPD), training in sustainability education, and pedagogical innovation. Training and continuous professional development are vital for teachers to understand the multidimensional nature of ESD. Workshops, seminars, and online modules can equip teachers with innovative teaching strategies, fosters reflective practice, and enhances their ability to nurture critical thinking, problem-solving, and responsible citizenship among learners. Equally important is the institutional environment in which teachers operate, supportive policies, access to resources, collaborative leadership, and inclusion in decision-making processes are essential for sustained engagement with ESD.

In Nigeria, many teachers lack exposure to current global issues such as climate change, social equity, renewable energy, and sustainable agriculture. Therefore, providing regular training and continuous professional development (CPD) is essential. In 2022, the Nigerian Educational Research and Development Council (NERDC) collaborated with UNESCO to train secondary school teachers in Abuja on integrating climate education into science and geography classes. These workshops exposed teachers to the United Nations' SDGs and how to link global sustainability themes to local classroom content. Such CPD programmes should be expanded across all 36 states and include online modules for teachers in rural areas. Empowered with updated knowledge and teaching tools, Nigerian teachers can better inspire students to become change-makers in their communities, which is a strategic pathway to achieving the transformative goals of ESD and, by extension, the United Nations Sustainable Development Goals (SDGs).

2. Curriculum integration skills

Teachers should be trained to embed ESD within their subjects of specialisation especially in sciences, social studies, literature, technical and vocational education. This will enable a holistic approach to learning that mirrors real-world complexity. The Nigerian school curriculum is still largely content-heavy and examination-oriented. ESD calls for a holistic and integrated approach, where sustainability themes are woven into existing subjects instead of being treated as isolated topics. For example, a biology teacher in Lagos can incorporate lessons on deforestation and its impact on local biodiversity, while a literature teacher in Sokoto can guide students to analyse environmental themes in African novels. In vocational studies, teachers can include waste recycling projects, solar technology awareness, or water conservation practices relevant to local communities. Therefore, empowering teachers to see these connections and equip them with strategies to embed them into their lesson plans will ensure that students receive a multidimensional learning experience that mirrors the complexities of real life.

3. Pedagogical innovations

Teachers are nation builders. The mission of every teacher is the urge to instil in students the attitude to be creative and innovative, inspiring students' fraternity to strive for equity and social justice through his leadership acumen. It is therefore necessary, to empower teachers to adopt learner-centred pedagogies that promote critical thinking, creativity, and problem-solving. Teaching methods such as project-based learning, experiential learning, collaborative tasks, and technology-enhanced instruction are essential for engaging learners in meaningful, real-world problem-solving, which align with the goals of ESD. These methods of teaching should be encouraged among the teacher. It is disheartening that traditional “chalk-and-talk” method of teaching still, dominate Nigerian classrooms, this leaves little room for creativity or students' participation. ESD, however, requires learner-centred pedagogies that promote inquiry, collaboration, and action. Training teachers to adopt project-based learning, experiential learning, and problem-solving tasks will not only enhance students' engagement but also would cultivate skills like teamwork, leadership, and critical thinking that makes students fit into 21st-century learners need to thrive and contribute to sustainable futures.

4. Leadership and decision-making roles

Teachers are often left out of educational decision-making in Nigeria, despite being the frontline stakeholders. To drive ESD, teachers must be recognised and empowered as leaders who shape the policy on education and influence school practices. Therefore, teachers must be recognised as leaders within the school systems. Their voices should influence policy decisions, curriculum design, and resource allocation to educational systems.

5. Fostering critical thinking

Equipping teachers with the capacity to foster critical thinking among learners is fundamental to the goals of Education for Sustainable Development (ESD). Critical thinking enables students to analyse information, question assumptions, consider diverse perspectives, and make informed decisions-skills that are vital for addressing complex global and local challenges. To cultivate these abilities in learners, teachers themselves must be trained in pedagogical strategies that encourage inquiry, dialogue, reflection, and problem-posing. This requires deliberate investment in teacher education and continuous professional development that emphasizes higher-order thinking skills, Socratic questioning, and interdisciplinary approaches. Furthermore, institutional support, such as flexible curricula, resource access, and collaborative professional learning communities that enhances teachers' confidence and competence in promoting critical engagement in the classroom. When teachers are empowered

in this way, they can inspire learners to become active, reflective, and responsible citizens capable of contributing to a sustainable future.

6. Problem-solving skills

Equipping teachers with the capacity to foster problem-solving skills among learners is essential for advancing the goals of Education for Sustainable Development (ESD). In an increasingly complex and interdependent world, learners must be empowered to critically analyse real-life issues, consider multiple perspectives, and develop innovative solutions. Teachers play a pivotal role in cultivating these competencies, but doing so requires targeted professional development that emphasizes inquiry-based learning, collaborative pedagogies, and critical reflection. Furthermore, teachers need support to shift from traditional didactic methods to learner-centred approaches that actively engage students in identifying and addressing sustainability challenges. By strengthening teachers' abilities to integrate problem-solving into their instructional practices, education systems can nurture a generation of thoughtful, adaptive, and socially responsible citizens capable of contributing meaningfully to sustainable development.

Teachers' skills for Education for Sustainable Development

The following are the qualities that teachers, as change agents for Education for Sustainable Development, are expected to possess:

1. **Visionary thinking:** Teachers must have a forward-looking mindset, understanding long-term goals and how education can shape a sustainable future. Also, teachers must see education as a tool to address social, economic, and environmental challenges (UNESCO, 2020).
2. **Critical and reflective thinking:** Reflect on their teaching methods and adapt them to include sustainability principles.
3. **Lifelong learning orientation:** Teachers must stay informed about global trends, environmental issues, and pedagogical innovations; and continuously update their knowledge and skills.
4. **Empathy and social responsibility:** Teachers should promote equity, inclusion, and respect for cultural diversity and show concern for people, the planet, and future generations.
5. **Collaboration and partnership Skills:** Teachers should be able to build networks that support ESD activities and initiatives.
6. **Creativity and innovation:** Teachers should be able to use creative methods to teach complex sustainability topics, and design engaging, learner-centred, and real-world-based learning experiences.
7. **Commitment to ethical values:** Teachers should uphold values such as justice, peace, integrity, and stewardship.
8. **Effective Communication:** Teachers should be able to communicate sustainability concepts clearly across diverse audiences, using persuasive and motivating language to inspire action.
9. **Leadership and advocacy:** Teachers should be able to influence policy, curriculum, and educational reform related to ESD, and actively promote and advocate for sustainability in their schools and communities.

Theoretical Review: Transformative Learning Theory

The theory adopted for this study is Transformative Learning Theory. The theory was propounded by Jack Mezirow in 1991. The theory explains how adults change their frames of reference through critical reflection, dialogue, and experience. According to Mezirow,

transformative learning involves a process where individuals examine previously held beliefs, assumptions, and values, leading to a shift in their worldview and behaviour. This transformation typically begins with a disorienting dilemma, followed by self-examination, critical assessment, and eventually a reorientation of perspective, which results in new ways of thinking and acting.

Supporters of transformative learning theory include scholars such as Patricia Cranton and Edward Taylor. Cranton (2006) emphasized the role of authenticity and self-directed learning in facilitating transformation, particularly in professional and adult education. Taylor (2007) conducted an extensive review of empirical studies and found consistent support for Mezirow's core principles, especially the importance of critical reflection and dialogue in fostering change. Supporters argue that transformative learning empowers individuals to become more autonomous, socially responsible, and capable of effecting change in their communities.

Critics of the theory include John Dirkx and Stephen Brookfield. Dirkx (1998) argued that Mezirow's version of transformative learning is too rational and fails to adequately account for emotions, intuition, and imagination in adult learning. He posited that learning can also be deeply spiritual and unconscious, not just based on logical reasoning. Similarly, Brookfield (2000) critiqued the theory for underemphasizing power relations and social context, arguing that transformation does not occur in a vacuum but is influenced by societal and institutional factors that may limit individual agency.

The relevance of transformative learning theory to this study lies in its emphasis on critical reflection, value reorientation, and personal empowerment, which are central to empowering teachers as change agents for Education for Sustainable Development (ESD). For Nigerian teachers to effectively deliver ESD, they must first undergo their own transformation, that is, rethinking traditional teaching practices, embracing sustainable values, and developing the confidence to inspire similar change in their learners. The theory provides a robust framework for understanding how teachers can evolve from content deliverers to transformative leaders who influence both classroom practice and wider societal attitudes towards sustainability.

Challenges to teachers' empowerment in Nigeria

Teacher empowerment faces numerous challenges in Nigeria. These challenges are multifaceted and multidimensional (Oloba & Smith, 2022). These issues hinder teachers' ability to effectively educate their students and ultimately act as change agents for ESD across the nation. These challenges include:

1. Persistent systemic barriers

Teachers' realization of Education for Sustainable Development (ESD) goals is often hindered by persistent systemic barriers, among other challenges. These include rigid curricula, inadequate funding, limited access to teaching resources, bureaucratic inefficiencies, and lack of supportive leadership structures. Such entrenched obstacles undermine teachers' autonomy, stifle innovation, and constrain their ability to implement learner-centred, sustainability-oriented pedagogies. Without deliberate efforts to reform institutional frameworks and policy environments, even the most well-intentioned ESD initiatives risk falling short. Addressing these systemic issues is therefore critical to empowering teachers and ensuring the successful integration of ESD into educational practice.

2. Insufficient training in Education for Sustainable Development

Insufficient training poses a significant barrier to teacher empowerment in Nigeria, as it limits teachers' professional competence, confidence, and capacity for innovation in the classroom. Teacher empowerment refers to the process of enhancing teachers' professional autonomy, decision-making ability, and access to resources and support necessary to quality education deliver (Alagos, 2026). When training is inadequate, either in quality, frequency, or relevance, teachers struggle to keep up with pedagogical trends, curriculum changes, and evolving educational technologies. In addition, many Nigerian teachers, particularly at the basic and secondary education levels, receive minimal or outdated training, which affects their ability to deliver content effectively. Studies have shown that a significant number of teachers lack the pedagogical and content knowledge required for modern classrooms. For instance, Akinyemi and Ofodu (2019) noted that many teachers in Nigeria operate with obsolete teaching methods due to insufficient in-service training, thereby reducing their effectiveness and confidence. Also, Adepoju and Akinware (2021) emphasized that many in-service training workshops are poorly funded, irregular, and overly theoretical, making them ineffective in enhancing practical teaching skills.

3. Resource constraints

A major aspect of resource constraint is the lack of adequate instructional materials such as textbooks, teaching aids, laboratory equipment, and ICT tools. Many schools, particularly in rural areas, operate under severe material deprivation. According to Olaleye and Omotayo (2017), the scarcity of learning materials forces teachers to rely on traditional, teacher-centred methods rather than adopting learner-centred or technology-integrated approaches, thereby hindering creativity and innovation in the classroom. In the same vein, dilapidated infrastructure, overcrowded classrooms, and lack of basic facilities (such as electricity, water, and furniture) diminish teachers' morale and limit the effectiveness of instructional delivery. As reported by the Universal Basic Education Commission (UBEC, 2020), more than 50% of Nigerian public schools do not meet the minimum standard for safe and conducive learning environments. When teachers must operate in such conditions, their sense of professional fulfillment and empowerment is diminished.

Similarly, in this digital age, access to ICT resources is critical for teachers' empowerment. It has been found that many Nigerian teachers lack access to computers, internet connectivity, and digital training. Oyeniyi and Fagbamiye (2021) found that limited access to ICT tools hampers teachers' ability to engage in online training, digital pedagogy, and e-learning platforms, especially during emergencies like the COVID-19 pandemic.

4. Policy gaps and bureaucratic inertia

Policy gaps and bureaucratic inertia create an unsupportive framework that frustrates teacher empowerment in Nigeria. While policies for improving education and teacher welfare exist on paper, there is often a significant disconnect between formulation and effective implementation. This result is inconsistent practices, low teacher morale, and limited professional autonomy, thereby, undermining efforts to empower teachers for improved educational outcomes. Although Nigeria has several policies aimed at improving teacher quality, such as the National Policy on Education (NPE) and the National Teacher Education Policy (2014) but the implementation remains weak. According to Adeyemi and Uko-Aviomoh (2019), many teacher-focused reforms are either delayed, inconsistently applied across States of the country, or inadequately funded. This lack of uniformity creates confusion, marginalises teachers in policymaking, and reduces their trust in the system.

5. Low teacher motivation

Low teacher motivation plays significant challenge to teachers' empowerment in Nigeria, as it directly affects teachers' commitment, creativity, and willingness to take initiative in the classroom. Many Nigerian teachers face poor working conditions, over crowded classroom, irregular salary payments, limited opportunities for career advancement, and a general lack of recognition for their contributions. According to Akinsolu, (2010), these factors contribute to frustration, burnout, and disengagement from professional responsibilities. When motivation is low, teachers are less likely to pursue further training, implement innovative teaching strategies, or participate in school decision-making, which key aspects of empowerment.

Strategies for Empowering Teachers for Education for Sustainable Development

Empowering teachers as change agents is a critical strategy for sustainable development in Nigeria's education sector. It should be noted that the current sustainability plans in Nigeria are will not be able to meet sustainable development policy which ends in 2030, just 5 years away, targeted policy commitment and implementation, curriculum reform, public-private partnerships collaboration, teachers' recognition and incentive, improved working conditions and incentives and technology integration can unleash teachers' transformative potential. Therefore, the following strategies according to UNESCO (2024), can be adopted to empower teachers for ESD.

1. Curriculum reform

For Education for Sustainable Development (ESD) to take root, Nigeria's school curriculum must shift from rote memorization toward promoting critical thinking, problem-solving, environmental awareness, and social responsibility. When teachers' training curricula are revised at Colleges of Education and Faculties of Education to integrate ESD principles such as the introducing courses on climate change, peace education, gender equity, and environmental ethics. This reform will equip teachers with the tools to foster sustainability mindsets among learners. Empowered teachers can then serve as facilitators of transformational learning aligned with the SDGs.

2. Policy commitment and implementation

Strong policy frameworks are essential to institutionalize ESD practices in Nigerian education. The Federal and State Ministries of Education must demonstrate genuine commitment to ESD through robust policy frameworks and implementation strategies. This includes allocating special funds for ESD initiatives and monitoring their impact. Also, Government commitment must go beyond policy declarations to include financing, monitoring, and capacity building for teachers. Policies such as the National Policy on Environment (1999) and National Education Policy (2014) mention sustainability but lack effective teacher-focused implementation. Empowered teachers are more effective in integrating sustainability values into daily instruction when policy environments are supportive.

3. Public-Private Partnerships (PPPs)

Public-private partnerships are valuable for promoting ESD by pooling resources, expertise, and innovation, therefore, such PPPs must be encouraged. Private organizations, NGOs, and international bodies like UNESCO and UNICEF have supported teacher training, environmental education, and curriculum development in Nigeria. They should be invited to help fund teachers' development programmes, provide learning materials, and create networks for peer learning. Such collaborations build teacher capacity in sustainability education, especially in areas of climate education, digital literacy, and gender equality. Empowered

through such partnerships, teachers become local champions of sustainable development in their schools and communities.

4. Recognition and incentive

Recognition of teachers as key stakeholders in ESD should be institutionalised. Award schemes, promotions, and leadership opportunities can motivate teachers to embrace innovation should be implemented. Recognizing and rewarding teachers who effectively promote ESD can inspire others and build a culture of sustainability in education. Also, recognition can take the form of awards, scholarships, grants, and opportunities for international exchange. Teachers who feel valued are more likely to adopt and champion sustainability practices, design innovative environmental projects, and mentor others. Institutionalising rewards for ESD efforts send a clear signal that sustainability is a core priority of the government.

5. Improved working conditions and incentives

When teachers' welfare is enhanced through prompt salary payment, adequate housing, health benefits, and hazard allowances, this will boost the morale and professional commitment of teachers in order to deliver sustainability development goals.

6. Technology integration

Technology is a powerful enabler of ESD through interactive learning, global networking, and access to real-time data on environmental and social issues. Nigerian teachers equipped with ICT tools and digital pedagogy can design engaging sustainability-focused lessons, participate in global ESD forums, and promote awareness campaigns within their communities. Teachers empowered with digital skills are better positioned to teach students about renewable energy, climate change, and global citizenship. Also, investing in digital literacy and ICT infrastructure will allow teachers to access online ESD resources, participate in global forums, and deliver engaging lessons.

Conclusion

To achieve Education for Sustainable Development in Nigeria, teachers must be empowered through curriculum reform, effective policy implementation, public-private collaboration, motivation, and digital literacy. These strategies ensure that teachers not only transfer knowledge but also lead sustainable transformation in the classrooms, schools, and society. Therefore, to empower Nigerian teachers as agents of change, the strategies must go beyond surface-level interventions. Empowerment requires systemic reforms rooted in professional development, supportive environments, policy inclusion, and recognition. When teachers are empowered, they become catalysts for improving learning outcomes, transforming schools, driving educational innovation across States in Nigeria, and would also guide learners to become responsible citizens who are equipped to build a more sustainable and equitable Nigeria.

Recommendations

1. As a matter of policy, government should integrate ESD into teachers' education curricula at all levels. And also, institutionalise pre-service and in-service ESD training for educators at all levels.
2. Government should organise regular ESD-focused workshops, online training modules, and learning communities for teachers.
3. Government should increase education funding with specific allocations for ESD materials and training.

4. Government should introduce awards and incentives for teachers who demonstrate innovation in promoting sustainable practices. And also include ESD metrics in teacher performance appraisals and promotion criteria.
5. Government should strengthen policy implementation and monitoring by the establishment of national and state ESD taskforces to monitor progress and support implementation in schools.
6. Government should increase education sector funding with specific allocations for ESD materials and training and also encourage private sector investment through Corporate Social Responsibility programmes, aimed at education and sustainability.
7. Teacher Professional Associations such as the Nigeria Union of Teachers (NUT) and Academic Staff Union of Secondary School (ASUSS) can nominate representatives to participate in curriculum review panels, education policy drafting, and local SDG education projects.

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SOCIAL RESPONSIBILITY IN THE MANAGEMENT OF UNIVERSITY EDUCATION IN NIGERIA FOR TRANSFORMATION AND SUSTAINABLE DEVELOPMENT

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Abstract

University education is a type of higher education that involves the pursuit of advanced knowledge, skills acquisition, and high-level research. The transformation of university education in Nigeria is necessary for sustainable development. This paper, therefore, examines the concept, purpose, and stakeholders' participation in the management of university education to drive the transformation process. It is the social responsibility of universities to contribute to the development of society, and stakeholders' participation is essential in ensuring that university education is relevant, effective, and sustainable. The social responsibility theory and the concept of university social responsibility are largely explored to shape stakeholders' participation in university management and are viewed as ways of enhancing the level of university goal attainment, thereby transforming the university in a positive direction. All these can bring about a culture of innovation, accountability, and community management, thereby leading to the production of graduates who are equipped to drive sustainable development. Thus, when universities make social responsibility and stakeholders' participation a priority, they can play a significant role in bringing about transformation and sustainable development. The paper puts forward suggestions for actions to be taken with a view to transforming university education for good and improving the quality of education in Nigerian universities.

Keywords: *Management, Social Responsibility, Stakeholders' Participation, Transformation, and Sustainable Development.*

Introduction

In most countries, university education is positioned at the topmost part of the different levels of education. It plays a significant role in the development of every society. Even among the three tiers of tertiary education, it is considered the most sought-after because it is at this level that research and high-level manpower skills are produced. In other words, globally, university education or higher education promotes the exchange of knowledge, research, and innovation, and equips students with the skills needed to meet ever-changing labour markets (UNESCO, 2023). In Nigeria, universities have engaged in their tripartite role of teaching, doing research, and participating in community service. However, apart from the students and members of staff (teaching and non-teaching), there are other people whose interactions with the university in one way or another could impact the running of the university. Stakeholders are people who often play crucial roles in the operation of university education in Nigeria.

In their interaction within the university and outside the university, stakeholders are capable of encouraging social responsibility by way of engaging in acts and practices that will bring about changes in the right direction, thereby transforming the university system for good (UNESCO, 2019; Oyekunle & Eze, 2021). This paper thus attempts to explain the concept of stakeholders; it states the type of stakeholders found in the university system. Stakeholder participation in university education in Nigeria is essential to ensuring that university education is germane, effective, and sustainable. Social responsibility is defined, and it is discussed in relation to stakeholders' participation in the management of university education in Nigeria. It should be noted that Nigerian universities are expected to be socially responsible, contributing to national development and thereby promoting sustainable development. The paper also explores the goals of tertiary education.

Strategies that can be used to strengthen stakeholders' participation in the management of university education by way of social responsibility are also explored. Stakeholders in university education could harness available resources to move forward the agenda of social responsibility in order to bring about a total transformation in university education in the 21st century (Akinbami, 2020). In other words, by prioritizing social responsibility and engaging stakeholders in university management, Nigerian universities can bring about a culture of innovation, accountability, and community engagement. All these will, in turn, result in the turn-out of graduates who have been given the necessary equipment to bring about sustainable development in Nigeria.

The Goals of University Education

In Nigeria, higher education is considered to be a crucial stage or level of education because at that level, human capital is developed to man the industries, schools, and other workplaces. Saint et al. (2003) said that many people demand higher education because they view education not only as an investment in human capital, but also as a requirement for the development of the economy. Thus, the goals of university education have been carefully crafted to aim at achieving both the development of human capital in Nigeria and the development of the economy.

The Federal Republic of Nigeria (FRN, 2013) encapsulates the goals as follows: (a) contribute to national development through high level manpower training; (b) provide accessible and affordable quality learning opportunities in formal and informal education in response to the needs and interests of all Nigerians; (c) provide high quality career counselling and lifelong learning programme that prepares students with the knowledge and skill for self-reliance and the world of work; (d) reduce skill shortage through the production of skilled manpower relevant to the needs of the labour market; (e) promote and encourage scholarship, entrepreneurship and community service; and (f) forge and cement national unity; and promote national and international understanding and interaction.

In pursuing these goals, the FRN (2013) specifically mentioned that university education shall make optimum contribution to national development by doing the following: (a) intensifying and diversifying its programmes for the development of high level manpower within the context of the needs of the nation; making professional course contents reflect our national requirements; (b) making all students part of a general programme of all-round improvement in university education, to offer general study courses such as history of ideas, philosophy of knowledge, nationalism and Information Technology (IT); and (c) making entrepreneurial skills acquisition a requirement for all Nigerian universities.

Clarification of Concepts

The Concept of Social Responsibility

Social responsibility refers to the ethical and moral obligations that a person or an organization has towards society. This implies that people and organizations (including companies) must conduct their affairs taking into consideration the best interests of their environment and society as a whole. According to Planken (2013), social responsibility is the ideological notion that organizations should not behave unethically or function amorally but should aim to deliberately contribute to the welfare of society (or societies) – which comprises various communities and stakeholders – that they operate in and interact with.

However, recently, social responsibility has come to be seen as an idea that is also akin to corporate behaviour. This is to say that social responsibility also relates to the manner in which companies or business managers do things or go about their business, while relating to society. Also implied in this idea is the commitment of their leaders to social projects meant to enhance the standard of living of the people in general. Managers and leaders in companies, businesses, and organizations who are deemed to be socially responsible not only tend to make decisions that bring about optimum gains, but they also look out for the interests of the community in which they conduct their business, as well as the society in general.

Wallstreetmojo Team (2023) defined social responsibility as the responsibility of individuals and organizations to conduct their affairs in the best interest of their immediate environment (and by extension, the larger society) through their participation in activities that contribute to the development of society. The team also explained the concept of social responsibility by using the idea of an organization or a business entity plowing back into society, some of the projects or gains made by the organization in order to enhance the quality of life of society. In other words, they believe social responsibility is a kind of self-regulation or discipline and societal duty that every business and corporation should follow to uplift the condition of the environment or community in which it operates.

In the field of core business, the term ‘social responsibility’ is referred to as “corporate social responsibility”. This is a management concept whereby companies incorporate social and environmental matters in their business affairs and relationships with their stakeholders (UNIDO, 2023). In this way, Corporate Social Responsibility (CSR) helps a business enterprise to maintain a balance among environmental, social, and economic objectives, as well as taking into consideration the expectations of stakeholders and shareholders. Corporate Social Responsibility is also a process that is concerned with treating the stakeholders of a company or institution ethically or in a responsible manner (Hopkins, 2006).

Concept of Stakeholder

The term ‘stakeholder’ is a concept that is largely used in business where it denotes a person, a group or organization with vested interest or stake, in the decision-making and activities of a business organization or project (such as students, lecturers, and administrators) and external stakeholders (such as parents, employers, government agencies, and the wider community) play critical roles in shaping institutional performance (Barney & Holak, 2023). While Mutabazi (2022) approached the concept of stakeholder with a definition of ‘stake’, which means a legal claim, right, or interest. He therefore explains the meaning of stakeholder as someone who has an interest in the activities of a company. Thus, ‘a stakeholder is an individual, or any group or organization that has a legitimate concern or interest in a company or organization’. He further stated that stakeholders could be individuals or people within the organization or outside the organization, and while they could be affected by the operations of the organization, they could also affect the organization directly or indirectly. Barney and Holak (2023) viewed stakeholders as a ‘person, group or organization with a vested interest, or stake, in the decision-making and activities of a business, organization or project’. Stakeholders

may or may not be members of such an organization or business. However, their activities may directly or indirectly impact the operations of the business or the organization. According to them, stakeholders often include customers, managers, employees, investors, suppliers, donors, board of directors, owners, community groups, organizations, government agencies, trade unions, and creditors. Applying this to Nigerian higher education, it implies that universities cannot operate in isolation; rather, they must actively identify, engage, and manage stakeholders' expectations to ensure effectiveness and inclusivity. For instance, while government policies influence university governance and funding, employers' demands shape curriculum relevance, and parents' preferences affect students' enrolment choices. Hence, consistent with Barney and Holak's (2023) submission, universities must adopt robust stakeholder management strategies that balance these varied interests to achieve sustainable outcomes.

Types of Stakeholders

Stakeholders are individuals, groups, or organizations that have an interest in a project or organization, and can be categorized into several types. The most common classifications are internal vs. external and primary vs. secondary. Internal stakeholders are those within the organization, like employees and owners, while external stakeholders are outside, such as customers, suppliers, and the community. Primary stakeholders are directly affected by the project, while secondary stakeholders have an indirect impact.

According to Mutabazi (2022), two types of stakeholders were identified. These are internal and external stakeholders. From the perspective of the scholar, workers, members of the company board, shareholders, and managers are examples of internal stakeholders, while suppliers, creditors, communities, society, and customers constitute the external stakeholders. In another dimension, Asiyai (2014) categorized stakeholders into internal and external stakeholders. The government (which controls and manages all higher institutions), the members of staff, the students, and the university management team constitute the internal stakeholders, while the external stakeholders usually consist of the alumni, the National Universities Commission, parents, vendors and suppliers.

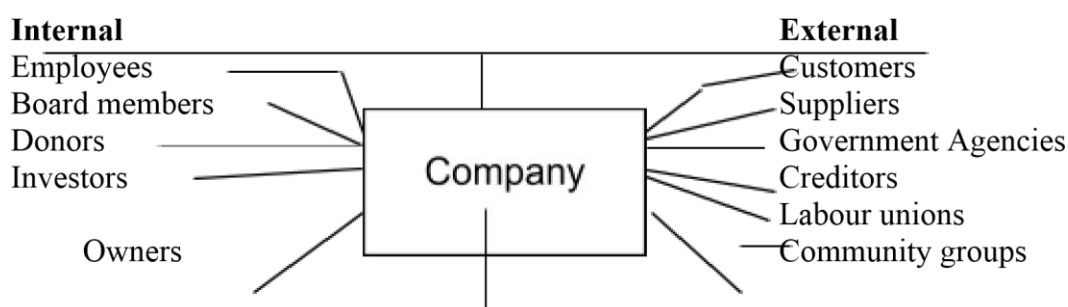


Figure 1: Internal and External Stakeholders

Internal Stakeholders: Internal stakeholders are individuals and groups within the university system who are directly involved in its daily activities and decision-making. They include students, academic staff, non-academic staff, and university management, all of whom play crucial roles in the delivery of quality education and institutional development.

External Stakeholders: External stakeholders are groups and organizations outside the university that influence or are influenced by its operations. These include government agencies, parents, alumni, employers, host communities, and donor agencies, whose support and collaboration are vital for the sustainability and societal relevance of the institution.

Primary Stakeholders: Primary stakeholders are those whose interests are central to the survival and effective functioning of the university. They consist mainly of students as the core beneficiaries, academic and non-academic staff as service providers, and the government as the key regulator and funder of higher education.

Secondary Stakeholders: Secondary stakeholders are those who are not directly essential for the university's survival but whose actions and opinions still shape its performance and image. They include the media, professional associations, civil society groups, and international partners, all of whom contribute indirectly to quality assurance, accountability, and global competitiveness of higher education.



Figure 2: Types of Stakeholders

Stakeholders are individuals or groups that have an interest in the activities, decisions, and performance of an organization. They may be internal, external, primary, or secondary depending on their level of involvement and influence. Internal stakeholders, such as employees, managers, and directors, to people who are directly engaged in the day-to-day operations of the organization, while external stakeholders, including customers, suppliers, government, and the wider community, exist outside the organization but are significantly affected by its actions.

In addition, primary stakeholders are those whose participation is essential to the survival and success of the organization, such as shareholders, employees, customers, and suppliers. Conversely, secondary stakeholders such as the media, Non-governmental Organizations (NGOs), and trade associations influence the organization indirectly, shaping its public image and external environment. Together, these stakeholder groups demonstrate the complex network of relationships that organizations must manage to ensure sustainability, accountability, and long-term growth.

Stakeholders in University Education

Stakeholders are individuals, people, groups of people, or organizations who have a vested interest in the affairs of the university. They are people who usually have one thing or the other to do with the university as a system. The American Society for Quality (2022) defined a stakeholder as an individual or a group that has an interest in any decision or activity of an organization. Employers of labour (public and private sectors) are also recognized as stakeholders. Asiyai (2015) buttressed this statement by stating that establishing a close

relationship with employers of labour and other external stakeholders could help to trigger improvement in university education. McGrath and Whitty (2017) viewed employers of labour as stakeholders in university education because they are the users or consumers of the product/service which the activity (or education) produces. In other words, employers of labour can be referred to as the end-users. In this scenario, the government can be seen to play a dual role of investor and consumer at the same time. The government invests in education in its capacity as the principal controller of education and owner of institutions at the different levels. The students are also investors in education, most of them through their parents and guardians.

In some circumstances, decisions that are made by the organization affect stakeholders. The term 'stakeholder' has been associated with business. Stakeholders may include suppliers, internal staff, customers (including shareholders, investors, and consumers), clients, buyers, and non-governmental organizations (NGOs). According to Jigwen et al. (2020), stakeholders in university education consist of the personnel at the helm of affairs in the university, the students, the staff, the alumni, the community, and the employers. They added that these stakeholders influence organizational practices to the extent that, without engaging them and without their cooperation, sustainable development goals would be difficult to achieve.

According to Ogunode et al. (2023), stakeholders in university education are viewed as people who take part in the process of achieving the goals and objectives of tertiary education. They went on to assert that many people have an interest in what goes on in the institutions. In their own view, the members of staff (teaching and non-teaching), students, parents, government, alumni, the Nigerian Universities Commission, community leaders, and school owners form the stakeholders of the university (Mc Cowan, Janmaat, & Rao in Ogunode et al., 2023).

Apart from the groups of people mentioned above as stakeholders in university education, union leaders and members can also be viewed as stakeholders because they also have a stake in the university system in the sense that, among other things, they seek to enhance the working conditions of their members, thereby improving the relationship between the employees and management. This opinion supports Iyayi's (2012) assertion that the purpose of trade unions in the tertiary institutions is to ensure that the terms and conditions of the employment of workers are properly controlled.

Stakeholder Relationship in Higher Education

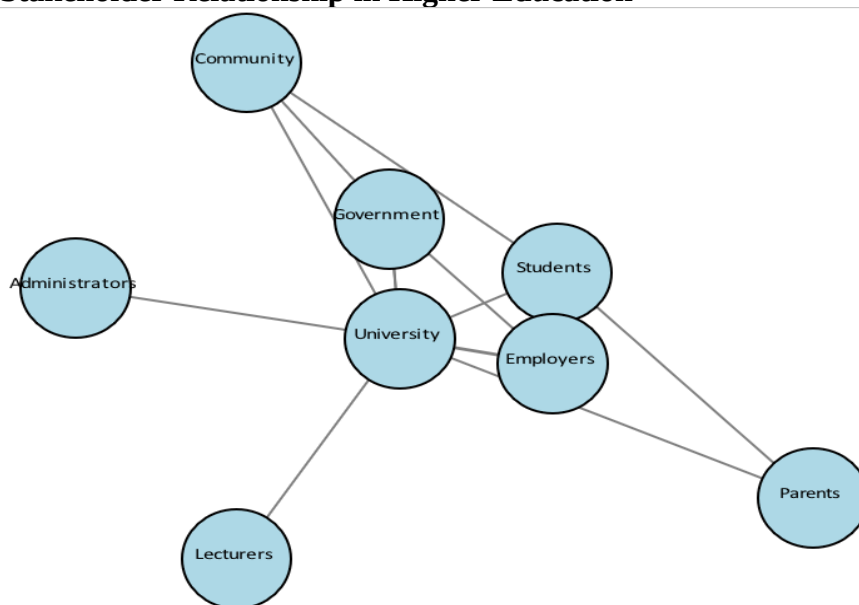


Figure 3: Stakeholder Relationship in Higher Education

The diagram illustrates the network of relationships among key stakeholders in higher education. At the center is the University, which interacts directly with major groups such as Students, Lecturers, Administrators, Government, Community, Parents, and Employers. These represent the primary stakeholders whose interests shape and are shaped by the institution.

The arrows show the flow of influence and interdependence. For instance, the University provides learning and services to students, while students are also influenced by their parents, community, and future employers. The Government connects with the University through regulation and policy, but it also influences the wider community and employers. Similarly, Employers not only depend on universities for skilled graduates but also influence students' career choices and employability.

Overall, the diagram emphasizes that the University does not operate in isolation; instead, it functions within a dynamic stakeholder ecosystem where each group contributes to and benefits from the success of higher education. This interconnectedness is crucial for promoting effective governance, accountability, and inclusive outcomes.

Social Responsibility Theory

The social responsibility theory is an ethical theory in which individuals are accountable for fulfilling their civic obligation, and the actions of an individual must be of benefit to the whole society (Pachamama Alliance, 2023). An action or decision may be considered to be socially irresponsible if it tends to harm society or the environment.

The Social Responsibility Theory is relevant to this study because it emphasizes that institutions enjoying autonomy must exercise such freedom with accountability to society. Applied to university education in Nigeria, the theory provides a framework for advocating stakeholder participation in governance, since universities, like the media, are obligated to act responsibly by ensuring inclusiveness, transparency, and responsiveness in decision-making. By engaging diverse stakeholders, universities strengthen public trust, align their activities with societal needs, and contribute more effectively to transformation and sustainable development.

Stakeholder Theory

According to Freeman (2018), the stakeholder theory is a view of capitalism that emphasizes the interconnected relationships that a business has with its customers, suppliers, employees, investors, communities, and others who have a stake in the organization. According to the stakeholders' theory, the organization is a network of mutual dependencies where the interests and expectations of the different stakeholders can be jeopardized in different ways, and the satisfaction of all of them is necessary for maintaining the balance of the group. (Pérez-Pulido, 2018).

In the same vein, Simon (2016) explained the description of stakeholder theory as put forward by Edward Freeman, who posited that the real success of a company lies in the satisfaction of all its stakeholders, not just those stakeholders who gained from its stock. This implies that in the view of Edward Freeman as quoted by Simon (2016), the stakeholders in a business enterprise comprise anybody or any group of people impacted by the activities of the business or the organization.

The stakeholder theory is relevant to this study because it explains why universities must involve all groups affected by their decisions—students, staff, alumni, government, employers, and the wider society—in governance processes. The theory emphasizes accountability, inclusiveness, and shared responsibility, thereby providing a framework for stakeholder participation as a means of enhancing transparency, legitimacy, and the contribution of university education to transformation and sustainable development in Nigeria.

Social Responsibility and Stakeholders' Participation in University Education in Nigeria

In the university system, the stakeholders comprise the students, the teaching (lecturers) and the non-teaching staff, the government, the parents, and the National Universities Commission. These groups constitute the internal stakeholders, while donors (or partners), the business community (i.e., suppliers, vendors, etc.), philanthropists, NGOs, Alumni, the private sector in general, and other nearby educational institutions. Universities play a crucial role in re-ordering the future of society. Social responsibility can be used as a tool to tackle some of the issues in society, such that universities will be able to impact their immediate environment in a positive way.

Some of the activities that universities can engage in are through funding an organisation that can provide for children who are underprivileged. Also, groups of volunteers among the students can get together and undertake the cleaning up of strategic places, as well as engage in other acts of community service. For environmental sustainability, universities can use renewable energy, such as the installation of solar panels on their buildings. Staff and students of the universities could also undertake charitable acts of philanthropy by donating money for projects that are not funded by the government. They could also donate blood and support social issues that affect society. An example of such an engagement is the recycling of plastics. Teaching staff could mount free curriculum programmes in nearby primary and secondary schools, while free workshops and seminars on societal issues could also be organized from time to time.

On an individual basis and to enhance the image of the university, the members of the university community could also project to the general public the idea of fairness, integrity, and honesty by creating awareness with the 'golden rule' of treating others in the way they would want to be treated. All these instances are ways in which stakeholders of the university can be socially responsible in society. Just as in their daily activities and operations, businesses are also expected to care about the welfare of the people in their immediate environment, or they should pay heed to the impact of their actions/ activities on society in general.

Strategies for Transformation and Sustainable Development of Nigeria Through Social Responsibility and Stakeholders' Participation in The Management of University Education

Universities are institutions that bring about changes in the society; as such they need to engage actively with stakeholders (the students, lecturers, alumni, the community, the government and industry) to ensure that the goals of education are in line with those of national development, thereby promoting sustainable practices (Ahmad et al., 2023; Flórez-Parra et al., 2024). One of the ways by which universities can promote social responsibility is by emphasising community service. This can be achieved by focusing on the well-being of their immediate communities (García-Feijoo et al., 2024). By addressing the needs of society, universities can help to tackle problems such as environmental pollution, poor healthcare, inequality, and illiteracy (Yusof et al., 2024). All these and similar problems can be handled using research, community service, and interactions with the government (Cuesta-Claros et al., 2025).

The inclusion of social responsibility in the curriculum is another way by which the nation can be transformed. In doing this, students can be encouraged and sensitized in such a way as to make them aware of social issues, thereby making them socially responsible citizens (Eromafuru, et al., 2022). Engaging in community service programmes and supporting local initiatives are ways by which this can be achieved.

The transformation of the university in the 21st century cannot take place without the involvement of different stakeholders in the processes of decision-making, where both the university management and stakeholders ensure that the objectives of the university are in line

with the goals of national development (Wilson et al., 2024). Stakeholders' participation in university management is crucial in the sense that it ensures transparency and accountability, which would bring about an improvement in the conduct of affairs in the organization (Fernández-Salinerio et al., 2022). One of the ways by which this can happen is through the inclusion of stakeholders in the area of consultation or having them as members of advisory boards (Boston University, 2024).

Social responsibility and stakeholders' participation in university management can enhance the creation of a skilled and ethical workforce that may enhance economic growth and social progress (Ahmad et al., 2023). Also, when stakeholders engage in research and development, this can bring about innovative solutions to challenging issues in the society, thereby bringing about sustainable practices (Dellantonio et al., 2024).

Universities can take advantage of the expert knowledge and skills of stakeholders as well as their (that is, universities') connections with stakeholders to influence policy decisions, thereby promoting sustainable development initiatives (Cuesta-Claros et al., 2025). For instance, this is one way by which universities might work together with a local business enterprise to develop sustainable energy solutions or work with the government to implement policies that address climate change (Flórez-Parra et al., 2024).

Challenges to Social Responsibility and Stakeholders' Participation

In their attempt to be socially responsible, coupled with the participation of stakeholders in the management of university education, universities face some challenges, one of which is a lack of adequate funding to fulfill their social responsibility roles effectively and engage with stakeholders effectively (HEPI, 2025). Universities also encounter a shortage of academic staff as a result of their drift to other countries. This occurrence weakens the capacity of the universities to contribute to national development (Lawal et al., 2023).

Poor infrastructural facilities also pose an impediment to effective teaching, research, and community service in the universities (Lawal et al., 2023). Teaching will not be effective without modern infrastructural facilities, while research strength will be reduced if up-to-date equipment and facilities are nonexistent or obsolete. The universities and stakeholders may not be able to engage fully and satisfactorily with the community in the absence of standard infrastructural facilities.

Another factor faced by universities in their attempt to use social responsibility and stakeholders' participation in university management to drive transformation has to do with challenges with university autonomy (Evans, 2024). Without full control of autonomy, universities will not be able to adjust to changes in society, which may demand the implementation of certain innovative ideas (Evans, 2024).

Suggestions for Enhancing Social Responsibility and Stakeholder Participation in Universities

The following suggestions were raised based on the literature review.

1. It is hereby suggested that universities should work with a variety of stakeholders, thereby achieving co-operation and maximum harnessing of resources.
2. The need for universities to be autonomous is very crucial. This should be adequately met to help universities work out and implement new ideas, thereby leading to sustainable development.
3. Adequate funding for universities should be made available to help universities to properly engage with stakeholders in their social responsibility efforts.

4. A conducive environment for learning and research can only be achieved through the provision of infrastructure. This can enhance the capability of the universities to push forward their social responsibility agenda.
5. Training and development should also be focused on to enhance the capacity of the staff to handle challenges in society.

Conclusion

University education is widely regarded as a pivotal platform for cultivating high-level human capital, essential for national development. As key stakeholders in the university system, individuals and groups must assume social responsibility, ensuring their actions align with the broader interests of society. By integrating socially responsible practices into their daily operations, universities can positively impact their immediate environment and contribute meaningfully to community well-being. Through embracing social responsibility and fostering stakeholder engagement in university management, Nigerian institutions can play a transformative role in driving sustainable national development.

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ASSESSING THE IMPACT OF BUSINESS EDUCATION ON ENTREPRENEURIAL OUTCOMES IN GOVERNMENT-SPONSORED SKILLS TRAINING PROGRAMMES: EVIDENCE FROM DELTA STATE, NIGERIA

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Abstract

Graduate unemployment remains a major socioeconomic problem in Nigeria despite the introduction of several employability programmes. In Delta State, the Skills Training and Entrepreneurship Programme (STEP) and Youth Agricultural Entrepreneurs Programme (YAGEP) were established to promote job creation and self-reliance among youth. However, questions remain about how the quality of training influences entrepreneurial outcomes and employment status. This study examined the relationship between Business Education quality and entrepreneurial outcomes among beneficiaries of STEP and YAGEP, guided by Human Capital Theory, Experiential Learning Theory, and the Graduate Work Readiness Model. A descriptive ex-post facto correlational design was adopted. A stratified random sample of 303 beneficiaries was drawn from a population of 1,438 across five cohorts (2017–2022). Data were collected using the Entrepreneurship and Vocational Education Questionnaire (EVEQ), which demonstrated acceptable reliability (Cronbach's $\alpha = 0.87$). Hierarchical multiple regression, controlling for socio-demographic variables, revealed that Business Education quality significantly predicted entrepreneurial ability ($B = 0.658$, $\beta = 0.638$, $*p < .001$; total $R^2 = 0.452$) and employment status ($B = 0.484$, $\beta = 0.498$, $*p < .001$; total $R^2 = 0.301$). Within two years post-programme, 66.7% of beneficiaries were gainfully employed, and 52.5% had established MSMEs. Employment rates differed by programme type (STEP: 69.8%; YAGEP: 65.3%; $\chi^2 = 4.69$, $*p = 0.030$). Socio-demographic imbalances revealed urban overrepresentation (59.1%) and underrepresentation of older youth (38.9%). The study recommends strengthening financial management training, upgrading training environments, expanding rural access, and enhancing post-training support systems to improve programme inclusivity and effectiveness.

Keywords: Business Education quality, entrepreneurial ability, employment outcomes, skills training, STEP, YAGEP, youth employment, Nigeria

1.1 Background of the Study

In a society defined by rapid technological disruption, economic volatility, and the imperatives of sustainable development, entrepreneurship education has emerged as a cornerstone for fostering innovation, self-reliance, and inclusive growth. Globally, vocational

and business-oriented training programmes have been instrumental in bridging the skills gap, empowering marginalised populations, and mitigating youth unemployment. According to the International Labour Organization (2024), approximately 64 million young people globally are unemployed, with the highest rates concentrated in Sub-Saharan Africa.

In developing economies like Nigeria, entrepreneurship education is not merely an academic pursuit but a strategic imperative for socioeconomic transformation. Business Education equips individuals with practical knowledge in financial literacy, market analysis, business planning, and ethical leadership, thereby turning human capital into engines of productivity and poverty alleviation (National Business Education Association, 2020). By instilling these multifaceted competencies, Business Education enables individuals to navigate entrepreneurial landscapes and vocational opportunities effectively.

Nigeria, Africa's most populous nation, faces a protracted unemployment crisis. According to the National Bureau of Statistics (2024), the national unemployment rate stood at 4.3% in Q2 2024, while youth unemployment (ages 15–24) was 6.5%, affecting approximately 9.87 million individuals. Underemployment and informal employment remain pervasive, with over 90% of employed persons engaged in informal work. In Delta State, a resource-rich yet agrarian hub in Nigeria's Niger Delta region, the unemployment rate was approximately 8.2% in 2023, affecting over 178,000 persons (Nairametrics, 2024).

In response, the Delta State Government established the Skills Training and Entrepreneurship Programme (STEP) and the Youth Agricultural Entrepreneurs Programme (YAGEP) through the Delta State Job and Wealth Creation Bureau. STEP imparts vocational skills in sectors such as information technology, fashion design, and fabrication, while YAGEP targets agricultural value chains including crop production and livestock management. Both programmes integrate Business Education modules emphasising opportunity identification, risk management, and sustainable business modeling to enhance participants' employability and self-reliance.

Despite the proliferation of such interventions, empirical evidence on the specific role of Business Education quality in shaping entrepreneurial outcomes remains limited. This study addresses this gap by examining the relationship between Business Education quality and entrepreneurial outcomes among STEP and YAGEP beneficiaries in Delta State.

1.2 Statement of the Problem

Despite government interventions, graduate unemployment and underemployment persist in Nigeria. As of Q2 2024, unemployment among post-secondary graduates remained around 9%, reflecting a paradox where higher qualifications correlate with diminished employability due to weak industry education linkages (International Labour Organization, 2024; Omoju et al., 2023).

Many beneficiaries of STEP and YAGEP struggle to sustain enterprises due to weak business management competencies, particularly in financial literacy, risk analysis, and market navigation (Delta State Government, 2025). Programme evaluations indicate that less than 50% of alumni maintain viable MSMEs two years post training, suggesting limited long term impact. Without evidence based reforms, rising unemployment may curtail economic growth and hinder the attainment of Sustainable Development Goals 4 and 8.

The paucity of empirical evaluation on the role of Business Education quality within these programmes, specifically isolating its contribution from socio demographic confounders, creates a critical policy gap. This study, therefore, investigates how Business Education quality is associated with entrepreneurial capability and employment outcomes among STEP and YAGEP beneficiaries in Delta State.

1.3 Purpose of the Study

The main objective of this study is to examine the relationship between Business Education quality and entrepreneurial outcomes among STEP and YAGEP beneficiaries in Delta State. The specific objectives are to:

1. Determine the socio-demographic characteristics of participants.
2. Assess the perceived quality of Business Education delivery in terms of trainers, methods, and environment.
3. Determine the level of entrepreneurial ability among beneficiaries.
4. Examine the relationship between Business Education quality and entrepreneurial ability after controlling for socio-demographic variables.
5. Investigate the relationship between Business Education quality and employment status after controlling for socio-demographic variables.

1.4 Research Questions

1. What are the socio-demographic characteristics of STEP and YAGEP participants?
2. What is the perceived quality of Business Education delivery in STEP and YAGEP?
3. What is the level of entrepreneurial ability among STEP and YAGEP beneficiaries?
4. What are the employment outcomes of STEP and YAGEP beneficiaries?

1.5 Hypotheses

H₀₁: There is no significant relationship between Business Education quality and entrepreneurial ability of beneficiaries after controlling for socio-demographic variables.

H₀₂: There is no significant relationship between Business Education quality and employment status of beneficiaries after controlling for socio-demographic variables.

1.6 Significance of the Study

This study provides evidence-based insights for improving programme design, implementation, and resource allocation within Delta State's entrepreneurship and vocational training initiatives. Theoretically, it links Business Education outcomes to Human Capital Theory and Experiential Learning Theory, illustrating how knowledge acquisition and practical exposure jointly enhance entrepreneurial competence. Practically, it offers guidance to trainers, policymakers, and development agencies on strengthening curriculum delivery, mentorship, and post-training support. Academically, it enriches the literature on vocational and entrepreneurship education in developing economies by providing the first empirical benchmark for Business Education quality's association with entrepreneurial outcomes in Nigeria's Delta region.

2.2 Theoretical Review

This study is anchored on three complementary theories that provide a robust framework for understanding how Business Education contributes to entrepreneurial outcomes in government-sponsored skills training programmes. These theories collectively explain the mechanisms through which structured education and practical training enhance human capital, facilitate effective learning, and prepare beneficiaries for the workplace.

The Human Capital Theory, propounded by Becker in 1993, posits that investment in education and training enhances an individual's productivity, earning potential, and contribution to economic growth. Within the context of the STEP and YAGEP programmes, Business Education represents a strategic investment in human capital, equipping beneficiaries

with competencies that improve their employability, entrepreneurial efficiency, and income generation capacity. This theory underscores the role of Business Education as a vehicle for transforming human potential into economic value.

Kolb's Experiential Learning Theory emphasises that meaningful learning occurs through a cyclical process of experience, reflection, conceptualisation, and experimentation. This framework supports the training design of STEP and YAGEP, which blend classroom instruction with hands-on practice in real or simulated business environments. By engaging participants in active learning processes, the programmes enable beneficiaries to internalise theoretical concepts, develop problem-solving abilities, and acquire enterprise management skills critical for business sustainability.

The Graduate Work Readiness Model conceptualises work readiness as the degree to which graduates possess the skills, attributes, and dispositions necessary for success in the workplace. It highlights employability as a function of both technical competence and behavioural adaptability. This model aligns closely with the objectives of Business Education within STEP and YAGEP, which aim to cultivate workplace readiness, entrepreneurial initiative, and the soft skills essential for sustained participation in the labour market.

2.1 Conceptual Review

2.1.1 Business Education

Business Education refers to the systematic acquisition of knowledge, skills, and attitudes essential for business ownership, management, and effective participation in economic activities. It integrates disciplines such as entrepreneurship, accounting, business management, and marketing aimed at equipping learners with the competencies required to establish and manage sustainable enterprises. According to Okoye and Eze (2021), Business Education plays a pivotal role in producing self-reliant individuals capable of creating jobs rather than seeking them. Within the framework of STEP and YAGEP, Business Education empowers beneficiaries with foundational and managerial competencies needed to initiate, operate, and sustain micro, small, and medium enterprises (MSMEs), thereby enhancing their economic independence and contribution to development.

2.1.2 Entrepreneurship and Entrepreneurial Ability

Entrepreneurship is widely conceptualised as the process of identifying opportunities, mobilising resources, and establishing ventures to satisfy market needs and achieve profitability (Hisrich et al., 2017). Entrepreneurial ability, on the other hand, refers to the set of cognitive, technical, and behavioural skills that enable individuals to carry out entrepreneurial functions effectively, including creativity, innovation, decision-making, opportunity recognition, and risk management (Shane & Venkataraman, 2000). In the context of STEP and YAGEP, entrepreneurial ability reflects beneficiaries' capacity to translate training inputs into viable business activities and self-employment outcomes.

2.1.3 Employment Outcomes

Employment outcomes encompass the post-training work status of individuals, including self-employment, wage employment, underemployment, or unemployment. These outcomes serve as key indicators for assessing the effectiveness of vocational and entrepreneurship programmes (International Labour Organization, 2024). Positive employment outcomes demonstrate the extent to which participants transition from training to productive economic engagement, signalling the success of Business Education and skill acquisition initiatives.

2.3 Empirical Review

Several studies have shown that Business Education and vocational training have a positive influence on entrepreneurship development and employment creation. For example, Emeh and Nwanguma (2018) found that structured business education significantly improves opportunity recognition, innovation, and enterprise sustainability among Nigerian youths. In the same vein, Okolie and Igwe (2022) reported that Technical and Vocational Education and Training (TVET) programmes enhance participants' employment prospects and entrepreneurial intentions in developing countries. Similarly, McKenzie and Woodruff (2017) observed that structured business training in low- and middle-income countries leads to higher enterprise survival rates, better profitability, and increased income levels.

However, most of these studies have focused on general training impacts. There is limited empirical research on the specific role of Business Education within state-led entrepreneurship programmes such as STEP and YAGEP in Delta State. Many existing studies do not isolate the educational components that affect entrepreneurial ability and employment outcomes.

2.4 Gap in Literature

Although the importance of Business Education in promoting entrepreneurship and employment is well documented in the literature, empirical studies on government-initiated programmes in Delta State are still very few. There is a lack of focused evaluation on how the content, delivery methods, and experiential aspects of Business Education influence beneficiaries' entrepreneurial ability and employment trajectories. This study therefore seeks to fill this gap by empirically examining the relationship between Business Education, entrepreneurial ability, and employment outcomes among beneficiaries of the STEP and YAGEP programmes in Delta State. It is hoped that the findings will provide useful evidence for policy formulation and theoretical advancement.

3.0 Methodology

3.1 Research Design

A descriptive correlational research design was adopted to examine the relationships among programme participation, skill acquisition, employability readiness, and employment status. This design allowed for the description of participant characteristics and the examination of associations between variables.

3.2 Population and Sample

The population comprised graduate beneficiaries of YAGEP and , STEP from five cohorts (2017–2022). The total population across all cohorts was 1,773 participants. A stratified random sampling technique was used to select 296 participants, proportionate to cohort sizes.

Table 3.1: Sample Distribution by Programme Cycle

Cohort	Adjusted Population	Adjusted Sample
2017–2018	242	51
2018–2019	308	65
2019–2020	258	54
2020–2021	325	69
2021–2022	305	64
Total	1,438	303

3.3 Instrumentation

Content validity was established through expert review by two entrepreneurship education professionals, one psychometrician, and one programme coordinator. The experts assessed item clarity, relevance, and alignment with the research questions and hypotheses. Revisions were made based on their feedback, ensuring the instrument adequately captured the constructs of engagement, skills acquisition, readiness, and status. Face validity was confirmed during the pilot, with 90% of participants finding items clear and unambiguous.

Reliability of the Instrument: A pilot study was conducted with 30 participants from a non-sampled cohort of YAGEP and STEP. Cronbach's alpha was used to assess internal consistency because the items were not all on the same scale. Some items used Likert scales, multiple choice, checklists, categorical yes/no items, and attribution questions, with an acceptable threshold of $\alpha \geq 0.70$. Separate reliability scores were also calculated for the essential skills scale, vocational skills scale, and employability readiness scale.

The computed reliability indices for the Entrepreneurship and Vocational Education Questionnaire (EVEQ) are as follows: Engagement subscale ($\alpha = 0.820$), Essential entrepreneurship skills subscale ($\alpha = 0.795$), Vocational entrepreneurship skills subscale ($\alpha = 0.922$), Employability readiness subscale ($\alpha = 0.713$), Employment status subscale ($\alpha = 0.785$), and overall instrument ($\alpha = 0.701$). These values indicate acceptable to high internal consistency, supporting the instrument's suitability for the main study.

3.4 Data Collection and Analysis

Data were collected through direct administration of the questionnaire to participants. Descriptive statistics (frequencies, percentages) were used to summarize participant characteristics.

3.5 Data Analysis

Descriptive statistics (frequencies, percentages, means, standard deviations) were used to summarise participant characteristics and address research questions 1–4.

Hierarchical multiple regression was employed to test hypotheses H_{01} and H_{02} . This technique allows the researcher to determine the unique contribution of Business Education quality (independent variable) to entrepreneurial ability and employment status (dependent

variables) after controlling for socio-demographic variables (sex, academic background, programme type, residential location, age group). The hierarchical approach entered variables in two blocks:

Block 1: Business Education quality only

Block 2: Socio-demographic control variables added

All analyses were conducted using SPSS Version 27.

4. Results

4.1 Socio-Demographic Characteristics of Beneficiaries (Research Question 1)

Table 4.1 presents the key socio-demographic characteristics of the 303 beneficiaries, providing insights into the inclusivity of the programmes.

Table 4.1: Socio-Demographic Characteristics of Respondents (N = 303)

Characteristic	Frequency	Percentage (%)	95% CI
Sex			
Male	155	51.2	[45.5, 56.8]
Female	148	48.8	[43.2, 54.5]
Academic Background			
Sciences	33	10.9	[7.8, 14.9]
Social Sciences	53	17.5	[13.5, 22.2]
Arts	60	19.8	[15.6, 24.7]
Engineering	47	15.5	[11.7, 20.1]
Agricultural Sciences	110	36.3	[31.0, 41.9]
Programme Type			
STEP	179	59.1	[53.4, 64.5]
YAGEP	124	40.9	[35.5, 46.6]
Residential Location			
Urban	179	59.1	[53.4, 64.5]
Rural	124	40.9	[35.5, 46.6]
Age Group			
20–25	185	61.1	[55.5, 66.4]
26–30	40	13.2	[9.8, 17.5]

Characteristic	Frequency	Percentage (%)	95% CI
31–35	57	18.8	[14.7, 23.7]
36–40	21	6.9	[4.5, 10.4]

Source: *Field Survey (2025)*

The socio-demographic profile shows near gender parity (51.2% male, 48.8% female) but reveals notable imbalances in programme type (STEP 59.1%, YAGEP 40.9%), residential location (urban 59.1%, rural 40.9%), age distribution (61.1% aged 20–25), and academic background (Agricultural Sciences 36.3%, with underrepresentation of Sciences and Engineering at 10.9% and 15.5% respectively).

4.2 Quality of Business Education Delivery (Research Question 2)

Analysis of respondents' ratings indicated that the overall quality of Business Education delivery was satisfactory, with mean ratings falling within the "Good" range.

Table 4.2: Perceived Quality of Business Education Delivery (N = 303)

Component	Mean (M)	Standard Deviation (SD)	95% CI for Mean	Interpretation
Trainers	2.87	0.62	[2.80, 2.94]	Good
Delivery Methods	2.88	0.59	[2.81, 2.95]	Good
Training Environment	2.76	0.68	[2.68, 2.84]	Good
Overall Business Education Quality	2.84	0.58	[2.78, 2.90]	Good

Note: Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent

Source: *Field Survey (2025)*

Mean ratings across components were: Trainers (M = 2.87, SD = 0.62), Delivery Methods (M = 2.88, SD = 0.59), and Training Environment (M = 2.76, SD = 0.68). A repeated-measures ANOVA indicated significant differences among the three components ($F(2, 604) = 4.68$, $*p* = 0.009$, $\eta^2 = 0.015$), with post-hoc tests revealing that Training Environment was rated significantly lower than Trainers ($*p* = 0.007$) and Delivery Methods ($*p* = 0.005$).

4.3 Entrepreneurial Ability of Beneficiaries (Research Question 3)

Table 4.3: Entrepreneurial Ability of Beneficiaries (N = 303)

Component	Mean (M)	Standard Deviation (SD)	95% CI for Mean	Interpretation
Entrepreneurial Ability	2.78	0.65	[2.71, 2.85]	Good

Note: Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent

Source: *Field Survey (2025)*

The mean entrepreneurial ability score was 2.78 (SD = 0.65), indicating a "Good" level of entrepreneurial competence among beneficiaries. Item-level analysis showed highest scores for "ability to identify business opportunities" (M = 2.94, SD = 0.71) and lowest for "financial management skills" (M = 2.61, SD = 0.78).

4.4 Employment Outcomes of Beneficiaries (Research Question 4)

Within two years post-programme, **66.7%** of participants were gainfully employed. The employment outcomes are presented in Table 4.4.

Table 4.4: Employment Outcomes and MSME Establishment (N = 303)

Outcome	Frequency	Percentage (%)	95% CI
Gainfully Employed ¹	202	66.7	[61.2, 71.8]
Self-Employed Only	145	47.9	[42.3, 53.5]
Paid Employment Only	55	18.2	[14.1, 23.0]
Both Self-Employed and Paid ²	2	0.7	[0.1, 2.4]
Established MSMEs	159	52.5	[46.8, 58.1]
Employment Rate by Programme			
STEP Employment Rate	125 of 179	69.8	[62.7, 76.2]
YAGEP Employment Rate	81 of 124	65.3	[56.5, 73.3]

*Notes:

¹Gainfully employed is the aggregate of self-employed and paid employment categories. Percentages for self-employed and paid employment do not sum to the gainfully employed total because two beneficiaries reported simultaneous self-employment and paid employment.

²Two beneficiaries (0.7%) reported holding both self-employment and paid employment simultaneously.*

Source: Field Survey (2025)

Programme-type comparison: STEP beneficiaries recorded a **69.8%** employment rate compared to **65.3%** for YAGEP beneficiaries. A chi-square test of independence indicated that this difference was statistically significant ($\chi^2 = 4.69$, $df = 1$, $*p* = 0.030$, $\phi = 0.12$), suggesting programme type is associated with employment outcomes, though the effect size is small.

4.5 Hypotheses Testing

Hierarchical multiple regression was conducted to test the hypotheses. In Block 1, Business Education quality was entered as the predictor. In Block 2, socio-demographic variables (sex, academic background, programme type, residential location, age group) were entered as controls to isolate the unique contribution of Business Education quality.

Hypothesis 1 (H₀₁): *There is no significant relationship between Business Education quality and entrepreneurial ability of beneficiaries after controlling for socio-demographic variables.*

Table 4.5: Hierarchical Multiple Regression Results for Entrepreneurial Ability (N = 303)

Model	Predictor	B	SE B	B	t	p	95% for B	CIR ² Change	Total R ²
Block 1	Business Education Quality	0.671	0.048	0.651	13.98	<.001	[0.577, 0.765]	0.438	0.438
Block 2	Business Education Quality	0.658	0.049	0.638	13.43	<.001	[0.562, 0.754]	0.014	0.452
	Sex (Male = 1)	0.042	0.052	0.032	0.81	0.419	[-0.060, 0.144]		
	Age Group (20–25 ref)								
	Age 26–30	-.038	0.079	-.019	-0.48	0.632	[-0.193, 0.117]		
	Age 31–35	-.021	0.070	-.013	-0.30	0.765	[-0.159, 0.117]		
	Age 36–40	0.015	0.103	0.006	0.15	0.884	[-0.188, 0.218]		
	Academic Background (Sciences ref)								
	Social Sciences	0.087	0.092	0.048	0.95	0.343	[-0.094, 0.268]		
	Arts	0.064	0.090	0.037	0.71	0.478	[-0.113, 0.241]		
	Engineering	0.112	0.094	0.059	1.19	0.235	[-0.073, 0.297]		
	Agricultural Sciences	0.041	0.085	0.029	0.48	0.632	[-0.126, 0.208]		
	Programme (STEP = 1)	0.076	0.054	0.055	1.41	0.160	[-0.030, 0.182]		
	Residential (Urban = 1)	0.051	0.053	0.037	0.96	0.338	[-0.053, 0.155]		

Note: Final model: $F(11, 291) = 21.85$, $p < .001$. Reference categories: Sex (Female = 0), Age Group (20–25 as reference), Academic Background (Sciences as reference), Programme Type (YAGEP = 0), Residential Location (Rural = 0).

Source: *Field Survey (2025)*

Business Education quality explained **43.8%** of the variance in entrepreneurial ability before controls ($R^2 = 0.438$) and remained a significant predictor in the full model ($B = 0.658$, $\beta = 0.638$, $p < .001$). The addition of socio-demographic variables accounted for only an additional **1.4%** of variance ($\Delta R^2 = 0.014$, $p = 0.32$ for the block), confirming the dominant role of Business Education quality. None of the socio-demographic control variables reached statistical significance at $\alpha = 0.05$.

Decision: The null hypothesis was rejected. Business Education quality significantly predicted entrepreneurial ability in the final model after controlling for socio-demographic variables.

Hypothesis 2 (H_{02}): *There is no significant relationship between Business Education quality and employment status of beneficiaries after controlling for socio-demographic variables.*

Table 4.6: Hierarchical Multiple Regression Results for Employment Status (N = 303)

Model	Predictor		B	SE	B	B	t	p	95% for B	CIR ² Change	Total R ²
Block 1	Business Quality	Education	0.498	0.050	0.513	9.96	<.001	[0.400, 0.596]	0.278	0.278	
Block 2	Business Quality	Education	0.484	0.051	0.498	9.49	<.001	[0.384, 0.584]	0.023	0.301	
	Sex (Male = 1)		0.038	0.054	0.031	0.70	0.484	[-0.068, 0.144]			
	Age Group (20–25 ref)										
	Age 26–30		-.041	0.082	-.022	0.50	0.618	[-0.202, 0.120]			
	Age 31–35		-.029	0.072	-.019	0.40	0.689	[-0.171, 0.113]			
	Age 36–40		0.022	0.107	0.009	0.21	0.837	[-0.188, 0.232]			
	Academic Background (Sciences ref)										
	Social Sciences		0.091	0.095	0.053	0.96	0.338	[-0.096, 0.278]			

Model	Predictor	B	SE B	B	t	p	95% for B	CIR ² Change	Total R ²
	Arts	0.069	0.093	0.043	0.74	0.460	[-0.114, 0.252]		
	Engineering	0.118	0.097	0.066	1.22	0.224	[-0.073, 0.309]		
	Agricultural Sciences	0.047	0.088	0.035	0.53	0.597	[-0.126, 0.220]		
	Programme (STEP = 1)	0.089	0.056	0.069	1.59	0.113	[-0.021, 0.199]		
	Residential (Urban = 1)	0.058	0.055	0.045	1.05	0.295	[-0.050, 0.166]		

Note: Final model: $F(11, 291) = 11.41$, $p < .001$. Reference categories: Sex (Female = 0), Age Group (20–25 as reference), Academic Background (Sciences as reference), Programme Type (YAGEP = 0), Residential Location (Rural = 0). Dependent variable: Employment status coded as 1 = employed, 0 = unemployed.

Source: *Field Survey (2025)*

Business Education quality explained **27.8%** of the variance in employment status before controls ($R^2 = 0.278$) and remained a significant predictor in the full model ($B = 0.484$, $\beta = 0.498$, $p < .001$). The addition of socio-demographic variables accounted for an additional **2.3%** of variance ($\Delta R^2 = 0.023$, $p = 0.28$ for the block). Programme type (STEP vs. YAGEP) approached but did not reach statistical significance ($p = 0.113$), suggesting that the bivariate difference observed in Table 4.4 (69.8% vs. 65.3%) may be partially explained by other factors included in the regression model.

Decision: The null hypothesis was rejected. Business Education quality significantly predicted employment status in the final model after controlling for socio-demographic variables.

Effect sizes: Cohen's f^2 for the final models were **0.82** (entrepreneurial ability) and **0.43** (employment status), indicating large and medium-to-large effects respectively (Cohen, 1988). The large effect size ($f^2 = 0.82$) indicates that Business Education quality is not merely statistically significant but substantively impactful.

5. Discussion

The employment outcomes (66.7% gainfully employed and 52.5% MSME establishment) compare favourably with national statistics. Nigeria recorded a 4.3% unemployment rate in Q2 2024, yet underemployment and informal employment exceed 90% (National Bureau of Statistics, 2024). Both programmes performed well, with STEP achieving 69.8% employment and YAGEP 65.3%. The modest gap requires attention.

Business Education quality explained 45.2% of the variance in entrepreneurial ability ($R^2 = 0.452$) and 30.1% in employment status. These results align with Akinwale and Adeyemi (2023) and Ogunleye and Fasina (2024), who reported similar positive effects of business training on enterprise sustainability and employment in Nigeria.

The lower employment rate in YAGEP may stem from agricultural challenges such as land access, seasonality, and market constraints. This is consistent with Mwangi and Kinyua (2023), who noted lower sustainability in agricultural programmes compared to service-sector ones due to higher capital needs and longer returns.

Hierarchical regression showed that Business Education quality remained a significant positive predictor of entrepreneurial ability ($B = 0.658$) and employment status ($B = 0.484$) after controlling for socio-demographic factors. These findings support Human Capital Theory (Becker, 1993), Experiential Learning Theory (Kolb, 1984), and the Graduate Work Readiness Model (Caballero et al., 2011). Delivery methods received the highest rating ($M = 2.88$), confirming the value of practical learning.

The study contributes theoretically by emphasising training quality over mere participation, identifying gaps in training environment, and showing that programme type affects outcomes indirectly through other variables. Practically, it highlights financial management skills ($M = 2.61$) and training environment ($M = 2.76$) as key areas for improvement in Delta State programmes.

6. Conclusion

This study concludes that Business Education quality significantly predicts entrepreneurial ability and employment outcomes among STEP and YAGEP beneficiaries in Delta State. High-quality training, featuring competent trainers, effective experiential methods, and better learning environments, enhances entrepreneurial capacity and labour market success beyond socio-demographic factors.

Business Education quality accounted for 45.2% of variance in entrepreneurial ability and 30.1% in employment status. The programmes achieved 66.7% employment and 52.5% MSME establishment rates within two years, which compare favourably with national figures, although YAGEP requires further strengthening.

High-quality Business Education equips participants with vital skills in management, finance, and innovation. It plays a key role in reducing unemployment, promoting self-reliance, and supporting inclusive growth. Improving training quality in state entrepreneurship programmes will advance Sustainable Development Goals 4 and 8.

7. Recommendations

Based on the findings of this study, the following recommendations are made:

1. Programme implementers should strengthen trainer capacity through continuous professional development and expand post-training support, including mentorship, incubation, and credit access.
2. Policymakers must address disparities between programmes by developing targeted interventions for agricultural entrepreneurs.
3. Monitoring and evaluation systems should adopt comprehensive frameworks to track long-term outcomes, enable longitudinal follow-up, and promote alumni networking.
4. Programme organisers should prioritise training quality, equitable access, and sustained post-programme support to improve the effectiveness of government-sponsored skills development initiatives

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EVALUATING THE SKILLS NEEDED BY BUSINESS EDUCATION STUDENTS FOR SELF-RELIANCE IN FEDERAL COLLEGE OF EDUCATION (TECHNICAL) BICHI, KANO STATE

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Abstract

*The study evaluates the skills needed for self-reliance among business education students at the Federal College of Education (Technical) in Bichi, Kano State. Two specific research objectives and questions guided the study. The population consisted of all 175 final-year business education students at FCE (Tech) Bichi who were included in the study. The sample size was 121 respondents. A descriptive survey research design was adopted for the study. Data were collected using a structured, 20-item four-point rating scale questionnaire. The collected data were analyzed using percentage scores for the respondents' personal data, and mean scores with a benchmark of 2.50 and above for agreement or disagreement with the questionnaire items and the overall grand mean. The study revealed that skills such as **Information and Communication Technology (ICT) Skills, Leadership Skills, Marketing Skills, and Communication Skills** were needed for self-reliance among business education students. Conversely, issues like **Inadequate Funding, Insufficient ICT Facilities, and Poor Curriculum Design with Limited Emphasis on Practical Skills, among others**, were identified as constraints that hinder the effective acquisition of these skills. The study concluded that Business Education students at the Federal College of Education (Technical), Bichi, require a diverse set of technical, managerial, and digital skills to achieve self-reliance in today's competitive and fast-evolving economic landscape. Finally, the study recommended, among others, that the Business Education curriculum should be regularly reviewed and updated to incorporate contemporary entrepreneurial, digital, and vocational competencies in line with industry demands and global best practices.*

Keywords: Business Education, Entrepreneurship, Skills, and Self-Reliance.

Introduction

Education can be described as a systematic process of facilitating learning and transmitting knowledge, skills, values, and habits from one generation to another through formal, informal, and experiential learning environments. Through this process, individuals develop intellectual abilities, critical thinking skills, and social competencies necessary for personal growth and societal advancement (UNESCO, 2023; Doharey Verma, Verma and Yadav, 2023). As observed by Mbaji and Ibezim (2019), education is regarded as the cornerstone of every society, instrumental in nation-building and in fulfilling national goals and aspirations. Traditionally, education is delivered through formal institutions such as schools, colleges, and universities, where learning is guided by structured curricula,

professional educators, and systematic assessments to cultivate both intellectual and practical abilities. The importance of equipping individuals with quality education that fosters self-employment and contributes to national development cannot be overstated (Opara, 2018). Nevertheless, education also takes place in informal contexts such as family settings, peer interactions, self-learning, and community participation, where lifelong learning occurs naturally. Okenwa (2018) emphasized that a critical aspect of general education involves acquiring practical skills and competencies applicable to office and business-related occupations. At its core, education empowers individuals to navigate challenges, make informed decisions, and contribute to cultural, technological, and economic progress.

Business education is a vital component of the education system that prepares individuals to understand, manage, and innovate within commercial and organizational environments. It equips learners with the knowledge, skills, and competencies required for effective participation in business activities and decision-making processes. Business education covers diverse disciplines such as accounting, marketing, finance, operations management, entrepreneurship, and human resource management, all of which contribute to developing managerial competence and entrepreneurial capabilities necessary for economic development (Osuala, 2010; Okoro, 2018; Amoor and Udoh, 2020).

Ahmadu and Idoko (2013) define it as a purposeful instruction in business and economic concepts and skills designed to be useful throughout one's career and life. Business education significantly contributes to economic development by equipping learners with the ability to apply knowledge, operate modern office technologies, and manage information systems effectively. This results in the production of competent business educators, administrators, and entrepreneurs capable of thriving in a competitive job market (Ajua, 2020). Ajoma (2021) describes business education as a training that provides graduates with the skills and economic competencies necessary to pursue business careers or launch their own enterprises. In a similar vein, Olowu (2019) views business education as both education for and about business, primarily aimed at preparing individuals for productive roles in the business world. Akinpelu (2017) further sees it as a component of holistic education that imparts functional and marketable skills, knowledge, and values necessary for success in the business world, whether as consumers or producers of goods and services.

Skills, in this context, refer to the development of new abilities and knowledge over time, often involving continuous adaptation rather than rote memorization. Alison (2019) defines technical skills as the specific competencies and expertise required to perform particular tasks. These include vocational abilities (such as trade-specific skills) and broader life or entrepreneurial skills like decision-making and problem-solving that prepare individuals for employment or self-employment. According to Saidu, Dahiru, and Suleiman (2017), the entrepreneurial skills essential for sustainable economic development include technical know-how, business management abilities, and personal entrepreneurial capabilities. Similarly, Martin (2015) cites the 2014 OECD annual report, which highlights these three key skills as fundamental for entrepreneurial success.

For business education graduates to become self-reliant and productive members of society, they must acquire and practice essential skills during their training. These include entrepreneurial skills, accounting and financial management skills, marketing and sales skills, communication skills, digital and information technology skills, problem-solving and critical thinking skills, managerial and leadership skills, among others. Amesi (2018) affirms that the acquisition of relevant skills enables business education students to attain independence, productivity, and self-reliance within the larger society.

Statement of problem

The general expectation of the public from graduates of higher institutions, particularly those from Colleges of Education offering Business Education programs, is that they should acquire relevant business knowledge, skills, and competencies that enable them to become consistently productive members of society. Graduates from the Federal College of Education (Technical), Bichi, share in this collective aspiration of contributing meaningfully to the state's economic development. However, despite the large number of graduates produced by Colleges of Education in the state and across Nigeria, the unemployment rate remains a major concern. This is largely due to the fact that many of these graduates continue to seek white-collar jobs, which are becoming increasingly scarce. According to the National Bureau of Statistics (NBS, 2023), Nigeria's unemployment rate rose from 4.1% in the first quarter of 2023 to 5.0% in the third quarter of the same year. The NBS further noted that the number of people within the labour force who are underemployed increased from 12.2% to 12.3% between the first and third quarters of 2023. These statistics reflect the situation across all states of the federation, including Kano State. It is against this backdrop that this study seeks to evaluate the skills needed by Business Education students for self-reliance at the Federal College of Education (Technical), Bichi, Kano State.

Objectives of the Study

The main objective of this study is to evaluate the skills needed by Business Education students for self-reliance at the Federal College of Education (Technical), Bichi, Kano State. The specific objectives are:

1. To evaluate the entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi.
2. To identify the constraints that hinder the acquisition of entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi.

Research Questions

Based on the problems identified, the following research questions were developed to guide the study:

1. What are the entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi?
2. What are the constraints that hinder the acquisition of entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi?

Methodology

A descriptive survey research design was adopted for this study, which was carried out at the Federal College of Education (Technical), Bichi, in Kano State. The choice of this institution was informed by the substantial number of Business Education students available to serve as respondents, as well as the increasing rate of unemployment among graduates of the program, making them key beneficiaries of the study's findings. The population consisted of 175 final-year Business Education students, selected due to their high entrepreneurial potential. From this population, a sample size of 121 students, representing 69.14% of the total, was drawn. This sampling decision aligns with the recommendation by Gay (as cited in Olayiwola, 2007), who posits that a 10% sample is adequate for descriptive studies. The sample was proportionately selected across the four departments (Accounting, OTME, Entrepreneurship, and Marketing) within the college.

To collect data, a structured questionnaire titled “Assessing Skills Needs Questionnaire” (ASNQ) was employed. The instrument comprised 20 items, presented on a four-point Likert scale: *Strongly Agree (SA)* = 4 points, *Agree (A)* = 3 points, *Disagree (D)* = 2 points, and *Strongly Disagree (SD)* = 1 point. The questionnaire items were subjected to face and content validation. Two experts from the Department of Entrepreneurship Education, School of Secondary Education (Business), Federal College of Education (Technical), Bichi, reviewed the instrument. Additionally, one expert each from the fields of Measurement and Evaluation and English Language from the same institution also validated the instrument to ensure clarity and appropriateness. Data collected in response to the research questions were analyzed using mean scores. A benchmark of 2.50 and above was set as the acceptance threshold, while mean scores below 2.50 were interpreted as not accepted.

Research Result

The results of the study were presented in the tables below:

Table 1: Distribution of Respondents Based on their Departments

Department	Frequency	Percent
Accounting Education	50	41.32%
Office Technology and Management Education	18	14.88%
Marketing Education	30	24.79%
Entrepreneurship Education	23	19.01%
Total	121	100.0%

Table 1 displays the distribution of respondents according to their departments. The findings reveal that 41.32% of the total respondents were from the Accounting Education Department, 14.88% from Office Technology and Management Education, 24.79% from Marketing Education, and 19.01% from the Entrepreneurship Education Department. These results indicate that the highest proportion of respondents was from the Accounting Education Department.

Table 2: Represent the Distribution of Respondents Based on Gender

Gender	Frequency	Percent
Male	75	61.98%
Female	46	38.02%
Total	121	100.0%

Table 2 presents the gender distribution of the respondents. The data reveals that a majority, 61.98%, were male, while 38.02% were female. This indicates that male respondents constituted the larger portion of the sample.

Table 3: Age Distribution of the Respondents

Age Group	Frequency	Percent
15-20	09	7.44%
21-25	52	42.98%
26-30	40	33.06%
31-35	20	16.53%
Total	121	100.0%

Source: Field survey Data 2025

Table 3 above presents the age distribution of the respondents. According to the results, 7.44% of the respondents were within the 15–20 years age group, while the largest proportion,

42.98%, fell within the 21–25 years range. Additionally, 33.06% of the respondents were aged 26–30 years, and 16.53% were between 31–35 years. These findings indicate that the majority of respondents were between 21 and 25 years old.

Research Question 1:

What are the entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi?

Table 4: Mean ratings of the Respondents on Entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi.

S/N	Items	SA	A	D	SD	Mean	Decision
1	Innovation and Creativity Skills	50	64	4	3	3.33	Accepted
2	Leadership Skills	61	48	8	4	3.37	Accepted
3	Marketing Skills	81	30	6	4	3.55	Accepted
4	Interpersonal Skills	65	50	6	0	3.49	Accepted
5	Communication Skills	74	40	3	4	3.52	Accepted
6	Business Plan Writing Skills	49	70	2	0	3.39	Accepted
7	Desktop Publishing Skills	66	53	0	2	3.51	Accepted
8	Accounting Skills	45	72	3	2	3.31	Accepted
9	Web Design Skills	59	53	6	3	3.39	Accepted
10	Information and Communication Technology (ICT) Skills	68	51	1	1	3.54	Accepted
Grand mean						3.44	Accepted

Source: *Field survey Data 2025*

Table 4 presents the mean ratings of respondents on the entrepreneurial and vocational skills required by Business Education students for self-reliance. Using a four-point Likert scale, the results show that all items had mean scores of 2.50 or higher, indicating acceptance. The grand mean of 3.40 also falls within the accepted range. This suggests that respondents unanimously agreed that all the listed items represent essential entrepreneurial and vocational skills needed by Business Education students in colleges of education (Technical) Bichi to achieve self-reliance after graduation.

Research Question 2:

What are the constraints that hinder the acquisition of entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi?

Table 5: Mean ratings of the Respondents on Constraints that hinder the Effective acquisition of entrepreneurial and vocational skills needed by Business Education students for self-reliance in Federal College of Education (Technical), Bichi.

S/N	Items	SA	A	D	SD	Mean	Decision
1	Financial Constraints	49	53	8	11	3.16	Accepted
2	Inadequate Training Facilities	51	63	7	0	3.36	Accepted
3	Lack of Awareness and Information	56	50	10	5	3.30	Accepted

4	Poor Government Support and Policy Implementation	72	40	6	3	3.50	Accepted
5	Cultural and Societal Beliefs	60	48	9	4	3.36	Accepted
6	Low Motivation and Interest Among Youths	48	70	3	0	3.37	Accepted
7	Shortage of Qualified Instructors	57	50	10	4	3.32	Accepted
8	Unstable Power Supply and Poor Infrastructure	72	49	0	0	3.60	Accepted
9	Outdated Curriculum	47	59	12	3	3.24	Accepted
10	Limited Private Sector and Industry Collaboration	63	55	3	0	3.50	Accepted
Grand Mean						3.37	Accepted

Source: *Field survey Data 2025*

Table 5 presents the respondents' views on the constraints hindering the effective acquisition of entrepreneurial and vocational skills by Business Education students for self-reliance. The results reveal that all items recorded mean scores at or above the benchmark value of 2.50, indicating acceptance. The grand mean of 3.37 also falls within the accepted range. This implies that the respondents agreed that all the listed items are significant constraints affecting the effective acquisition of entrepreneurial and vocational skills by Business Education students in Federal colleges of education (Technical) Bichi.

Discussion of findings

The findings of table 4 above clearly demonstrate that Business Education students require a broad spectrum of technical, managerial, and digital competencies to achieve self-reliance in an increasingly competitive and dynamic economic environment. The consistently high mean ratings across all the identified skills reinforce the necessity of integrating entrepreneurial and vocational competencies into the Business Education curriculum. This integration not only equips students with practical, hands-on skills but also prepares them for the realities of the labour market, where self-employment and small-scale enterprise development are becoming increasingly vital.

These findings are in line with existing literature, which underscores the critical role of education in cultivating entrepreneurial mindsets, reducing youth unemployment, and driving sustainable economic development (Amoor and Udoh, 2008; Olawolu and Kaegon, 2012). As noted by Uddin (2021), entrepreneurship plays a pivotal role in economic success regardless of a country's political or economic structure, as it contributes to innovation, job creation, and wealth generation. Therefore, fostering entrepreneurial skills among Business Education students is not merely a curricular enhancement but a strategic response to the socio-economic challenges facing Nigeria and other developing nations.

Furthermore, the findings in table 5 reveal that all identified constraints to acquiring entrepreneurial and vocational skills among Business Education students at the Federal College of Education (Technical), Bichi, were acknowledged by respondents, with each scoring above the benchmark mean of 2.50. The most critical barriers identified were unstable power supply, poor infrastructure, and inadequate government support and policy implementation. These systemic deficiencies align with the observations of Okolocha and Onyeneke (2013), who noted that weak infrastructure and policy gaps significantly undermine vocational training outcomes. Limited collaboration between educational institutions and the private sector also

emerged as a major issue, reinforcing Nwokolo and Ezeani's (2018) assertion that poor school-industry partnerships restrict access to modern tools, industrial practices, and entrepreneurial networks.

Other challenges highlighted include low motivation and interest among students, inadequate training facilities, and socio-cultural beliefs that discourage entrepreneurial engagement. These factors demonstrate that skill acquisition is shaped not only by resources but also by attitudes and societal norms, as supported by Amoor (2010). Furthermore, the shortage of qualified instructors and the persistence of outdated curricula present ongoing challenges to maintaining training relevance. This reflects Osuala's (2009) position that regular curriculum updates are essential to meeting evolving industry demands and preparing students for the realities of the labour market.

Conclusion

This study established that Business Education students at the Federal College of Education (Technical), Bichi, require a diverse set of technical, managerial, and digital skills to achieve self-reliance in today's competitive and fast-evolving economic landscape. The findings confirm that embedding entrepreneurial and vocational competencies within the Business Education curriculum is critical to equipping students with practical, market-relevant abilities, fostering innovation, and enhancing employability. However, the study also revealed that the acquisition of these skills is hampered by systemic and institutional constraints, including inadequate infrastructure, poor government support, weak industry collaboration, low student motivation, outdated curricula, and a shortage of qualified instructors. These multifaceted challenges reflect broader structural and socio-cultural issues that must be addressed to strengthen the capacity of Business Education in producing self-reliant graduates capable of contributing to sustainable economic development.

Recommendations

Based on the findings, the following recommendations are proposed:

1. The Business Education curriculum should be regularly reviewed and updated to incorporate contemporary entrepreneurial, digital, and vocational competencies in line with industry demands and global best practices.
2. Government and institutional authorities should prioritize the provision of adequate training facilities, stable power supply, and modern instructional tools to enhance the practical delivery of entrepreneurial and vocational training.
3. Stronger partnerships should be established between the Colleges and private sector organizations to provide students with industrial exposure, internship opportunities, and access to modern technologies and business networks.
4. Continuous professional development programs should be implemented for instructors to ensure they remain updated with emerging industry trends, teaching methodologies, and entrepreneurial innovations.
5. The Government should implement and enforce supportive policies that promote entrepreneurship education, provide funding for start-ups, and reduce bureaucratic barriers to self-employment.

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EFFECT OF GAMIFICATION APPLICATION ON MOTIVATION AND PERFORMANCE IN BASIC SCIENCE AMONG UPPER BASIC STUDENTS, IN KADUNA METROPOLIS, NIGERIA

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Abstract

This study explores the effects of gamification on the academic performance and motivation of upper basic science students in Kaduna metropolis, Nigeria. Utilizing a quasi-experimental design, the population of the study covered fifteen public junior secondary schools in Kaduna Metropolis. A total of 2,434 student's forms the population of the study. Samples of 2 schools with a total number of 120 students selected using simple random sampling technique, participated in the study. From the two schools one intact class was randomly assigned to experimental or control groups. For the purpose of data collection, two instruments: Basic Science Academic Performance Test (BSAPT) and Student Motivation Questionnaire (SMQ) were used. The instruments were validated by experts and pilot tested with the reliability coefficient for SMQ was $r = 0.71$ and BSAT was $r = 0.81$. The research involved two groups: an experimental group exposed to gamified learning strategies and a control group receiving traditional instruction. Descriptive statistics in the form of mean and standard deviation were used to answer research questions while the hypotheses were tested using Independent t- test statistics and ANCOVA. Results obtained from the analysis revealed that gamification significantly enhances both academic performance and student motivation and there is a statistically significant difference in how students rated the effectiveness of different game elements, with points, badges, and leaderboards rated higher than others suggesting its potential as an effective pedagogical tool in Nigerian science education. Based on the findings of the study recommendations were made such as principals should ensure that teachers at the upper basic level should incorporate gamification techniques such as points, badges, leaderboards, and challenges into their daily teaching to enhance student motivation and academic performance.

Keywords: Gamification, Academic Performance, Motivation, Upper Basic Education, Kaduna, Nigeria

Introduction

In recent years, the educational landscape has witnessed significant shifts in instructional strategies, particularly with the integration of technology and innovative pedagogical approaches aimed at improving student outcomes. One such innovation gaining widespread attention is Gamification, the application of game design elements in non-game contexts, such as education. A growing body of research indicates that traditional teaching methods characterized by rote memorization, teacher-centered instruction, and limited student engagement are insufficient for meeting the diverse learning needs of 21st-century learners (Adeoye, 2024). These outdated pedagogical strategies often result in low student interest, poor knowledge retention, and a widening achievement gap, especially in core subjects such as mathematics, science, and languages.

Moreover, the increasing prevalence of digital technologies among young learners has created disconnect between students' out-of-school digital experiences and in-school learning environments. While students are actively engaging with interactive media outside the classroom, most classroom settings fail to harness this digital familiarity for educational purposes. This mismatch contributes to a lack of motivation and underperformance, as learners perceive schooling as irrelevant and uninspiring (Moses, Oladokun & Ladipo, 2025).

Gamification application such as kahoot, Khan Academy, Quizzizz etc has emerged as a promising solution to these challenges, offering an innovative approach that merges educational content with game mechanics such as point scoring, competition, and achievement tracking. International and some Nigerian studies have shown that gamification can enhance engagement, improve motivation, and lead to better academic outcomes (Fasinro, 2024). However, empirical research on its application and effectiveness remains limited in Northern Nigeria, particularly among upper basic science students in Kaduna State a population that may greatly benefit from such pedagogical innovations. Gamification has emerged as a promising strategy to enhance student engagement, motivation, and ultimately academic performance by leveraging the intrinsic appeal of games to create a more interactive and rewarding learning environment.

Motivation and academic performance are critical determinants of student success, especially among upper basic students who are at a transitional stage in their cognitive, emotional, and social development. At this stage, learners often experience a decline in motivation due to increased academic demands and the rigidity of traditional classroom methods. This challenge is particularly pronounced in many Nigerian schools, where rote learning and teacher-centered approaches continue to dominate instructional practices. Consequently, there is a growing need to explore innovative, learner-centered strategies that can rekindle student interest and improve academic outcomes (Fasinro, 2024).

Kaduna, one of the educationally vibrant states in northern Nigeria, presents a compelling context for investigating the effectiveness of gamification in the classroom. While there has been growing interest in educational technology in the region, empirical evidence on the effects of gamification on students' academic motivation and performance remains scarce (Mutum, 2024). Understanding how gamification influences learning in this context is crucial for informing educational policy and practice, particularly as educators and policymakers seek to address issues related to low student engagement and underachievement in core subjects (Mutum, 2025).

This study holds significant value for various stakeholders in the education sector, particularly in the context of improving teaching and learning outcomes at the upper basic level in Kaduna, Nigeria.

Firstly, the findings will provide educators with empirical evidence on the effectiveness of gamification as a teaching strategy. By highlighting how game-based elements can enhance academic performance and motivation, teachers will be better equipped to design more engaging, interactive, and student-centered lessons that cater to the interests and learning styles of their students.

Secondly, the study will offer school administrators and curriculum planners valuable insights into innovative approaches that can be integrated into existing instructional practices. This can guide policy formulation and curriculum development, leading to more dynamic and responsive teaching methods that go beyond traditional rote learning techniques.

Thirdly, educational policymakers will benefit from the research by gaining a deeper understanding of how gamification can contribute to addressing broader educational challenges such as low student engagement, high dropout rates, and poor academic outcomes. The study's results could support the development of national or state-level policies that encourage the adoption of digital and interactive tools in classrooms.

Furthermore, the study will be useful to researchers and scholars by contributing to the growing body of literature on gamification in education, especially within the Nigerian and broader African context, where empirical data on the subject is still limited. It will also serve as a foundation for future studies exploring the use of educational technology to improve learning outcomes.

Ultimately, the study aims to support efforts to create a more inclusive, motivating, and effective educational experience for upper basic students, helping to build a stronger foundation for lifelong learning and academic success.

This study, therefore, seeks to examine the effect of gamification on motivation and performance in basic science among upper basic science students in Kaduna, Nigeria.

Statement of the Problem

Academic underachievement and declining motivation among students have become persistent challenges in the Nigerian educational system, particularly at the upper basic level. Incidence of student's poor performance in Basic Education Certificate Examinations (BECE) Basic Science particularly in the last five years (2017 to 2024) as released by the National Examinations Council (NECO) corroborates the poor achievement in Basic science. Many students in this category exhibit low levels of engagement, poor attitudes toward learning, and unsatisfactory academic performance. This trend is often attributed to the continued reliance on traditional, teacher-centered instructional methods that fail to stimulate students' interest or cater to diverse learning styles. As a result, learners often perceive schooling as monotonous and uninspiring, leading to decreased motivation and suboptimal academic outcomes.

In Kaduna State, despite various educational reforms and interventions, many schools still struggle to adopt innovative teaching strategies that can effectively address these issues. The limited use of interactive and student-centered methods, such as gamification, poses a significant gap in instructional delivery. While gamification has been shown in other contexts to enhance student motivation, foster active learning, and improve academic performance, its adoption and effectiveness within Nigerian classrooms, particularly in Kaduna, remain underexplored.

This gap presents a critical need for empirical investigation into whether gamification can serve as a viable solution to the problem of low academic motivation and poor performance among upper basic students. Without such evidence, educators and policymakers may continue to overlook a potentially powerful tool for transforming teaching and learning processes. Therefore, this study seeks to examine the impact of gamification on academic performance and motivation among upper basic students in Kaduna, Nigeria, in order to provide relevant insights and practical recommendations for improving educational outcomes.

Objectives of the Study

1. To determine the mean scores academic performance of upper basic students in basic science taught using Gamification application and those using conventional method.
2. To assess the impact of gamification on students' motivation to learn at the upper basic science students in Kaduna State.
3. To identify the specific game elements that most significantly influence academic performance and motivation among upper basic science students.

Research Questions

1. What is the difference between the mean academic performance scores of upper basic students in basic science taught using Gamification application and those using conventional method?

2. What is the difference between the mean motivation scores of upper basic students in basic science taught using Gamification application and those using conventional method to learn?
3. Which game elements are most effective in enhancing academic performance and motivation among upper basic science students?

Hypotheses

- H₁:** There is no significant difference between the mean academic performance scores of upper basic students in basic science taught using Gamification application and those taught using conventional method
- H₂:** There is no significant difference between the mean motivation scores among upper basic students in basic science taught using Gamification application and those taught using conventional method.
- H₃:** Certain game elements (e.g., points, badges, leader-boards) have a more significant impact on academic performance and motivation than others among upper basic students.

Methodology

Research Design

The study adopted a quasi-experimental research design, specifically the non-equivalent pre-test post-test control group design. This design is suitable because it allows for the comparison of academic performance and motivation between students exposed to gamified instruction (experimental group) and those taught through conventional methods (control group), even when random assignment is not fully possible.

Population

The target population comprises Upper Basic students (Basic 7–9) in public secondary schools in Kaduna metropolis, Nigeria. This group was selected because they are at a critical stage of cognitive and academic development and are commonly affected by declining motivation and performance.

Samples and Sampling Techniques

A total of 120 students were selected from two public secondary schools in Kaduna State. One school served as the experimental group, and the other as the control group, with 60 students in each group. A purposive sampling technique was used to select schools that have similar academic standards, facilities, and accessibility. Within each school, simple random sampling was used to select the students who will participate in the study.

Research Instruments

Two instruments were used for data collection:

Basic Science Academic Performance Test (BSAPT): This is a researcher-developed standardized test based on the curriculum of a selected subject (Basic Science) to measure students' academic performance before and after the intervention.

Student Motivation Questionnaire (SMQ): This structured questionnaire, adapted from validated motivation scales (Academic Motivation Scale), was used to assess students'

motivation levels across different dimensions such as interest, engagement, and perceived relevance.

Validity and Reliability

Both instruments were validated by experts in educational measurement and psychology, and a pilot test will be conducted to determine reliability using Cronbach's alpha for internal consistency.

Procedure for Data Collection

Pre-test Administration: Both the APT and SMQ were administered to students in the experimental and control groups to establish baseline data.

Intervention: Over a period of 6 weeks, the experimental group was taught using gamification strategies (e.g., points, badges, leaderboards, challenges), while the control group received conventional instruction.

Post-test Administration: At the end of the intervention, the same APT and SMQ were re-administered to both groups to assess changes in academic performance and motivation.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). The following statistical tools were employed:

Descriptive statistics (mean, standard deviation) to summarize pre- and post-test scores.

Paired sample t-test to determine significant differences in pre- and post-test scores within each group.

Independent sample t-test to compare the post-test results between the experimental and control groups.

One-way ANOVA was used to control for pre-test differences when analyzing post-test outcomes.

All hypotheses were tested at a 0.05 level of significance.

Results and Findings

Research Question 1: What is the difference between the mean academic performance scores of upper basic students in basic science taught using Gamification application and those using conventional method?

To answer research question one, the data generated via Basic Science Academic Performance Test (BSAPT) were subjected to descriptive statistics of mean and standard deviation and the result were computed and used to draw Table 1

To answer this question, a paired sample t-test was conducted to compare the pre-test and post-test scores of students in both the experimental and control groups.

Table 1: Mean and Standard Deviation on Academic Performance

Group	N	Mean Score	SD	Mean Difference
Experimental	60	70.85	8.12	15.65
Control	60	55.20	9.74	

The results in Table 1 indicate a statistically improvement in the academic performance of students in the experimental group after the gamification intervention with a mean score of 70.85. While the control group also showed a slight improvement, it was much smaller in magnitude. This shows that difference of 15.65 exist between mean scores of students taught

Basic Science concepts using Gamification and those taught by Conventional method This suggests that gamification had a more substantial effect on academic performance.

Research Question 2: What is the difference between the mean motivation scores of upper basic students in basic science taught using Gamification application and those using conventional method to learn?

To answer research question two, the data was generated using the Student Motivation Questionnaire (SMQ) were subjected to descriptive statistics of mean and standard deviation and the result were computed and used to draw Table 2.

Table 2: Mean and Standard Deviation on Motivation Scores

Group	N	Mean Score	SD	Mean Difference
Experimental	60	76.65	6.45	15.15
Control	60	61.50	7.63	

Table 2 indicated that there was an increase in motivation scores among students in the experimental group following the gamification intervention (76.65). However, the increase in the control group was not statistically different (61.50). This shows that difference of 15.15 exist between mean scores of students taught using Gamification and those taught by Conventional method, indicating that gamification had a meaningful impact on student motivation.

Research Question 3: Which game elements are most effective in enhancing academic performance and motivation among upper basic students?

Students in the experimental group were surveyed to rate the impact of different game elements. Table 3 shows the mean effectiveness ratings of various gamification components on a 5-point Likert scale.

Table 3: Mean Ratings of Game Elements by Students (N = 60)

Game Element	Mean Rating (1–5)	SD	Rank
Points	4.60	0.54	1st
Badges	4.30	0.67	2nd
Leaderboards	4.10	0.79	3rd
Challenges	3.85	0.92	4th
Rewards/Prizes	3.70	1.01	5th

Among the gamification elements in Table 3, points and badges were rated as the most effective in enhancing students' motivation and academic engagement. These elements provided immediate feedback and recognition, which students found motivating. Leaderboards also had a strong impact, although some students expressed concerns about competition. Challenges and rewards were rated moderately, possibly due to variation in their implementation or students' preferences.

Testing Hypotheses

The null hypotheses were tested using independent sample t-tests and ANOVA (where appropriate), based on post-test scores from both groups.

Hypothesis 1: There is no significant difference between the academic performance of upper basic science students exposed to Gamification and those taught by conventional method of teaching.

To test this hypothesis, an independent samples t-test was conducted to compare the post-test academic performance scores of students in the experimental and control groups.

Table 4: Independent Samples t-test on Academic Performance (Post-test Scores)

Group	N	Mean Score	SD	t-value	p-value
Experimental	60	70.85	8.12	10.42	0.000*
Control	60	55.20	9.74		

*Significant at 0.05 level

Table 4 shows that there is a statistically significant difference in academic performance between students in the experimental and control groups. Students exposed to gamification scored higher ($M = 70.85$) than those in the control group ($M = 55.20$), with a p-value of 0.000. Hypothesis 1 is hereby rejected. Gamification positively affects academic performance.

Hypothesis 2: There is no significant difference in motivation levels between upper basic science students who are exposed to gamification and those who do not.

An independent samples t-test was conducted to compare post-test motivation scores.

Table 5: Independent Samples t-test on Motivation Scores (Post-test)

Group	N	Mean Score	SD	t-value	p-value
Experimental	60	76.65	6.45	12.11	0.000*
Control	60	61.50	7.63		

*Significant at 0.05 level

Table 5 indicated that students in the gamified learning environment had significantly higher motivation scores than those in the traditional classroom. The p-value of 0.000 confirms this difference is statistically significant. Hypothesis 2 is hereby rejected. Gamification significantly enhances student motivation.

Hypothesis 3 (H_3): Certain game elements (e.g., points, badges, leader-boards) have no significant impact on academic performance and motivation than others.

A one-way ANOVA was conducted to compare the perceived effectiveness ratings of five gamification elements.

Table 6: One-way ANOVA on Game Elements' Effectiveness Ratings

Source	SS	df	MS	F	p-value	Remarks
Between Groups	42.36	4	10.59	8.27	0.000*	Significant
Within Groups	370.40	295	1.26			
Total	412.76	299				

*Significant at 0.05 level

There is a statistically significant difference (p value of 0.000) in how students rated the effectiveness of different game elements, with points, badges, and leaderboards rated higher than others. Post hoc analysis (e.g., Tukey's HSD) would confirm where the significant differences lie. Hypothesis 3 which states that: Certain game elements (e.g., points, badges, leader-boards) have no significant impact on academic performance and motivation than others is hereby rejected. Some game elements are more effective than others in influencing academic performance and motivation.

Discussion of Findings

The findings provide compelling evidence that gamification is an effective pedagogical strategy in enhancing learning outcomes and student engagement. The results revealed a statistically significant improvement in the academic performance of students in the experimental group who were exposed to gamified instruction using Kahoot, compared to those in the control group who received traditional teaching. The mean post-test score of the experimental group was significantly higher, and the p -value indicated a strong effect ($p = 0.000$).

This finding aligns with studies by Su and Cheng (2015) and Hamari et al. (2016), which demonstrated that gamification can promote deeper learning and better academic outcomes by increasing students' involvement in the learning process. In the Nigerian context, where teaching is often teacher-centered and textbook-driven, the interactive and goal-oriented nature of gamified learning appears to offer a more effective alternative for improving student achievement.

The study also found a significant increase in the motivation levels of students in the experimental group after being taught with gamification strategies. The motivation scores rose sharply, while those in the control group showed only a marginal, statistically insignificant increase.

This supports the research by Deci and Ryan (2020), who emphasizes that intrinsic motivation, is crucial for effective learning. Gamification introduces elements such as rewards, competition, and progress tracking, which foster a sense of achievement and keep students engaged. The findings suggest that gamification not only captures students' interest but also sustains their commitment to learning, which is critical at the upper basic level where motivation often declines.

The one-way ANOVA results showed significant variation in the perceived effectiveness of different game elements. Points, badges, and leaderboards emerged as the most influential components in boosting students' performance and motivation. Suggesting that the type of game element used plays a critical role in determining the success of a gamified learning environment. Points and badges offer immediate feedback and reward effort, while leaderboards introduce healthy competition that can drive students to perform better. These findings are consistent with research by Dichev and Dicheva (2017), who noted that the effectiveness of gamification depends largely on how well game mechanics are aligned with educational objectives and student needs.

Implications of the Findings

The results of this study have several implications for educational practice in Nigeria: For Teachers: Gamification offers a practical and effective way to enhance classroom engagement and learning outcomes. Teachers can integrate simple gamified elements even without advanced technology.

For School Administrators and Curriculum Designers: Encouraging the adoption of gamification can lead to more dynamic classrooms. Training programs on gamified instruction should be developed.

For Policymakers: There is a need to support innovative, evidence-based teaching strategies, especially in public schools where engagement and performance are often low.

Conclusion

The study provides strong evidence that gamification significantly improves both academic performance and student motivation among upper basic students in Kaduna. Moreover, specific game elements play distinct roles in driving these outcomes. These findings highlight the transformative potential of gamification in Nigerian classrooms and call for broader adoption of such strategies in teaching and learning.

Recommendations

On the basis of the findings of the study, the researcher hereby put forward the following recommendations:

1. Principals should ensure that teachers at the upper basic level should incorporate gamification techniques such as points, badges, leaderboards, and challenges into their daily teaching to enhance student motivation and academic performance. Simple and low-cost gamification strategies can be used even in resource-limited settings.
2. Education authorities and school administrators should provide regular workshops and training programs to equip teachers with the skills and tools needed to design and implement gamified learning experiences effectively. Curriculum developers should consider including structured opportunities for gamified learning within subjects, particularly in areas where students typically struggle with motivation and engagement.
3. Where possible, the Federal Government, NGOs and development partners should support schools with the technological infrastructure (such as tablets, internet access, or gamified educational apps) needed to facilitate effective gamified instruction. Alternatively, non-digital versions of gamification should be promoted for schools lacking advanced technology.
4. Teachers should use gamification to promote active learning, collaboration, and critical thinking. Game elements that foster peer learning and healthy competition should be emphasized to maximize both cognitive and affective outcomes.
5. Policymakers and educational researchers should support further studies and pilot programs on gamification across other subjects, grade levels, and geographical areas to expand the evidence base and inform broader policy adoption.

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TEACHERS' PROFESSIONAL DEVELOPMENT FOR EDUCATIONAL TRANSFORMATION AND SUSTAINABLE DEVELOPMENT IN NORTH CENTRAL NIGERIA

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Abstract

This study examined teachers' professional development as a catalyst for educational transformation and sustainable development in North Central Nigeria. A descriptive survey design was employed to assess teachers' perspectives on the relevance, adequacy, and impact of professional development programs. The population comprised 6,956 teachers across the North Central geopolitical zone, from which a proportional sample of 400 respondents was selected. The study was guided by three research questions and two null hypotheses. The research instrument, titled Teachers' Professional Development and Educational Transformation Questionnaire (TPDETQ), was developed and validated for content and face validity through expert reviews and supervisory input to ensure clarity, relevance, and alignment with study objectives. A pilot test was conducted using the same sample size to establish the instrument's reliability, yielding a Cronbach's Alpha coefficient of 0.813. Data were analyzed using mean scores and standard deviations for the research questions, while t-tests and one-way ANOVA were used to test the hypotheses at a 0.05 level of significance, utilizing SPSS software. Findings revealed that while teachers acknowledged the critical role of professional development in enhancing educational practices and promoting sustainable development, challenges remained in areas such as access to quality training, relevance of content, and ongoing support. Demographic variables such as gender, location, and teaching experience showed no significant influence on perceptions. The study recommends strategic investment in continuous professional development, policy reforms, and institutional support systems to drive long-term educational transformation and sustainability in the region.

Keywords: Educational Transformation, Professional Development and Sustainable Development

Introduction

Teacher professional development (PD) is widely recognized as a critical driver of quality education and national transformation. In Nigeria, and particularly in the North Central region, education systems are undergoing increasing pressure to meet the demands of curriculum reforms, global sustainability targets, and the rapid integration of technology into teaching and learning. Teachers are expected not only to deliver subject content effectively but

also to foster creativity, critical thinking, and lifelong learning among students. Professional development programs are therefore essential in equipping teachers with the necessary skills, competencies, and innovative practices to achieve these goals. However, despite policy initiatives and donor-supported projects, concerns persist regarding the accessibility, adequacy, and relevance of such programs. Many teachers in the region still face limited opportunities for continuous training, with infrastructural deficits and institutional constraints posing significant barriers.

This study emerges from the pressing need to interrogate whether existing professional development initiatives are capable of transforming teaching and driving sustainable educational outcomes in Nigeria. While PD is globally acknowledged as a catalyst for educational improvement, Nigerian teachers often encounter programs that lack contextual relevance, are short-lived, or provide insufficient follow-up support for classroom implementation. Such challenges raise questions about whether professional development is genuinely bridging the gap between teacher capacity and the realities of educational transformation. Against this backdrop, the study aims to assess teachers' perceptions of the relevance, adequacy, and impact of professional development, while also examining whether demographic factors such as gender, location, and teaching experience significantly shape these perceptions. The ultimate goal is to generate evidence-based recommendations that can inform strategic investments, policy reforms, and institutional support systems to strengthen professional development and advance sustainable education in North Central Nigeria.

Literature Review

Recent Nigerian research underscores the pivotal role of teacher professional development (PD) in elevating education quality, yet highlights persistent systemic shortcomings. For instance, environmental education programs aimed at supporting United Nations Sustainable Development Goals (particularly SDG 4) often face legal, institutional, and resource barriers in Nigerian higher education institutions, thereby limiting their intended impact (MDPI). In a similar vein, Babalola and Olawuyi (2021) identify that while environmental education is formally integrated into policy, its implementation remains weak due to unclear governance structures and low funding (MDPI). Likewise, Okeke's 2023 study in Anambra State revealed that teachers seldom employ inclusive and guided learning strategies essential for achieving SDG 4 pointing to ongoing gaps in PD effectiveness at the secondary level (Nnamdi Azikiwe University Journals). Nationally, UN Nigeria affirms that key targets of SDG 4, such as increasing qualified teachers and promoting lifelong learning are still narrowly met, signaling an urgent need for more robust PD systems to support equitable, quality education (SDGs Nigeria, The United Nations in Nigeria).

Emerging scholarship also highlights the potential of digital competence and contextualized training models to revitalize PD in Nigeria. Ogunbodede et al. (2023) report moderate digital literacy among university teachers but emphasize that existing PD programs fail to comprehensively address all dimensions of digital competence and call for sustained, context-sensitive, hands-on training frameworks (EJI-ME, ICERT Publication). Supporting this, Olurinola and Olugbade (2024) studied the UNESCO MGIEP digital teacher training program and observed improvements in educators' digital pedagogy confidence, demonstrating the value of targeted digital PD interventions (University of Guelph Journals). This aligns with broader evidence suggesting that PD initiatives anchored in digital tools, mentorship, and communities of practice can produce more sustainable transformational effects—but only when tailored to local needs and adequately supported (ICERT Publication, University of Guelph Journals, SDGs Nigeria). These findings collectively point to a pressing need for context-aware, technology-enabled PD strategies, especially in underserved areas like North Central Nigeria, anchored in both sustainability and equity objectives.

Objectives of the Study

The main objective of this study is to examine teachers' professional development as a catalyst for educational transformation and sustainable development in North Central Nigeria. Specifically, the study seeks to:

1. Assess teachers' perspectives on the relevance and adequacy of professional development programs.
2. Determine the perceived impact of professional development on teaching practices and educational transformation.
3. Examine challenges that hinder teachers' participation in professional development programs in North Central Nigeria

Research Questions

The study was guided by the following research questions:

1. How relevant and adequate are professional development programs for teachers in North Central Nigeria?
2. What is the impact of professional development on teaching practices and educational transformation?
3. What challenges hinder teachers' participation in professional development programs in North Central Nigeria?

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

- H01:** There is no significant difference in teachers' perceptions of professional development based on location.
- H02:** There is no significant difference in teachers' perceptions of professional development based on teaching experience.

Methodology

This study adopted a descriptive survey design to investigate teachers' professional development as a catalyst for educational transformation in North Central Nigeria. The population comprised 6,956 teachers across the region, from which a proportional sample of 400 respondents was selected using stratified random sampling to ensure representativeness across gender, location, and teaching experience. Data were collected through a researcher-developed instrument titled *Teachers' Professional Development and Educational Transformation Questionnaire (TPDETQ)*, which was subjected to content and face validation by experts and supervisors to confirm clarity, relevance, and alignment with study objectives. A pilot test yielded a Cronbach's Alpha reliability coefficient of 0.813, establishing internal consistency. The instrument was administered with due consideration for ethical standards, including informed consent and confidentiality of responses. Data analysis involved the use of means and standard deviations to answer research questions, while t-tests and one-way ANOVA were employed to test the two null hypotheses at a 0.05 significance level, using SPSS statistical software.

Analysis

Research Question 1: *How relevant and adequate are professional development programs for teachers in North Central Nigeria?*

Table 1: *The relevant and adequate of professional development programs for teachers in North Central Nigeria*

S/N	Statements	Mean	Std. Dev.	Decision
1	Professional development programs I have attended are relevant to my subject area and teaching needs.	2.72	1.103	Agreed
2	The content of professional development programs is adequate for addressing current classroom challenges.	2.55	1.046	Agreed
3	Professional development programs are regularly updated to reflect new educational trends and innovations.	2.60	1.071	Agreed
4	The duration and structure of professional development programs are sufficient for meaningful learning.	2.51	1.050	Agreed
Sectional Mean		2.595	1.0675	

The results in Table 1 show that teachers generally agree that professional development programs are relevant and adequate, with a sectional mean of 2.60. However, the relatively moderate mean scores suggest that while PD is useful, its depth and consistency may not fully meet teachers' evolving needs. This highlights the need for more comprehensive, updated, and well-structured programs to maximize impact.

Research Question 2: *What is the impact of professional development on teaching practices and educational transformation?*

Table 2: *The impact of professional development on teaching practices and educational transformation*

S/N	Statements	Mean	Std. Dev.	Decision
5	Professional development programs have improved my classroom teaching practices and methods.	2.74	1.127	Agreed
6	I have applied knowledge and skills gained from professional development to improve student learning outcomes.	2.45	1.127	Disagreed
7	Professional development initiatives have contributed to promoting educational transformation in my school.	2.56	1.060	Agreed
8	Professional development programs have equipped me with skills that support sustainable development goals in education.	2.58	1.076	Agreed
Sectional Mean		2.58	1.0904	

Table 2 reveals that teachers acknowledge the positive impact of professional development on classroom practices, educational transformation, and sustainable development, with a sectional

mean of 2.58. However, the disagreement on applying acquired skills to improve student outcomes indicates a gap between training and practical classroom implementation. This suggests the need for follow-up support and context-specific PD to ensure knowledge translates into measurable student achievement

Research Question 3: *What challenges hinder teachers' participation in professional development programs in North Central Nigeria?*

Table 3: The challenges hinder teachers' participation in professional development programs in North Central Nigeria

S/N	Statements	Mean	Std. Dev.	Decision
9	Lack of funding limits teachers' access to professional development opportunities.	2.69	1.110	Agreed
10	Inadequate time and heavy workload prevent teachers from participating in professional development activities.	2.57	1.026	Agreed
11	Professional development programs are often hindered by poor planning and a lack of follow-up support.	2.60	1.060	Agreed
12	Limited access to relevant training resources and facilities reduces the effectiveness of professional development.	2.48	1.128	Disagreed
Sectional Mean		2.585	1.081	

Table 3 indicates that teachers largely agree that lack of funding, heavy workload, and poor planning are major barriers to professional development, with a sectional mean of 2.59. Interestingly, they disagreed that limited training resources alone reduce effectiveness, suggesting that systemic and structural issues weigh more heavily than material shortages.

H01: There is no significant difference in teachers' perceptions of professional development based on location.

Table 4: t-test on the difference in the mean scores of teachers' perceptions of professional development based on location.

Location	Number	Mean	S. D	t-value	Df	Sig(2-tailed)	Decision
Urban	221	2.60	.812	-.672	398	.502	Not Significant
Rural	179	2.65	.848				

Table 4 shows that teachers' perceptions of professional development **do not significantly differ by location** ($t = -0.672$, $p = 0.502 > 0.05$). With urban teachers reporting a mean of 2.60 and rural teachers 2.65, the slight variation is statistically insignificant. This implies that challenges and benefits of professional development are generally consistent across both urban and rural contexts in North Central Nigeria.

H02: There is no significant difference in teachers' perceptions of professional development based on teaching experience.

Table 5: One-way ANOVA on the difference in the mean scores of in teachers' perceptions of professional development based on teaching experience.

Teaching Experience	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	1.698	3	.566	.802	.491	Not Significant
Within Groups	278.019	396	.702			
Total	279.717	399				

Table 5 reveals that teachers' perceptions of professional development do not significantly differ based on teaching experience ($F = 0.802$, $p = 0.491 > 0.05$). Although teachers with varying years of experience may encounter PD differently, the results suggest a broadly shared perception across groups. This indicates that the challenges and benefits of PD are common to all teachers, regardless of their length of service.

Discussion of Findings

The findings of this study revealed that teachers in North Central Nigeria generally perceive professional development (PD) programs as relevant and adequate to their teaching needs, with mean scores above the acceptance level. However, the relatively moderate ratings suggest that PD is yet to achieve full depth and consistency in meeting evolving classroom demands. This aligns with Ajani (2019), who observed that while Nigerian teachers value PD opportunities, they often describe the programs as too generic, short-term, and insufficiently tailored to local challenges. Similarly, Babalola and Olawuyi (2021) argue that without structured, context-specific training, professional development risks becoming a routine exercise rather than a transformative tool. Thus, the study reinforces the need for more robust, updated, and context-driven PD interventions.

In terms of impact, the results show that teachers agreed that PD has improved their classroom practices and contributed to educational transformation, but they disagreed on its direct effect on improving student learning outcomes. This finding echoes Ogunbodede et al. (2023), who reported that while digital and pedagogical trainings enhanced teachers' knowledge, the translation of such knowledge into measurable learning outcomes was often hindered by lack of follow-up mentoring and poor resource support. Likewise, Olurinola and Olugbade (2024) emphasize that without continuous support, PD often improves teacher confidence but not necessarily student achievement. This highlights the gap between policy intentions and classroom realities, stressing the need for ongoing support mechanisms, mentoring systems, and localized PD models that bridge knowledge acquisition and practical implementation.

Furthermore, the study identified key challenges to PD participation, including lack of funding, inadequate time due to workload, and poor planning, while limited resources alone were not perceived as the greatest barrier. This is consistent with UNESCO (2019), which emphasizes that systemic issues such as funding structures, institutional leadership, and teacher workload present stronger barriers to PD than material shortages. The absence of significant differences in teachers' perceptions based on location or teaching experience further indicates that these challenges are systemic rather than demographic, affecting teachers across rural and urban settings as well as different career stages. This resonates with Fullan's (2019) assertion that educational transformation requires systemic reforms and supportive institutional structures, rather than isolated PD initiatives. Overall, the findings reinforce the literature's consensus that while professional development is crucial, its transformative potential in Nigeria can only be realized through strategic investment, policy coherence, and sustainable implementation frameworks.

Conclusion

This study examined teachers' professional development as a catalyst for educational transformation and sustainable development in North Central Nigeria. The findings show that while teachers generally perceive PD programs as relevant and beneficial, their adequacy and long-term impact remain limited due to poor planning, insufficient funding, and a lack of continuous support. Although PD improved teaching practices and contributed to school-level transformation, its direct influence on student outcomes was less evident. Importantly, perceptions of PD did not significantly differ by teachers' location or years of experience, indicating that the challenges are systemic and require structural reforms. Therefore, professional development in Nigeria must evolve into a more sustained, context-driven, and well-supported process to fully realize its potential in driving educational transformation and sustainable development.

Recommendations

- i. Government and stakeholders should allocate dedicated funding for continuous and well-structured professional development programs to ensure equitable access for teachers across all contexts.
- ii. Professional development programs should be tailored to reflect the realities of teachers' classrooms, integrating local challenges, curriculum demands, and sustainable development goals.
- iii. Instituting mentoring frameworks and ongoing support systems should be encouraged to bridge the gap between training and classroom implementation, thereby improving student learning outcomes.
- iv. Schools and education authorities should create flexible schedules or workload adjustments that enable teachers to actively participate in professional development without compromising teaching responsibilities.
- v. Policymakers should institutionalize continuous professional development as a mandatory, career-long practice, supported by clear frameworks, monitoring mechanisms, and incentives for participation.

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INFLUENCE OF DIGITAL TECHNOLOGIES ON INSTRUCTIONAL DELIVERY IN ACADEMIC RESEARCH FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

This paper explores the influence of digital technologies on instructional delivery in academic research for sustainable development in Nigerian educational system. Looking into the historical perspectives, current challenges, opportunities, and future trends. The integration of digital technologies will revolutionize education and research, offering innovative tools and platforms to enhance learning experiences, facilitate collaboration, and advance knowledge dissemination. However, this integration also presents challenges, including issues related to equity, quality assurance, intellectual property, and cybersecurity. As educators, researchers, and institutions navigate the complexities of the digital age, it is imperative to prioritize ethical conduct, promote inclusivity, and embrace emerging technologies to harness the transformative potential of digital innovation. By adopting proactive strategies and thoughtful approaches, stakeholders can leverage digital technologies to create inclusive, accessible, and impactful learning and research environments. Therefore, institutions should address the digital divide requires by making proactive efforts to ensure equitable access to technology and internet connectivity for all learners. Institutions should invest in infrastructure and resources to support marginalized communities and foster inclusivity in digital learning environments.

Keywords: Digital, Delivery, Influence, Instructional, Technologies

Introduction

In an era characterized by rapid technological advancement, the influence of digital technologies on instructional delivery and academic research has become increasingly profound. The integration of digital tools and platforms has transformed traditional educational practices and revolutionized the landscape of scholarly inquiry. This introduction provides a comprehensive overview of the multifaceted impact of digital technologies on education and research, exploring the evolution of digital innovations, their implications for instructional methodologies, and their role in shaping contemporary academic scholarship. The proliferation of digital technologies in educational settings can be traced back to the emergence of computer-based learning systems in the mid-20th century. Since then, the development of the internet, multimedia applications, and interactive learning environments has paved the way for a paradigm shift in instructional delivery. Today, online learning platforms, virtual classrooms, and educational apps have become integral components of educational ecosystems, offering unprecedented opportunities for flexible, personalized learning experiences (Bates, 2019). Furthermore, the COVID-19 pandemic has accelerated the adoption of digital learning modalities,

highlighting both the potential and the challenges of digital education on a global scale (Hodges, Moore, Locke, Trust, & Bond, 2020).

Simultaneously, digital technologies have revolutionized the landscape of academic research, fundamentally altering the way scholars access information, collaborate with peers, and disseminate their findings. The advent of digital libraries, online databases, and open-access repositories has democratized access to scholarly resources, enabling researchers to transcend geographic and institutional boundaries (Borgman, 2015). Moreover, collaborative tools, social media platforms, and virtual conferencing technologies have facilitated interdisciplinary collaboration and knowledge exchange, fostering vibrant research communities across diverse domains (Veletsianos & Kimmons, 2012). However, alongside the opportunities afforded by digital technologies, scholars must also contend with a myriad of challenges and ethical considerations. The digital divide, disparities in access to technology, and concerns regarding data privacy and cybersecurity pose significant obstacles to the equitable implementation of digital tools in education and research (Selwyn, 2016).

Furthermore, the proliferation of online misinformation and the commodification of knowledge raise critical questions about the integrity and sustainability of digital scholarship (Weller, 2011). Despite these challenges, the transformative potential of digital technologies in education and research cannot be overstated. As scholars navigate the complexities of the digital age, it is imperative to critically examine the implications of technological advancements for pedagogy, scholarly communication, and knowledge production. By embracing digital innovation while safeguarding ethical principles and promoting inclusivity, educators and researchers can harness the full potential of digital technologies to advance learning, discovery, and societal progress.

Historical Perspectives of Digital Technologies

The historical evolution of digital technologies in education and academic research provides valuable insights into the trajectory of technological innovation and its impact on scholarly practices. The roots of digital technologies in education can be traced back to the mid-20th century, with the advent of computer-based learning systems and early experiments in computer-assisted instruction (CAI). One notable milestone according to Adediran (2022) was the development of PLATO (Programmed Logic for Automated Teaching Operations) in the 1960s, which introduced interactive, computer-mediated learning experiences in educational settings (Ely, 2000). PLATO laid the foundation for subsequent innovations in instructional technology, demonstrating the potential of computers to support personalized, self-paced learning environments.

Throughout the latter half of the 20th century, advancements in computing hardware and software paved the way for the emergence of multimedia learning environments and interactive educational software. The advent of personal computers in the 1980s democratized access to computing resources, enabling educators and students to explore new modes of instruction and engage with digital content (Reiser, 2017). Concurrently, researchers began to explore the potential of the internet as a platform for distributed learning and collaborative research, leading to the development of early online learning communities and virtual research networks (Garrison & Anderson, 2016).

The turn of the millennium witnessed a proliferation of digital technologies in education, driven by the widespread adoption of the internet and the rise of e-learning platforms. Learning Management Systems (LMS), such as Blackboard and Moodle, became ubiquitous tools for course management and content delivery in higher education institutions (Ally, 2016). Meanwhile, the Open Educational Resources (OER) movement gained momentum, advocating for the creation and sharing of freely accessible educational materials online (Atkins, Brown, & Hammond, 2017). These developments democratized access to educational resources and empowered educators to adopt innovative pedagogical approaches in their teaching practice.

In the realm of academic research, the digitization of scholarly communication and information management revolutionized traditional research practices. The advent of digital libraries, electronic journals, and online databases expanded researchers' access to scholarly literature and facilitated more efficient literature reviews and citation management (Borgman, 2015). Additionally, the open-access movement challenged traditional publishing models, advocating for free, unrestricted access to research outputs to foster greater dissemination and impact (Suber, 2012). Therefore, the historical evolution of

digital technologies in education and academic research underscores the dynamic interplay between technological innovation, pedagogical practice, and scholarly communication.

From early experiments in computer-assisted instruction to the emergence of online learning platforms and open-access repositories, the trajectory of digital transformation reflects a continuous quest to harness technology to enhance learning, facilitate research, and advance knowledge dissemination.

Digital Technologies: Digital technologies encompass a wide array of tools, devices, and systems that leverage digital information and electronic data processing to perform various functions and tasks. These technologies encompass hardware components such as computers, tablets, smartphones, and digital sensors, as well as software applications, online platforms, and digital networks (Selwyn, 2016). Digital technologies enable the creation, storage, retrieval, manipulation, and transmission of data in digital formats, transforming how information is accessed, shared, and utilized across different sectors, including education, research, business, and entertainment.

Instructional Delivery: Instructional delivery refers to the methods, strategies, and approaches employed by educators to facilitate teaching and learning experiences in educational contexts. It encompasses the planning, organization, and execution of instructional activities, resources, and interactions designed to support the attainment of learning objectives and outcomes (Graham, 2019). Instructional delivery modalities may include traditional face-to-face instruction, online learning, blended learning, and experiential learning approaches. Effective instructional delivery fosters learner engagement, comprehension, and skill development, contributing to meaningful learning experiences and positive educational outcomes.

Academic Research: Academic research involves systematic inquiry and investigation conducted by scholars, researchers, and academics to advance knowledge, deepen understanding, and contribute to the scholarly discourse within specific fields or disciplines. Academic research encompasses a diverse range of activities, including theoretical inquiries, empirical studies, experimental investigations, and scholarly analyses, aimed at addressing research questions, testing hypotheses, and generating new insights and discoveries (Borgman, 2015). It entails the application of rigorous methods, critical analysis, and scholarly communication, often resulting in the dissemination of research findings through peer-reviewed journals, conference proceedings, and academic publications. Academic research plays a vital role in advancing knowledge, informing practice, and driving innovation across various domains of study.

Digital Technologies in Instructional Delivery

The integration of digital technologies has revolutionized instructional delivery, offering educators and learners innovative tools and platforms to enhance teaching and learning experiences. Here are the diverse array of digital technologies shaping instructional methodologies, including online learning platforms, multimedia resources, and personalized learning environments, and examines their impact on pedagogy and student engagement. Online learning platforms have emerged as central components of contemporary instructional delivery, providing educators with the infrastructure to design, deliver, and manage courses in digital environments. Learning Management Systems (LMS), such as Moodle, Canvas, and Blackboard, offer features such as content management, assessment tools, and communication channels, facilitating the creation of interactive and collaborative learning experiences (Ally, 2004). These platforms enable educators to deliver course materials, engage students in discussions and activities, and provide feedback and assessment, regardless of geographical location or time constraints.

In addition to LMS, Massive Open Online Courses (MOOCs) have garnered attention for their potential to democratize access to higher education and lifelong learning opportunities. MOOC platforms like Coursera, edX, and Udacity offer a wide range of courses from leading institutions and educators around the world, often free of charge or at a nominal cost (Liyanagunawardena et al., 2013). MOOCs leverage multimedia resources, interactive exercises, and community forums to deliver engaging and accessible learning experiences to a global audience, transcending traditional barriers to education.

Multimedia tools and resources play a pivotal role in enhancing instructional delivery by catering to diverse learning styles and preferences. Interactive simulations, educational videos, virtual laboratories, and gamified learning activities provide opportunities for active, experiential learning and promote deeper engagement with course content (Mayer, 2014). Furthermore, the integration of multimedia elements into instructional design fosters creativity and flexibility, enabling educators to create dynamic and interactive learning environments that accommodate learners' individual needs and preferences. Personalized learning environments leverage digital technologies to adapt instruction to the unique needs and abilities of individual learners. Adaptive learning systems utilize data analytics and machine learning algorithms to assess learners' knowledge, skills, and learning preferences and dynamically adjust the pace, content, and sequence of instruction accordingly (Vander Ark & Schneider, 2017). By providing tailored learning experiences, personalized learning environments promote self-directed learning, mastery of content, and learner autonomy, ultimately enhancing learning outcomes and engagement.

Influence of Digital Technologies on Academic Research

The integration of digital technologies has profoundly influenced the landscape of academic research, revolutionizing the way scholars access information, collaborate with peers, and disseminate their findings. Examine the multifaceted impact of digital technologies on academic research, including their role in facilitating access to information and data, enabling collaboration and networking, and enhancing research methodologies and analysis. Digital technologies have transformed scholarly communication by providing researchers with unprecedented access to a wealth of information and resources. Digital libraries, online databases, and academic search engines offer comprehensive repositories of scholarly literature, enabling researchers to efficiently access, retrieve, and review relevant literature across diverse disciplines (Borgman, 2015). Additionally, the open-access movement has advocated for the free, unrestricted dissemination of research outputs, making scholarly publications more accessible to scholars worldwide (Suber, 2012). These developments have democratized access to knowledge and facilitated interdisciplinary research collaboration, fostering innovation and discovery.

Collaboration and networking are essential aspects of contemporary academic research, and digital technologies have significantly expanded opportunities for scholarly collaboration and knowledge exchange. Virtual collaboration platforms, such as Google Workspace, Microsoft Teams, and Slack, enable researchers to communicate, share documents, and collaborate in real-time, irrespective of geographical distances (Veletsianos & Kimmons, 2012). Furthermore, social media platforms and academic networking sites, such as ResearchGate and Academia.edu, provide avenues for scholars to connect with peers, share research updates, and engage in scholarly discussions, thereby fostering vibrant research communities (Kaplan & Haenlein, 2010).

Digital technologies have also revolutionized research methodologies and analysis, empowering researchers with advanced tools and techniques for data collection, analysis, and visualization. Big data analytics, machine learning algorithms, and data mining techniques enable researchers to extract insights from large, complex datasets and identify patterns and trends that may have previously been inaccessible (Borgman, 2015). Moreover, computational modeling and simulation technologies facilitate hypothesis testing and experimentation in virtual environments, allowing researchers to explore complex phenomena and predict outcomes with greater precision (Hey, Tansley & Tolle, 2019). These computational tools enhance the rigor and reproducibility of research findings, driving innovation and discovery across various domains. However, digital technologies have profoundly transformed academic research, empowering scholars with enhanced access to information, facilitating collaboration and networking, and revolutionizing research methodologies and analysis. As scholars navigate the digital age, it is essential to critically evaluate the ethical and societal implications of digital technologies on scholarly practices, including issues related to data privacy, intellectual property rights, and research integrity. By leveraging digital technologies thoughtfully and ethically, researchers can harness the full potential of digital innovation to advance knowledge, address complex societal challenges, and contribute to the global research community.

Challenges Associated with the use of Digital technologies in Education and Research

The integration of digital technologies in instructional delivery and academic research presents both challenges and opportunities for educators, researchers, and institutions. These are key challenges associated with the use of digital technologies in education and research, including issues related to equity and access, quality assurance, intellectual property, and cybersecurity.

A. Digital Divide and Equity Issues

The digital divide remains a significant challenge in the integration of digital technologies in education and research, highlighting disparities in access to technology and internet connectivity among different populations (Selwyn, 2016). Marginalized communities, including those in rural areas, low-income households, and underserved regions, often lack access to reliable internet infrastructure and digital devices, placing them at a disadvantage in accessing educational resources and participating in digital learning environments. Addressing the digital divide requires concerted efforts from policymakers, educators, and technology providers to ensure equitable access to technology and internet connectivity for all learners, thereby promoting inclusivity and reducing educational inequalities.

B. Quality Assurance and Credentialing

Ensuring the quality of digital education and research outputs poses a significant challenge, as the proliferation of online learning platforms and digital resources raises concerns about the rigor and credibility of educational experiences and research findings (Hodges et al., 2020). Quality assurance mechanisms, including rigorous instructional design, effective pedagogical strategies, and robust assessment practices, are essential to evaluate learning outcomes and ensure alignment with educational standards and objectives. Moreover, credentialing and accreditation of online programs and courses play a crucial role in maintaining standards of excellence and ensuring the credibility and recognition of digital credentials in the job market and academic institutions.

C. Intellectual Property and Copyright Concerns

Intellectual property rights and copyright issues present complex challenges in the digital era, particularly in academic research and scholarly communication (Weller, 2011). The ease of sharing and disseminating digital content online raises questions about ownership, attribution, and fair use, necessitating clear policies and guidelines to protect intellectual property rights while promoting open access to knowledge. Researchers must navigate copyright laws, licensing agreements, and attribution requirements when sharing research outputs and using digital resources, ensuring compliance with legal and ethical standards to avoid plagiarism, copyright infringement, and disputes over intellectual property.

D. Cybersecurity and Data Privacy

Cybersecurity threats and data privacy breaches pose significant risks to educational institutions, researchers, and learners in the digital age (Selwyn, 2016). Data breaches, phishing attacks, and malicious software can compromise sensitive information, including student records, research data, and intellectual property, leading to reputational damage, financial losses, and legal liabilities. Safeguarding digital infrastructure and implementing robust cybersecurity measures, such as encryption, access controls, and cybersecurity training, are essential to protect the integrity and confidentiality of educational and research data. Moreover, complying with data privacy regulations, such as the General Data Protection Regulation (GDPR) and the Family Educational Rights and Privacy Act (FERPA), is critical to ensure the ethical and responsible handling of personal and sensitive data in digital learning and research environments.

Addressing the challenges associated with digital technologies requires a holistic approach that considers issues of equity, quality assurance, intellectual property, and cybersecurity. By proactively addressing these challenges and leveraging digital technologies thoughtfully and ethically, educators, researchers, and policymakers can harness the transformative potential of digital innovation to create inclusive, accessible, and impactful learning and research environments.

Future Trends and Directions

As digital technologies continue to evolve at a rapid pace, the future of instructional delivery and academic research is poised to undergo further transformation. The emerging trends and future directions in the integration of digital technologies in education and research, including advancements in technology, pedagogical innovations, and shifts in scholarly practices. One prominent trend is the increasing adoption of immersive technologies, such as virtual reality (VR) and augmented reality (AR), in educational settings (Johnson, Adams, Becker, Cummins, Estrada, Freeman, 2016). VR and AR offer immersive, interactive learning experiences that enable learners to engage with content in three-dimensional environments, fostering deeper understanding and retention of complex concepts. From virtual field trips and simulations to interactive anatomy lessons and architectural design studios, immersive technologies have the potential to revolutionize experiential learning across diverse disciplines.

Another emerging trend is the rise of artificial intelligence (AI) and machine learning (ML) in educational technology (ET) and academic research (Holmes, Tangney, FitzGibbon, Savage, & Mehan, 2018). AI-powered adaptive learning systems can personalize instruction to meet the unique needs and preferences of individual learners, providing tailored learning experiences and real-time feedback. Furthermore, AI-driven analytics and predictive modeling enable educators and researchers to gain insights from large-scale data sets, identify learning patterns and trends, and optimize instructional strategies and interventions. Blockchain technology is also poised to disrupt traditional credentialing and certification processes, offering secure, decentralized platforms for verifying academic credentials and digital badges (Swan, 2015). Blockchain-based credentialing systems enable learners to securely store and share their academic achievements, skills, and competencies, thereby enhancing transparency, trust, and portability of credentials across educational institutions and employers. Moreover, blockchain holds the potential to revolutionize scholarly publishing by providing transparent, tamper-proof systems for peer review, attribution, and copyright management.

In addition to technological advancements, future trends in instructional delivery and academic research will likely be shaped by shifts in pedagogical paradigms and scholarly practices. Blended learning models, which combine traditional face-to-face instruction with online learning activities, are gaining popularity as educators seek to maximize the benefits of both synchronous and asynchronous learning modalities (Graham, 2019). Similarly, interdisciplinary research collaborations and open science initiatives are fostering a culture of collaboration, transparency, and knowledge sharing, driving innovation and discovery in academic research. As educators, researchers, and institutions embrace these emerging trends and future directions, it is essential to critically evaluate the implications of digital technologies on learning outcomes, research integrity, and societal impact. Ethical considerations, including issues of privacy, equity, and accessibility, must be prioritized in the design and implementation of digital learning environments and research practices. By leveraging digital technologies thoughtfully and ethically, stakeholders in education and research can harness the transformative potential of digital innovation to advance learning, discovery, and societal progress in the years to come.

Conclusion

In conclusion, the integration of digital technologies in instructional delivery and academic research heralds a transformative era of innovation, collaboration, and accessibility in education and scholarly inquiry. From immersive technologies and artificial intelligence to blockchain and open science initiatives, the future of education and research is shaped by an array of emerging trends and directions. As scholars, educators, and institutions navigate the complexities of the digital age, it is imperative to critically evaluate the implications of digital technologies on learning outcomes, research integrity, and societal impact. By leveraging digital technologies thoughtfully and ethically, we can harness the transformative potential of digital innovation to advance learning, discovery, and societal progress in the years to come.

Recommendations

Based on the discussion of the study, it is recommended that;

1. Institutions should address the digital divide requires proactive efforts to ensure equitable access to technology and internet connectivity for all learners. Institutions should invest in infrastructure and resources to support marginalized communities and foster inclusivity in digital learning environments.
2. Government should implement robust quality assurance mechanisms to ensure the rigor and credibility of digital education and research outputs. This includes rigorous instructional design, effective pedagogical strategies, and transparent assessment practices to evaluate learning outcomes and maintain educational standards.
3. Institutions should uphold ethical principles and responsible practices in the use of digital technologies, including respect for intellectual property rights, data privacy, and cybersecurity. Educate stakeholders about ethical considerations and provide guidelines and support for ethical decision-making in digital learning and research
4. Government should encourage interdisciplinary collaboration and knowledge exchange through digital platforms and networking opportunities. Facilitate collaboration among educators, researchers, and practitioners to promote innovation, share best practices, and address complex challenges in education and research.
5. Educators should embrace emerging technologies, such as immersive technologies, artificial intelligence, and blockchain, to enhance teaching, learning, and research experiences. Explore innovative pedagogical approaches and research methodologies that leverage the unique affordances of digital technologies to promote engagement, creativity, and discovery.
6. Institutions should promote a culture of lifelong learning and professional development among educators, researchers, and learners. Provide opportunities for ongoing training and upskilling in digital literacy, technology integration, and research methods to empower stakeholders to thrive in the digital age.

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RELATIONSHIP BETWEEN RESILIENCE AND ACADEMIC ACHIEVEMENT IN BUSINESS STUDIES AMONG OSUN STATE ADOLESCENTS

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Abstract

The study investigated relationship between resilience and academic achievement in Business Studies among Osun State adolescents. This study adopted descriptive research of correlational type. The population for the study comprised all Osun State adolescents in Junior Secondary Schools. Simple random sampling technique was used to select 10 Local Government Areas, 20 schools and eventually 200 adolescents that participated in the study. Adolescents Resilience Rating Scale (ARRS) has a reliability coefficient of 0.76, Business Education Achievement Tests were used for data collection. Data collected were analyzed using frequency count, simple percentage, mean, Pearson Product Moment Correlation (PPMC) and Analysis of Variance (ANOVA). The findings of the study revealed that the relationship between the level of students' resilience and the academic achievement of adolescents in Osun State was moderate. The gender relationship between the level of students' resilience and the academic achievement of adolescents in Osun State was moderate. Family type has low relationship with the level of students' resilience and the academic achievement of adolescents in Osun State. It was recommended that counsellors and teachers should assist students to develop resilience in adolescents through regular talks, and life skills orientation to enable them acquire coping skills to face challenges and unfriendly situations that may disrupt their academic achievement. Particularly, efforts should be made by parents to debunk ill words and negative feelings which might be the reason why family type has low relationship with the level of students' resilience and the academic achievement of adolescents in Osun State.

Keywords: Academic Achievement, Adolescents, Resilience

Introduction

Academic achievement among adolescents is influenced by several factors, one of which is resilience. Resilience refers to the ability of individuals to adapt to challenges, cope with stress, and recover from setbacks. In the academic environment, students who possess a higher level of resilience are more likely to remain focused, motivated, and persistent in their studies despite difficulties they may encounter. This quality can play an important role in determining students' performance in school subjects such as Business Studies, which require consistent effort, problem-solving skills, and active engagement in learning. In Osun State, adolescents face various academic and social pressures that may affect their learning outcomes. Therefore, examining the relationship between resilience and academic achievement in Business Studies among adolescents in Osun State is important in understanding how students' ability to cope with challenges may influence their academic success.

Education is a dynamic and evolving concept that defies simple definition and it is shaped by power relations and policies that determine its structure and accessibility (Esther2023). Ayodele (2016) perceived education as the process by which learners acquire the

relevant knowledge, skills to ensure proper intellectual and character development of individuals for self-reliance and responsible citizenship. Education occupies a fundamental position for economic empowerment and the development of sustainable economy. In line with the above, one of the national goals of education is the acquisition of appropriate skills and the development of mental, physical and social abilities and competencies as equipment for the individual to live and contribute to the development of the society (National Policy on Education 2013). Educated people contribute greatly to manpower and personnel needed to bring about national development. It therefore means that the quality of education received by the citizens determines the level of development of any nation.

The Universal Basic Education (UBE) programme was introduced in Nigeria in September, 1988. Following this, in 2008 the Federal Government of Nigeria, through the Nigeria Educational Research and Development Council (NERDC) developed and introduced the 9-Year Basic Education Curriculum (BEC) in schools by realigning primary and Junior Secondary School curricula to meet the key targets of the UBE programme. In view of some contemporary and national concerns and to make the curriculum more practical, relevant, interest generating to the young learners and in line with global best practices, the 9-year BEC was recently revised in 2012 and its implementation commenced in September 2014, in a bid to establish part of the objective stated by the National Policy on Education, to provide every child with basic tools for further educational advancement, Including preparation for trades which can majorly be gotten through the knowledge of business studies as one of the core subjects that must be taught during the adolescent stage.

Recent studies by Nigerian scholars have shed light on the academic achievements of adolescents in business studies, highlighting the factors that influence their success. According to Onuigbo (2015), the performance of business education students is influenced by gender, parents' educational qualification, and occupation ¹. Similarly, Abdullah (2011) noted that economic courses have a significant impact on the academic performance of business students. Other determinants of academic achievement in business studies include parental levels of education, with students whose parents have higher levels of education tend to perform better (Olabisi et al 2018). The school environment and teacher quality also play a crucial role, as students who receive support and encouragement from their teachers tend to perform better (Eduviere et al 2021). Furthermore, recent research has highlighted the importance of motivational components, such as self-efficacy and intrinsic motivation, in determining students' academic achievement in business studies (Adeyemi, S. A., Oyebanji, A. O., & Ademola, B. O. 2022). Additionally, the influence of peer groups on adolescents' academic performance in business studies has been noted, with students who associate with high-achieving peers tending to perform better (Adeyemi et al., 2022). Overall, the academic achievements of adolescents in business studies are influenced by a range of factors, including parental education, school environment, teacher quality, motivational components, and peer groups. Understanding these factors can help educators and policymakers develop effective strategies to support students' academic success in business studies.

Business studies is one of the vocational education subjects specifically offered by the students in junior secondary schools in Nigeria. Ohaka (2017) defined business studies as a subject that prepares and arms students with knowledge aimed at creating career awareness of saleable skills that will enable them to fit into the world of work with little or no difficulty. It is made up of five component units namely; Typewriting, Shorthand, Book-keeping, Commerce and Office practice. With the increased demand for accountability in line with performance standards and with the growing demand for evidence-based policy, students' academic performance is considered an accurate measure of teachers' effectiveness and has become a basis for value-added teacher assessment systems (Nwogu 2019). Despite all the initiatives undertaken by stakeholders in education to improve students' academic performance

in schools, poor or low-level academic performance, high failure rate in examinations such as West African Senior School Certificate Examination (WASSCE), National Examination Council (NECO), Basic Education Certificate Examination (BECE) among others and low quality school graduates that are turned out have called for very serious concern in the society (Igbinedion. 2018). Business studies is a compulsory subject in three years of junior secondary education programme with the following stated objective: inculcate in the student an interest and positive attitude towards business world, develop business skill and communication, use new techniques in business and recording, develop the skill of accurate keyboarding etc. Growth and development of any nation is hinged on the quantity and quality of education attained in vocational subjects by its citizens (Igbinedion. 2018). It is the key of positive change in the society Nwaso and Ifeoma (2015) asserted that vocational subjects are agent of change in his/her environment. The need for quantitative and qualitative business education has become a major concern has been described as the bane of self- sufficiency and development. According to Nwogu (2019) study in Anambra state, students' achievement in business studies BECE was quite low. Only 699 students or about 49.7% of the 1530 students who completed business studies examination in sampled schools received credit and above, according to the report while the rest received pass, failed, or withheld results. The government and private individuals have made various initiatives to improve students' performance in public examinations such as BECE, WAEC and NECO. Igbinedion and Epumepu (2018) conducted research in Ovia South-West Local Government Area council of Edo State, Nigeria, contrasting students' academic performance in Business studies in public and private junior secondary schools certificate examination (JSSCE), and discovered a big variation in academic performance in business studies between public and private schools from 2019 to 2022. The importance of academic achievement to the individual, in particular and the generality of the Nigerian society cannot be overemphasized. Thus, the desire to climb the ladder of achievement to as high a level as possible put a lot of pressure on students, teachers, schools and in general, the educational system. Pupils' academic achievement and overall school performance is the yardsticks or benchmarks for assessing the success or otherwise of the school system. In the Nigerian primary school system, for instance, academic performance is generally leveraged by various stakeholders to ascertain if the goals of education are being achieved or not. There exists a plethora of studies by Nigerian authors on students' academic achievement. Some have identified factors affecting poor academic achievement and some variables were also established to have relationship with academic achievements which are not far from adolescents' resilience level.

Adeyanju et al (2015) worked on the effect of resilience on the academic achievement of first-year University students in Nigeria. Titilayo et al (2016) analyzed the self-efficacy and chemistry students' academic achievement in senior secondary schools in North-Central, Nigeria. Mbativga (2018) examined the influence of social media on academic achievement of adolescent students in Makurdi Local Government Area, Benue State, Nigeria. Amalu (2018) worked on Emotional intelligence as predictor of academic performance among Secondary School Students in Makurdi Metropolis of Benue State, Oyekola (2021) investigated Motivation and resilience as predictors of students' academic achievement in secondary school chemistry in Oyo State, Nigeria. Resilience is a broad construct that defies a singular and universally accepted definition. Thus, the meaning of resilience varies from scholar to scholar in extant literature. Resilience implies the extent to which an individual is able to maximize his/her ability to forge ahead in life, regardless of various adverse occurrences that are common to humankind (Okeke et al, 2020). Everson et al (2019) also defined resilience as a positive attitude and effective strategy that one employs in response to stressors. The American Psychological Association (2017) defined resilience as the process of adapting to adversity, trauma, tragedy, threats and other forms of adverse situations. Likewise, resilience is a broad

set of cognitive, behavioural and emotional responses that enable a person to rebound or bounce back from adversity, uncertainty, conflict, failure, or even positive change, progress and increased responsibility. Jensen, Trollope, Resilience is the ability and capacity of an adolescent to withstand unpredictable transformation, discontinuities and risk caused by the environment (Carvalho and Cintra, 2016). Adolescent, for example, might be grappling with school work pressures and other negative factors that might negatively affect their level of academic performance. Hence, the need for adolescents to overcome various setbacks, stress and other forms of challenges associated with childhood by implementing internal and external protective factors, such as cognitive abilities, temperament, positive self-image, emotional stability and sense of humour (Karmalkar & Vaidya, 2018). According to Martin and Marsh (2019), resilience could also be leveraged by a child to deal with major and minor setbacks in the pursuit of academic and life goals. Resilient pupils experience one or more difficult life circumstances or traumatic events, but somehow find the power to overcome their adverse impact. Although, learners experience the same challenging or threatening circumstances, resilient pupils can turn stressful events into opportunities for personal growth and benefit (Jensen, 2018). In line with this, Al-Srouf (2015) affirmed that students' resilience ability and a conducive environment for learning play a significant role in academic achievement. This means that the resilience of adolescents cannot be left unaddressed by educators and researchers. Resilience helps students to successfully deal with academic setbacks, stress, and study pressures during the learning process.

García-zquierdo et al. (2015) reported that resilience plays a moderating role in academic stress and it can significantly predict pupils' academic achievement in primary schools. Hence, there is need for children to overcome various setbacks, stress and other forms of challenges associated with their academic and general development by implementing internal and external protective factors (Karmalkar & Vaidya, 2018). The experiences of student mothers with unintended pregnancies and strategies adopted in resolving the stigma in Osun State Nigeria. Since such constructions affect adolescents' ability to find relevance in the unexpected and redirect their future and that of their children from a precarious to a promising one especially within social context where minimum supports and social tolerance may be inadequate.

Many researchers outside Nigeria have carried out several studies on resilience. Maria and Elisabetta (2015) analyzed the relationship between resilient profile and creative personality in a large sample of 749 Italian middle and late adolescents recruited from six Public High Schools in East Sicily (Italy). Further, Zina (2016) examined individual resiliency factors measured by the Resilience Scale (RS) influence academic success for Bermudian foster care adolescents. Results revealed a statistically significant positive relationship between resilience and reading achievement. Oyoo et al (2018) also examined academic resilience and academic burnout among Form Four students in Homa-Bay County, Ayomide (2020) investigated the effects of resilience on students' academic success in Baccalaureate nursing and a host of others. From the literature available to the researcher, there was no evidence that resilience and academic achievement of primary school pupils in Osun State, Nigeria have been investigated. This has created a research gap which the study seeks to fill by investigating the relationship between resilience and academic achievement among Osun State adolescent students.

Several moderating variables, such as gender and family type could also play critical roles in the development of resilience and can have an influence on academic performance among primary school children. In other words, being a male or female pupil could determine the extent to which one is able to be resilient. For instance, studies have indicated that there is higher resilience among the males than their female counterparts (Lees, 2016). In study conducted by Mallick and Kaur (2016) on academic resilience among senior secondary school

students, revealed a significant gender difference in academic resilience of the students in favour of male students and private school students. Likewise, Mwangi (2018) found a significant difference in resilience and achievement for primary school pupils in favour of girls. Bala (2019) found that female students are more resilient in their academics than male students. He also observed that parental educational background has also been identified to have a great impact on the education and academic performance of a child as well helping children to be more resilient. He also pointed out that parents with high educational background tend to gear their children towards studying courses that they are talented in, observing them to make sure that they do their assignment, stick to their time table by reading always which will help their children to perform better academically. When parents are interested in their children's education, the children tend to be more resilient academically. The assumption here is that more concentrations are given by parents to fewer adolescent than the families where the children are many. It is against this background that this study intends to investigate the relationship between resilience and academic achievement in Business Studies. The research adopts gender, family type and parental education as moderating variables.

Statement of the Problem

Despite the importance of resilience in helping students cope with academic challenges, many adolescents still experience difficulties that negatively affect their academic performance. In subjects such as Business Studies, students are often required to demonstrate critical thinking, problem-solving ability, and sustained academic engagement. However, some adolescents struggle to maintain consistent performance due to academic pressure, personal challenges, and limited coping skills. In Osun State, these challenges may contribute to variations in students' academic achievement. Although resilience is believed to help students overcome such difficulties, the extent to which it influences academic achievement in Business Studies among adolescents in Osun State remains unclear. Therefore, the problem of this study is to determine the relationship between resilience and academic achievement in Business Studies among adolescents in Osun State.

Purpose of the Study

The purpose of this study is to establish the relationship between students' resilience and their academic achievement in Osun State, Nigeria. Specifically, the purpose of the study includes to:

- i. evaluate whether there is significant relationship between adolescents' resilience and their academic achievement in Business Studies
- ii. assess whether there is a gender relationship between students' resilience in Business Studies and academic achievement of adolescents in Osun State.
- iii. ascertain whether family type influences students' resilience in Osun State junior secondary schools.

Research Hypotheses

The following research hypotheses are raised to pilot the study:

1. Students' resilience has no significant relationship with the academic achievement of adolescents in Osun State.
2. Gender has no significant influence on the relationship between students' resilience and the academic achievement of adolescents in Osun State.
3. Family type has no significant influence on students' resilience and the academic achievement of adolescents in Osun State.

Methodology

The design for this study was descriptive survey of correlational study. According to Nworgu (2016), a descriptive survey is a type of research design in which a group of people are studied by collecting and analyzing data from representative of entire group. Specifically, Correlational research is a type of descriptive survey research method in which a researcher measures two variables, understands and assesses the statistical relationship between them with no influence from any extraneous variable. The aim of correlational research is to identify variables that have some sort of relationship to the extent that a change in one creates some change in the other. This type of research design assisted the researcher to understand variables under study in greater depth and useful for studying variables to form predictions and understand outcomes. The population for the study comprised all adolescents in all 279 public secondary schools (JSS category) in Osun State. Osun Central Senatorial District was selected out of the three (3) Senatorial Districts in the State. Simple random sampling technique was used to select one JSS from each Local Government Area, making a total of 10 schools altogether that would be involved in the study. In all, a total of 385 JSS students from the total of 20,983 students would be involved in the study. This number was a good representation of the entire population. As confirmed from Krejcie and Morgan (1970) and The Research Advisors (2006), a sample size of 381 is found appropriate in a population size of 50,000 with a marginal error of 5%.

Results

Table 1: Profile of Adolescents' Resilience in Osun State

S/N	Items	Very often	Often	Sometimes	Never	Mean
1	I am able to adjust to change	71(35.5)	70(35.3)	46(22.8)	13(6.4)	3.00
2	I can deal with whatever comes my way	57(28.7)	37(18.7)	29(14.6)	76(38.0)	2.38
3	I try to see humorous side of problems	69(29.4)	45(22.6)	34(16.8)	62(31.2)	2.50
4	Coping with stress can strengthen me	50(25.1)	50(25.1)	67(33.3)	33(16.6)	2.59
5	I feel special and appreciated	83(41.3)	54(27.1)	34(16.8)	30(14.8)	2.95
6	I seek assistance appropriately	46(22.8)	88(43.9)	37(18.7)	29(14.6)	2.75
7	I can stay focused under pressure	61(31.0)	46(22.8)	67(33.5)	25(12.7)	2.72
8	I show empathy and able to relate with others	62(31.0)	54(26.9)	34(16.8)	51(25.3)	2.64
9	I think of self as strong person	79(39.6)	42(21.1)	46(22.8)	33(16.4)	2.84
10	I can handle unpleasant feelings	46(23.0)	79(39.4)	33(16.6)	42(20.9)	2.64
11	I tend to bounce back quickly after hard times	66(33.1)	37(18.7)	63(31.6)	33(16.6)	2.68
12	I am aware of my weakness and also know my strengths	83(41.7)	51(25.3)	29(14.6)	37(18.5)	2.90
13	It does not take me long to recover from a stressful event	62(31.0)	62(31.0)	42(20.9)	34(17.0)	2.76
14	I set and attain realistic goals	54(26.9)	70(34.9)	46(23.2)	30(15.0)	2.74

15	I usually come through difficult times with little trouble	75(37.4)	63(31.6)	33(16.6)	29(14.4)	2.92
16	Do not feel discouraged when things are not going smoothly	66(33.1)	37(18.5)	34(16.8)	63(31.6)	2.53
17	I am capable of showing initiative	41(20.7)	71(35.5)	75(37.6)	12(6.2)	2.71
18	Past success gives me confidence for new challenge	42(20.9)	78(39.2)	63(31.6)	16(8.2)	2.73
19	I can act independently	67(33.3)	76(37.8)	37(18.7)	21(10.3)	2.94
20	I can solve problems and make decisions effectively	104(52.0)	37(18.5)	30(14.8)	30(14.8)	3.08
Weighted Mean						2.75

The weighted mean score of 2.75 indicates that adolescents in Osun State often exhibit resilience traits, suggesting a generally high level of resilience among the respondents.

Research Question 1: Is there any relationship between the level of students' resilience and the academic achievement of adolescents in Osun State.

Table 2: Correlation Table showing relationship between the level of students' resilience and the academic achievement of adolescents in Osun State

		Adolescents' Resilience	Academic Achievement
Adolescents' Resilience	Pearson Correlation	1	.62*
	Sig. (2-tailed)		.001
	N	200	200

Table 2 shows the relationship between students' resilience level and academic achievement in Osun State. The relationship between resilience and academic achievement of the adolescent in Osun State was moderate because it is with the score cohort (0.62-1).

Research Question 2: Is there any gender relationship between the level of students' resilience and the academic achievement of adolescents in Osun State

Table 3: Standard deviation Table showing the adolescents' resilience of male and female adolescents in Osun State

Gender	N	Mean	Std. Deviation	t	df	Sig	Remark
Male	91	55.49	7.91	-.92	200	.410	Statistically non Significant
Female	109	55.65	8.40				

Table 3 shows the adolescents resilience of male and female students in Osun State. The mean score of male was 55.49 and 55.65 for the female. The standard deviation of both male (7.91) and female (8.40) was moderate because it is with moderate score cohort (7.91-8.40).

Research Question 3: Does family type has any relationship with the level of students resilience and the academic achievement of adolescents in Osun State.

Table 4: ANOVA Table showing the resilience of Adolescents in Osun State based on family type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	139.914	1	19551.319	1.713	.163
Within Groups	1313.82	198	27.29		
Total	1329.92	199			

Table 4 shows the adolescents' resilience based on family type. Analysis of variance was used to determine the relationship between family type and adolescent academic achievement. The significant value 0.163 which shows that family type has low relationship with the level of resilience and the academic achievement of adolescents in Osun State.

Summary of Findings

1. The relationship between the level of students' resilience and the academic achievement of adolescents in Osun State was moderate.
2. The gender relationship between the level of students' resilience and the academic achievement of adolescents in Osun State was moderate
3. Family type has low relationship with the level resilience and the academic achievement of adolescents in Osun State.

Discussion of Findings

The study investigated the relationship between resilience and academic achievement in Business Studies among Osun State Adolescents. One of the findings revealed that the relationship between the level of students' resilience and the academic achievement of adolescents in Osun State was moderate. This finding is in line with that of Calaguas (2011) who found out that there was moderate resilience level among Freshman College students. This is also in agreement with Elisabetta (2014) who found out that resilience and creative personality in a large sample of 749 Italian middle and late adolescents recruited from six Public High Schools in East Sicily (Italy) was very high. The finding is not in consonance with Kumar and Dixit (2014) when they reported low resilience level among students from India and McLafferty, Mallet, and McCauley (2012) and Cassidy (2015) who also reported low level of resilience.

Another finding revealed that gender relationship between the level of students' resilience and the academic achievement of adolescents in Osun State was moderate. This is in agreement with Ayodele, Aladenusi & Oyinloye (2016) who found that adolescents' academic performance was average. Similarly, Tadese et. al (2022) reported that 66% of students had good academic performance in Ethiopia Universities which indicated high performance. The finding is not consistent with Luke and Mavis (2011) found decline academic performance among Botswana Secondary School students.

The last finding revealed that family type has no relationship with the resilience level and the academic achievement of adolescent in Osun State. This finding is in agreement with Susan (2015) who found out that there was no significant relationship in the level of students' resilience from various family types. He concluded that family type does not have influence on global and community resilience scores.

Conclusions

This study investigated the relationship between resilience and academic achievement of adolescents' in Osun State. It was concluded that adolescents' resilience remains a significant factor that determine their academic achievement in life. The study also revealed 54.55 as the mean of academic achievement of Junior school adolescents in Osun State which is above average. From the results of the study, it was also revealed that the moderating variables have moderate contribution to the prediction of academic performance among Junior Secondary school adolescents in the area of study. In conclusion, resilience appeared to be correlated to adolescents' academic achievement as revealed in this study.

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STRATEGIC AND ADEQUATE FUNDING OF SECONDARY EDUCATION FOR TRANSFORMATIVE AND SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

*This paper explores the critical role that strategic and adequate funding plays in shaping secondary education in Nigeria, which is essential for achieving transformative and sustainable development. It also examined the existing challenges that confronts the secondary education sector in Nigeria due to insufficient funding. This paper equally highlighted the positive impacts that strategic, adequate and appropriate financial investment can have on student outcomes, educational quality, and national development. Inadequate funding has had a very profound and far-reaching impact on secondary education in Nigeria. The researcher was able to identify transformative as something that causes or can cause a significant and lasting change while sustainable development as an approach to growth and human development that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable Development aims to balance the needs of the economy, environment, and society. This paper also provides actionable recommendations for improving fund allocation and management in secondary education to drive progress in the teaching and learning process. Here are the key areas identified, where underfunding causes significant challenges; **poor infrastructure, shortage of qualified teachers, lack of instructional materials, limited access to technology, dropout rates and low enrollment, poor student performance, stifled innovation and reform etc.** Finally, inadequate funding cripples the Nigerian secondary education system by weakening infrastructure, reducing teaching quality and limiting student outcomes. Hence the use of strategic funding for sustainable investment which is crucial to reversing these trends and ensuring equitable and quality education for transformative and sustainable development of the Nigeria secondary education sector.*

Keywords: Strategic funding, Adequate funding, Education, Transformative, Sustainable Development, and Challenges.

Introduction

Education is universally acknowledged as the cornerstone of national development. In Nigeria, the strategic positioning of Secondary Education is a bridge between basic education and higher or vocational education for productive citizens. Education is a key driver of sustainable development, national transformation, and social equity. In Nigeria, Secondary Education plays a critical role in shaping the workforce and leadership of tomorrow. The Secondary Education sector holds significant potential for equipping youths with essential skills and knowledge. However, persistent underfunding remains a critical challenge. This paper investigates how strategic and adequate funding of secondary education can foster transformative and sustainable development in Nigeria.

It is quite evident today that there is huge financial gap in the Nigerian education section. Over the years the fluctuating and inconsistency pattern in Nigeria's budget allocation to the education sector has created a lot of negative impact on the development of education in the country. Even with the inadequacy in financial allocation to education, other indicators such as corruption, infrastructural inadequacies, overcrowded classrooms, poor incentives and irregular teacher salaries, school dropouts and high student – teachers ratio, has necessitated a strategic approach to funding of secondary education for transformative and sustainable development in Nigeria.

According to Baker (2016), “school funding refers to the financial resources provided to educational institutions to support their operational costs, including salaries for teachers and staff, educational materials, infrastructure maintenance, and various student services”. Educational funding can come from various sources, including local, state, and federal government, as well as private entities and grants. **School funding**, therefore is the financial resources allocated to schools and educational institutions to support the delivery of education. These funds are used to cover a wide range of expenses necessary for maintaining and improving educational services and infrastructure. The sources and allocation of school funding can vary significantly depending on the region or state, but the fundamental purpose is to ensure that schools have the resources required to provide quality education for students. In Nigeria, the Secondary Education sector holds significant potential for equipping youths with essential skills and knowledge. However, persistent underfunding remains a critical challenge. This paper investigates how strategic and adequate funding of Secondary Education can foster transformative and sustainable development in Nigeria. However, the funding mechanisms for this vital sector has been grossly inadequate, erratic, and misaligned with the country's development goals (Baker, 2021). The relationship between school funding and student achievement has been a significant topic of discussion in every state in Nigeria and can never be overemphasized. School funding plays a crucial role in providing the resources and support systems that can enhance the quality of education and improve student performance. Funding in education refers to the financial resources allocated for the development and maintenance of educational institutions, including salaries for teachers, provision of learning materials, building infrastructure, and extracurricular activities. Adequate funding enables schools to offer high-quality education, while poor funding can lead to poor academic performance among students due to insufficient learning materials, overcrowded classrooms, and poorly trained staff, (Baker, 2020).

Despite national efforts, funding for Secondary Education in Nigeria remains inadequate and poorly coordinated, limiting its impact on youth empowerment, skill development, and sustainable growth, hence the gap considered in this position paper is government and secondary education managers in Nigeria can devise strategic approaches to funding secondary education for sustainable development.

Objectives:

- To analyze the current funding landscape (trend) of Education in Nigeria.
- To identify strategic funding approaches for Secondary Education to enhance sustainable transformation.
- To recommend policy and practical solutions to inadequate funding to enhance sustainable transformation in Secondary Education in Nigeria.

Conceptual and Theoretical Framework

The study is grounded in Human Capital Theory and the Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education). The Human Capital Theory posits that investment in education enhances productivity and economic growth. This aligns with the vision of the SDGs to ensure inclusive and equitable quality education.

Theoretical Framework

Human Capital Theory: - The theoretical foundation for this study is Human Capital Theory, originally developed by Theodore Schultz in 1961 and further expanded by Gary Becker in 1964. The theory posits that education is an investment in human beings, which enhances their productivity, skills, knowledge, and economic values. Just as physical capital such as machines and infrastructure, contributes to economic growth, human capital developed through education, contributes to national development and individual earnings.

Human Capital Theory assumes that individuals and governments invest in education because of its expected future returns, such as increased productivity, higher wages, improved innovation capacity, and economic growth (Qin and kong, 2021). Within this framework, education expenditure is not considered as consumption but rather a long-term investment with measurable economic and social benefits.

Application to Secondary Education in Nigeria

In the Nigerian context, secondary education plays a critical transitional role between basic education and higher education or labor market entry. Under Human Capital Theory:

- Government spending on secondary education should improve student skills and competencies.
- Improved skills should increase employability and productivity.
- Enhanced productivity should contribute to national economic development.

However, when secondary education is underfunded, the expected chain of returns is disrupted

Strategic Funding: Strategic funding in education refers to the intentional and targeted allocation of financial resources to achieve specific educational goals, priorities, and outcomes. Unlike ad-hoc or generalized funding, **strategic funding is planned, policy-driven, and outcome-oriented**, aiming to improve equity, efficiency, quality, and alignment with national or institutional development strategies, World Bank (2017).

Strategic Funding is a planned, data-driven approach to allocating financial resources to education based on national priorities, performance metrics, and development goals. It is quite evident that funding of secondary education in Nigeria is so abysmal due to either corruption or paucity of fund, hence the need to be very strategic in the provision of fund for the effective running of the secondary education in Nigeria. **Strategic investment in**

Secondary Education increases the productivity of the youth, preparing them for skilled jobs or further education. Well-educated citizens contribute more effectively to the **economy, innovation, democracy, and environmental sustainability**. Inadequate funding leads to **underdeveloped human capital**, which perpetuates **poverty, inequality, and stagnation**.

Adequate Funding: Ensures that schools have the necessary infrastructure, teaching resources, qualified personnel, and curriculum support. Adequate Funding is the provision of sufficient financial resources to ensure minimum standards in infrastructure, learning materials, teacher quality, and student support services.

Methodology

Historical Research Design: - Historical research design was adopted for this study. It is a systematic method of investigating, analyzing, and interpreting past events, policies, trends, and records to understand present conditions and make informed projections about the future. The historical research method relies mainly on **documented evidence** rather than direct experimentation or surveys. In this research, the historic research method was used to examine past funding patterns, policies, reforms, and outcomes over a defined period of 1999 – 2025.

Methods of Data Collection

Secondary data collection method was the major source of data collections. Data for this study were mainly sourced from of already existing data of the following sources;

1. **Document Analysis:** Government Reports, Budget Documents, Policy Papers, School Records
2. **Published Sources:** Books, Academic Journals, Newspapers, Online Databases
3. **Official Statistics:** National Bureau of Statistics, Federal Ministry of Finance Bulletins, Central bank of Nigeria Bulletins

The primary sources for the statistical figures in table 1 are:

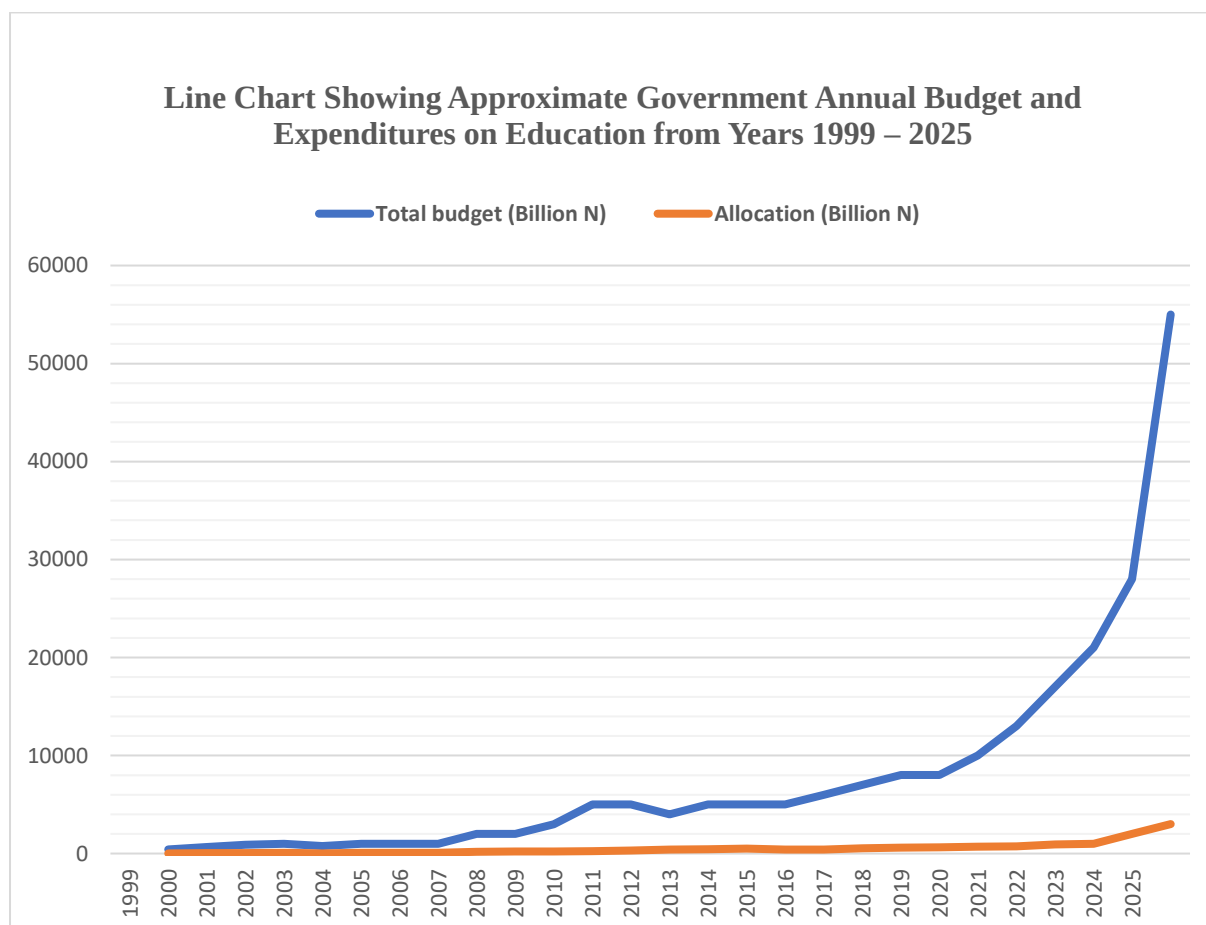
- i. Published annual Federal Government Appropriation Acts and detailed budget breakdown from the Budget Office of the Federation
- ii. Fiscal policy documents and budget summaries from the Federal Ministry of Finance
- iii. Appropriation Acts of the National Assembly
- iv. Published annual statistical bulletins that summarize government expenditure data of the Central Bank of Nigeria

Analyzing the Current Funding Landscape (trend) of Education in Nigeria.

Table 1: Approximate Government Annual Budget and Expenditures on Education, 1999 – 2025

Year	Total budget (₦)	Allocation on Education (₦)	Percentage of Total Budget (%)
1999	419.5 billion	27.7 billion	6.6
2000	677.5 billion	56.7 billion	8.4
2001	894.2 billion	62.6 billion	7.0
2002	1.1 trillion	73.4 billion	6.9
2003	765.1 billion	13.9 billion	1.8
2004	1.9 trillion	93.8 billion	5.1
2005	1.9 trillion	92 billion	5.0
2006	1.9 trillion	92 billion	4.8
2007	2.3 trillion	186 billion	8.1
2008	2 trillion	210 billion	10.1
2009	3.1 trillion	221 billion	7.3
2010	5.2 trillion	249 billion	4.8
2011	5 trillion	306 billion	6.2
2012	4.9 trillion	400 billion	8.2
2013	5 trillion	426.1 billion	8.5
2014	5 trillion	493 billion	9.9
2015	5.1 trillion	392 billion	7.7
2016	6.1 trillion	396 billion	6.5

2017	7.4 trillion	550 billion	7.4
2018	8.6 trillion	605 billion	7.0
2019	8.8 trillion	620.5 billion	7.0
2020	10.6 trillion	691.1 billion	6.7
2021	13.6 trillion	742.5 billion	5.6
2022	17 trillion	923.8 billion	5.4
2023	21.8 trillion	1.5 trillion	6.9
2024	28.7 trillion	2.2 trillion	7.6
2025	55 trillion	3.5 trillion	6.4



Indicators of Secondary School Underfunding

Underfunding in secondary schools is often reflected in:

- Dilapidated classrooms
- Lack of functional laboratories and libraries
- Overcrowded classrooms
- Irregular teacher salaries
- High student – teacher ratios

Low budgetary allocation has been linked to poor school facilities and limited access to learning resources (Edugist, 2024). Recent reports indicate that Nigeria allocated approximately 7.85% of its national budget to education in 2024, which falls below UNESCO's recommended benchmark of 15–20% (Patriot, 2024). The persistent low and inconsistency

budgetary allocation has contributed to infrastructural deficits, inadequate instructional materials, and shortages of qualified teachers in most of our public secondary schools.

Conceptual Analysis of the Correlation between Fluctuating Education Budget Percentages and Educational Decline Indicators in Nigeria (1999–2025)

1. Nature of the Budget Pattern (1999–2025)

From table 1, the education allocation as a percentage of total budget shows:

- Severe fluctuation (e.g., 1.8% in 2003; 10.1% in 2008, 5.4% in 2022 etc.)
- No consistent upward trend
- Long-term average around 6 – 7%
- Persistent allocation below international recommendations (15–20%)

Conceptually, this suggests instability rather than strategic long-term planning.

2. Conceptual Relationship with Educational Decline Indicators

Effects of Funding on Dropout Rates

When funding decreases it can result to: Lack of teaching materials in the school, infrastructure deterioration, teachers become poorly motivated and overcrowded classrooms.

These conditions increase student disengagement, student dropout rates, student failure and repetition rates. It indicate an inverse (negative) relationship. The implications is represented below;

Lower funding → Higher dropout rate

Higher funding → Lower dropout rate

Effects of funding on Infrastructure Decay

Expected Relationship: Strong Negative Correlation. Secondary schools require funding for classroom construction, Laboratory equipment, ICT facilities and maintenance Fluctuating funding prevents:

- Preventive maintenance
- Capital project completion
- Long-term infrastructure planning

Effects of Funding on Student – Teacher Ratio

Negative Correlation. Adequate funding allows recruitment of qualified teachers and training and retraining programs. When funding drops: Constant recruitment of teachers occur, Teacher shortages worsen, Student – teacher ratio increases etc.

Effects of funding on academic performance

Positive Correlation is observed. Higher funding enhances:

- The provision of instructional materials
- Teacher training
- Curriculum development
- Examination preparation

Implication:

Higher funding → Better performance

Lower funding → Declining outcomes

3. Effect of Funding Volatility

An important conceptual issue in table 1 dataset is not only low funding but instability. Volatility causes interrupted projects, policy discontinuity, planning uncertainty and poor financial forecasting. Even if funding occasionally increased (e.g., 2008, 2014), inconsistent allocation weakens cumulative developmental impact. In development economics, predictability of funding is as important as volume.

4. Long-Term Sustainable Development Implications

Secondary education influences human capital formation, employment rates, productivity and innovation capacity. Persistent underfunding leads to skills mismatch, youth unemployment, increased poverty and lower GDP growth. Thus, educational decline indirectly affects sustainable development indicators, which is demonstrated in the chain below;

Funding → Education Quality → Human Capital → National Development

5. Theoretical Explanation

From Human Capital Theory, education is an investment that increases productivity. If investment is low, unstable and poorly managed. Then expected returns such as economic and social transformation will decline. Therefore, fluctuating and inadequate funding leads to weak transformation and unsustainable development trajectory.

6. Overall Conceptual Conclusion

Based on theoretical reasoning and funding patterns:

- There is a negative conceptual relationship between education budget percentage and educational decline indicators (infrastructure decay, teacher shortage and dropout).
- There is a positive conceptual relationship between funding and educational quality indicators (academic performance, completion rates).
- The volatility observed in table 1 data, tends to weakens long-term planning and sustainability.

The State of Secondary Education Funding in Nigeria

The trend on table 1 above shows that there is significant underfunding of the Nigerian Education Sector. None of the year under review was in anywhere close to UNESCO's recommendation of 15 – 20% of total annual budget. Despite efforts such as the Universal Basic Education Commission (UBEC) and international donor support, Nigeria continues to allocate less than the UNESCO-recommended 15-20% of national budgets to education. Secondary education suffers disproportionately due to the focus on basic education and the rapidly expanding population. The federal budget allocation always below benchmarks. In 2025, the education sector received ₦3.52 trillion, accounting for 7.07% of the ₦49.7 trillion national budget. This is well below the UNESCO's recommended 15–20% of public spending or 4–6% of GDP, (Vanguard Newspaper 2025). Historically, Nigeria's education allocation has fluctuated between 4%–10%, with a high of about 10.1% in 2008 and low of about 1.8% in 2003.

The underfunding of the educational sector has had tremendous negative impact in the performance of secondary school education in Nigeria. The system is grossly underfunded, with both **quantitative** and **qualitative** shortfalls. This undermines not only educational outcomes but also a broader **national development objectives**. Achieving transformative and sustainable progress will require **significant increases in funding, smart and better financing strategies**, involvement of **public private partnership (PPP)**, and **strong public accountability**. This chronic underfunding leads to **dilapidated infrastructure, large class**

sizes, and **insufficient laboratories and libraries** in secondary schools. Which in turn reduces teacher motivation, training, and welfare, consequently **poor educational quality, irregular salaries, and high turnover**.

Key aspects of school funding:

1. **Local Funding:** Often sourced from property taxes, local funding plays a significant role in a school district's budget. It tends to create disparities, as wealthier areas with higher property values can generate more revenue for their schools, while poorer areas struggle with fewer resources.
2. **State Funding:** State governments contribute a substantial portion of school budgets, attempting to balance disparities by providing additional funding to lower-income districts. State formulas for allocating funding can vary, but they usually consider factors like the number of students, economic need, and special education requirements.
3. **Federal Funding:** The federal government also provides funds, though typically a smaller share. Programmes like Title I for low-income students and special education funding are key areas of federal involvement in school financing.

Transformative Development: Transformative Development in Education refers to fundamental, systemic changes in the goals, practices, structures, and outcomes of education to meet the evolving needs of individuals, communities, and societies. It emphasizes deep, structural reform that is not just incremental improvement, so that education can drive equity, sustainability, empowerment, and lifelong learning but also transformative, UNESCO (2022). Transformative education involves teaching and learning geared to motivate and empower happy and healthy learners to take informed decisions and actions at individual, community and global levels, (UNESCO, 2022)

According to Mezirow (1997), transformative learning is the process by which we transform problematic frames of reference to make them more inclusive, discriminating, open, emotionally capable of change, and reflective, this concept underpins transformative development by focusing on how individual and collective worldviews evolve through education. Transformative education development is a strategy that builds capacity, changes systems, and redefines the purposes of learning to align education with social justice, environmental sustainability, and innovation. This helps to fosters innovation, critical thinking, digital literacy, and socio-economic participation. Transformative Development is a social and structural change that leads to improved quality of life and inclusive economic growth.

Sustainable Development Goals (SDG 4): Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Sustainable Development is the development that meets present needs without compromising the ability of future generations to meet their own. In the Context of Education, Sustainable development refers to building an education system that:

- i. Equips students with skills for the future (e.g., STEM, digital, vocational, civic responsibility)
- ii. Encourages critical thinking and innovation
- iii. Is accessible to all, regardless of gender, region, or income
- iv. Supports long-term national prosperity, environmental awareness, and social equity

According to UNESCO (2017), Sustainable development in education refers to integrating the principles, values, and practices of sustainable development into all aspects of teaching, learning, and institutional operations. It aims to empower learners with the knowledge, skills, values, and attitudes necessary to contribute to a sustainable future. Education for Sustainable

Development (ESD) empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations. Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues.

Strategic investment for sustainable development in secondary education increases the productivity of the youth, preparing them for skilled jobs or further education. Well-educated citizens contribute more effectively to the economy, innovation, democracy, and environmental sustainability. Inadequate funding leads to underdeveloped human capital, which perpetuates poverty, inequality, and stagnation.

STRATEGIC FUNDING APPROACHES FOR SECONDARY EDUCATION TO ENHANCE SUSTAINABLE TRANSFORMATION

In order to maximize the lean financial resources available for the day-to-day running of the secondary education, here are some of the conceptual and practical strategic approaches to funding secondary education:

1. Result-Based Financing (RBF)

This is a funding approach in which financial disbursements are **contingent upon the achievement of predetermined, measurable results**. Rather than funding inputs (like salaries or infrastructure), RBF ties funding to **outputs or outcomes**, such as improved student test scores, increased enrolment, or higher graduation rates. According to World Bank, (2015), Result-Based Financing is any programme where disbursement of funds is conditional on the achievement of clearly specified results. It is a financing mechanism that links funding to the delivery of results such as improvement in learning outcomes, equity, and efficiency in the education system, (Global Partnership for Education, 2017). Here, incentives to institutions is focused on learning outcomes rather than just the inputs.

2. Equity-Based Budgeting

An equitable education financing system redistributes resources to disadvantaged learners and regions, enabling all to reach at least minimum learning standards, **UNESCO. (2020)**.

Equity-Based Budgeting in education is a funding approach where school systems allocate money and resources intentionally to reduce disparities and ensure all students have what they need to succeed, even if it means that some schools will receive more funding than others. It focuses on fair outcomes, not just equal spending.

Equity-based budgeting recognizes that students start from different circumstances, some schools face greater challenges, and equal funding does not always produce equal opportunity. So resources are distributed based on need, barriers, and systemic inequities.

Features of Equity-Based Budgeting

- i. Direct more funds to schools in low-income communities
- ii. Increase staffing for mental health, counselors, and special education
- iii. Invest in culturally responsive programs
- iv. Fund language learners
- v. Fund science oriented programmes
- vi. Adjust class sizes in high-need schools

3. Public-Private Partnerships (PPPs): Public-Private Partnerships (PPPs) in education refer to **collaborative arrangements between government bodies and private sector organizations** to deliver, finance, or manage educational services, infrastructure, or programmes. These partnerships aim to **leverage the strengths and resources of both sectors**

to improve access, quality, and efficiency in education. This is the collaboration between governments and private entities to expand access, innovation, and infrastructure in secondary education.

4. Needs-Based Funding:

Needs-Based Funding in education is a system where schools receive money based on the specific needs of their students, rather than a flat amount per student. Instead of giving every school the same funding per child, this approach provides additional funding for students who require extra support.

Need-based budgeting means that schools receive funding based on the needs of their students. That is to say, more for students who need more, including low-income students, English learners, and students with disabilities, Education Trust (2021).

Needs-based funding is aimed at:

- i. Promoting equity (fairness based on need)
- ii. Reducing achievement gaps
- iii. Ensuring vulnerable students receive adequate support
- iv. Improving overall educational outcomes

5. Education Trust Funds

Education trust funds are earmarked financial instruments designed to mobilize resources for specific education priorities, often with the goal of ensuring sustainability and accountability, (UNESCO, 2016). Education trust funds are pooled or individual donor resources managed independently or within broader funding frameworks, intended to support education systems through strategic investment, **Global Partnership for Education (2020)**. Trust funds in education refer to financial arrangements, usually donor-supported that is used to provide targeted funding for key priorities such as rebuilding post-conflict systems, promoting girls' education, or expanding access, (World Bank, 2009).

6. Sustainability Integration

Sustainability Integration in education means embedding environmental, social, and economic sustainability principles into all aspects of teaching, learning, and school operations. It aligns closely with the framework of UNESCO's Education for Sustainable Development (ESD), which promotes equipping learners with the knowledge, skills, values, and attitudes needed to build a sustainable future. Sustainability integration in education means teaching *for the future* by embedding sustainability principles into what is taught, how it is taught, and how institutions operate. Sustainability integration align funding with the United Nations **Sustainable Development Goals (SDGs)**, particularly: Funding priorities should support, renewable energy adoption, climate-resilient infrastructure, green skills development and digital transformation.

7. Decentralized School-Based Budgeting

School-based budgeting refers to the practice of decentralizing budget authority to the school level, giving school leaders discretion over how to use financial resources to meet educational objectives, **OECD, (2017)**. Decentralized budgeting allows schools or local education offices to manage a portion of the education budget, enabling greater flexibility, accountability, and responsiveness to community needs, **World Bank, (2008)**. Decentralization in education, including school-based budgeting, shifts authority from central to local or school-level actors to enhance participation, relevance, and resource efficiency. **UNESCO. (2015)**.

Decentralized School-Based Budgeting (DSBB) is a system where financial authority is transferred from central ministries (such as the Federal Ministry of Education) or state education boards to individual schools. School leaders often in collaboration with School-Based Management Committees (SBMCs), teachers, and community representatives are given the authority to prepare budgets, manage allocated funds, procure learning materials and monitor expenditures. Instead of decisions being made exclusively at federal or state governments, schools directly manage a portion of their own funds.

How DSBB Mitigates Mismanagement and Corruption

a. Reduces Centralized Leakages

In highly centralized systems, funds pass through multiple bureaucratic layers before reaching schools. Each layer often increase delays, administrative costs and risk of diversion. By transferring funds directly to schools, fewer intermediaries exist, leading to fewer opportunities for embezzlement. Thus financial flows become easier to trace.

b. Strengthens Community Oversight

Nigeria has strong community structures, including Parent-Teacher Associations (PTAs) and SBMCs. When these groups participate in school budgeting, financial decisions are discussed publicly, expenditures are scrutinized locally, and irregularities quickly detected. Local oversight increases social accountability because community members directly see whether funds are used for classroom repairs, purchase of textbooks, teaching materials, infrastructure. When parents are involved, it becomes harder to inflate contracts or divert funds unnoticed.

c. Improves Transparency through Public Disclosure

Effective DSBB systems often require, public posting of budgets, display of funds received and spent, annual financial reports. When schools post their allocations and expenditures on notice boards:

- Teachers know what funds are available.
- Parents can question discrepancies.
- Students benefit from improved accountability culture.

d. Enhances Responsiveness and Reduces Waste

Centralized systems may allocate funds for items that are not urgently needed. For example, a school needing roofing repairs may instead receive laboratory equipment. With DSBB, schools prioritize their real needs, spending is aligned with local conditions, funds are less likely to be wasted on irrelevant projects. Better alignment reduces the incentive to divert “unwanted” centrally imposed resources.

e. Facilitates Easier Auditing and Monitoring

Auditing a few thousand school-level accounts can sometimes be easier than tracing opaque state-level pooled budgets, especially if digital tools are introduced. With direct transfers, standardized reporting templates, and independent audits, monitoring agencies and civil society organizations can track funds more effectively.

8. Innovative Financing Mechanisms: Innovative financing refers to mechanisms that mobilize additional resources for education by using new instruments, partnerships, or financial structures beyond conventional government funding, **UNESCO. (2010)**. Innovative financing involves using financial instruments and institutional arrangements to attract new funding sources or make more efficient use of existing resources in education, **World Bank. (2012)**.

Innovative finance for education includes results-based financing, impact bonds, public-private partnerships, and leveraging philanthropic capital to drive improved outcomes. **Global**

Partnership for Education (GPE, 2017).

POLICY AND PRACTICAL SOLUTIONS TO INADEQUATE FUNDING TO ENHANCE SUSTAINABLE TRANSFORMATION IN SECONDARY EDUCATION IN NIGERIA

Challenges of Secondary Education in Nigeria include:

1. Fragmented funding sources
2. Weak monitoring and evaluation mechanisms
3. Corruption and misappropriation of education funds
4. Overdependence on federal allocations without robust state-level initiatives
5. Poor implementation of Public-Private Partnerships (PPPs)
6. Strategic Funding: A Tool for Transformation
7. Strategic funding involves:
8. Needs-based allocation informed by school audits and performance indicators
9. Gender-sensitive and inclusive financing
10. Emphasis on teacher training and welfare
11. Infrastructure development through targeted capital projects
12. Integration of technology and innovation funding in the curriculum
13. By aligning budget planning with the SDGs, particularly SDG 4 (Quality Education), Nigeria can build a resilient educational system that promotes innovation, equity, and long-term national growth.

Practical Solutions

1. Strengthen and Expand Public–Private Partnerships (PPPs)

This can solve the funding gaps by allowing private firms to co-finance school infrastructure and learning resources, which will bring about efficiency, technology, and innovations in schools. For examples, build and maintaining classrooms, laboratories, and ICT centers through joint ventures where returns are tied to performance. Also by partnering with tech companies for teacher training in digital skills. This can be achieved if government establish clear legal frameworks and incentives (tax holidays, recognition) to attract reputable partners and create oversight boards to monitor quality and accountability.

2. Introduce and Institutionalize School-Based Income Generation

Many schools can raise funds internally by producing goods and services. For examples, establishment of:

- i. School farms/agricultural projects (selling produce locally).
- ii. Workshops that provide carpentry, tailoring, or technical services to communities.
- iii. Renting school facilities (auditoriums, halls) after school hours and on weekends.

3. Community-Based Funding Initiatives

Communities gain ownership and accountability when they contribute to local schools funding, through education levies collected transparently with community oversight committees and Parent-Teacher Associations (PTAs) support in cash and kind.

4. **Expand School Internally Generated Revenue (IGR) with Innovation Grants**
Government, NGOs, and donors can offer innovation challenge funds to schools. The schools submit proposals for projects that improve learning and generate income. Also winning proposals get funding with mentorship support. The benefits includes the encouragement of local solutions tailored to each school's context and the promotion of creativity and accountability.
5. **Strengthen Partnerships with International Development Agencies**
Work with donors like UNESCO, UNICEF, World Bank, and foreign embassies on long-term funding programs to provide school infrastructure, teacher training programs, digital learning platforms and research for policy-making etc.
6. **Expand Use of Technology to Reduce Costs and Improve Quality**
Digital content reduces dependence on expensive textbooks, remote teacher training cuts travel costs and E-learning platforms increase access for underserved areas. For example this can be achieved through the implementation of:
 - Low-cost tablets with offline content libraries.
 - Partnerships with telecom providers to subsidize educational data.
7. **Enforce Accountability and Monitoring Frameworks**
Funds are wasted when there's poor accountability and corruption. This can achieved by developing citizen report cards, independent school performance audits, and scorecards that link education financing to outcomes.
8. **Reform Teacher Recruitment and Incentive Structures**
Effective teaching improves learning outcomes without proportional increases in spending. This can be achieved through;
 - i. Performance-based incentives
 - ii. Local recruitment to reduce relocation costs
 - iii. Continuous professional development funded through joint programs
9. **Advocate for Increased Government Budget Allocation and Policy Reform**
Strategies to achieve increase in government budget allocation include:
 - Mobilize teacher unions, civil society, and parent associations for advocacy campaigns.
 - Use evidence from research and impact evaluations to push for *at least 15–20% of national budget* on education (aligned to global benchmarks).

Policy Recommendations

- i. **Increase Government Budgetary Allocation to Education:** The Nigerian government should increase the national budgetary allocation to education to **meet or exceed the UNESCO-recommended benchmark of 15–20% of total public expenditure.**
- ii. **Establish Education Trust Funds for Secondary Schools:** Expand the mandate of the **Tertiary Education Trust Fund (TETFund)** or create a parallel **Secondary Education Trust Fund (SETFund)** to directly support infrastructure, teacher development, and learning materials in secondary schools. It is evident that TETFund has significantly improved infrastructure and research at tertiary levels; a similar model can work for secondary education in Nigeria.

- iii. **Promote Public-Private Partnerships (PPP) in Education:** Encourage partnerships with private sector and non-governmental organizations (NGOs) to co-fund secondary education projects, especially in underserved areas. PPPs can fill funding gaps, introduce innovation, and improve efficiency.
- iv. **Decentralize Funding and Empower Local Governments:** Strengthen the financial capacity and accountability of **State Universal Basic Education Boards (SUBEBs)** and **local governments** to ensure timely and needs-based disbursement of funds to secondary schools. Centralized disbursement of funds often leads to delays, misallocations, and inefficiencies.
- v. **Implement Transparent and Accountable Use of Funds:** Introduce strict monitoring and evaluation frameworks to track how education funds are spent at the school and state levels. Reduces corruption and ensures funds directly impact school improvement.
- vi. **Adopt a National Education Investment Framework (NEIF):** This will ensure long-term, needs-based planning for resource allocation across all states.
- vii. **Leverage Innovative Financing Models:** Explore innovative models such as **Education Bonds, Diaspora Funds, and Social Impact Bonds** to attract alternative sources of funding. These can help diversify funding sources and tie education financing to measurable outcomes.
- viii. **Mandate and strengthen Education Tax:** State governments should introduce **dedicated education levies** (e.g., 1% of income tax or PAYE) strictly earmarked for secondary education. Increases sustainable internal revenue for education without relying solely on federal allocations.
- ix. **Institutionalize Accountability Mechanisms:** Independent audits, stakeholder monitoring, and community scorecards.
- x. **Integrate Education with Development Planning:** Ensure every national and regional development policy reflects education goals.

Conclusion

Strategic and adequate funding of secondary education is not a luxury but a developmental necessity. Nigeria's path toward transformative and sustainable development must be sharpened with policies that prioritize education financing, promote accountability, and align spending with measurable outcomes. The benefits of such investment extend beyond the classroom to national peace, productivity, and prosperity.

Sustainable development in Nigeria depends on a well-funded and strategically managed secondary education system. Policymakers must give more priority to education financing reforms to unlock the transformative potential of the youth. Education in the life of any nation has always been widely recognized because of its importance, not only by educators but by policy makers themselves. Indeed, this is so in most cases because education is regarded as the most important instrument of socialization and reform, a belief that date back for more than 2000 years starting with Greeks who recognized education as a means of laying foundation for strong nation, (Abiodun-Oyebanji, 2004).

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APPLICATION OF COUNSELLING STRATEGIES IN MODIFYING DISRUPTIVE BEHAVIOURS AMONG SECONDARY SCHOOL STUDENTS IN IKORODU, LAGOS STATE

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Abstract

The study examined the application of counselling strategies in modifying disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State. Four research questions and one hypothesis guided the study. The descriptive survey design was utilized for the study. The population of the study consisted of all 13 public senior secondary schools with 998 teachers in Ikorodu LGA, Lagos State (Lagos State Government Ministry of Education, 2023). Census samplings method was used since all the 13 secondary schools in Ikorodu LGA, Lagos State was used. Purposive sampling technique was employed in choosing 15 teachers from each school thereby constituting a sample size of 195 for the study. The instrument used for the study was the questionnaire titled Disruptive Behaviour Scale (DBS). The data collected were analysed with descriptive statistics, mean rating and Anova. Hypotheses were tested at 0.05 significant levels. The outcome of the study showed among others that there are quite a lot of influence of counselling strategies on disruptive behaviours among secondary school students. Conclusion was drawn and useful recommendations made which include among others that counsellors should be adequately trained on the skills of managing disruptive behaviour in schools.

Key Words: Disruptive Behaviour, Counselling, Qualifications, Teachers, Schools

Introduction

Education remains one of the tools for the transformation of an individual and society at large. It is one of the most powerful instruments for social change, which plays a crucial role in nation-building. The school is a place where students acquire needed competencies for various vocations. The major objective of teaching and learning is to impart knowledge to students. According to Idowu and Esere (2007), education helps to develop people's intellectual and functional capabilities. However, attaining this educational objective is seriously under threat with the proliferation of disruptive behaviour among secondary school students.

Deviance is typically described as behaviour that doesn't comply with the set-up regulations of a groups (Idris, 2016). Disruptive behaviours (DB) may be explained as not being observant to the regulations or standards of the culture, or that of the institution's norms. Disruptive behaviour may also be any form of behaviour that disregards the regulations and policies or even legal guidelines that preside over an established order. Disruptive behaviours breach the custom or social order of the society are disruptive.

It was observed that pretty number of learners in institutions exhibit disruptive behaviours. Eremus (2015) posited that rules and regulations are not obeyed in our schools as there are many cases of examination malpractice, truancy, bullying, extortion, sexual offenses, dishonesty, drug offenses, dressing offenses and deviant behaviours among others. Angel (2016) posited that school has become a place of committing different types of atrocities.

Learners are assumed to be disruptive when they take on actions which are not under the rules of the school organization. Some researchers have diagnosed the distinct kinds of DB among students; those include absenteeism, exam misconduct, drug and alcohol abuse, harassment, sabotage, and sexual depravity (Odunmuyiwa, 2001; Esere 2008). A number of these public crimes are enlarged tempo of dropout in schools, substance abuse amid youths, betting, theft and present disturbance to civilization.

Parental influence cannot be exonerated from the proliferation of disruptive behaviour that have infiltrated the world today. Parents as one of the primary agents of socialization and can subsequently influence the behaviour of children positively or negatively. Their influence could be exerted through their method of children upbringing, maternal attachment, breast feeding, patterns of family structure and their socio-economic status. The deprived moral demeanor of the families often pessimistically affects students' behaviour. In keeping with Goode (2007), a lot of parents have lost their responsibilities within the families and deprived domestic education causes students to engage in disruptive behaviours. Gbadamosi (2003) found that the reasons of DB are associated with defective syllabus, managerial deficit, broken homes, insufficient college facilities, cruel institutions' guidelines and community challenges. Delinquent students are more likely to be influenced by peers who engage in anti-social behaviors reinforcing their own delinquent tendencies (Anderson, 2020).

Babatunde (2016) observed that a number of children lodge to disruptive behaviour owing to their incapability to handle the educational challenges in institutions. He noted that 90 percent of youngsters who smoke begin at as teenager. Boyd (2015) documented that many school children are caught up with usage of tobacco, amphetamines, bartitirates and heroin. Within the equal vein, Idris (2016) opined that there are numerous cases of cultism, sexual violence, acts of sabotage, blackmails, intimidation and threats as documented by teachers and school principals. Such undisciplined acts among students have culminated in infantile criminal behavior.

Disruptive behaviour is disparaging to institutions and learners. Disruptive behaviour has ruined the lives of countless number of children thereby preventing them from attaining their potentials in life. They have caused emotional disturbances and economic setbacks to their parents and the society at large. Deviant behaviour in the class room increases the stress level of teachers and at the same time changes the classroom dynamics. All hands should therefore be on desk to fight this ugly trend in the society.

Numerous elements which include age and sex are related to adolescent's antisocial behaviours. Burt and Neiderhiser (2009) submitted that age is one of the fundamental traits which could determine delinquent behaviours among youngsters and adolescents. Furthermore, Letourneau, Duffet-Leger, Levac, Watson, & younger-Morris, (2013) advice that age might be used as a moderator variable on the connection between socio-monetary status (SMS) and delinquency.

There are a number of proofs for the precise effect of sex on affiliation among behaviours dilemma and criminal activities amongst youth. In some of these studies, the effect of juvenile delinquency predictable more in boys while adult crimes as a type of disruptive behaviours occurred to both genders. It is planned that the impact of criminal behaviours in young people might come about with a setback in girls (Topitzes, Mersky, & Reynolds, 2011). American Psychological Association (APA) (2013) has noted with concern the increase of disruptive behaviour in recent times. Estimate of the current prevalent rate suggested between 17.6 % and 22% of children have symptoms of one or more Disruptive behaviour (Barkoukis, Staats & Dambeek, 2008). There is no adequate statistics on ground to determine the percentage of all Disruptive behaviour in Nigeria but general observation has shown that the prevalent rate is indeed very high. However, the prevalent rate of neurological disorders among Nigerian children is 6.7% (Briggs & Alikor, 2011), Psychiatric disorders stand at 11.4% and 7.1% for

functional impairment, while statistics shows 8.7% prevalent rate of ADHD among elementary and secondary school children (Achilike & Achilike, 2016).

The use of the psychological principles are the various ways in which deviant behaviours are managed in schools. Behavioural modification can simply be defined as the systematic application of principles derived from learning theories and experience in psychology (Amede, 2016; Asonibare 2016). The techniques are used in extinguishing unwanted behaviour and at the same time helping to increase existing positive behaviours. It can also be used to teach new behaviour patterns. Garber (2006) opined that reinforcement strategy in classroom instruction promotes academic achievement.

Disruptive behaviours have enormous uneasiness to the parents, authorities and educators. Various attempts to mitigate the debilitating effects of disruptive behaviour in the society have minimal impact as indicated by the rising number of cases (APA, 2013). The past and present efforts made by psychologists, clinicians and physicians to stem the rising trend of disruptive behaviour have yielded little results, partially because school counsellors were not taken into consideration. This paper therefore examined the application of counselling strategies in modifying disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State.

Statement of the problem

The issue with disruptive behaviour among secondary school students has been a topmost recurrent problem amongst psychologists, sociologists, teachers and the school counsellors. Disruptive behaviour is posing a challenge in most institutions. Some delinquent behaviour in schools include harassment, extortion, disobedience aggression or act of violent behaviour towards other students and staff, sexual attacks and harassment, gang actions or weapon wearing. There is a proving propensity for pupils to be concerned with such terrible manner as theft, absenteeism, smoking and so forth. That is due to the fact that many mothers and father are so pre-occupied with responsibilities away from the homes and have no time to look after their children.

These disruptive characteristics no doubt may affect students' academic performance. This study therefore attempted a determination the influence of counselling strategies on disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State.

Purpose of the Study

This research was to assess the application of counselling strategies in modifying disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State. Specifically, the study has highlighted below the reasons for this research;

1. Examine the causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State.
2. Survey the influence of counselling strategies on disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State.
3. Investigate the counselling strategies that can help to modify secondary school students with Disruptive behaviour in Ikorodu LGA, Lagos State.
4. Evaluate the views of teachers with varying qualifications on the influence of counselling strategies on disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State.

Research Questions

1. What are the causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State?
2. What counselling strategies can help to modify secondary school students with Disruptive behaviour in Ikorodu LGA, Lagos State?
3. To what extent do counselling strategies influence disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State?

Hypothesis

Teachers qualifications do not significant influence the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State

Methodology

This study adopted the descriptive survey research as it enables the researcher to identify and classify the elements or characteristics of the subject and to systematically gather data directly from the respondents through the use of research tool. The population of the study consisted of all 13 public senior secondary schools with 998 teachers in Ikorodu LGA, Lagos State (Lagos State Government Ministry of Education, 2023). A total of 195 teachers constituted the sample for this study. Census samplings method was used since all 13 secondary schools in Ikorodu LGA, Lagos State was used. Purposive sampling technique was employed in choosing 15 teachers from each school thereby constituting a total sample of 195 for study.

The instrument used for the study was the questionnaire titled: Disruptive Behaviour Scale (DBS). The instrument was divided into five sections, A - D. section B dwells on the causes disruptive behaviours, section C is deals on the counselling strategies that can help to modify secondary school students with Disruptive behaviour while D was concerned with the extent to which counselling strategies influence disruptive behaviours among secondary school students. The 4 type liket scale was used to rate the reaction of the respondents to the items contained in the questionnaires. The weighted mean of 2.5 was used as the bench mark for assessing the instrument.

Validation of the Instrument

The questionnaire was constructed by the researcher. The instrument was validated by two experts in measurement and Evaluation and two Guidance Counsellors in the Faculty of Education, NOUN. The corrected version was used for the study. The Reliability of the instrument was determined by Administering it on a sample of 30 secondary school teachers in Apapa Local Government Area of Lagos State, which was not part of the original sample population. Based on the data obtained from the respondents, the reliability was calculated using Cronbach's Alpha which gave the reliability scale of 0.84, which was deemed satisfactory for the study.

Method of data collection and analysis

The questionnaire was administered by the researcher and 3 research assistants. The cause and rationale of the studies become well explained and copies duly administered. All respondents had been given adequate time to fill the questionnaire and were at no time under any form of duress. Out of 195 questionnaires administered, 176 were retrieved, which constituted about 90%.

The data collected were analysed with descriptive statistics, mean rating the and ANOVA. The statistics were chosen for the analysis because of their robust nature of comparing the variances and means of two independent samples. Hypotheses were tested at

0.05 confidence level. The data were processed and analysed using Microsoft excel and the SPSS statistical analysis software.

Results

Answer to Research Questions

Research Question 1: What are the causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State?

Table 1: Mean rating on the causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State

S/N	Causes of disruptive behaviour among secondary school students	N	Sum	Mean	Std. Deviation
Q1	poor parental upbringing	176	516.00	2.9318	.71387
Q2	inherited antisocial behaviour	176	469.00	2.6648	1.16428
Q3	poor moral conduct contributes to deviance behaviours	176	427.00	2.4261	1.16384
Q4	Low intellectual capacity deviance behaviours	176	412.00	2.3409	1.08376
Q5	negative peer group influence	176	451.00	2.5625	1.09365
Q6	brain damage	176	442.00	2.5114	1.05283
Q7	psychosomatic challenges may cause deviance behaviours	176	443.00	2.5170	1.10052
Q8	non-assertiveness of the students	176	433.00	2.4602	1.16551
Q9	Parental separation	176	479.00	2.7216	1.00671
Q10	effects of unwholesome mass media	176	460.00	2.6136	1.14574
	Total	1760	4532	2.57	1.07

Table 1 reveals Mean rating on the causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State. poor parental upbringing tops the list with mean of 2.9318, followed by parental separation (2.7216), and inherited antisocial behaviour (2.6648), effects of unwholesome mass media (2.6136) and negative peer group influence (2.5625). The least is Low intellectual capacity deviance behaviours as indicated in the Table was a lower mean score of 2.3409. The total average is 2.57, which is above the weigh average of 2.5. The implication is that there are numerous causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State.

Research Question 2: What counselling strategies can help to modify secondary school students with Disruptive behaviour in Ikorodu LGA, Lagos State?

Table 2: Descriptive Statistics on the counselling strategies can help to modify secondary school students with Disruptive behaviour in Ikorodu LGA, Lagos State

S/N	Counselling strategies can help to modify secondary school students with Disruptive behavior	N	Sum	Mean	Std. Deviation
Q11	Use of appropriate referral	176	429.00	2.4375	1.04009
Q12	Life development skill	176	527.00	2.9943	.68866
Q13	Information service	176	517.00	2.9375	.67744
Q14	Individual counseling	176	537.00	3.0511	.71130
Q15	Family counselling	176	508.00	2.8864	.81320
Q16	Good Listening skill	176	481.00	2.7330	.76513
Q17	Cognitive restructuring	176	517.00	2.9375	.72629
Q18	Rational emotive therapy	176	473.00	2.6875	.79933
Q19	Group counselling	176	511.00	2.9034	.69840
Q20	Career counselling	176	465.00	2.6420	.85673
	Total	1760	4965	2.82	177

Table 2 above is a descriptive statistic on the counselling strategies can help to modify secondary school students with disruptive behaviour in Ikorodu LGA, Lagos State. The analysis revealed a total of 4965, a mean average of 2.82 and a standard deviation value of 0.78. The mean average of 2.82 is above the bench mean of 2.5. The implication is that there are several counselling strategies that can help to modify secondary school students with disruptive behaviour.

Research Question 3: To what extent do counselling strategies influence disruptive behaviours among secondary school students in Ikorodu LGA, Lagos State?

Table 3: Descriptive Statistics on the influence of counselling strategies on disruptive behaviours among secondary school students in of Ikorodu LGA, Lagos State

S/N	Influence of counselling strategies on disruptive behaviours among secondary school students	N	Sum	Mean	Std. Deviation
Q21	Engaging peer support can curtail disruptive behaviours	176	461.00	2.6193	1.18441
Q22	Use of appropriate referral can help to curtail disruptive behaviour	176	438.00	2.4886	1.19038
Q23	bibliography therapy can improve their lifestyle	176	457.00	2.5966	1.11703
Q24	Satiation can weaken the tendency to engage in disruptive behavior	176	462.00	2.6250	1.09349
Q25	Family counselling can inculcate discipline in children	176	433.00	2.4602	1.06294
Q26	Good Listening skill can help students to open to correction	176	453.00	2.5739	1.06648

Q27	Group counselling can present deviant with good models	176	434.00	2.4659	1.20900
Q28	stipulation of precise moral education	176	477.00	2.7102	1.00348
Q29	Career counselling can enhance students reading habit	176	455.00	2.5852	1.20646
Q30	cognitive restructuring can modify deviant behavior	176	418.00	2.3750	1.03441
	Total	176	4488	2.55	1.12

Table 3 above is a descriptive statistic on the influence of counselling strategies on disruptive behaviours among secondary school students. The analysis revealed a total of 4488, a mean average of 32.55 and a standard deviation value of 1.12. The mean average of 2.55 is above the bench mean of 2.5. The implication is that then there are quite a lot of influence of counselling strategies on disruptive behaviours among secondary school students.

Test of Hypothesis

Hypothesis 1: Teachers qualifications do not significant influence the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State.

Table 4: Descriptive statistics on the difference between the views of teachers with varying qualifications on the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NCE and Below	43	1	0	0	1	1	1	1
Degree	89	1.65	0.48	0.051	1.55	1.75	1	2
Post Degree	44	2	0	0	2	2	2	2
Total	176	1.58	0.49	0.04	1.50	1.65	1	2

At .05 significant level

Table 4 above depicts a Descriptive statistic on the difference between the views of teachers with varying qualifications on the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State. The table gives categories of certificate teachers into NCE, Bachelor Degree and Post-graduate Degree. A total of 176 teachers participated in the study. Out of this figure, 43 Teachers hold NCE certificate, 89 were Bachelor Degree holders and 44 have Post-graduate Bachelor Degrees. The mean scores for the NCE teachers, Bachelor Degree and Tertiary are 1.00, 1.65 and 2.00 respectively; with a total mean score of 1.57.

Table 5: One-way ANOVA statistics on the difference between the views of teachers with varying qualifications on the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	22.68	2	11.34	97.13	.000
Within Groups	20.20	173	.117		
Total	42.89	175			

05 level of significant.

The one-way statistics revealed a significant difference between and within groups as shown in Table 8 above with F (97.127= df, 2/173, p = .000. The hypothesis which states that teachers' qualifications do not significant influence the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State was therefore rejected. A posteriori in Table 6 was tested to determine the Degree of differences between the categories of teachers' qualifications. The mean differences for NCE and Below are -.66 and -1.00* to Bachelor Degree and Post-graduate Degree respectively. Bachelor Degrees are .65169* and -.35* to NCE and Post-graduate Degrees respectively while Post-graduate Degree to NCE and Bachelor Degree are -1.00* and -.35* respectively. The implication is that there is a significant difference between the views of teachers with varying qualifications on the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State.

Table 6: Turkey multiple comparisons statistic on the difference between the views of teachers with varying qualifications on the impact of counselling strategies disruptive behaviour among of secondary school students in Ikorodu LGA, Lagos State

(I) Qualifications	(J) Qualifications	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound Upper Bound	
NCE	and Degree	-.65*	.06	.000	-.80	-.50
Below	Post Degree	-1.00*	.073	.000	-1.1732	-.83
Degree	NCE and	.65*	.06	.000	.50	.80
	Below					
	Post Degree	-.35*	.06	.000	-.49	-.19
Post Degree	NCE and	1.00*	.07	.000	.83	1.17
	Below					
	Degree	.35*	.06	.000	.19	.49

*. The mean difference is significant at the 0.05 level.

Discussion of the Findings

The analysis revealed that there are numerous causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State. This outcome concurred with the opinion of Chuks (2016) who posited that other factors within the home like broken family, and poor parental relationship are capable of breeding children that misbehave in school. Omotosho (2009) noted that indiscipline in colleges has reached an alarming charge; this may be traced to the house, society and the attitude of students towards training. Gbadamosi (2003) found that the reasons of DB are associated with defective syllabus, managerial deficit, insufficient college facilities, cruel institutions' guidelines and community challenges. Babatunde (2016) observed that a number of children lodge to disruptive behaviour owing to their incapability to handle the educational challenges in institutions. The deprived moral

demeanor of the families often pessimistically affects students' behaviour. In keeping with Goode (2007), a lot of parents have lost their responsibilities within the families and deprived domestic education causes students to engage in disruptive behaviours. Gbadamosi (2003) found that the reasons of DB are associated with defective syllabus, managerial deficit, insufficient college facilities, cruel institutions' guidelines and community challenges.

The outcome of the study revealed there are several counselling strategies can help to modify secondary school students with disruptive behaviour. Behavioural modification can simply be defined as the systematic application of principles derived from learning theories and experience in psychology (Asonibare 2016). The techniques are used in extinguishing unwanted behaviour and at the same time helping to increase existing positive behaviours. It can also be used to teach new behaviour patterns. The behavioural Garber (2006) opined that reinforcement strategy in classroom instruction promotes academic achievement.

The study found many ways that there are quite a lot of influence of counselling strategies on disruptive behaviours among secondary school students. The behavioural Garber (2006) opined that reinforcement strategy in classroom instruction promotes academic achievement.

The outcome of Null hypothesis in the study found that there is a significant difference between the views of teachers with varying qualifications on the impact of counselling strategies on disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State. Null hypothesis was therefore rejected. According to Idowu and Esere (2007), education helps to develop people's intellectual and functional capabilities. However, attaining this educational objective is seriously under threat with the proliferation of disruptive behaviour among secondary school students.

Implications of the Study to Counsellors

This study focused on the influence of counselling strategies on disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State. The study would help school proprietors and principals to identify the causes of disruptive behaviour among secondary school students and modalities for curbing them efficiently. The study would help school administration to improve the disciplinary attitude of staff and students as well as the academic performance of secondary school students. Specifically, it will bring to the fore the attributes of students with disruptive behaviour, causes of disruptive behaviour among secondary school students and counselling strategies that can help to modify secondary school students with disruptive behaviour. The findings from the study would help school counsellors to think out of the box to ameliorate the impact of disruptive behaviour on students' educational attainment.

Conclusion

The findings established that there are numerous causes of disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State. There are several counselling strategies that can help to modify secondary school students with disruptive behaviour. There are quite a lot of influence of counselling strategies on disruptive behaviours among secondary school students. There is a significant difference between the views of teachers with varying qualifications on the impact of counselling strategies on disruptive behaviour among secondary school students in Ikorodu LGA, Lagos State. However, counsellors should be adequately trained on the skills of managing Disruptive behaviour in schools.

Recommendations

The following recommendations were made based on research findings;

1. Counsellors should be adequately trained on the skills of managing Disruptive behaviour in schools. The training of counsellors should focus on on emergent strategies to manage deviant behaviour should be recurrent.
2. Government should also deploy trained counsellors to all secondary schools to handle students with abnormal behaviours. The establishment of counselling centres in every secondary school should be complemented by training and curriculum reviews on techniques of managing deviant behaviour.
3. School heads should provide avenues for capacity building to counsellors, through seminars, conferences and orientation programmes,.

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PRINCIPALS' LEADERSHIP ROLES IN DEVELOPING TEACHERS' PROFESSIONAL COMPETENCES FOR SUSTAINABLE EDUCATION

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Abstract

The paper assessed educational leadership roles in developing teachers' professional competences for sustainable education. The need for sustainable education has placed new demands on teachers to acquire professional competencies that enable them to integrate sustainability into teaching practices. These competences include critical thinking, value-based instruction, interdisciplinary knowledge, and the ability to engage learners in responsible decision-making. This paper, therefore, examined the role of educational leadership in developing competencies among teachers. Furthermore, it ascertained how school leaders create supportive working environments that promote continuous professional development, collaboration, and innovation. Moreover, the paper highlighted the importance of leadership strategies that align with the institutional goals and sustainability values and provide practical support for teachers to adopt new methods. In addition, it discussed barriers that limit competence development and offers suggestions for various stakeholders, including policy makers, teacher training institutions, and school administrators. Although challenges exist, strong and purposeful leadership can significantly improve teachers' readiness to implement sustainable education. The paper concluded that educational leadership is central to fostering professional growth that equips teachers to contribute effectively to sustainability goals within and beyond the classroom. Amongst others, the paper suggested that School Leaders and Administrators should prioritize sustainability in their strategic plans and allocate time and resources for teacher professional development that aligns with sustainable education.

Keywords: Educational leadership, Teacher professional competences, Sustainable education, School leadership, Professional development,

Introduction

Education system across the world is increasingly being called upon to respond to the challenges posed by sustainability, not only as an environmental issues but as a broad social responsibility requiring thoughtful reform in pedagogical approaches and school leadership. The integration of sustainable education into teaching practice demands that teachers possess a distinct set of competences that extend beyond traditional academic instruction. These competences include values-based teaching, interdisciplinary understanding, reflective thinking, and the ability to prepare learners to act responsibly within local and global contexts. In order to foster these capacities, educational leadership assumes a key role in designing institutional environments that support teachers' professional growth. Leadership in education does not only involve administrative functions but also includes the creation of vision, motivation of staff, provision of professional development, and the shaping of school culture towards sustainability-oriented practices (Leithwood et al., 2020). As such, the quality of

educational leadership directly affects the development of teacher competences necessary for promoting sustainable education.

Furthermore, the notion of sustainable education aligns with the broader goals of Education for Sustainable Development (ESD), which seeks to empower learners to take informed decisions and responsible actions that safeguard environmental integrity, economic viability, and a just society for present and future generations (UNESCO, 2017). Teachers are at the forefront of translating these goals into classroom practice, which requires more than content knowledge; it requires a redefinition of professional competence to include adaptive, reflective, and participatory skills. Educational leaders are expected to facilitate this redefinition by creating opportunities for continuous learning and collaborative practices among teachers. Moreover, they are responsible for establishing institutional conditions that promote innovation, experimentation, and responsiveness to local sustainability challenges (Hargreaves & Fullan, 2012).

Additionally, school leaders are in a position to guide pedagogical transformations through their ability to influence curriculum design, instructional supports, teacher evaluation, and professional development planning programmes. Leadership in this context becomes a driver of change, not through coercive authority, but by empowering teachers to engage meaningfully with sustainability content and methods. In addition, effective leaders are those who can align school goals with sustainability values and offer strategic guidance that strengthens teachers' motivation and commitment to change (Day & Sammons, 2016). Teachers who operate under strong leadership tend to be more confident in applying sustainability concepts and are more likely to participate in school-wide initiatives that reflect sustainable values. This connection between leadership and teacher competence development is essential for embedding sustainability across all levels of the school system.

Although there is growing recognition of the importance of sustainability in education, there remain gaps in how leadership practices are used to support this agenda. The transition toward competence-based professional development is not automatic and requires deliberate actions by school leaders. In many cases, the absence of clear frameworks, insufficient resources, and lack of coordinated policy measures hinder the effective preparation of teachers for sustainability education. Moreover, where leadership is passive or disconnected from pedagogical realities, teachers may find it difficult to engage in the kind of transformative learning needed for sustainable teaching. Therefore, exploring the role of educational leadership in enhancing teachers' competences is not only relevant but necessary for understanding how schools can contribute meaningfully to sustainable development goals. This paper focuses on how educational leadership contributes to the development of teachers' professional competences in the context of sustainable education. In light of the foregoing, this paper looked at the concept of educational leadership, teachers' professional competence, sustainable education, Principal Leadership Roles in Developing Teachers' Professional Competences.

Concept of Educational Leadership

Educational leadership refers to the process of influencing and guiding educators, students, and the wider school community toward achieving educational objectives. This concept encompasses more than just managing school operations; it involves setting clear goals, fostering collaboration, and nurturing a learning environment where both teachers and students can thrive (Northouse, 2021). Leadership within schools is critical for maintaining focus on teaching quality, student outcomes, and innovation. Leaders must act as visionaries, motivators, and facilitators of change, ensuring that the institution continually adapts to evolving educational demands and societal expectations. Moreover, educational leadership entails the cultivation of a positive school culture that values professional growth, inclusivity,

and shared responsibility (Bush, 2019). Leaders are expected to promote ethical standards, encourage teacher autonomy, and engage in practices that enhance morale and commitment. Instructional leadership forms a significant component where leaders concentrate on curriculum development, teacher support, and assessment strategies, all aimed at improving student learning experiences. Additionally, leadership demands emotional intelligence and communication skills to effectively navigate relationships among staff, parents, and students. Furthermore, contemporary educational leadership incorporates the concept of distributed leadership, which disperses leadership responsibilities across multiple individuals rather than relying solely on a single figure. This approach supports capacity building among staff and encourages collaborative problem-solving (Spillane, 2012). It recognizes the complexities of modern schooling where multiple actors contribute to school improvement. The evolving educational landscape, marked by technological advances, diverse student populations, and shifting policy priorities, calls for leaders who are adaptable and proactive. These leaders must anticipate challenges, mobilize resources, and align school activities with broader educational reforms. In this way, educational leadership functions as a crucial mechanism for ensuring school effectiveness and equity.

Teachers' Professional Competences

Teachers' professional competences include the knowledge, skills, and dispositions required by teachers to deliver effective instruction and foster meaningful student learning. Some core competences consist of subject expertise, instructional planning, classroom management and assessment literacy, which together ensure that teachers can create engaging and supportive learning environments (Shulman, 1987). Additionally, teachers must demonstrate adaptability and creativity, adjusting methods to meet the unique needs of learners and evolving curricular demands.

Moreover, interpersonal skills are fundamental professional competences, enabling teachers to build positive relationships with students, colleagues, and families. Effective communication, empathy, and conflict resolution contribute to a healthy classroom atmosphere conducive to learning (Danielson, 2011). These competences also include a commitment to equity and inclusion, as teachers must recognize and address diverse learner backgrounds to promote fairness and opportunity.

Reflection and continuous professional development form the backbone of competence enhancement. Teachers who regularly evaluate their practice and seek out new knowledge improve their instructional effectiveness and student outcomes (Schön, 1983). Furthermore, engagement in collaborative professional learning communities fosters shared expertise and collective responsibility for student achievement. The development of competences extends beyond technical skills to include ethical considerations and professional attitudes. Teachers are expected to uphold standards of integrity, confidentiality, and respect while advocating for student welfare. Lifelong learning attitudes and openness to change are also essential, especially as education evolves in response to societal and technological shifts. Overall, teachers' professional competences are critical for ensuring quality education. They provide the foundation for effective pedagogy and support the development of learners' academic, social, and emotional capacities.

Sustainable Education

Sustainable education entails holistically empowering learners with the knowledge, competencies, values, and critical dispositions needed to actively promote the enduring well-being, resilience, and equitable development of society, the environment and future generations. It emphasizes the interconnectedness of social equity, economic development, and environmental protection, aiming to cultivate responsible citizenship and ethical decision-

making (Jickling & Wals, 2008). The educational process under this concept encourages critical thinking about global challenges and promotes active participation in solutions that ensure the well-being of current and future generations.

Furthermore, sustainable education adopts an interdisciplinary approach, integrating scientific, social, and cultural perspectives to provide holistic understanding. Students are encouraged to reflect on their own lifestyles and community practices, developing competencies such as systems thinking, problem-solving, and collaboration (Sterling, 2011). The pedagogical emphasis is on experiential and participatory learning methods, including project-based activities, community engagement, and real-world problem solving. School environments that promote sustainability extend beyond the classroom to include policies, resource management, and institutional culture that align with sustainable development principles.

Principal Leadership Roles in Developing Teachers' Professional Competences

Educational leadership plays a vital role in fostering the growth and development of teachers' professional competences, which are essential for delivering high-quality education. Leaders in schools and educational institutions influence the environment, culture, and structures that support continuous teacher learning and competence enhancement. They create opportunities for professional development, encourage collaboration among teachers, and provide resources that enable educators to update and expand their skills (Klar & Brewer, 2013). Moreover, effective leadership ensures that teachers have access to mentorship, coaching, and feedback mechanisms that promote reflective practice and instructional improvement. Furthermore, leaders serve as role models by demonstrating commitment to lifelong learning and ethical standards, inspiring teachers to pursue similar goals. They establish a shared vision that aligns with educational priorities, motivating staff to work collectively toward improving teaching and learning. Educational leadership also involves removing barriers that may hinder teachers' growth, such as limited time for collaboration or insufficient training materials. Through strategic planning and supportive supervision, leaders prioritize initiatives that enhance teacher competence in areas like curriculum design, assessment strategies, and classroom management (Leithwood, et al. 2017).

In addition, leadership fosters an inclusive and trusting school culture, where teachers feel valued and are willing to engage in experimentation and innovation. Encouraging professional learning communities allows educators to share experiences and best practices, which accelerates competence development (Vangrieken, Meredith, Packer, & Kyndt, 2017). Leaders also play a key role in aligning professional development activities with the evolving demands of education, ensuring relevance and practical application. Their involvement in policymaking and advocacy further supports teachers' access to quality training and career advancement opportunities.

Although leadership demands balancing multiple roles and responsibilities, effective leaders maintain a clear focus on teacher development as a priority for school success. Their efforts not only improve teacher performance but also positively impact student outcomes, demonstrating the link between leadership, teacher competence, and learning achievement. Educational leaders who recognize their role as facilitators of teacher growth contribute significantly to creating resilient and adaptive education systems.

Teachers' Professional Competences Required for Sustainable Teaching

Sustainable teaching refers to teaching practices that promote long-term learning, adaptability, and continuous improvement—ensuring that both teachers and learners thrive in a changing world. To achieve this, teachers need a range of professional competences that go beyond classroom instruction. These competences enable teachers to deliver quality edu-

professional competences required for sustainable teaching, foster lifelong learning, and respond effectively to societal and environmental changes. (Barth, Godemann, Rieckmann and Stoltenberg, (2021) mentioned the key professional competences required for sustainable teaching to include; pedagogical competence, subject-matter competence, technological competence, communication, interpersonal competence, assessment, evaluation competence, reflective and research competence.

Principal Leadership Approaches in Enhancing Teachers' Competences

Principals play a vital role in developing and improving teachers' professional competences. Their leadership contextualization determine how effectively teachers grow in knowledge, skills, and attitudes necessary for quality teaching and learning. According to Tolstikova, Osechkina, Tabolova and Travnova (2021) opined that the major leadership approaches principals use to enhance teachers' competences include Instructional Leadership Approach, Transformational principals inspire, motivate, and support teachers to reach their full potential, the principal involves teachers in decision-making and school management processes, distributive leadership allows the principal to shared responsibilities among teachers and other staff members, finally, the principal acts as a servant-leader who prioritizes the needs and growth of teachers.

Capacity Building and Continuous Professional Development

Capacity building and continuous professional development (CPD) are essential processes through which teachers improve their knowledge, skills, and attitudes to meet the demands of modern education. Capacity building involves strengthening the abilities of teachers to perform effectively through targeted training, access to resources, and opportunities for practice and collaboration (Day & Sachs, 2004). It empowers educators to respond to curricular changes, technological advances, and diverse learner needs. Furthermore, Continuing Professional Development (CPD) is an ongoing and systematic process that supports teachers in reflecting on their practice, acquiring new knowledge, and implementing innovative teaching strategies (Darling-Hammond et al., 2021). Professional development activities range from formal workshops and seminars to informal peer coaching and collaborative learning communities. The effectiveness of CPD increases when it is sustained, school-based, and closely aligned with teachers' classroom realities.

In addition, capacity building and CPD contribute to teacher motivation and job satisfaction. Educators who perceive professional growth opportunities tend to be more engaged and committed to their work (Opfer & Pedder, 2011). This engagement translates into improved instructional practices and better student learning experiences.

Moreover, educational leadership plays a crucial role in facilitating CPD by creating supportive structures, securing funding, and fostering a culture that values lifelong learning (Guskey, 2000). Leaders ensure that CPD programs are relevant, practical, and reflective of both individual teacher needs and broader school goals.

Although challenges such as time constraints and limited resources can hinder CPD, innovative models like online learning and peer collaboration offer flexible and cost-effective solutions. Overall, capacity building and continuous professional development are indispensable for maintaining and advancing teachers' professional competences in dynamic educational environments.

The Role of School Leaders in Promoting Sustainability-Oriented Pedagogy

School leaders have a pivotal role in advancing sustainability-oriented pedagogy, which integrates sustainability concepts into teaching and learning processes. They set the tone for the school's commitment to sustainability by embedding its principles into the vision, mission,

and daily practices of the institution (Leal Filho et al., 2018). Leaders encourage educators to incorporate environmental, social, and economic dimensions of sustainability into their curricula and instructional methods.

Moreover, school leaders facilitate professional development that equips teachers with the knowledge and skills required for sustainability education. This includes training on interdisciplinary approaches, systems thinking, and participatory pedagogies that actively engage students in addressing sustainability challenges (UNESCO, 2020). Providing teachers with resources and time to experiment with innovative instructional methods is critical for embedding sustainability in classroom practice.

In addition, leaders promote whole-school approaches to sustainability that extend beyond teaching. They support initiatives such as green infrastructure, waste reduction programs, and community partnerships, which serve as practical learning contexts for students (Rieckmann, 2017). These efforts create a school culture where sustainability is lived and experienced, reinforcing lessons learned in classrooms.

Furthermore, school leaders play a critical role in monitoring and evaluating sustainability efforts, ensuring continuous improvement and alignment with global frameworks such as the United Nations Sustainable Development Goals (SDGs). They mobilize stakeholders, including parents and local organizations, to participate in and support sustainability initiatives, strengthening the impact. Although promoting sustainability-oriented pedagogy requires overcoming challenges such as resistance to change and competing priorities, committed leadership fosters an environment conducive to transformative learning. School leaders who champion sustainability prepare learners to become informed, responsible citizens capable of contributing to a sustainable future.

Conclusion

Educational leadership plays a central role in shaping how teachers acquire, apply, and sustain the professional competences needed for effective sustainable education. Teachers are expected to implement teaching practices that promote critical thinking, collaboration, ethical reasoning, and long-term responsibility in learners. These expectations cannot be met without leadership that prioritizes professional development, models sustainability values, and creates an enabling school environment. Furthermore, leadership is instrumental in setting a clear vision, providing instructional support, and fostering collaboration among educators to align teaching with sustainability goals. Moreover, leaders influence how policies are interpreted and translated into daily practice, which directly affects the quality and direction of competence development.

In addition, they are responsible for organizing structures that support continuous learning, reflection, and responsiveness to change. Although various challenges such as limited resources, unclear frameworks, and resistance to change may hinder progress, committed and strategic leadership can overcome these barriers by cultivating a shared commitment to sustainability. Educational leaders are therefore not only facilitators of learning but also key agents in advancing the professional capacity of teachers to respond effectively to the demands of sustainable education. A strong leadership approach ensures that competence development becomes a sustained and supported process within schools, making it possible for teachers to play their full role in contributing to a more just, inclusive, and sustainable society.

Suggestions

The following suggestions were made to improve on the issues raised in this paper:

1. School Leaders and Administrators should prioritize sustainability in their strategic plans and allocate time and resources for teacher professional development that aligns with sustainable education.

2. Teachers should actively engage in continuous learning opportunities focused on sustainability education. Furthermore, they should collaborate with peers through professional learning communities and interdisciplinary teams to enhance their understanding and application of sustainability in their teaching.
3. Education policy makers should develop and implement policies that integrate sustainable education as a core requirement in teacher training and ongoing professional development. training programs.
4. Institutions should design training that equips future teachers with both content knowledge and pedagogical skills related to sustainability. Moreover, leadership development for prospective school leaders should include training on how to support teachers in implementing sustainability-focused practices.
5. Non-Governmental Organizations and Development Partners should support schools and governments by offering technical assistance, capacity-building workshops, and learning materials related to sustainability

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TRANSFORMATIONAL LEADERSHIP IN NIGERIAN EDUCATION: DRIVING INNOVATION AND INCLUSIVE LEARNING IN THE 21ST CENTURY

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Abstract

In Nigerian education system, where rapid technological advancements, evolving pedagogical demands, and growing calls for inclusive education are on the rise, transformational leadership has become a crucial framework for driving institutional success. This study explores the core principles and practices of transformational leadership within educational settings, focusing on its role in promoting innovation, motivating teachers, and achieving inclusive student outcomes. Drawing on current research, international examples and practical case studies from Nigerian schools, this study examines how transformational leaders inspire a shared vision, empower staff, and cultivate a collaborative culture that supports change and continuous improvement. using a population of 76 public senior secondary schools in the Federal Capital Territory (FCT), a stratified sampling technique was employed with five schools picked from each six (6) area councils. A total of 30 schools were used as sample size. Exploring statistic tools such as mean, standard deviation, variance and ANOVA, the study highlights the challenges and opportunities faced by school leaders in implementing transformational leadership, particularly amidst resource constraints and systemic barriers. The study concludes with strategic recommendations for school leaders, policymakers, and educational stakeholders who seek to harness transformational leadership as a tool for fostering sustainable growth and promoting equity in education. This paper offers both theoretical insights and practical approaches to leadership development in diverse, dynamic learning environments.

Keywords: Transformational Leadership, Inclusive Education, Educational Innovation, School Leadership Development

Introduction.

The 21st century has ushered in significant shifts within the Nigerian educational system, characterized by rapid technological advancements, evolving societal expectations, and increasing demands for inclusivity. Educational leaders are increasingly recognizing the need to adapt to these changes by embracing innovative leadership styles that foster continuous improvement and equity (Ogunyemi & Ogunyemi, 2011). Among the various leadership frameworks available, such as instructional leadership, transformational leadership, distributed leadership, and transactional leadership. Transformational leadership has emerged as one of the most effective models for addressing the complex challenges faced by modern educational institutions. Transformational leadership, characterized by its focus on vision, inspiration, and empowerment, is particularly well-suited for driving change and fostering a culture of collaboration and growth in schools.

In Nigerian educational context, transformational leadership shifts from a “maintenance” mindset to one of “innovation”. Research indicates that in a landscape often hampered by bureaucratic bottlenecks and infrastructure deficits, transformational leaders acts as the primary drivers of teacher job satisfaction and school effectiveness. (Akinpelu, 2016).

Over the years, the Nigerian education system has undergone several reforms aimed at improving quality and inclusivity. However, the implementation of these reforms remains inconsistent across the country, with disparities between urban and rural areas and among different socio-economic groups. School leaders in Nigeria face unique challenges in implementing transformational leadership practices due to the varying levels of resources availability, teacher preparedness, and institutional support. These challenges underscore the need for a more in-depth examination of how transformational leadership can be effectively applied within the Nigerian educational system, particularly in the face of significant socio-economic and infrastructural limitations.

At the global level, transformational leadership has been shown to improve teacher motivation, enhance student engagement, and drive educational reforms aimed at increasing access to quality education for all students, including those from marginalized groups (Leithwood & Jantzi, 2005). In countries such as the United States, the United Kingdom, and Australia, educational leaders have adopted transformational leadership practices to bridge achievement gaps, foster inclusive learning environments, and create school culture resilient to emerging challenges. The impact of such leadership is evident in improved academic outcomes, heightened teacher job satisfaction, and the overall educational experience for students. (Ainscow, 2005). Transformational leaders play a pivotal role in making inclusive education a reality through targeted attention to individual student needs, educator empowerment, and the cultivation of a school culture rooted in respect and collaboration. Although transformational leadership has been widely adopted across many educational settings globally, significant challenges persist, in resource-constrained environments. The implementation of transformational practices is often hindered by systemic barriers, such as limited funding, inadequate teacher training, and socio-cultural factors resistant to change. (Bush, 2003). In developing countries like in Nigeria, the potential for transformational leadership to effect meaningful change is frequently tempered by these obstacles. (Amanchukwu, et. al, 2015)

This study, therefore, seeks to explore the role of transformational leadership in driving educational innovation and promoting inclusive education within Nigerian schools. This research examines the core principles and practices of transformational leadership, its impact on institutional culture, and the hurdles school leaders face during implementation, aiming to deepen the understanding of how transformational leadership can serve as a catalyst for positive change in Nigerian education. It also seeks to provide practical recommendations for policymakers and educational stakeholders on how to harness transformational leadership to overcome current barriers and drive sustainable improvements in educational outcomes.

1.2 Statement of the Problem

Many studies in Nigeria establish a theoretical link between leadership and school growth but fail to address the “moderating variables unique to the Nigerian environment. Such as chronic underfunding, political interferences in school appointments and policy discontinuity (Adetona B.O, (2026). While Inclusive learning is often discussed in Nigerian educational policy, but it’s practical implementation through the lens of transformational leadership remains under-researched, particularly regarding students with diverse disabilities. Growing pressure to implement inclusivity has led to increased interest in transformational leadership as a means of driving change within schools. Even with its proven effectiveness in various educational settings, a significant gap still exists in understanding the structural application and impact of transformational leadership within the Nigerian educational context. Nadeem, M (2024). While international studies have highlighted the benefits of transformational leadership in fostering innovation and inclusivity, there is limited research on how Nigerian school leaders implement these practices in resource-constrained environments.

Furthermore, there is a scarcity of qualitative and quantitative studies that examine the direct impact of transformational leadership on the teachers' job satisfaction and academic performance of students with diverse disabilities in Nigeria. (Chigbu & Makapela, 2025). This study centers on the FC, Nigeria, to provide localized insights that can guide leadership development programs and inform policy decisions aimed at improving educational outcomes in the country.

1.3 Purpose of the study

1. Explore the core principles and practices of transformational leadership within Nigerian educational settings.
2. Examine the role of transformational leadership in promoting inclusive education.
3. Investigate the impact of transformational leadership on institutional culture.
4. Assess the challenges faced by school leaders in implementing transformational leadership practices in Nigerian schools

1.4 Research Questions

1. What are the core principles and practices of transformational leadership within Nigerian educational settings?
2. How does transformational leadership contribute to promoting inclusive education?
3. What is the impact of transformational leadership on institutional culture Nigerian in educational settings?
4. What challenges do school leaders face in implementing transformational leadership practices in Nigerian schools?

2.0 Literature Review

2.1 The Concept of Transformational Leadership

Transformational leadership is a leadership style that emphasizes change and innovation within an organization, focusing on motivating followers to achieve higher levels of performance and personal development (Bass, 1990). Transformational leadership is increasingly recognized as a vital catalyst for reform within the Nigerian educational landscape (Nadeem, M.2024). Unlike transactional leadership, which is based on reward and punishment, transformational leadership seeks to inspire and elevate the followers by addressing their needs and aligning their values with the vision of the organization. This approach is rooted in the belief that leaders can create significant change by fostering an environment that encourages creativity, autonomy, and professional growth (Northouse, 2018).

Transformational leaders are characterized by their ability to articulate a clear vision, set high expectations, and provide continuous support and encouragement for followers to achieve these goals. They do not merely manage tasks but work to transform the attitudes and capabilities of their followers, thereby cultivating a culture of innovation and improvement (Bass & Avolio, 1994). This leadership style is often linked to positive organizational outcomes, including improved morale, increased job satisfaction, and greater organizational commitment (Avolio & Bass, 2004).

2.2 Key Principles of Transformational Leadership

The key principles of transformational leadership, as outlined by Bass (1990), include idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. These principles serve as the foundation for building trust, fostering motivation, and encouraging growth among followers.

Idealized Influence refers to the leader's ability to serve as a role model for ethical behavior, instilling respect and trust among followers (Bass, 1990). Leaders who exhibit idealized influence are admired for their commitment to values, integrity, and a clear sense of purpose.

Inspirational Motivation involves the leader's ability to articulate a compelling vision that inspires and energizes followers to strive for higher performance (Bass & Avolio, 1994). This principle focuses on creating a sense of shared purpose and enthusiasm, which drives individuals to work towards achieving collective goals.

Individualized Consideration involves the leader's attention to the individual needs and aspirations of their followers, offering personalized support and development opportunities (Northouse, 2018). This principle fosters an environment where followers feel valued and supported, enhancing their commitment and willingness to contribute to organizational goals.

2.3 Transformational Leadership in Education

In educational settings, transformational leadership has gained significant attention as an effective framework for driving innovation and improving the quality of education (Akinpelu, J.A. 2016). Transformational leaders in education focus not only on managing the administrative aspects of schools but also on inspiring teachers and students to strive for excellence in learning outcomes. They create a shared vision for the school's future, motivate teachers to develop their skills, and work to cultivate a culture of collaboration and continuous improvement (Leithwood & Jantzi, 2005).

The role of transformational leadership in fostering educational innovation is particularly important in the context of changing educational demands, including the integration of technology and the shift towards inclusive education. Leaders who embrace transformational practices actively encourage teachers to adopt new teaching methods, engage in professional development, and collaborate to create more effective learning environments (Fullan, 2001). In promoting inclusive education, transformational leaders ensure that all students, regardless of their backgrounds or abilities, have access to quality education by fostering an inclusive and supportive school culture (Ainscow, 2005).

2.4 The Role of Transformational Leadership in Innovation and Change

Transformational leadership plays a pivotal role in driving innovation and change within organizations, particularly in educational settings where constant adaptation to new challenges is essential. (Bass, 1990). In education, the emphasis on innovation is vital as schools' face increasing pressure to integrate new technologies, adopt diverse teaching methodologies, and address a wide range of student needs.

Transformational leaders stimulate innovation by encouraging risk-taking, questioning the status quo, and fostering an environment where creative solutions are celebrated (Fullan, 2001). They support teachers and staff by creating a shared vision that aligns with the values and goals of the school, which motivates individuals to contribute towards achieving that vision.

2.5 Inclusive Education: Definitions and Frameworks

Inclusive education refers to the practice of ensuring that all students, regardless of their abilities, backgrounds, or challenges, have access to high-quality education within general education settings. Internationally, inclusive education is framed as a human rights imperative, the primary focus is on systematic reform rather than just "placing " a child in a classroom.(UNESCO,2020) It involves creating learning environments that accommodate a diverse range of learners, including those with physical, intellectual, or emotional disabilities, as well as students from marginalized or disadvantaged backgrounds (Ainscow, 2005).

Inclusive education seeks to move away from the traditional practice of segregating students with special needs into separate classrooms or institutions, instead advocating for their full participation in mainstream schools.

The framework for inclusive education emphasizes the removal of barriers to learning and participation, focusing on making adjustments to teaching methods, resources, and assessments to cater to the diverse needs of students (UNESCO, 1994). Key principles of inclusive education include respect for diversity, promoting equal opportunities for all students, and ensuring that education is adaptable to individual needs (Booth & Ainscow, 2011). At a policy level, inclusive education has gained global recognition as a key strategy for achieving educational equity. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has been at the forefront of advocating for inclusive practices, urging countries to align their educational policies with principles of inclusion to ensure that all children can benefit from a quality education (UNESCO, 2009).

2.5.2 Intersection of Transformational Leadership and Inclusive Education.

The intersection of transformational leadership and inclusive education is a dynamic and vital area of focus within educational research. (Northouse, P.G 2018). In Nigeria, transformational leadership has been found to have a significant positive correlation with teacher commitment. Leaders who provide inspirational motivation help educators look past immediate challenges such as delayed promotions or limited teaching aids to focus on the broader goal of national development (Onyekuru, B.U. & Ibegbunam, J.O 2013). Transformational leadership serves as a powerful catalyst for driving inclusive practices by creating a school culture that values diversity, encourages the active participation of all students, and fosters collaboration among educators (Leithwood & Janie, 2005). Transformational leaders in education have the ability to inspire and motivate teachers, parents, and students to embrace inclusive education as a fundamental aspect of the school's mission. Transformational leaders work to empower teachers through professional development and support, equipping them with the skills and knowledge needed to teach students with varied learning needs (Fullan, 2001). Furthermore, these leaders promote a shared vision of inclusivity that encourages all staff members to adopt inclusive teaching strategies, fostering an environment where students are given equal opportunities to succeed.

In addition, Nigerian education is currently in a transition phase toward digital literacy. Transformational leaders provide intellectual stimulation by encouraging teachers to move away from rote learning and embrace technology even within the constraints of the digital divide. (Amanchukwu, R.N, Stanley, G.J, & Olumati, N.P 2015). Transformational leaders actively engage with the broader community to raise awareness about the importance of inclusive education. They encourage collaboration with parents, caregivers, and local organizations to ensure that students' social and emotional needs are met, creating a network of support that benefits the whole school community (Ainscow, 2005).

2.6 Global Perspectives on Transformational Leadership in Schools

Transformational leadership has gained significant traction across educational systems worldwide, with its principles influencing school management and leadership practices in countries from North America to Europe, Asia, and beyond. Globally, the model has been employed to address a range of educational challenges, including teacher burnout, student disengagement, and the integration of new technologies in the classroom.

In the United States, for example, transformational leadership has been linked to improvements in school culture and student achievement. Studies have shown that transformational leaders, by fostering a sense of collective responsibility and providing professional development opportunities, can significantly enhance teacher effectiveness,

which, in turn, leads to better student outcomes (Leithwood, 2006). Similarly, in the United Kingdom, transformational leadership has been recognized as a key factor in driving educational reforms, particularly in schools that serve disadvantaged communities. Leaders in these contexts have used transformational principles to motivate staff, enhance teaching practices, and address the diverse needs of students (Day & Leithwood, 2007).

In Australia, transformational leadership has been promoted as a means of empowering schools to manage change in response to evolving educational standards and societal expectations. Australian educators have adopted transformational leadership to improve school leadership capacity, foster inclusivity, and enhance the quality of teaching and learning (Robinson, 2006). Globally, the common thread is the focus on empowering individuals, fostering collaboration, and creating schools that are responsive to the changing needs of students and society.

These global perspectives underscore the flexibility and applicability of transformational leadership in diverse educational contexts, highlighting its potential to drive positive change and promote educational success. However, the successful implementation of transformational leadership often depends on the local socio-economic, cultural, and political context, making it essential to consider the unique characteristics of each school system.

Methodology

Research Design

This study employed a descriptive survey research design to explore transformational leadership in Nigerian schools. This design is suitable for capturing the perceptions and experiences of educational leaders, teachers, and other stakeholders without manipulating variables.

Population and Sampling Techniques

The target population for this study consists of all public senior secondary schools in the Federal Capital Territory (FCT), Abuja, with a total of 76 schools as per official records from the FCT Education Secretariat (2025). A stratified sampling technique was employed, with five schools selected from each of the six Area Councils: Abaji, Abuja Municipal Area Council (AMAC), Bwari, Gwagwalada, Kuje, and Kwali. In each selected school, one principal, one vice principal, and eight teachers were chosen, resulting in 10 respondents per school, totaling 50 respondents per area. This led to a total of 300 respondents across the six Area Councils in the FCT.

Validity and Reliability:

The instrument was subjected to content validity by three experts in the department of Educational Foundations, National Open University, Abuja. Subsequently, a pilot test was conducted with 20 teachers from Police Day Secondary School, Garki, Abuja. Yielding a Cronbach's Alpha coefficient of 0.82, indicating high internal consistency.

Data Collection Methods

A structured questionnaire was developed as the primary instrument for data collection. The researcher distributed the questionnaires directly to participants through face-to-face interactions. This method was chosen to ensure a high response rate, aiming for a 100% return on the administered questionnaires.

Data Analysis

The data collected from the survey were analyzed using both descriptive and inferential statistical techniques (mean, standard deviation and ANOVA). Descriptive statistics provided

a summary of the data, while inferential statistics were used to draw conclusions and make predictions based on the responses.

Ethical Considerations

Ethical considerations for this study was sought and obtained from Research Ethics committee of the National Open University of Nigeria (NOUN). it included ensuring voluntary participation, informed consent, and maintaining the confidentiality of respondents' identities and responses. Participants were informed about the purpose of the study, their rights to withdraw at any time, and how their data would be used solely for research purposes.

FINDINGS AND DISCUSSION

4.1 Responses to the Research Questions

Research Question 1

What are the core principles and practices of transformational leadership within educational settings?

Table 1: Principles and practices of transformational leadership within educational settings

S/ N	Question	SA	A	SD	D	M ea n	Stan dard Devi ation
1	Transformational leaders in education inspire a shared vision among staff.	74 (29.6%)	102 (40.8%)	29 (11.6%)	45 (18.0%)	2.82	1.05
2	Educational leaders promote innovation through collaborative decision-making.	79 (31.6%)	91 (36.4%)	32 (12.8%)	48 (19.2%)	2.8	1.08
3	Transformational leadership practices encourage continuous professional development.	85 (34.0%)	83 (33.2%)	35 (14.0%)	47 (18.8%)	2.82	1.1
4	Leaders in schools model ethical behavior and integrity for others to follow.	73 (29.2%)	107 (42.8%)	30 (12.0%)	40 (16.0%)	2.85	1.01
5	School leaders empower teachers to take initiative in school improvement processes.	71 (28.4%)	97 (38.8%)	48 (19.2%)	34 (13.6%)	2.82	0.99

For the analysis of Research Question 1 in Table 1, the percentage of responses for each item varies across the different categories. For example, in the statement "Transformational leaders in education inspire a shared vision among staff," 29.6% strongly agreed, 40.8% agreed, 11.6% strongly disagreed, and 18.0% disagreed. The mean for this item was 2.82, indicating a generally positive perception of transformational leadership practices. The standard deviation was 1.05, suggesting moderate variability in the responses.

Similarly, in other statements, percentages reflect positive trends in transformational leadership, with means generally ranging from 2.80 to 2.85, indicating that respondents mostly agreed with the transformational leadership principles being assessed. The standard deviations ranged from 0.99 to 1.20, demonstrating some variability in responses across the questions. This indicates that while most participants agreed with the statements, there were some differing opinions on the impact and importance of various transformational leadership practices.

Research Question 2

How does transformational leadership contribute to promoting inclusive education?***Table 2: Contribute of transformational leadership to promoting inclusive education***

S / N	Question	SA	A	SD	D	M ea n	Standard Deviation
6	Transformational leaders promote policies that support learners of all abilities.	88 (35.2%)	104 (41.6%)	20 (8.0%)	38 (15.2%)	2.97	1.02
7	Leadership practices in my school support cultural and gender inclusiveness.	88 (35.2%)	96 (38.4%)	20 (8.0%)	46 (18.4%)	2.9	1.08
8	Leaders in my school ensure equal learning opportunities for all students.	93 (37.2%)	103 (41.2%)	25 (10.0%)	29 (11.6%)	3.04	0.97
9	Transformational leaders actively involve marginalized groups in decision-making.	83 (33.2%)	93 (37.2%)	24 (9.6%)	50 (20.0%)	2.84	1.1
10	My school leadership promotes the use of inclusive teaching and learning strategies.	95 (38.0%)	96 (38.4%)	25 (10.0%)	34 (13.6%)	3.01	1.01

For the analysis of Research Question 2, the percentage values indicate a generally positive response to the transformational leadership practices aimed at promoting inclusive education. For example, in the statement "Transformational leaders promote policies that support learners of all abilities," 35.2% strongly agreed, while 41.6% agreed. The percentages of strongly disagreeing and disagreeing were lower, at 8.0% and 15.2%, respectively. The mean for this item was 2.97, showing a positive perception of the practice. The standard deviation of 1.02 suggests that while the overall response was positive, there was some variability in how respondents viewed this practice.

In other statements, the means ranged from 2.84 to 3.04, reflecting a consistent positive attitude toward the role of transformational leadership in promoting inclusivity. The standard deviations for these statements varied between 0.97 and 1.10, which indicates a moderate spread in the responses. While most respondents agreed with the statements, the variation suggests that there were some differences in opinions. Overall, the analysis shows that transformational leadership is positively perceived in terms of supporting inclusive education, though there are some differing views among respondents.

Research Question 3

What is the impact of transformational leadership on institutional culture in educational settings?

Table 3: Impact of transformational leadership on institutional culture.'

S/N	Question	SA	A	SD	D	Mean	Standard Deviation
11	Transformational leadership fosters a culture of trust and openness.	68 (27.2%)	12 (5.0%)	25 (10.4%)	37 (14.8%)	2.88	0.97
12	The leadership style in my school encourages teamwork and collaboration.	76 (30.4%)	10 (4.0%)	29 (11.5%)	37 (14.8%)	2.89	1.00
13	Staff morale and motivation are positively influenced by the leadership approach.	83 (33.2%)	10 (4.0%)	29 (11.5%)	38 (15.2%)	2.91	1.02
14	My school's culture supports innovation and change due to the leader's vision.	71 (28.0%)	11 (4.4%)	35 (14.0%)	32 (12.8%)	2.89	0.96
15	The institutional culture is focused on continuous improvement under transformational leadership.	78 (31.2%)	10 (4.0%)	28 (11.2%)	37 (14.8%)	2.90	1.00

For the analysis of Research Question 3 in Table 3, the percentage values indicate that most respondents agreed with the transformational leadership practices impacting the institutional culture. In the statement "Transformational leadership fosters a culture of trust and openness," 27.2% strongly agreed, while 48.0% agreed, 10.0% strongly disagreed, and 14.8% disagreed. The mean for this item was 2.88, reflecting a generally positive response, with a standard deviation of 0.97, indicating some variability in the responses.

Similar trends were seen across the other statements. In the statement "The leadership style in my school encourages teamwork and collaboration," 30.4% strongly agreed, 43.2% agreed, with the remaining respondents either strongly disagreeing or disagreeing. The mean for this item was 2.89, with a standard deviation of 1.00. Other statements like "Staff morale and motivation are positively influenced by the leadership approach" and "The institutional culture is focused on continuous improvement under transformational leadership" showed similar patterns, with means ranging from 2.89 to 2.91 and standard deviations between 0.92 and 1.05, suggesting a consistent positive attitude toward the leadership approach, although some variation in opinions remains.

Research Question 4

What challenges do school leaders face in implementing transformational leadership practices in Nigerian schools?***Table 4: Challenges faced in implementing transformational leadership***

S / N	Question	SA	A	SD	D	Mean	Standard Deviation
16	Inadequate training limits the ability of school leaders to adopt transformational leadership.	138 (55.2%)	81 (32.4%)	8 (3.2%)	23 (9.2%)	3.34	0.92
17	Resistance to change among staff poses a barrier to leadership transformation.	114 (45.6%)	97 (38.8%)	15 (6.0%)	24 (9.6%)	3.2	0.93
18	Lack of resources hampers the implementation of inclusive and innovative leadership practices.	130 (52.0%)	87 (34.8%)	10 (4.0%)	23 (9.2%)	3.3	0.92
19	Bureaucratic constraints affect the flexibility required for transformational leadership.	129 (51.6%)	81 (32.4%)	14 (5.6%)	26 (10.4%)	3.25	0.96
20	Cultural expectations and traditional norms can hinder transformational leadership in Nigerian schools.	117 (46.8%)	85 (34.0%)	16 (6.4%)	32 (12.8%)	3.15	1.01

For the statement "Lack of resources hampers the implementation of inclusive and innovative leadership practices," 52.0% of respondents strongly agreed, 34.8% agreed, 4.0% strongly disagreed, and 9.2% disagreed. The mean for this item was 3.30, indicating a strong positive perception of the impact of resource constraints, with a standard deviation of 0.92, suggesting some variation in how respondents viewed this challenge.

For the statement "Bureaucratic constraints affect the flexibility required for transformational leadership," 51.6% strongly agreed, 32.4% agreed, 5.6% strongly disagreed, and 10.4% disagreed. The mean for this item was 3.25, showing a similarly strong agreement with the idea that bureaucratic constraints are an issue, with a standard deviation of 0.96, indicating moderate variability in the responses. This suggests that while most respondents agree on the importance of flexibility in leadership, there are some differences in how strongly they feel about it.

Conclusively "the 20 item leadership scale showed high internal consistency, with a Cronbach's alpha of .86. you can refer to the following standard thresholds below: #

Cronbach 'Alpha (α)	Internal consistency Level
$\alpha \geq 0.9$	Excellent
$0.8 \geq \alpha < 0.9$	Good(high Consistency)
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$\alpha < 0.5$	Unacceptable

Conclusion

Transformational leadership practices—such as involving marginalized groups in decision-making, ensuring equal learning opportunities, and promoting inclusive teaching strategies—are essential. Respondents consistently rated these leadership qualities favorably, with mean scores between 2.8 and 3.0, signaling that these practices are seen as highly beneficial for inclusivity.

However, challenges remain in fully implementing transformational leadership. Key barriers identified include inadequate training, resistance to change among staff, lack of resources, and bureaucratic constraints. These barriers were highlighted across various statements, with the majority of respondents strongly agreeing that these issues significantly hinder the implementation of effective leadership. Despite these challenges, the overall perception of transformational leadership remains positive, with respondents identifying opportunities for improvement in the areas of leadership training and resource allocation.

To promote inclusive education and innovation in the 21st century Nigerian classroom, leadership must move beyond traditional management toward a transformational approach. This involves reimagining how we use technology and how we view learner diversity.

Recommendations

Based on the findings from this study, several strategic recommendations can be made to promote transformational leadership in education, particularly in the context of driving innovation and inclusive learning in the FCT:

1. **Leadership Development Programs:** Educational leadership courses and workshops should be more readily available, tailored to meet the specific needs of school leaders in the FCT.
2. **Increased Focus on Inclusivity:** School leaders should implement inclusive teaching strategies and work closely with marginalized communities to ensure their voices are heard in decision-making processes.
3. **Resource Allocation and Support:** Resource constraints must be addressed, as they are a significant barrier to the effective implementation of inclusive educational practices.
4. **Addressing Bureaucratic Barriers:** Reducing red tape will empower leaders to innovate, adapt, and respond to the changing needs of their schools and communities.

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ASSESSING THE IMPACT OF EDUCATIONAL RESOURCES ON TEACHING AND LEARNING OF SOCIAL STUDIES EDUCATION IN NIGERIA

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Abstract

The integration of Open Educational Resources (OER) into Social Studies Education offers transformative opportunities for improving teaching and learning in Nigeria. OER, defined by UNESCO as freely accessible, openly licensed educational materials that can be reused, revised, remixed, and redistributed, provide an innovative response to persistent challenges such as inadequate instructional resources, high costs of textbooks, and limited access to localised learning materials. This paper assesses the impact of OER on the teaching and learning of Social Studies Education in Nigeria, drawing on recent empirical and conceptual studies published between 2023 and 2025. It examines how OER fosters learner-centered pedagogy, supports curriculum alignment with the Core Curriculum and Minimum Academic Standards (CCMAS), and encourages collaborative content development. The study also highlights critical barriers, including low digital literacy, infrastructural deficits, policy gaps, and limited awareness of open licensing. Using a review-based analytical approach, findings reveal that OER enhances instructional quality, promotes contextualised knowledge sharing, and reduces educational costs, thereby contributing to the attainment of Sustainable Development Goal 4 (Quality Education). The paper proposes a four-pillar OER assessment framework encompassing policy, capacity building, technology, and analytics. It concludes with actionable recommendations for government, institutions, educators, and development partners to strengthen OER adoption and sustainability. The significance of OER in promoting civic competence and global citizenship within Social Studies is underscored, positioning it as a key driver for equitable and inclusive education in Nigeria.

Keywords: Open Educational Resources, Social Studies Education, Nigeria, Teaching and Learning, Educational Technology

Introduction

Over the past two decades, the educational landscape in Nigeria has undergone profound transformation, largely driven by rapid technological advancements, globalization, and the increasing integration of digital tools into teaching and learning processes. These changes have redefined how knowledge is created, accessed, and disseminated, thereby presenting both opportunities and challenges for educators and learners. Within this dynamic context, Social Studies Education—an interdisciplinary field designed to promote civic competence, critical thinking, cultural awareness, and national development—occupies a central role in preparing students to function effectively in a complex and evolving society. Despite its importance, the teaching and learning of Social Studies in Nigeria continue to face significant constraints, including inadequate instructional materials, limited access to current and locally relevant content, insufficient teacher training, and the high cost of educational

resources (Oluwaseun & Adeyemi, 2024). In addition to these challenges, disparities in access to quality educational resources between urban and rural schools further exacerbate inequalities in learning outcomes. Many schools, particularly in underserved communities, rely on outdated textbooks and lack the technological infrastructure required to support modern pedagogical approaches. Consequently, students are often deprived of engaging, interactive, and contextually relevant learning experiences that are essential for meaningful understanding of Social Studies concepts. These limitations underscore the urgent need for innovative, scalable, and cost-effective solutions that can enhance both teaching effectiveness and student learning outcomes.

Open Educational Resources (OER) have emerged as a promising response to these challenges. Since their formal introduction at UNESCO's 2002 Forum on Open Courseware, OER have gained global recognition as freely accessible, openly licensed educational materials that can be used, adapted, and redistributed with minimal or no cost. These resources include textbooks, lesson plans, multimedia content, simulations, and assessment tools, all of which can significantly enrich classroom instruction. The flexibility and adaptability of OER make them particularly suitable for addressing the diverse learning needs and contextual realities of Nigerian classrooms.

In Nigeria, the adoption of OER has been gradually gaining traction, particularly within higher education institutions and through initiatives supported by governmental and non-governmental organizations. However, despite these emerging efforts, the integration of OER into Social Studies Education at the basic and secondary levels remains limited, inconsistent, and under-researched (Babatunde, 2023). Factors such as low awareness among teachers, inadequate digital literacy skills, poor internet connectivity, and the absence of clear policy frameworks continue to hinder widespread adoption. As a result, the transformative potential of OER in enhancing Social Studies Education has not been fully realized. Against this backdrop, this paper critically examines the role of Open Educational Resources in improving the teaching and learning of Social Studies in Nigeria. It explores the multifaceted benefits of OER, including increased access to high-quality educational materials, enhanced teacher professional development, improved student engagement, and the promotion of collaborative and learner-centered pedagogies. At the same time, the paper highlights the key challenges associated with the adoption and implementation of OER, offering insights into strategies for overcoming these barriers.

Furthermore, the study situates the use of OER within the broader global agenda for sustainable educational development. In particular, it underscores the alignment of OER with the Sustainable Development Goals (SDGs), especially Goal 4, which seeks to ensure inclusive, equitable, and quality education and promote lifelong learning opportunities for all (UNESCO, 2023). By facilitating open access to knowledge and reducing educational inequalities, OER represent a critical tool for advancing educational equity and social inclusion in Nigeria.

Ultimately, this paper argues that a systematic, policy-driven, and well-supported integration of OER into Social Studies Education can play a transformative role in addressing existing resource gaps, strengthening teacher capacity, and enhancing student learning outcomes. Such an approach is essential for equipping learners with the knowledge, skills, and values required to participate actively and responsibly in national development and global citizenship.

Statement of the Problem

Despite increasing policy recognition of the importance of digital learning and the integration of technology in education, the reality within many Social Studies classrooms in Nigeria remains largely unchanged. The teaching and learning environment continues to be

constrained by several persistent and interrelated challenges that undermine effective instructional delivery and student learning outcomes. One of the most critical issues is the inadequacy of teaching resources. Many schools, particularly in public and rural areas, depend heavily on outdated textbooks that are limited in scope, lack current information, and fail to address emerging societal issues. This restricts the ability of teachers to deliver relevant and engaging lessons, thereby diminishing the quality of Social Studies education. Closely related to this is the high cost of instructional materials. Commercially produced textbooks and supplementary resources are often prohibitively expensive for many students and schools, leading to unequal access to essential learning materials. This financial barrier further widens the gap between well-resourced and under-resourced institutions. Another significant concern is the lack of contextualization of learning materials. A considerable proportion of available instructional resources are either imported or developed without adequate consideration of Nigeria's unique socio-cultural, economic, and political realities. As a result, students may find it difficult to relate theoretical concepts to their immediate environment, limiting meaningful learning and the development of critical civic competencies. Furthermore, technological and infrastructural challenges continue to hinder the effective integration of digital resources into Social Studies instruction. Limited access to reliable internet services, inconsistent electricity supply, and low levels of digital literacy among both teachers and students significantly restrict the utilization of modern educational technologies. These barriers are particularly pronounced in rural and underserved communities, thereby exacerbating existing educational inequalities. In this context, Open Educational Resources (OER) offer a promising, cost-effective, and flexible alternative to traditional instructional materials. OER have the potential to provide up-to-date, adaptable, and locally relevant content that can enhance both teaching and learning experiences. However, despite their advantages, the adoption and utilization of OER in Nigeria remain sporadic and limited. Key barriers include low awareness among educators, inadequate training in the use and adaptation of OER, and the absence of comprehensive and supportive policy frameworks to guide their implementation. Given these challenges, there is a clear need to critically examine how OER can be effectively integrated into Social Studies Education in Nigeria to address existing gaps and improve educational outcomes.

Purpose

The aim of this paper is to examine the current status of Open Educational Resources (OER) adoption in Social Studies Education in Nigeria. It seeks to analyze the impact of OER on teaching effectiveness and student learning outcomes, particularly in relation to access to quality instructional materials and learner engagement. In addition, the paper identifies the key challenges that hinder the widespread adoption and effective utilization of OER within the Nigerian educational context. Finally, it provides practical recommendations for policy development, educational practice, and further research to support the systematic integration of OER into Social Studies Education.

Conceptual Clarifications

To ensure clarity and a shared understanding of key terms used in this study, it is important to provide concise explanations of the central concepts. This helps to establish a common framework for interpreting the discussion and analysis presented in the paper. Open Educational Resources (OER) refer to teaching, learning, and research materials that are freely available for use, adaptation, and redistribution, typically under open licenses. These resources include textbooks, lesson plans, multimedia content, and assessment tools, and are designed to reduce cost barriers while enhancing access to quality education. Social Studies Education is an interdisciplinary field that focuses on the study of society and social relationships, with the aim of developing informed, responsible, and active citizens. It integrates knowledge from

history, geography, economics, and civics to promote critical thinking, cultural awareness, and civic competence.

Teaching and Learning describe the interactive processes through which knowledge, skills, values, and attitudes are transmitted and acquired. Teaching involves the methods and strategies employed by educators, while learning refers to the cognitive and behavioral changes that occur in students as a result of instruction and experience. Educational Technology refers to the use of digital tools, platforms, and resources to enhance teaching and learning processes. It encompasses technologies such as computers, the internet, mobile devices, and software applications that support the creation, delivery, and management of educational content.

Theoretical and Conceptual Framework

This study is grounded in a combination of complementary theoretical perspectives that collectively explain how knowledge is accessed, constructed, and disseminated in digitally mediated learning environments, as well as how innovations such as Open Educational Resources (OER) are adopted within educational systems. These frameworks provide a robust lens for analyzing the role of OER in enhancing Social Studies Education in Nigeria. The first theoretical anchor is Connectivism, as proposed by Siemens (2024). Connectivism challenges traditional views of learning by asserting that knowledge is not confined to the individual but is distributed across networks of information, individuals, and digital platforms. Learning, therefore, involves the ability to identify, access, and connect to relevant information sources. In the context of this study, OER function as key nodes within these knowledge networks, enabling teachers and learners to access diverse, up-to-date, and globally sourced materials. This is particularly significant for Social Studies Education, where understanding dynamic societal issues requires continuous access to current information. Connectivism also highlights the importance of digital competence, decision-making, and the ability to filter information—skills that are essential for both teachers and students engaging with OER. Complementing this is the framework of Open Pedagogy, which represents a shift from traditional teacher-centered instruction to more participatory and collaborative learning approaches. Open Pedagogy is rooted in the principles of openness, sharing, and learner empowerment. It emphasizes that learners are not merely consumers of knowledge but active contributors to its creation and dissemination. Within the scope of this study, OER provide the tools and platforms that make such participation possible. For instance, students can adapt, remix, and co-create learning materials that reflect their local realities and experiences. This is particularly relevant in Social Studies Education, where contextual understanding and critical engagement with societal issues are essential. Open Pedagogy also fosters creativity, collaboration, and reflective learning, thereby enhancing student engagement and ownership of the learning process.

The third theoretical foundation is the Diffusion of Innovations Theory, developed by Rogers (2023), which provides a framework for understanding how new ideas and technologies are adopted within a social system. According to this theory, the adoption of an innovation such as OER is influenced by several key attributes, including its perceived relative advantage over existing practices, compatibility with users' needs and values, level of complexity, trialability, and observability of its benefits. In the Nigerian educational context, these factors help explain why OER adoption remains uneven and limited. For example, while OER may offer clear advantages in terms of cost and accessibility, challenges such as low digital literacy, inadequate infrastructure, and lack of institutional support may reduce their perceived usefulness or increase their complexity. The theory also highlights the role of communication channels, social networks, and change agents—such as policymakers and educational leaders—in promoting or hindering adoption. Conceptually, this study integrates these theories to propose that OER adoption in Social Studies Education operates within an interconnected system involving teachers, learners, technological infrastructure, and institutional frameworks.

OER are conceptualized as enabling resources that can enhance teaching effectiveness by providing flexible, up-to-date, and contextually adaptable materials. They also have the potential to improve learning outcomes by promoting active engagement, critical thinking, and collaborative knowledge construction among students.

However, the effectiveness of OER integration is not automatic; it is mediated by several critical factors. These include teachers' awareness and competency in using OER, availability of technological infrastructure such as internet access and electricity, supportive educational policies, and institutional commitment to innovation. Additionally, socio-cultural factors and attitudes toward technology play a significant role in shaping adoption patterns. Thus, the conceptual framework of this study posits a dynamic relationship in which OER influence teaching and learning processes, which in turn affect educational outcomes in Social Studies. At the same time, this relationship is moderated by contextual variables such as infrastructure, policy environment, and user capacity. Understanding these interactions is essential for developing strategies that can enhance the effective integration of OER in Nigeria's education system.

Review of Related Literature

Global Perspective

OER adoption is expanding globally. In Canada and the U.S., open textbooks have significantly reduced student costs (Jhangiani & Biswas-Diener, 2024). In South Africa, the Siyavula project demonstrates how openly licensed materials improve learning in underserved schools (Letseka, 2023).

African and Nigerian Experiences

Nigeria's OER movement is gaining traction through initiatives like the National Open University of Nigeria (NOUN) OER Portal, but penetration in primary and secondary education remains low (Babatunde, 2023). A 2024 study by Iwu and Okeke found that only 27% of Social Studies teachers had used any form of OER in the last academic year.

Methodological Considerations

This study adopts a desk review approach, analyzing peer-reviewed articles, government reports, and institutional case studies from 2023–2025. The Four-Pillar OER Assessment Framework is proposed:

1. Policy Support
2. Capacity Building
3. Technological Infrastructure
4. Analytics and Feedback

Findings and Discussion

Benefits of OER in Social Studies Education
Cost Savings: Students save on textbook costs (Jhangiani, 2024). **Localization of Content:** Materials can be adapted to reflect Nigerian sociocultural realities. **Interactive Learning:** Multimedia OER improves engagement and retention (Okonkwo & Yusuf, 2025).

Barriers to the Utilization of Open Educational Resources

Despite the significant potential of Open Educational Resources (OER) to transform teaching and learning, their effective utilization in Nigeria is constrained by several critical challenges. One major barrier is the limited awareness and understanding of Creative Commons licensing among educators. Many teachers are unfamiliar with the legal and ethical frameworks that guide the use, adaptation, and distribution of OER, which often leads to hesitation or misuse of available resources. Another key challenge is the low level of digital

literacy among teachers. The effective use of OER requires a certain degree of technological competence, including the ability to search for, evaluate, adapt, and integrate digital resources into instructional practices. However, many educators lack the necessary skills and training to fully harness these tools, thereby limiting their adoption in classroom settings.

In addition, infrastructural limitations such as inconsistent internet connectivity and unreliable electricity supply significantly hinder access to and use of OER. These challenges are particularly prevalent in rural and underserved areas, where schools often lack the basic technological infrastructure required to support digital learning.

Conclusion

Open Educational Resources (OERs) have proven to be a transformative force in education, particularly in enhancing the teaching and learning of Social Studies in Nigeria. By providing open access to quality materials, OERs reduce the financial strain on learners and institutions, while at the same time allowing teachers to adapt content to suit local contexts and learners' needs. This flexibility not only enriches classroom experiences but also promotes equity and inclusiveness in education. Despite these clear advantages, the effective integration of OERs is still challenged by issues such as inadequate digital infrastructure, low levels of awareness, and limited training for educators. Addressing these gaps requires deliberate government policies, institutional commitment, and sustained investment in technology and capacity building. Collaboration among stakeholders—educators, policymakers, and researchers—is equally vital in ensuring that OERs are accessible, reliable, and of high quality.

Ultimately, OERs are more than just cost-saving alternatives; they embody the vision of democratized knowledge, lifelong learning, and shared growth. Their adoption aligns with the Sustainable Development Goal 4 on quality education, positioning them as powerful tools for fostering innovation, collaboration, and social responsibility. If properly harnessed, OERs will not only advance Social Studies Education but also contribute to the development of a more informed and participatory citizenry capable of driving Nigeria's sustainable development.

Recommendations

Based on the findings of this study, the following recommendations are made to enhance the adoption and effectiveness of Open Educational Resources (OER) in teaching and learning Social Studies Education in Nigeria:

- Government should incorporate OER strategies into the National Policy on Education and provide grants for OER projects.
- Institutions should establish OER repositories and incentivize faculty contributions.
- Teacher Training should include OER integration modules.
- Infrastructure Investment to expand internet and electricity access.

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KINESTHETIC LEARNING AS A BRIDGE IN HYBRID CLASSROOMS: IMPACTS ON REFLECTIVE AND IMPULSIVE SECONDARY SCHOOL STUDENTS

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Abstract

In the evolving landscape of hybrid education, understanding diverse cognitive styles is vital to fostering effective student retention. This paper examined the effectiveness of integrating kinesthetic learning strategies to enhance retention among secondary school biology students with differing cognitive styles specifically, reflective and impulsive learners within a hybrid classroom environment. The study adopted a quasi-experimental control group design, involving pretest, and post posttest. Population comprised 6,346 SSII Biology students from 15 public co-education senior secondary schools in Giwa education Zone, Kaduna, Nigeria. 120 students from two schools participated in the study. Impulsive and Reflective Student Scale (IRSS) with a reliability coefficient of 0.82 was used to establish the cognitive style of student. The Ecology Concept Retention Test (ECRT) with a reliability coefficient of 0.88 was used to measure academic retention of students. The experimental group was taught using kinesthetic learning strategies delivered within a hybrid classroom model (a combination of physical and online instruction). While the control group was taught using conventional lecture method. Two research questions were answered using mean and standard deviation statistic and two null hypotheses were tested at $p \leq 0.05$. Data collected were analysed using independent t-test, one way ANOVA and Scheffes' test. Result among others revealed that: a significant difference exists between mean retention score of experimental and control group ($P = 0.001 < 0.05$). Based on these findings, it was concluded that both reflective and impulsive learners showed substantial improvement in post-test retention scores after participating in kinesthetic learning activities within a hybrid classroom model. The researchers recommended that biology lessons should be designed to blend physical activities with digital tools and teachers should tailor tasks for reflective learners with more structured, paced activities, and allow impulsive learners to explore with less constraint.

Keywords: kinesthetic learning, hybrid classroom, impulsive learners, reflective learners.

Introduction

Hybrid classrooms, also known as blended learning environments, combine face-to-face instruction with online learning components, offering flexibility and access to diverse learning tools and experiences (Zainuddin, Perera, and Halili 2020). In secondary education, hybrid models have become increasingly relevant, especially following the global shift toward digital learning platforms during and after the COVID-19 pandemic. These classrooms according to Zhu, Bonk, and Doo, (2021) integrate live and self-paced learning, allowing teachers to differentiate instruction and students to engage with materials at their own pace, and time. Hybrid models promote personalized learning, facilitate the inclusion of active learning strategies like kinesthetic learning, and support sustainable engagement across diverse cognitive styles.

This shift has revealed the limitations of single-mode instruction, particularly for learners with diverse cognitive styles. Mayer, (2021) opine that the growing diversity in learners' needs calls for multimodal engagement, that is the use of various instructional

strategies such as kinesthetic learning, interactive strategy among others to support different cognitive styles. Multimodal engagement according to Almusharraf and Khahro, (2020), helps improve student motivation, comprehension, and retention by catering to individual strengths and reducing cognitive overload. In hybrid classrooms, where physical presence may be inconsistent, such strategies are essential to maintain inclusivity and active learning.

Hybrid learning environments, while offering flexibility and accessibility, present certain challenges for students with differing cognitive styles, especially reflective and impulsive learners. These styles as reported by Zhang and Sternberg (2022), influence how students process information, make decisions, and interact with content materials. O'Shea, Stone, and Delahunty (2019), noted that reflective students tend to prefer slow, deliberate processing of information. In hybrid settings, they often struggle with real-time participation, especially in synchronous discussions or activities that demand quick responses. The nature of hybrid classroom can limit their ability to deeply engage with content material, especially when instructional pacing is fast or inconsistent across digital and in-person modalities.

Conversely, Impulsive students according to Rashid and Asghar, (2020), tend to act or respond quickly without full deliberation, which may make it difficult for them to self-regulate in hybrid environments where autonomy and time management are essential. They may complete tasks hastily during asynchronous sessions without adequate reflection, leading to errors or shallow understanding. In the absence of immediate feedback from teachers, which is more common in physical classrooms, Maatuk, Elberkawi, Aljawarneh, Rashaideh, and Alharbi (2022) highlight that impulsive learners may feel unsupported or lost. Both reflective and impulsive learners face difficulties with engagement and adaptation. Reflective students may become overwhelmed by the number of digital platforms or disengage when interaction is minimal, while impulsive students may be distracted by multitasking or online stimuli. These challenges emphasize the need for differentiated instruction and multimodal strategies such as kinesthetic learning in hybrid classrooms to accommodate varied cognitive styles in hybrid classroom.

Kinesthetic learning is a teaching approach where students engage in hands-on, physical activities to explore and understand content of a subject. It emphasizes learning by doing, allowing learners to internalize concepts through movement, touch, and physical manipulation. This approach according to Samsudin, Abdullah, and Yusof, (2021) improved attention span, retention, and motivation, especially in subjects like science and biology where abstract concepts can be difficult to grasp. In secondary schools, kinesthetic strategies such as lab experiments, physical simulations, model-making, and role-playing are used to make lessons more interactive and engaging. Khan and Ahmad, (2020) noted that these methods are particularly effective for learners who struggle with traditional lecture-based formats or who have high levels of energy and need frequent movement, making it a powerful tool in addressing the learning needs of both reflective and impulsive students in hybrid environments. In hybrid classrooms, kinesthetic learning can be integrated through interactive online simulations, role-playing, movement-based activities, and the use of real-life scenarios that allow students to "learn by doing" regardless of physical location and cognitive diversity (Basheer, Ibraim and Hussaini 2022).

For reflective learners, who tend to process information thoughtfully and prefer time for internal reasoning, kinesthetic activities offer structured, tangible experiences that deepen understanding. Tasks such as role-playing, model-building, or simulations allow them to engage in meaningful learning at their own pace, reinforcing concepts through physical application rather than hurried verbal responses (Hashemnezhad and Hashemnezhad, 2021). When incorporated into hybrid settings, kinesthetic tasks also provide reflective students with opportunities for offline exploration, which supports their cognitive preference for delayed decision-making and contemplation. Conversely, impulsive learners, who often respond

quickly but risk making errors due to limited processing, benefit from kinesthetic strategies that channel their energy into purposeful movement and task-driven focus. Activities like timed sorting games, interactive lab experiments, or digital manipulation of objects can help regulate their impulsivity while promoting active involvement. According to Alghamdi (2020), these learners thrive when instructional tasks are dynamic and involve bodily movement, as it keeps them stimulated and less prone to distraction.

Kinesthetic learning promotes multisensory engagement, which has been shown to improve working memory and attention span in learners with varying cognitive styles. In hybrid classrooms, where motivation and focus can fluctuate, especially during asynchronous sessions, kinesthetic strategy offers a bridge, ensuring both reflective and impulsive learners are actively constructing knowledge rather than passively receiving it. Integrating kinesthetic learning into hybrid classroom according to Tay, Lee and Tan (2023) also encourages collaborative learning, peer interaction, and self-regulation, skills that are essential for both cognitive types but are often underdeveloped when instruction is overly reliant on screen-based or lecture-driven formats

The significance of this study lies in its potential to inform both educational theory and practice by addressing a crucial gap on how to effectively to engage learners with diverse cognitive styles, specifically reflective and impulsive students, in blended learning environments. Many hybrid classrooms still rely heavily on visual and auditory modes of instruction, potentially neglecting students who benefit more from tactile, physical engagement. This research highlights kinesthetic learning as a viable and inclusive instructional approach to bridge these gaps.

The theoretical framework upon which this study was based is dual-process theory of Evans, (2008) which is a review on Kagan (1965), Matching Familiar Figures Test (MFFT). Kagan's theory posits that these cognitive styles are not necessarily linked to intelligence but to individual preferences for how information is processed. According to Kagan, impulsive learners tend to act more quickly but may be less accurate, while reflective learners are slower but more accurate. The dual-process theory (Evans, 2008) further builds on this by suggesting that cognitive processing can be categorized into two systems: a fast, automatic, impulsive system and a slow, deliberate, reflective system. In education, it implies that students may benefit from teaching strategies tailored to their cognitive style, which may influence their overall learning effectiveness. This framework underpins the study's exploration of how kinesthetic learning can be adapted to meet the diverse cognitive needs of learners in hybrid classrooms.

Research objectives

This study was guided by the following research objectives which are to;

1. determine the effects of Kinesthetic-learning strategy on retention ability of SSII students when taught ecology concepts in a hybrid classroom.
2. determine the effects of Kinesthetic-learning strategy on retention ability of SSII impulsive and reflective students taught ecology concepts in a hybrid classroom.

Research Questions

Based on the objectives stated, the researcher sought answers to the following questions.

1. What is the difference between the mean retention score of SSII students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture method?

2. What is the difference between the mean retention score of SSII impulsive and reflective students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture method?

Null Hypotheses

The following null hypotheses were formulated and tested at $P \leq 0.05$ level of significance.

H₀₁: There is no significant difference between the mean retention scores of SSII students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture methods.

H₀₂: There is no significant difference between the mean retention scores of SSII impulsive and reflective students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture method.

Methodology

The study adopted quasi experimental control group design. The population of this study was made up of all 6,346 SSII biology students, 3,762 males and 2,584 females all from Public senior secondary schools within Giwa Education Zone of Kaduna state. Simple random sampling technique by balloting was employed to select four co-education schools from the 15 senior secondary schools in Giwa Education Zone. In each of these four schools, one intact class was further randomly selected and subjected to equivalent test, from which two school were finally selected and randomly assigned to experimental and control group. Two research instrument were used to generate data in this study; Impulsive Reflective Student Scale (IRSS) and Ecology Concept Performance Test (ECPT).

Students in both experimental and control groups were subjected to IRSS was adapted from Kegan's (1966) Matching Figures Test (MFFT), a well-established tool for assessing cognitive styles, specifically impulsivity and reflectivity in decision-making. The IRSS was employed to categorize students into two distinct cognitive styles: impulsive and reflective. These categories were used to analyse how students' cognitive styles influenced their performance during the learning intervention.

Using Kegan's (1966) MFFT samples, the researcher adapted the framework and developed 10 similar test items named IRSS to suit SSII students. The rule of the task is that, students are shown a familiar image (standard) and six similar variants. Only one of the variants is identical to the standard. The student were asked to select the variant that is identical to match the standard. The score is the average of the number of errors and response time to the first selection across the total number of test items. Students with below-median errors and above-median response times were classified as reflective, while those with above-median errors and below-median response times were deemed impulsive. The scoring of the IRSS is based on two key metrics:

Errors: The number of incorrect selections made by the student.

Response Time: The time taken by each student to select the matching image.

Students were classified based on their performance relative to the median of the group:

Reflective Students: Below-median errors and above-median response times.

Impulsive Students: Above-median errors and below-median response times.

The experimental group was made up of 34 and 21 impulsive and reflective students. The control group was made up of 44 and 21 impulsive and reflective students. The study was conducted over eight-week period in selected secondary schools using a hybrid learning model that combined face-to-face instruction with online learning platforms such as Zoom classroom and Whatapp classroom. Both physical and digital learning tasks were designed to engage students through movement-based, hands-on, and interactive activities. These included: face-to-face sessions, where students engaged in classroom-based kinesthetic activities such as role-playing, group simulations, and interactive sessions. While learners participated in interactive sessions, video-based physical demonstrations, and guided home-based tasks such as acting out a scenario.

Ecology Concept Retention Test (ECRT) designed to measure the retention of ecological concepts over time, following the learning intervention. This test, also adapted from SSCE questions, was used to assess students' ability to retain and recall ecological concepts after the completion of the treatment period. ECRT was made up of 42 questions. A total of 42 items comprising 32 multiple choice items with options A-D, one answer and three distracters, including 10 fill in the blank. ECRT was administered as pretest and post posttest to establish the effects of the treatment on retention. These instruments were subjected to both face and content validity. The face validity was done by senior lectures who are experts in test/evaluation in faculty of Education, they reviewed items for clarity, suitability of language to the target respondents. The reliability of the instrument yielded a PPMCC of 0.82 and 0.88 for IRSS and ECRT respectively. Descriptive statistics was employed in the analysis of the data collected. All research questions earlier stated were answered using mean and standard deviation while the hypotheses were tested using t-test, one-way ANOVA as well as post hoc Scheffes' test at $P \leq 0.05$ level of significance

Results

Data obtained for the purpose of this study were analysed based on the research questions as follows:

1. What is the difference between the mean retention score of SSII students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture method?

To answer research question one, Mean and standard deviation was used on ECPT, and summary of statistics is presented in Table 1.

Table 1 Mean and Standard Deviation in Experimental and Control Group

Groups	N	Mean	STD	Mean difference
Experimental	55	36.82	3.05	
Control	65	29.20	4.03	7.62
Total	120			

Result of the descriptive statistic from Table 1 revealed the difference between the mean retention score of students in experimental and control group. The descriptive mean statistic revealed the mean retention score of experimental group to be 36.82 and control group to be 29.20 with a mean difference of 7.62. This clearly indicates that the experimental group have

higher mean retention score than the control group. To test whether the difference was significant or not, null hypothesis one was tested and result is presented in Table two

H₀₁: There is no significant difference between the mean retention scores of SSII students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture methods.

To test null hypothesis one, independent t-test was employed on ECPT, and summary of analysis is presented in Table 2

Table 2: t-test statistic on difference in the mean retention of experimental and control group

Variable	Groups	N	Mean	STD	Mean diff.	Df	T cal.	T crit.	p-value
mean performance	Experimental	55	36.82	3.05	7.62	186	14.45	1.96	0.001
	Control	60	29.20	4.03					

p value – 0.001 < 0.05,

Results of the independent t test statistics revealed a significant difference in the mean retention of experimental and control group. Reasons being that the p-value calculated of 0.001 is lower than the 0.05 alpha level and its computed t value of 14.45 is greater than the 1.96 t critical value at df 186. Therefore, the null hypothesis is rejected, indicating that the difference in retention scores is statistically significant in favor of the experimental group. This suggest that the kinesthetic-learning strategy in hybrid classroom is more effective than the lecture method for enhancing retention of ecology concepts.

2. What is the difference between the mean retention score of SSII impulsive and reflective students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and lecture method?

To answer research question two, mean and standard deviation were used on ECPT posttest, and summary of statistic is presented in Table 3

Table 3: Means and Standard Deviation of Retention in Experimental and Control Group.

Cognitive styles	Group	N	Mean	Std. Deviation	Mean difference
Reflective	Experimental	21	39.42	2.20	8.97
	Control	20	30.45	3.18	
Impulsive	Experimental	34	34.73	2.81	5.92
	Control	44	28.81	3.69	

Result of the descriptive statistic from Table 3 revealed the difference between the mean retention score of impulsive and reflective students in experimental and control group. The

descriptive mean statistic revealed that the mean retention score of reflective students in experimental and control are 30.94 and 30.45 with a mean difference of 8.97 while impulsive students in experimental and control group have 34.73 and 28.81 mean retention scores with a difference of 5.92. This clearly shows that based on cognitive styles (Reflective and Impulsive), experimental group have higher mean retention score than the control group. To test whether the difference was significant or not, null hypothesis two was tested and summary of result is presented in Table 4.

H₀₂: There is no significant difference between the mean retention scores of SSII impulsive and reflective students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture methods.

To test null hypothesis two, one-way ANOVA was employed, and summary of analysis is presented in Table 4

Table 4: ANOVA Distribution on Retention of Students in Experimental and Control Groups

Variables	Sum of Squares	df	Mean Square	F crit.	P value	R
Between Groups	1855.61	3	618.53	6.25	.00	sig
Within Groups	1137.25	115	9.88			
Total	2992.87	118				

$P = 0.000 < 0.05$

From Table 4 outcome of the Analysis of Variance shows that the calculated P value 0.00 is lower than the alpha value 0.05 level of significance and the computed F value of 9.76 of is above the 6.25 F critical value at df 3. This implies that significant differences exist between the mean retention score of SSII impulsive and reflective students in experimental and control group in favour of the experimental group. Consequently, the null hypothesis which states that there is no significant difference between the mean retention scores of SSII impulsive and reflective students taught ecology concepts using Kinesthetic-learning strategy in a hybrid classroom and those taught using lecture methods, is hereby rejected. To reveal the groups with significant difference, a post hoc Scheffe's test was used, the result is presented in Table 5

Table 5: Multiple Comparison of Students' Retention in Experimental and Control Group

(I) Groups of Cognitive Styles	(J) Groups of Cognitive Styles	n	Mean	Mean Difference (I-J)	Std. Error	P value	Remarks
Experimental Reflective	Experimental Impulsive	3 4	30.4 5	4.69*	.87	.00	Sig
	Control Reflective	2 0	34.7 3	8.97*	.98	.00	Sig
	Control Impulsive	4 4	28.8 1	10.61*	.83	.00	Sig

Experimental Impulsive	Experimental Reflective	21	39.4	-	.87		Sig
	Control Reflective	2	34.7	4.69*	.88	.00	Sig
	Control Impulsive	4	28.8	5.91*	.71	.00	Sig
Control Reflective	Experimental Reflective	2	39.4	-8.97*	.98	.00	Sig
	Experimental Impulsive	3	30.4	-4.28*	.88	.00	Sig
	Control Impulsive	4	28.8	1.63	.84	.30	NS
Control Impulsive	Experimental Reflective	2	39.4	-10.61*	.83	.00	Sig
	Experimental Impulsive	3	30.3	-5.91*	.71	.00	Sig
	Control Reflective	2	34.7	-1.63	.84	.30	NS

Table 5 post hoc Scheffe's mean comparison test indicates significant differences exist between the mean retention scores of SSII impulsive and reflective students in experimental and control group. The post hoc Scheffe's means comparison clearly indicates that the P calculated 0.00, 0.00 and 0.00 is lower than the P value 0.05, which implies that significant difference exists between mean retention scores of experimental reflective, experimental impulsive, control reflective and control impulsive in favour of experimental reflective. While the P calculated 0.30 is higher than the P value 0.05, which implies that no significant difference in the mean retention scores between control reflective and control impulsive. These result highlights the effectiveness of kinesthetic-learning strategy in hybrid classroom, particularly in enhancing retention among impulsive and reflective learners. The results align with reviewed literatures which has indicated that kinesthetic learning in hybrid classroom can improve students' retention across diverse cognitive styles. Literatures on reflective and impulsive cognitive styles supports the finding that active learning approaches may benefits different learning types differently. This reinforces the understanding of how various teaching strategies and cognitive styles impact students' retention, particularly in hybrid learning environment.

Discussion of Findings

Effectiveness of Kinesthetic-learning in Hybrid Classroom

Findings revealed significant difference in the mean retention scores between experimental groups taught ecology concept using Kinesthetic-learning strategy in a hybrid classroom and control group taught the same concepts using Lecture method. The difference was in favor of experimental groups. This finding suggests that Kinesthetic learning strategy in a hybrid classroom has a positive effect on academic retention in ecology concept at senior secondary level. Kinesthetic-learning strategies promote greater interaction between students and teachers. Teachers observed and provide real-time feedback during hands-on activities, which benefited learners who needed immediate reinforcement and also provided opportunities to discuss and analyze the hands-on activities, helping them to build deeper insights. Kinesthetic learning strategy in hybrid classroom improved student motivation, comprehension, and retention by catering to individual strengths and reducing cognitive overload. The finding agrees with other studies like Solomon, Hassan and Hrastinski, (2019) and Tay et al (2023). Both reported positive outcome of multimodal engagement such as blending kinesthetic learning strategy in a hybrid classroom on academic retention when compared to lecture method. It also concurs with Gartner and McCowan, (2021) who highlighted that Kinesthetic learning benefits both reflective and impulsive learners, supporting the finding that impulsive learners thrive with fast-paced, action-oriented tasks, and reflective learners benefit from time for contemplation and offline engagement.

Result also revealed significant difference in the mean retention scores between experimental groups taught ecology concept using Kinesthetic-learning strategy in a hybrid classroom and control group taught the same concepts using Lecture method. The difference was in favor of experimental groups. To be precise reflective and impulsive students taught with Kinesthetic-learning strategy in a hybrid classroom. Impulsive learners showed significant improvements in their performance after participating in kinesthetic activities in a hybrid classroom, this suggest that hands-on, quick-feedback strategies help them focus and enhance their understanding of biological concepts. Their tendency to make fast decisions may be complemented by the immediate engagement and action-oriented nature of kinesthetic-learning strategy. These learners thrive when instructional tasks are dynamic and involve bodily movement, as it keeps them stimulated and less prone to distraction. While reflective learners demonstrate improved retention. This concurs with Tay et al. (2023) found that using kinesthetic modalities in blended classrooms helped balance the needs of students with varying cognitive preferences, resulting in more inclusive and participatory learning environments.

Impact of Lecture Method on Retention in Hybrid Classroom

The lecture method involved delivering contents in a structured, usually one directional format, where students receive information passively. In a hybrid classroom the lecture was supplemented with online recorded videos, reading materials and virtual discussions, but the core of the methods remains lecture-based. While hybrid classrooms offer flexibility and access to recorded content, the impact of a purely lecture-based approach can be a challenge for certain types of learners, especially those who need more interaction, engagement, or time for reflection.

Impulsive learners who are naturally inclined to act quickly struggle with long, passive lectures, especially in hybrid settings where they are expected to sit and listen to recorded content without immediate interaction. They tend to lose focus quickly, become disengaged, reducing retention. On the other side reflective learners in a lecture setting, without opportunities to interact with peers or the instructor, fall into a passive learning mode. While they may process information more thoroughly than impulsive learners, a lack of active engagement (for instance hands-on activities, discussions) diminish retention, as they do not

apply the material enough to retain its long-term. Reflective learners also struggle with online lecture formats that prioritize speed and brevity, especially in environments like video lectures, where information is delivered quickly without much time for contemplation unlike in the

kinesthetic-learning strategy.

Kinesthetic tasks provide reflective students with opportunities for offline exploration, which supports their cognitive preference for delayed decision-making and contemplation. This suggests that kinesthetic learning provides them with an opportunity for deeper engagement and time for thoughtful reflection while still involving movement and hands-on tasks. This deliberative approach allows them to connect abstract concepts with tangible experiences. Kinesthetic learning promotes multisensory engagement, which improves memory and attention span in reflective and impulsive learners. In hybrid classrooms, where motivation and focus can fluctuate, especially during asynchronous sessions, kinesthetic learning strategy can serve as a bridge to ensure both reflective and impulsive learners are actively constructing knowledge rather than passively receiving it. Integrating kinesthetic learning into hybrid classroom encourages collaborative learning, peer interaction, and self-regulation, some skills that are essential for both cognitive types but are often underdeveloped when instruction is overly reliant on screen-based or lecture method.

Conclusion

The following conclusions were deduced from this study

1. Kinesthetic-learning strategy within hybrid classroom helped students build problem-solving skills, encourages collaborative learning, peer interaction, and self-regulation. Thus, improved student motivation, comprehension, and retention ability.
2. Kinesthetic-learning strategy often involves group work and collaborative problem-solving. By working together on biology experiments, model-building tasks, or simulations, students developed collaborative skills, such as teamwork, communication, and negotiation. These skills are highly valued as education increasingly moves into hybrid and digital spaces, kinesthetic learning serves as a critical bridge, supporting student interaction in ways that enhance inclusivity and depth of learning

Recommendations

The following recommendations were made from this study

1. Senior secondary school teachers could be sensitized by professional bodies like Science Teachers Association of Nigeria (STAN) through workshops, conferences, and symposia on how to integrate structured kinesthetic activities such as simulations, manipulative, and role-play in both in-person and online sessions to accommodate diverse cognitive styles
2. Curriculum developers should ensure that kinesthetic components are adaptable for low-tech and high-tech environments, addressing equity concerns in digital access.

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LANGUAGE CONTACT, HYBRIDISATION, AND RE-DEVELOPMENT OF NIGERIAN PIDGIN IN ONLINE SPACES

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Abstract

This study investigates the evolving contact dynamics and processes of linguistic hybridisation underlying the contemporary re-emergence of Nigerian Pidgin (NP) within digital communication environments. Drawing on Weinreich's (1953) language contact theory, Bhabha's (1994) hybridity theory, and Rickford's (1987) decreolisation model, the paper analyses NP's transformation across virtual spaces such as social media, online discussion forums, and instant-messaging platforms. Using qualitative analysis of digital discourse samples collected between 2023 and 2025, it explores how NP functions as a fluid and inventive communicative repertoire that blends lexical, syntactic, and stylistic resources from English, indigenous Nigerian languages, and global internet vernaculars. The findings reveal that digitalisation has intensified NP's hybrid character while simultaneously exposing patterns of digital decreolisation, where English prestige and online fluency reshape NP's linguistic ecology. Evidence suggests that NP is increasingly performing new sociolinguistic roles, humour, solidarity, social critique, and expressions of national identity, making it a powerful marker of postcolonial creativity and identity negotiation in twenty-first-century Nigeria.

Keywords: Language contact; hybridisation; Nigerian Pidgin; digital discourse; decreolisation; virtual environments

Introduction

Language is an ever-changing social practice that adapts to the communicative demands of speakers. In Nigeria, advances in digital communication have transformed linguistic usage, particularly through Nigerian Pidgin (NP); a language once synonymous with non-formal, urban street life. No longer relegated to the periphery as "broken English," NP is now a signifier of contemporary identity, openness, and creativity, both online and offline (Akande, 2018; Ofulue, 2019). The introduction of social media spaces like X (formerly Twitter), Facebook, WhatsApp, and TikTok has amplified hybrid linguistic interactions. NP sits at the core of these digital spaces as a lingua franca through which humour, political satire, and popular culture are expressed. Phrases like "*Wahala for who no get data!*" or "*Na you sabi pass!*" circulate widely, combining NP lexis with English orthography. These illustrate what Blommaert (2010) calls *superdiversity*—a state of complex multilingual practice within globalised contexts.

According to Bamgbose (1995), NP "is a functional adaptation of English to Nigeria's sociolinguistic realities." Formerly restricted to trade and urban life, NP now flourishes in online communities where it merges with English and indigenous languages in creative new ways. This paper explores these phenomena through two questions: how language contact and hybridisation occur in Nigerian online discourse, and how digital decreolisation emerges through exposure to English norms. Nigeria's digital revolution has reshaped communication, redefining how languages are used and valued. With rising smartphone penetration and affordable internet, Nigerians interact daily in online spaces that encourage linguistic innovation. NP, once dismissed as a low-prestige variety, has gained new social value as a creative and inclusive form of online communication (Igboanusi, 2021; Ajagbe, 2024).

Recent studies reveal that NP's digital presence goes beyond casual chat; it functions as a platform for cultural politics, youth identity, and transnational belonging (Adelani et al., 2024). Hashtags like *#NaijaNoDeyCarryLast* and *#WahalaNoDeyFinish* encapsulate digital humour and solidarity. NP thus serves as both a unifier and a leveller across Nigeria's diverse ethnic and class groups (Faraclas, 2013). Unlike other postcolonial pidgins such as Jamaican Patois and Haitian Kreyòl, which have also undergone digital revitalisation (DeGraff, 2005; Mufwene, 2010), NP's evolution is distinctive. Its hybrid nature merges English vocabulary, indigenous syntax, and global memes, resulting in a glocal language that is simultaneously Nigerian and international (Garba, 2024).

Statement of the Problem

Despite many studies carried out on Nigerian Pidgin (NP) from the perspective of its usage as a contact language in physical, social settings (Elugbe & Omamor, 1991; Akande, 2018; Ofulue, 2019), little has been given to its internet-era transformations and the way it is carving new roles for itself in the digital domain. The shift in communication patterns from offline to internet-mediated social sites, chat sites, and digital entertainment networks has also brought NP under the spell of new driving forces, especially the imprint of English, spell-correction algorithms, and the pull of prestige standardisation. The lack of knowledge in digital decreolisation leaves a considerable gap in understanding how English prestige and digital literacy practices moulding NP's orthography, lexis, and value through the process are. Equally, the performative aspects of NP's internet presence, utilising it for humour, irony, and social commentary, are also uncharted territory when it comes to research in contact linguistics through hybridisation. This lack of research raises questions about how NP's internet transformation can be gauged in larger trends related to language adaptation, hybridisation, and identity construction.

Aim and Objectives of the Study

The study examines how Nigerian Pidgin (NP) evolves and operates in online spaces influenced by multilingual contact and digital hybridity, highlighting the sociolinguistic processes that shape its ongoing transformation. The objectives of the study are to:

1. Explain the role of language contact and hybridisation in NP's online usage.
2. Describe the linguistic features of digital NP—particularly codeswitching, lexical innovation, and orthographic variation.
3. Identify evidence of digital decreolisation and the influence of English prestige on NP's online evolution.
4. Examine NP's role as a medium of humour, identity construction, and resistance within digital communities.
5. Propose a theoretical framework for understanding digital contact languages in multilingual societies.

Research Questions

1. What patterns of contact and hybridisation define digital NP?
2. How do digital platforms shape NP's structure and function?
3. In what ways does exposure to English promote decreolisation?
4. How does NP encode humour, identity, and resistance?
5. Which framework best explains NP's online development?

Theoretical Framework

This study draws upon three interrelated theoretical perspectives, Language Contact Theory (Weinreich, 1953), Hybridity Theory (Bhabha, 1994), and Decreolisation Theory (Rickford,

1987), to explain the evolution of Nigerian Pidgin (NP) within digital communication environments. Together, these models interpret NP as a dynamic site of linguistic resistance and adaptation, shaped by contact, creativity, and convergence in online discourse.

Language Contact Theory (Weinreich, 1953)

Weinreich's *Language Contact* (1953) established that when speakers of different languages engage in regular interaction, linguistic interference, borrowing, and transfer occur, often giving rise to new varieties or contact languages. The theory provides a foundation for understanding how NP emerged historically through sustained interaction between English and indigenous Nigerian languages. In digital spaces, these contact dynamics persist as users blend English, NP, and local linguistic elements in online conversations. Thus, Weinreich's framework illuminates how digital multilingualism continues to fuel NP's ongoing hybridisation and lexical expansion.

Hybridity Theory (Bhabha, 1994)

Bhabha's (1994) *Hybridity Theory*, articulated in *The Location of Culture*, conceptualises hybridity as a "third space", a zone of negotiation where elements of dominant and subordinate cultures combine to produce new meanings, identities, and linguistic forms. Rather than viewing hybridity as impurity, Bhabha positions it as a creative force that destabilises authority and produces innovation. Within this framework, NP functions as a third space of linguistic and cultural negotiation, especially in online contexts where speakers remix English and indigenous expressions through code-mixing, memes, and creative orthography. This study, therefore, views digital NP as a postcolonial linguistic performance that challenges standard English dominance while asserting Nigerian sociocultural identity.

Decreolisation Theory (Rickford, 1987)

Rickford's (1987) *Decreolisation Theory* explains how creole languages tend to shift toward their lexifier or prestige language, typically English, due to sociolinguistic pressures such as education, literacy, and social mobility. The theory identifies a continuum from basilectal (more creole) to acrolectal (more standard) varieties. Applied to this research, decreolisation captures how digital communication accelerates convergence between NP and English. Influenced by autocorrect systems, algorithmic spelling, and the social prestige of English, users increasingly align their NP orthography and syntax with standard forms. Nevertheless, this process coexists with a counter-movement of linguistic resistance, as speakers intentionally preserve and stylise NP features to mark cultural authenticity in online interactions.

Synthesis of Theoretical Perspectives

Together, these theories conceptualise Nigerian Pidgin as a hybrid contact language undergoing continuous redefinition. Language Contact Theory situates NP's origin within historical bilingual interaction; Hybridity Theory frames its online creativity as negotiation within a third space; and Decreolisation Theory accounts for its gradual convergence toward English norms under digital and prestige pressures. By integrating these perspectives, this study interprets NP in virtual environments as both a product of contact and an instrument of cultural agency, reflecting broader patterns of linguistic adaptation and identity construction in the digital age.

Review of Related Literature

The early conceptual frameworks treated Nigerian Pidgin (NP/Naijá) as either the national lingua franca or a contact language (Elugbe & Omamor, 1991; Faraclas, 1996), while others analysed its sociocultural relevance (Akande, 2018) and identity constructions (Ofulue, 2019).

Early attention to orthography and semantics in NP's digital forms, as seen in Heyd's (2016) study, revealed how new media writing conventions reshape orthographic choices and semantic extension, highlighting the influence of platform affordances on emerging linguistic forms. Recent research has followed NP's entry into web spheres and its shift in prestige. Mair (2025) reports the rapid rise and social acceptance of Naijá in online and social media environments, arguing that "digital media are friendly to NP's emergence." Similarly, new corpus-driven surveys have explored the forces driving NP's ongoing standardisation, especially in areas such as grammar regularisation and dictionary extension (Mair, 2025; *Standardization of Nigerian Pidgin in Social Media*, 2025). The corpus-linguistic infrastructure has also expanded through resources such as NaijaSynCor and UD Naija-NSC, which enable large-scale analysis of spoken Naijá at levels of macro-syntax, pragmatics, and discourse variation (Caron et al., 2024; Scholman et al., 2025).

Empirical Literature and Findings

Heyd (2016) empirically examined online discourse in Nigerian and Ghanaian Pidgin forums, revealing how users create new spellings and word meanings through interactive, user-led innovation. The study demonstrated that digital participation itself is a site of language change, mirroring this research's interest in virtual contact environments. However, Heyd's work was limited to early web forums and did not address the hybridisation or decreolisation processes visible in contemporary social media. Mensah (2021) conducted an orthographic field survey across tertiary institutions and media outlets, recommending a phonemic orthography for NP to enhance its use in literacy and education. This aligns with the current study's concern with standardisation and orthographic regularity, though Mensah's analysis was offline and policy-oriented, lacking the algorithmic and platform dimensions explored here.

Adelani et al. (2024) approached NP from a computational-linguistic perspective, testing large language models (LLMs) trained on West African Pidgin English datasets. Their experiments revealed systemic underrepresentation of Naijá, exposing how digital technologies and AI systems can subtly advance "digital decreolisation"—the assimilation of NP to English norms through machine bias. While their study focused on model performance, the present study extends this argument to naturalistic online discourse, tracing decreolisation as a social and linguistic process among users. Scholman et al. (2025), building on the NaijaSynCor corpus, examined discourse relations, implicitness, and coherence markers in spoken Naijá, showing how contact-induced variation manifests at the discourse level. Their findings reinforce NP's hybrid pragmatics and support this study's contact-theoretical orientation, but their corpus did not include digital text data from the post-2023 period.

Nwosu (2025) conducted one of the first mixed-methods studies on NP standardisation on social media, analysing posts from Facebook and X (Twitter). The results showed increasing lexical convergence and a gradual shift in prestige towards "educated Naijá" forms, driven by user corrections and community norms. While Nwosu's work documents convergence patterns, it does not situate them within a tri-theoretical framework or quantify decreolisation pressures across platforms, as the present study aims to do.

Synthesis and Research Gap

Collectively, these studies confirm that Nigerian Pidgin is no longer confined to spoken or informal domains—it is being reconstituted as a techno-cultural written code shaped by social media affordances, corpora/NLP infrastructures, and standardisation pressures. The literature affirms NP's evolution but leaves critical gaps regarding how contact dynamics, hybridity, and decreolisation jointly operate in virtual communicative ecosystems.

What this study adds

This study goes beyond earlier research by:

1. Integrating three theoretical lenses, Language Contact (Weinreich, 1953), Hybridity (Bhabha, 1994), and Decreolisation (Rickford, 1987), to explain NP's digital reformation as both linguistic adaptation and cultural resistance.
2. Employing a multi-platform corpus (2023–2025) that captures NP across WhatsApp, X (Twitter), and TikTok commentaries, offering empirical evidence of digital decreolisation and hybridisation in real time.
3. Introducing quantitative indices such as *Orthographic Convergence* and *English-Alignment Scores* to measure standardisation drift—a methodological innovation absent from previous work.
4. Linking discourse-level functions (humour, stance, resistance) with micro-linguistic forms, demonstrating how identity negotiation and expressive creativity coexist with structural convergence.
5. Highlighting platform affordances (auto-correct, spell-check, trending syntax) as drivers of linguistic change, thus showing how technological infrastructures mediate contemporary NP evolution.

Through these contributions, the study provides the first integrated, post-2023 empirical **account** of how Nigerian Pidgin is being hybridised, decreolised, and re-standardised within digital contact environments.

Methodology

Research Design

The study adopts a qualitative digital discourse analysis (DDA) supported by a light quantitative description. This design enables the examination of naturally occurring online language across different interactional contexts, aligning with the theoretical foundations of contact, hybridity, and decreolisation.

Data Sources and Platform Selection

Data were drawn from Twitter (X), Facebook, and WhatsApp; platforms representing public, semi-public, and private registers of NP. Their high text density and widespread use in Nigeria make them ideal for capturing contemporary NP variation. Other platforms were excluded due to their predominantly video-based interaction patterns.

Sample Size and Sampling Procedure

A corpus of 500 NP items was compiled. This number was selected based on linguistic saturation, the need for platform comparison, and the feasibility of detailed manual analysis.

Platform Distribution

- 200 items from Twitter (X)
- 150 items from Facebook
- 150 items from WhatsApp

This stratification reflects the linguistic productivity and discourse characteristics of each platform. WhatsApp data were collected strictly with consent.

Data Collection

Data were gathered from trending posts, comment threads, chat excerpts, and keyword searches. Data were anonymised in accordance with the British Association of Applied Linguistics (2021) guidelines and coded using grounded theory methods

Findings and Discussion

Findings indicate significant re-development of NP in digital environments. Three major patterns emerged:

Hybrid Density and Contact Features

Across platforms, users mix NP and English fluidly, producing hybrid clause structures such as:

“I no even understand wetin dem dey yarn for that meeting.”

Hybrid density is highest on Twitter, where political commentary, trending hashtags, and humour attract rapid code-switching. This reflects high-contact environments predicted by Weinreich (1953).

Orthographic Innovation and Drift

Orthographic practices show both stabilisation and experimentation. Common NP spellings, *abeg, wahala, sabi, tori, no wahala*, appear consistently across platforms. Digital affordances also generate expressive elongations: *abegggg, wahalaaaa, mad oooo*. Twitter displays more English-aligned punctuation, while WhatsApp favours conversational phonology-based spellings.

Digital Decreolisation and Re-creolisation

Two parallel processes emerge:

- Decreolisation:
Increasing English alignment is evident in sentence structures and vocabulary, particularly in posts aimed at broader audiences.
Example: *“They don’t want to accept am sha.”*
- Re-creolisation:
Humour, banter, and in-group contexts activate deeper NP features:
“Dem no wan gree accept am. Na so life be.”
These shifts are consistent with Rickford’s (1987) model.

Identity and Stance Expression

Users deploy NP to signal humour (*abeg, rest!*), solidarity (*my people*), irritation (*una wahala too much*), and local identity. Emojis frequently intensify stance, functioning alongside NP discourse markers.

Platform-Specific Patterns

- Twitter: Highest hybrid density; strongest decreolisation.
- Facebook: Most structured storytelling and mixed registers.
- WhatsApp: Most basilectal features, intimate expressions, and affective language.

These findings validate Bhabha’s (1994) hybridity theory, showing how digital NP becomes a space of creative negotiation.

Data Presentation and Analysis

Digital discourse shows heavy hybridisation, with Nigerian Pidgin (NP) and English blending fluidly across platforms. Users mix NP lexemes in English structures (“I no fit explain abeg”) or English words in NP syntax (“Dem no wan gree accept am”). Emojis and memes act as cohesion tools and emotional cues, reinforcing stance and humour. Orthographic creativity is a daily occurrence, with spellings like “abeg,” “wahala,” and “sabi” becoming standard. On X (Twitter), English alignment and autocorrect create more formal spellings, while WhatsApp and TikTok display freer, expressive variations (e.g., abeggg, wahalaaaa) that heighten emotional expression and identity play.

Digital decreolisation varies by context. Posts aiming for a wider reach—such as news or political commentary—use more English frames and punctuation, reflecting prestige pressures. In casual or humorous exchanges, users often revert to basilectal NP, which is rich in interjections (e.g., *biko*, *chai*, *haba*). NP serves pragmatic functions such as humour, critique, and solidarity (“Our government sabi cruise pass comedian”). Code-switching manages tone and social distance, while words like *wahala* expand semantically to express any difficulty, often intensified with emojis.

10.1 Illustrative mini-table of patterns.

Feature	Example	Interpretation
Lexical Mixing	“ <i>E choke, abeg!</i> ”	Combines NP syntax with global meme culture.
Orthographic Innovation	“ <i>Abeg,</i> ” “ <i>Wahala,</i> ” “ <i>sef</i> ”	Phonetic spellings standardised across social media.
Digital Decreolisation	“ <i>I no even understand sef</i> ”	English syntax applied on NP pragmatics.
Pragmatic Functions	“ <i>Our government sabi cruise pass comedian!</i> ”	Protest and rebellion in a witty manner.
Pragmatic Functions	“ <i>We move!</i> ”	Solidarity
Local Language Insertion	“ <i>Make we see wetin dem wan biko.</i> ”	Use of a local Igbo pragmatic interjection (<i>biko</i> ‘please’) within a stable NP sentence structure, signalling micro-solidarity.
Semantic Extension	“ <i>This network wahala don pass joke.</i> ”	The core NP noun (<i>wahala</i> ‘trouble’) is used hyperbolically in a typically SE syntactic structure for dramatic effect.

These patterns confirm that NP is not merely surviving but actively evolving as a digitally hybrid language.

Extended observation of current data (2024–2025) reveals more about the increased use of English lexical insertions driven by predictive text software and literacy pressure (Adelani et al., 2024). Producers also exhibit new code-switching trends, techno-hybridity, as Mbey et al. (2025) term it, when memes and emojis alternate with NP sentences. These acts of communication showcase performative multilingualism (Scholman, 2025), making NP a tool for humour and online activism. Overall, NP’s hybridisation consolidates group identity and decreolisation captures sociotechnical adaptation. These two processes combined ensure NP’s usability and viability within Nigeria’s digital public sphere.

Transition: Towards a Digital Linguistic Ecology

As NP thrives online, its evolution redefines contact linguistics. Rather than eroding linguistic diversity, digitalisation expands NP's reach, fostering creative negotiation between English prestige and Nigerian identity. This dynamic reflects a new linguistic ecology where innovation, hybridity, and resistance coexist.

Conclusion

The energy of Nigerian Pidgin symbolises Nigeria's linguistic creativity and adaptability. Through hybridisation and decreolisation, NP bridges local identity with global connectivity. The paper concludes that NP's digital transformation not only recasts linguistic contact in Nigeria but also upends expectations of language hierarchies in cyberspace. Through synthesis of creativity, pragmatism, and resilience, NP remains the linguistic pulse of new Nigeria.

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SOLUTION-BASED EDUCATION FOR PROMOTION OF EMOTIONAL INTELLIGENCE AND ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS FOR SUSTAINABLE DEVELOPMENT

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Abstract

The present study determined the relationship between solution-based education for promotion of emotional intelligence and the academic achievement of upper basic education level school students in Ebonyi State for sustainable development. The researcher posed two research questions and formulated two hypotheses. The design of the study was correlational survey. The population of the study was 13337 upper basic education level schools' 2 (JSS2) students whereas the sample of the study was 1337 JSS2 students. Two instruments were used in data collection and they are: Solution-Based Education for Promotion of Emotional Intelligence Questionnaire (SBEPEIQ) and 40 Multiple Choice Objective Questions in English Language (MCOT). The instruments were validated by specialists and were determined to have a reliability coefficient of 0.76 and 0.71. Data collected was analyzed by applying correlational statistics to answer the research questions whereas the value of calculated 't' was compared against the table value of 't' in testing the hypotheses. The findings of the study were that: Solution-based education for promotion of emotional intelligence had a low but positive relationship with academic achievement of students. Another finding of the study was that solution-based education for the promotion of emotional intelligence has a significant relationship with the academic achievement of students. The implication derived from the finding was that solution-based education for promotion of emotional intelligence could help resolve the problem of poor performance of students in Languages. Based on the findings and implications, the researcher recommended that students should be taught some components of emotional intelligence in schools.

Keywords: Solution-Based Education, Emotion, Intelligence, Achievement, Education, Basic, Certificate, Sustainable Development

Introduction

In the 21st century, the emphases on sustainable development are increasing on daily basis. Sustainable development according to UN (2020) is the focus on the future, while ensuring the reservation, and preservation of resources and ecosystems for generations yet unborn. This is also the reason for the promotion of emotional intelligence through solution-

based education. Solution-based education according to Mezieobi and Mezieobi (2019) promotes the cultivation of critical thinking, problem-solving, creativity, collaboration, and self-directed teaching and learning. A solution-based education whilst promoting emotional intelligence for better academic achievements, makes learners responsible and hold them accountable for achieving project goals and displaying desired emotional traits for development-oriented outcomes.

Furthermore, in modern times, solution-based education is needed to bring about sustainable development. This is because of the numerous problems that have bedeviled Nigeria and all sectors that make up Nigeria. Education has been perceived to be the pathway to solving the Nigeria's problems. Education stakeholders including students, teachers, education managers, parents, the community have strategic roles to play. With focus on students, they are endowed with many attributes that may help in optimizing educational instructions towards career attainment in life. How these traits are properly harnessed may decide who excels in education pursuit. Such attributes that create feeling of need to align with the goals of the National Policy on Education (FRN, 2013); acquisition of appropriate skills and the development of mental, physical, social abilities are scarce amongst secondary school students. Consequences are poor performance experienced in National examinations such as that organized by West African Examination Council for senior secondary school candidates (WAEC/WASSC). Poor performance among candidates who sat for the Joint Admission and Matriculation Board (JAMB) entrance examination into tertiary institutions in Nigeria in 2021/2022 is another indicator of the downward trend in competencies and attributes that produce quality learning behaviour among students.

Apart from intelligence which is widely acclaimed as chief among facilitators of quality learning behaviour that may translate to good educational outcome, emotions are also very important and necessary in productive learning behaviour among secondary school students. Aggregation of ingredients in an individual's personality includes feelings. Feelings are the internal constitution of one's personality that may translate into variety of exhibitions explained in behaviour. According to Ononuju (2021), thinking, feeling and behaviour differentiates one individual from another. How a student feels at any point in time may affect learning and class environment. Emotional states include: joy, happiness, contentment, anger, fear, anxiety, depression, hope, pride (authentic), optimism, inspiration and many more. Emotion therefore according to Otolehi (2019) is the internal state of an individual effective in socialization process. Students study in classrooms reflective of varieties in tribes and culture. Applying one's feelings correctly to facilitate cohesion, conscientiousness, and transactional skills while pursuing a goal state is called emotional intelligence (Mezieobi&Mezieobi, 2023). Anderson (2020) projects a picture of a classroom constituted of a variety of student-types, which include: the quiet types (who keep quiet because it is inherent in their trait and may be burdened with indecision, but are also analytical); the social types (who get along easily with peers, very active in class discussion and popular in school environment); the smart students (who are hard-working, with zeal, vigor and are motivated intrinsically to achieve good grades) and neurotic students (who add spice to the class, as they may be found playing football, fighting, charting with peers and disregard to class room tasks). Ability of a student to successfully relate to these varieties and at the same obtain good grades in achievement test given to evaluate educational goals calibrates students' level of emotional intelligence. According to a report from centre for National infant programme, the most critical element for a student's success in school is adaptation to learning emotions explained in ability to recognise problem solving emotions. Holistically, emotional intelligence could be seen as the capability of individuals to recognise their own emotions and those of others, discern between different feelings and label them appropriately, use emotional information to guide thinking and behaviour, and manage and/or adjust emotions to adapt to environments or achieve a goal state (Asouzu, 2021).

Emotional intelligence profoundly affects other abilities by either facilitating or interfering with them. Emotional intelligence encompasses the following five key components, namely; self-awareness, self-regulation or self-management, self-motivation, empathy or social awareness, social skills or relationship management. Self-awareness is being able to realize one's feeling, understanding how other people and how they perceive one, one's attitude and responses to them in the moment. This emotion may effectively manage bullying behaviour and adequately control excesses from wild students.

Self-motivation another asset of emotional intelligence towards learning and quality educational outcome concerns students' deepest preferences to move and guide actions, towards goal state. It helps in initiating motives that strive to improve, persevere, attribute achievement to personal effort or failure and staying power to maneuver challenges. Self-motivation is achievement oriented sustained by hope and optimism towards determined goals. Self-regulation or self-management involves handling emotions so that they facilitate rather than interfere with task at hand, being conscientious and delaying gratification to pursue goals; recovering well from emotional stress.

Empathy or social awareness is transactional in nature because it deals with the third party. Relational skills are dispensed toward the feelings of the third party. Empathy considers the wellbeing of the third party with strong assertions that may promote optimal functioning in an individual's environment. Empathy is shared in class orientations, discussions and learning strategies. More informed students share ideas, opinions' concepts with less informed mates with strong conviction to raise knowledge and schema through collaboration. Devoid of differences, empathy brings aspirations together towards goal state. It senses what people are feeling, being able to take their perspective and cultivate rapport and attunement with great diversity of people (Asouzu, 2021). Social skills or relationship skills are embellished in handling emotions in relationships well and accurately reading social situations and networks, interacting cordially with the society (class mates). Social skills, persuade, lead, negotiate and settle disputes, for cooperation and teamwork.

Experts in brain-based learning suggest that possession of emotional intelligence may combat conflicts in the society and among adolescents in the secondary and tertiary institutions. Building one's emotional intelligence according to studies from Anunobi (2017) has a dramatic influence in one's relational skills. In the present dispensation where adolescents' involvement in bullying, truancy and drug addiction is alarming, it may therefore be important to determine the level of emotional intelligence in them and subsequently empirically state how it relates to academic achievement of students. This study is therefore set to determine the relationship between solution-based education for promotion of emotional intelligence and academic achievement of upper basic education level schools' students in Ebonyi State. The present study was anchored on attribution theory which began with the work of Fritz Helder (1920s). However, ideas of Fritz Helder were developed into theoretical framework by Harold Kelley and Bernard Weiner in (1972). The theory was developed in California United states of America. The theory states that: people explain the world both to themselves and to other people attributing cause to the events around them. Attributing causes to the events around gives them greater sense of control. The theory further states that negative outcomes in behaviour are often attributed to internal personality factors (dispositional) whereas failure are based on external causes (situational factors). Students with high level of emotional intelligence attribute failure to personal factors thus considering effort and resilience as important ingredients of success and quality educational outcome.

To achieve the objectives of this study, the following research questions were raised:

- (1) what is the relationship between self-awareness and achievement of upper basic education level schools 2 (JSS2) students in English Language in Ebonyi State?
- (2) What is the relationship between self-management and achievement of upper basic education level schools 2 (JSS2) students in English Language in Ebonyi State?

The following null hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

Ho₁: There is no significant relationship between self-awareness and academic achievement of upper basic education level schools 2 (JSS2) students in English Language.

Ho₂: There is no significant relationship between self-management and academic achievement of upper basic education level schools 2 (JSS2) students in English Language

Methodology

A correlational survey design was employed in this study. A correlational study according to Nworgu (2015) tends to define the nature, magnitude and direction of the association between two variables of interest in a study. In the present study, the direction, magnitude and nature of the relationship between components of emotional intelligence (self-awareness and self-management) are expressed in positive/negative and coefficient index of range 0.1 to +1 and a reverse in a negative instance (-0.1 to -0.99). The design was chosen because the study was aimed at determining the relationship between emotional intelligence and academic achievement of students. The population of the study consisted of 13,337 upper basic education level schools 2 (JSS2) in the three educational zones in Ebonyi State. Ebonyi State has 285 public secondary schools. Studies have shown that determining the relationship between emotional intelligence and academic achievement is best at upper basic education level schools so as to utilize possible advantageous spill over virtues early and toward better educational engagement of senior secondary school and tertiary institution level. The sample size of the study was 1337. This sample was derived using 10% of the population. According to Nwanna (1998) a sample of 10% from a population in region of 10,000 and above is adequate in correlational design research. Gender was not considered in selecting the sample size rather class strata. The instruments used in data collection were: Students Emotional Intelligence Questionnaire (SEIQ) made up of two clusters representing self-awareness and self-management components of emotional intelligence. Each cluster was made of ten (10) items weighed on a 4-point likert scale of Strongly Agree (SA); Agree (A); Disagree (D) and Strongly Disagree (SD). They weight of their numerical values are +4 to +1. Self-awareness measured attributes of self-recognition and emotional state, temperament, how people around perceive one and one's attitude, responses and defense mechanism employed to avoid alteration in loop to goal state. Agreeableness to these variables attracts +4 which is the highest value obtainable and when summed into 10 item questions give 40 points. 25 points and above depicts self-awareness and emotional intelligence whereas 24 points and below signified low levels of self-awareness (aspect of emotional intelligence). Similarly, self-management component of emotional intelligence is made up of 10 item questions responded on a 4-point likert scale of Strongly Agree (SA) +4; Agree (A) +3; Disagree (D) +2; and Strongly Disagree (SD) +1. Responses are summed up and expressed in numerical strength of which 40 points was the highest and +10 was the lowest. The highest value +40 signified high levels of self-management traits and +24 to +10 signified low levels of self-management traits. These values are correlated with scores obtained in 40 multiple choice questions in English Language which

is the third instrument used in data collection (MCOEL). 40 multiple choice questions on English Language was a basic test derived from upper basic education level schools 3 (JSS3) Basic Certificate Examination graduating students from the first nine years of compulsory education. It is a standardized text with general acceptability in Imo State. It was organized by Ebonyi State Ministry of Education hence reliable for the present study.

The initial two instruments for emotional intelligence had reliability coefficient of 0.76 and 0.71. These coefficients were obtained by applying Cronbach alpha statistics on data collected from a pilot study conducted in ten neighbouring secondary schools in Enugu State. The instruments were given to three specialists from Alex Ekwueme Federal University, Ndufu-Alike for validation. The face and content validity of the instruments was examined and corrections were made on the final draft administered to respondents from selected schools. The research questions were answered using correlational statistics explained in coefficients ranging from 0.1+1. The hypotheses were tested by application of t-test of significance correlation.

Results

Table 1:

Analysis on the correlaitonal coefficient of the relationship between self-awareness and academic achievement in English Language

Variable	NO	R	Remarks
Self-awareness	1337	.214	Low and positive relationship
English language achievement test	1337		

Table 1 presents the correlational coefficient of the relationship between a component of emotional intelligence (self-awareness) and academic achievement of students. The coefficient of the relation was 0.24 which was remarked as low and positive. This when interpreted means that the level of self-awareness and academic achievement of students in English Language are in linear relationship. Thus, a higher level of self-awareness among students in reciprocated in higher achievement score in English Language. On the table students had low scores in English Language which reflected in law association coefficient of 0.214.

Table 2:

T-test of significance correlation analysis on the relationship between self-awareness and English Language achievement score

Source of Variation	N	r	df	t _{cal}	t _{crit}	Remarks
Self-awareness	1337	0.214	1335	8.004	1.960	Reject H ₀
English Language achievement test	1337					

Table 2 presents t-test of significance analysis on the relationship between self-awareness and students' academic achievement in English Language. This table shows a coefficient of 0.214, a calculated 't' of 8.004 which was greater than the table value of 1.960 at 0.05 level of confidence. The degree of freedom was df = 1335. Based on the fact that t_{cal} = 8.004 is greater than t_{crit} = 1.960, the hypothesis of no significant relationship is rejected hence, there is a significant relationship between self-awareness and academic achievement of students in English Language in Imo State.

Table 3:

Analysis on the correlational coefficient of the relationship between self-management and academic achievement in English Language of students

Variable	NO	R	Remarks
Self-management	1337	0.246	Low and positive relationship
English Language achievement test	1337		

Table 3 presents the numerical expression in coefficient on the relationship between self-management and English Language achievement of upper basic education level schools (junior secondary school) students. The coefficient of the relationship was 0.246 which was remarked as low and positive. This when interpreted suggests that students' level of self-management behaviours has a linear and direct relationship with their achievement scores in English Language. A high level of self-management behaviour is expected to attract high scores in English Language test. The low correlation coefficient (0.246) therefore, represents low levels in self-management behaviour and low scores in English Language achievement scores.

Table 4:

t-test of significance correlation analysis on the relationship between self-management behaviour and English Language achievement score of students

Source of Variation	N	r	df	t _{cal}	t _{crit}	Remarks
Self-management	1337	0.246	1335	9.273	1.960	Reject H ₀
English Language achievement test	1337					

Table 4 presents the numerical expression in coefficient on the relationship between self-management and English Language achievement test. The table also presents the calculated values of 't' and table value of 't'. The judgement was also made based on the comparison between calculated 't' and table 't'. As presented on the table, $t_{cal} = 9.273$ whereas $t_{crit} = 1.960$. t_{cal} is therefore greater than t_{crit} hence rejection of the null hypothesis of no significant relationship and acceptance of the alternative projection hence, there is a significant relationship between self-management behaviour of students and their relative scores in English Language test.

Discussion

The result of the study was that there exist a low and linear relationship between self-awareness level of students and academic achievement in English Language. This result means that low levels of self-awareness may attract low scores in English Language achievement test. The reason for this result may be attributed to the benefits of self-awareness which enable learners understand how best the process information, given out during classroom instructions. Areas of need in a particular subject, how to attract help from more informed mates or class teacher and approaches to studying a particular subject content are proceeds of self-awareness. High levels of these variables may result in better understanding of a subject content and subsequent high grade in achievement test.

The result of the present study is supported by Anunobi (2017) whose study revealed that high levels of self-awareness among secondary school students had commensurate effect on their academic achievement in basic sciences. A contrasting result was obtained in Ethel (2020) whose study revealed that high levels of self-awareness in students didn't translate to high grades in a given subject content. The difference in both studies findings may have been that Anunobi's study was carried out among SS2 students who had already developed a pattern

of processing information and may be fully focused on how to pass their senior secondary school certificate examination. Many would have adopted a particular pattern of learning fashioned for examination purposes. Ethel's study was carried out among junior secondary school students. a better comparison may be obtained when both groups are of the same level in education say, junior secondary school students. The stratification of the study group may have resulted in the difference in the findings of Anunobi (2017) and Ethel (2020).

The result of the study was that there was a low and linear relationship between self-management behaviour of students and academic achievement in English Language. The result means that self-management behaviour among students will attract a consequent high grade in achievement test. The scale of the behaviour therefore determines the height of educational outcome achieved by students. The reason for this result may be attributed to the impact of self-management skills in academic engagement students with self-management skills, are conscious of events around them. The keep accurate time, monitor their progress in any subject. They also through observation discover their areas of weakness in a particular subject and possible solution to the problem. When not clear in any area during classroom instruction, they are apt in asking questions and getting answers. They apply their senses effectively in peer selection hence, make good grades in examinations. The result of the present study is supported by Asian, Otolehi and Agulanna (2017) whose study revealed that self-management and Exercise, managed and improved academic achievement in Mathematics of students with hyperactive behaviour. in contrast Anunobi (2017) did not see much difference on the achievement grades of students with high levels of self-management skills and those devoid of the skill. The difference in both studies whose findings are at a variance may be because of the study group. Students with hyperactive behaviour problem may effectively be improved by self-management skills than other groups with peculiar problems. Students with bullying problems may be better with self-awareness skills. While Asian, Otolehi and Agulanna (2017) tackled hyperactive behaviour problem effectively with self-management skills, Anunobi (2017) needed to improve student's grades in a particular subject. There are numerous reasons why students' performance poorly in examinations some of these problems may not be effectively handled by self-management skills. These resulted in the variation on the finding of both studies.

Conclusion and Recommendation

The present study investigated on emotional intelligence and academic achievement of upper basic education level schools (junior secondary school) students. From the findings of the study, it could be deduced that considerable levels of self-awareness and self-management traits are needed for optimal performance of students in academic tasks in schools. Therefore, it was recommended that students should be taught some components of emotional intelligence in schools.

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COMPUTER PROFICIENCY AS A TOOL FOR SOLUTION-BASED EDUCATION ON ACADEMIC ACHIEVEMENT OF CANDIDATES IN JAMB ORGANIZED TERTIARY INSTITUTION ENTRANCE EXAMINATION FOR SUSTAINABLE DEVELOPMENT

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Abstract

Solution-based education is essential in contemporary Nigeria. It is believed that every available tool should be utilized in ensuring that education in Nigeria is solution-based including the use of computer literacy. Therefore, this study investigated the influence of computer proficiency as a tool for solution-based education on achievement scores of candidates in JAMB organized tertiary institution entrance examination in Ebonyi State. Two research questions and one null hypothesis guided the study. The study adopted a quasi-experimental design, using non-equivalent control group arrangement. The population of the study was 1,300 SS3 students in eleven public secondary schools. The sample of the study was 151 SS3 students. Two instruments were used in data collection. Computer Proficiency Questionnaire (CPQ) with reliability coefficient of 0.76 was used at pre-test to identify student who were proficient in computer operations. The second instrument was 40 Multiple Choice Objective Test (MCOT) in English Language adopted from SSSCE 2019 Examination organized by WAEC. The instruments were validated by specialists in computer science education, Educational Management, and measurement and evaluation. The findings of the study were that: students in group A who performed better in pencil and paper assessment test did not replicate such performance in computer assisted test. The implication of the finding was that students who failed to gain entrance into universities because of low scores on JAMB test may not be because of poor preparation but absence of computer literacy. The researchers recommended that computer studies be made compulsory in secondary schools to give students adequate training and preparation prior to JAMB examination.

Keywords: Influence, Solution-Based Education, Computer, Proficiency, Candidates, Examination, Sustainable Development

Introduction

Computer proficiency in contemporary times has become very important. This is because of the introduction of computers, and technology in all human activities including examinations inside and outside the school's environment. This also implies the gradual eradication of the pencil/pen and paper mode of assessment, and other human activities that require documentation, reporting, and codification. Pencil/pen and paper mode of assessment have been in use for a long time in Nigeria Educational history. Pencil and paper mode of assessment demands that students answer either objective or theoretical questions presented to them by an examination body (WASC, NECO, JAMB, GCE, NABTEB) within a stipulated time. This method does not demand manipulation of machines or computers to respond to questions. Candidates in a relaxed atmosphere are expected to put down their responses on papers given to them. However, paper and pencil assessment process are fast giving way to information communication technology (ICT) powered assessment test. Universities, polytechnics, and colleges of education entrance examinations organized by joint admission and matriculation board (JAMB) have adopted this modern method of assessment where computers are fast replacing paper, and pencil through computer-based tests (CBTs).

Since the introduction of the use of computers and technology in the writing of JAMB, students' performances have not been impressive. Mezieobi and Mezieobi (2023) stated that an assessment on the performances of candidates since the introduction of computer powered assessment method shows a dwindling trend in achievement scores of candidates who sat for JAMB organized entrance examination into universities, polytechnics and colleges of education in Nigeria. The dwindling trend has equally reflected in the national approved cut off point for entrance into universities, polytechnics and college of education. For example, in 2018/2019 assessment year, the national approved cut off mark for entrance into universities in Nigeria was 180, polytechnic had 150 as their cut off mark, and colleges of education 130. In 2019/2020, the national cut of mark was 150 for universities, 130 for polytechnics and 120 for colleges of education. In 2020/2021, universities were asked to accept candidates who scored 150 and above, polytechnics, 120 and colleges of education, 110. However, these guidelines are subject to the approval of institutions who may wish to set their own ceiling point.

Candidates are mandated to respond to questions on four subjects which must include English Language and Mathematics. The ceiling mark for each subject is 100% giving a total of 400 marks for the four subjects. A little arithmetic from what supposed to add up to the desired approved score shows that candidates are to score less than 50% in each subject to obtain the desired cut off mark. 50% is an average performance in an examination that has a ceiling of 100% for a subject. Any score below 50% is not acceptable if the high standard expected in education is to be promoted. Therefore, an approved cut off mark of 150 for universities and below for polytechnics and colleges of education is a misfortune to the academic progress expected in Nigeria's education system (Ezike, 2024).

The dwindling trend in performance of candidates in external/national examinations was also replicated in senior secondary school examination and results organized by West African Examination Council (WASC) for 2021/2022 and 2023 assessment period. As reported by Ncheke, et al (2022), in 2022, May/June West African Senior Secondary School Certificate Examination, 1,542,250 candidates sat for the senior secondary school certificate examination out of which 492,906 candidates passed with five credits including English Language and Mathematics. This result represents 31% from 100% ceiling point. In May/June 2024 West African Senior Secondary School Certificate Examination (WASSCE) result only 649,156 candidates obtained five credits including English Language and Mathematics from a total of 1,672,224 candidates who sat for the examination. This represents 38.81% from 100% ceiling point. These results are poor reflecting the dwindling standard of education in Nigeria.

The 2021 cut off mark for candidates who sat for the Joint Admission and Matriculation Board Examination for entrance into universities, polytechnics and colleges of education is very poor. In addition, 31% and 38.8% pass rate for 2022 assessment periods are also very poor. These results present a similar trend on the performances of candidates in both examination, there is a clear distinction on what could have engineered them (Mezieobi & Nwosu, 2024). Ezurike, et al (2020) attributed the poor performance of candidates in senior secondary school examination to teachers' factor such as; poor communication strategy, non-utilization of modern instructional materials, teacher centred teaching method and poor motivation of students. Ezekiel (2016) on the other hand considered non utilization of digital technology as top most on the list of factors that may have resulted in the dwindling performance of candidates, who sat for JAMB organized entrance examination. According to Ezurike, et al (2020) the worst are public senior secondary schools in rural areas in Ebonyi State.

Ebonyi state is not alone in this problem as secondary schools in other states in the South East, and states in Nigeria are equally affected by inadequate provision of information and communication technology devices (ICT). Information and communication technology facilities have become very essential part of the education system in Nigeria. These devices are used to store, process, produce, distribute and exchange instruction, ideas, information and learning strategies in and out of the classrooms (Asian, 2020). ICT could have lots of effect on the quality of instruction given out to students in senior secondary schools in Ebonyi State. In teaching, ICT devices could enhance interaction, flexibility, scope, feedback loop, and achievement in school tasks. Active engagement in course content may also be enhanced by information, communication technology facilities. It could create opportunities for students to relate classroom experiences to work practices. Furthermore, ICT facilities could create a favourable atmosphere for economic variability and entrepreneurship endeavours, thus connecting students to their environment (Dawes, 2021).

Computer proficiency as a tool for solution-based education is anchored on the use of ICT in the classrooms and schools. The use of ICT in teaching and learning is becoming increasingly inevitable in every aspect of classroom engagement. It is therefore expedient that the provision of these facilities must top the list of preferences in secondary schools in urban and rural areas. Now that ICT proficiency is highly needed in tertiary institutions entrance examination, availability of ICT devices becomes very important. Another advantage of information communication technology device in senior secondary schools is that it may help learners connect information and collaborate or interact with resources such as images and videos. The speed and flexibility of information communication technology processes could make a significant contribution to learners' knowledge, understanding and skills in various subjects. Availability of digital technology laboratories in senior secondary schools may help students, observe, measure, record and manipulate variables in a variety of ways. It may also enhance learning sciences through stimulations and modeling.

Proficiency in computer manipulations or computer proficiency can only be guaranteed when students have access to ICT laboratories regularly. Smart phones may not offer the necessary skills needed by the rigorous process of using computer during examinations such as Joint Admission and Matriculation Board tertiary institutions entrance examination. Being familiar with educational websites according to Nnadozie and Otolehi (2020) may also help in diversifying learning methods thus, building upon what the teacher has given out in classroom instruction. There are many besetting factors to the use of instructional websites in public senior secondary schools in Ebonyi State. These are absence of computer laboratory, digital library, teleconference devices, fax and wireless applications. Absence of computer facilities therefore may prevent proficiency in the use of computer facilities during examination. According to Odofin (2020), the federal government has spent the sum of N1.32 billion in building of ICT

laboratories and equipping them with ICT devices in 102 unity schools in Nigeria. There is no sign of similar investment on ICT laboratories in any local government area of Ebonyi State. A close scrutiny of the examination time table of senior secondary school candidates who intend sitting for their senior certificate examination show a close range between graduation period and entrance examination into universities, polytechnics and colleges of education. As many would anticipate, students going to enroll into computer centres to learn operations in wait for the joint admission and matriculation examination may not help in proficiency within the short interval. A gradual learning process which the school may offer will help and facilitate internalizing adequately the operations of computer, thus gaining proficiency before the entrance examination that normally takes place within the first quarter of the year (Akude, 2020).

Large percentage of candidates who enroll for JAMB entrance examination are mostly from hinter lands (rural areas). Absence of computer facilities in senior secondary schools' incident in rural areas may promote an unhealthy competition between them and their counterparts from model or sophisticated urban secondary schools. There is a public outcry on this issue (unavailability of computers), however, empirical evidence from research may promote the struggle on equipping rural secondary schools with information communication technology facilities and further help candidates achieve their dream of gaining admission into tertiary institutions in the country. Another significance of this study is that it may help create awareness on the fallen standard of education in Nigeria. The problem of the study is to counter the dwindling standard of education explained in low achievement scores obtained by candidates in both senior secondary school certificate examination and joint admission and matriculation board entrance examination. The direction of this study is to determine whether computer literacy/proficiency in computer operation as tool for solution-based education influences the achievement scores of candidates in JAMB entrance examinations for sustainable development.

Higgins (1998) provided a viable theoretical framework for this study. The theorist suggests that human behaviour is essentially motivated by the hedonic principle of embracing pleasure and avoiding pain. In regulation focus theory, Higgins (1998) postulated that there is a marked difference between promotion focus and prevention focus. While promotion focus refers to the pursuit of goals that would enhance individual's life and wellbeing, focus on its own involves vigilance and restrain shown by individuals as to shield negative outcomes. Promotion focused engagements such as the knowledge of computer operations has the tendency of enhancing learning and quality education outcomes.

The Concept: Computer Proficiency

Computer proficiency is the fundamental knowledge and skill required to use computers and other related computer facilities effectively and efficiently, which also encompasses everything from basic knowledge of computer operations, navigating the internet, and understanding essential computer concepts. In modern times, computer-based proficiency helps in beautifying the personal and professional lives of individuals in a technology-driven society (Akukwe, 2021).

Solution-Based Education

This is an approach or strategy where individual learners focus on the creation and implementation of concrete solutions to real life problems, rather than analyzing issues or absorbing theoretical knowledge. Solution-based education is the education that practicalizes concepts, ideas, opinions, and creating tangible substances, exposures and experiences.

The Concept: Sustainable Development

Sustainable development emphasizes the creation of balance between economic growth, social development, and environmental protection. It is way of meeting today's needs without compromising the ability of future generations to meet their own needs (UN, 2020).

Purpose of the Study

The objectives of the study were to determine the;

1. Effect of computer proficiency on JAMB scores of candidates in 2021 assessment period.

Research Questions

The study was guided by two research questions. They are:

1. What is the English Language achievement mean scores of students in experimental group A at pre-test and post-test assessment period?
2. What is the English Language achievement mean scores of students in control group B at pre-test and post-test assessment period?

Hypothesis

The researchers formulated a null hypothesis tested at 0.05 level of significance.

1. There is no significant difference between the mean assessment scores of students in group A and control group in English Language at pre-test and post-test assessment periods.

Methodology

The study adopted a non-equivalent control group quasi-experimental design under pre-test, post-test arrangement. This design is appropriate because the study sought to determine the effect of the computer-based literacy on English achievement scores of subjects in experimental group A (Nworgu, 2015). The study was carried out in public secondary schools and among SS3 students in Abakaliki Local Government of Ebonyi State. The population of the study was 1,300 SS3 students in eleven senior secondary schools in Abakaliki Local Government Area. A sample of 151 students in SS3 class comprising of 66 computer-based literate students from secondary schools in Abakaliki and 85 students who has average knowledge of computer operations. The sampled students were purposively selected for the study because their level of computer proficiency and operations were determined using Computer proficiency Questionnaire (CPQ) at pre-test. Average students in computer proficiency and operations were drawn into group B, tagged (control) group whereas students who are computer proficient in computer operations were drawn into group A and tagged experimental group.

At pre-test, two instruments were adopted for data collection. These instruments were: English Language 40 multiple choice objective questions with letter options labeled a,b,c and d. The students were made to circle the correct option. Each correct option to a test item was assigned a numerical weight of 2.5 marks to give a maximum of 10 marks. The instrument (ELMOT) was used to ascertain the equivalence of the study groups. Students who scored 60 marks and above were selected as appropriate for the study. Therefore, all the students '151' were good in English Language haven passed the paper and pencil test (ELMOT). The second instrument was to separate the subjects based on computer proficiency and operation proficiency. The test was conducted in school ICT centres where computers were used. The ICT centres have 160 pieces of computers installed with English Language 40 multiple choice objective test programme (software). The programme (software) installation was done by the computer instructors who were contracted for the test. The students selected were practically tested at post-test exercise. 35 minutes was given for subjects to respond to the 40 English

Language multiple choice objective test. Each question attracted 2.5 marks to give a maximum score of 10. ELMOT, was a paper and pencil test extracted from 2021 West African Senior Secondary School Certificate Examination. The reliability of the instrument (ELMOT) was 0.69.

The subjects were drawn into two cells (groups). 66 students from schools furnished with ICT laboratory tagged the experimental group. This group are considered to be proficient in computer operations. The second group 85 in number were selected from schools that do not have computer laboratory or ICT centres. This group were considered to have little or no operational experience in computer applications. A post-test assessment was arranged on practical application of computer in answering 40 multiple objective test questions in English Language installed in computers as software programmes. The post-test therefore is a computer powered test in which subjects were allowed to open the programme sites in computers and answer the multiple-choice test within a period of 35 minutes. The post-test multiple 40 choice objective test is a programme prepared by computer specialist inform of computer game. The software was installed in a central computer and distributed to the 85166 pieces of computer for the experimental group. The second group were also exposed to the same test in another centre. A 100% mark was assigned to the forty-item objective choice software in English Language. Data collected was analyzed with the mean, standard deviation and Analysis of Variance (ANOVA).

Method of Data Collection

Permission to carry out the research was obtained from the authorities of the five senior secondary schools used for the study. Preliminary visits were made to the institutions used for the study. Two centres served as the experimental group A with 66 students in attendance. The other three centres accommodated control group B with 85 students. The schools were in different locations in the Abakaliki local government (Abakaliki Survey Report, 2022). During the visits the researchers got acquainted with the schools, got the computer instructors informed of the purpose of the research and discussed with school teachers who served as research assistants.

The school ICT laboratory in the two schools had sufficient computers for the experimental group A (66). The experimental group B were scattered in three schools with mini computer centres. Experimental groups A and B had their post-test on the same day but at different times (11:15am-11:45am) and (2:15pm-2:45pm). The responses (test) were scored immediately and print out collected by the researchers (therapists) for analysis. The post-test 40 multiple choice objective questions software had a reliability coefficient of 0.76 and it is widely used by different establishments and institutions to test individual's proficiency in literacy in English Language. Each computer had functional time which regulated the exercise. The computer shot down immediately the stipulated time was achieved. All the computers were functional and had no problem for the period selected for the test.

Results

Research Question 1: What are the achievement mean score of students in group A and B exposed to paper and pencil English Language test at pre-test?

Table 1: Mean and standard deviation scores at pre-test of students in group A and B exposed to paper and pencil English Language assessment test at pre-test.

Group	N	Mean	Pre-Test
Experimental Group A	66	60.87	2.08
Experimental Group B	85	69.72	2.14
Mean difference		8.85	

In table 1, mean and standard deviation in SPSS statistics reveal that at pre-test group A students had a mean (X) score of 60.87 and standard deviation of 2.08 in a paper and pencil test. Similarly group B had a (X) score of 69.72 and standard deviation of 2.14 at pre-test. A marginal mean difference of 8.85 was obtained between group A students who are proficient an literate in computer operations and group B who have average experience in computer operations. This table indicates that the mean score of group B was higher than those in group A at pre-test (pencil and paper test).

Research Question 2: What are the mean (X) achievement scores in English Language of group A and group B students exposed to computer powered test in English Language at post-test?

Table 2: Mean and standard deviation at post-test of students in group A and B, exposed to computer powered test in English Language.

Group	N	Post-test Mean (X)	Standard Deviation (SD)
Experimental Group A	66	65.71	2.14
Experimental Group B	85	47.07	1.97
Mean difference		18.64	

In table 2, mean and standard deviation in SPSS statistics reveal that students in Group A (computer proficient) had a mean (X) achievement score of 65.71 and standard deviation of 2.14. Students in group B had a mean (X) achievement score of 47.07 and standard deviation of 1.97. The mean difference between both groups was 18.64 which is substantial enough to explain the difference in computer proficiency between both groups (group A & B).

Hypothesis 1

Ho₁: There is no significant difference between the mean achievement scores of students in Group A and B exposed to English Language computer powered test at post-test assessment period.

Table 3: ANCOVA test of between subjects on post-test mean scores of students in group A & B exposed to computer powered test in English Language

Dependent Variable Post-test

Source	Type II Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	10031.627 ^a	2	5031.817	78.04	.000	.514
Intercept	43458.048	1	43458.048	677.162	.000	.811
Pretest	57.306	1	57.305	.875	.351	.004
Subjects	9862.172	1		154.806	.000	.512
Error	9420.123	148	64.216			
Total	702221.000	151				
Corrected Total	19462.879	150				

a R-square = 512 (Adjusted Squared = 508)

Table 3 shows that $P=.000$. Since the calculated probability value .000 is less than criterion value.05 the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant difference between the mean achievement scores of students in group A and B on computer powered test on English Language at post-test assessment.

Discussion

The finding of the study revealed that at pre-test there was a marginal difference of (8.85) between the mean achievement scores of subjects exposed to pencil and paper test on English Language. At post-test the mean score of students in group A who are computer literate and proficient in operations was far more than students in group B (average literacy in computer). This result means that computer proficiency in operations had positive influence on the achievement mean scores of students in group A. The finding also revealed a significant difference between the mean achievement score of students in group A and B at post-test. The finding of this study therefore indicates that proficiency in computer applications and operations have great influence on the achievement scores of students in computer powered test (JAMB entrance examination). The ability of candidates to open their test websites successfully, operate the applications there in and complete their responses in good time, may affect students' output. The result of this study therefore explained why there is a progressive downward trend in the number of candidates who successfully enter the universities in recent years through Joint Admission and Matriculation Board Entrance Examination.

The finding of this study is in agreement with Asian, et al (2020) whose study revealed that guided use of technology increases students' engagement and achievement in Mathematics leading to quality educational outcome. In agreement with the finding of the present study also is the study of Ezurike, et al (2020) who found out that knowledge of computer operations will improve academic achievement scores of students in sciences. A contrasting result was obtained in Ezeonwumelu and Okoro (2020). The study revealed that proficiency in computer operations may not be transected in academic achievement of students as the knowledge of computer results in adverse use of information communication technology (ICT) facilities.

Conclusion and Recommendation

Students with computer operation proficiency and literacy had higher scores when exposed to a computer powered test in English Language at post-test. However, when both groups, A & B were exposed to a paper and pencil test at pre-test, in English Language, students who were not computer proficient and literate obtained higher scores in a multiple-choice objective test in English Language. Ideally students who were placed in group B had average knowledge of computer operations but are intelligent having obtained a good score at pre-test. Their failure to replicate similar achievement in computer powered test would have been because of their non-proficiency in computer manipulation. Exposure of students to computer operations while in school is an advantage to their success in JAMB entrance examination.

Based on the findings of the study, it was recommended that parents should endeavour to enroll their wards in computer classes at home to add to what the school offers. It is also recommended that computer studies be made compulsory in secondary schools to give students adequate training and preparation prior to JAMB examination. Furthermore, the exposure of students to computer-based training will advance the achievement of solution-based education which will promote the achievement of sustainable education in Nigeria.

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MANAGING UNIVERSITY EDUCATION THROUGH INNOVATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

Innovation in education is a process of creativity, changing, experimenting, transferring, and revolutionizing as a key to promoting equitable learning. University education from the perspective of innovation tends to bring about effective transformation, e-learning, curriculum changes, amongst others in the tertiary institution. University is designed in a way that on-going efficiency is crucial in quality education. Management and innovation are essential for achieving these qualities of sound principle and values. The management of any university institution starts from its leadership and goes down to its school designed curriculum, staff organisational structure, and administration. On the other hand, innovation comes in to improve on the existing management structure in the university to ensure modernisation and all-round effectiveness. Innovativeness has experienced a drastic change worldwide which has forced it to be at the forefront of university education. The Nigerian university system on its part has been plagued by insecurity, poor funding, financial vulnerability which fuels strikes and other internal conflicts. With this in mind, it is imperative to approach innovation in Nigerian university education in a manner that provides functional education for sustainable development. An introduction on this research paper will consist of the purpose, aims and relevance of innovation in university education management. This paper also provided an insight on several opinions of different authors regarding this topic. Issues and limitations which can arise in the course of engaging in innovation in managing university education will be discussed. The suggestions will be a response on how best to tackle these inadequacies.

Keywords: Management, Innovation, University Education, Sustainable Development, Nigeria.

Introduction

It is widely accepted across the globe that education plays a vital role in national development. Innovation and management in university education are two vital elements which play very significant roles in the educational system. The world is gradually transitioning into a digital age where new technological innovations are springing up to aid the daily lives of humans. Thus, it is imperative that humans keep up with these emerging trends of innovation. This would be possible through the use of education which serves as the foundation for the transfer of knowledge, especially at the university level. Looking at the changes that have taken place in the Federal Republic of Nigeria over the past 60 years of independence, it is clear that the driving force for improvement in the living standard of people came from gains in knowledge and transformation of value systems through education. It is therefore necessary

to consider specifically how universities as the highest citadel of learning could be managed to bring about the changes needed for sustainable development in Nigeria.

University education produces graduates who are the main actors in the development of the society. It would be a great disadvantage if the students in these universities pass through the university system and failed to adapt to existing trends of an innovative university education. It is against this background that it is pertinent for university administrators, who are charged with the responsibility of managing the affairs of the university so as to achieve the university's goals and objectives ensure that their activities are in line with current innovative trends in university education. It is worthy to mention that within the university education sector, there have been various efforts made by scholars and international organisations on the approaches and mechanisms to promote sustainable development through innovativeness and functional education. The experiences from these laudable initiatives show that there is a need to explore new and innovative ways to foster the cause of sustainable development through the ambit of universities in a more concrete and meaningful manner.

It is on this premise that the present study is apt to examine innovative ways of carrying out core mandates of universities in order to introduce current innovative trends in the university system. The aim of this paper is to identify possible problems facing the management of Nigerian universities in relation to innovation and to further identify solutions to these problems.

Conceptual Clarification Management

Management is being in charge or in control. The term "management" may infer two different things. Firstly, the term may refer to the activities of planning, organizing, directing, coordinating and controlling the activities of an organization. Secondly, it may refer to the personnel responsible for the planning, organizing, directing, coordinating and controlling the activities of an organization. In the words of Uchendu (2015), it is the process of utilizing available human and material resources without waste through effective and efficient planning, organizing, staffing, directing and co-coordinating school activities for the purpose of achieving educational goals and objectives

Onwuchekwa in Ezeani (2012) opined that management is the organization and utilization of all human and material resources in a particular system for the attainment of acknowledged objectives in the system. Yale (2010) cited in Ofor-Douglas (2021a) mentioned that management is an effective organization and utilization of human and managerial resources in particular system, for the achievement of identified objectives. Management is the effective and efficient utilization of the available human and material resources in a certain system with the purposes of achieving the set goals of that system. The meaning of management in the context of this work is careful handling of work, people, structure and sub-systems involved in university education by strategic leaders to bring about the desired change in students' behaviour to enable them contribute their quota in sustainable national and international development.

Innovation

Innovation can be described as incremental radical and revolutionary changes in thinking, products, processes, or organisation (Akomolade, 2021). Innovation is a deliberate introduction of something new as a way of solving individual or group problems or a way of accomplishing goals. It is a process of creativity, changing, experimenting, transferring, and revolutionizing is a key to the economic development of any nation and a factor of research together with innovation. Innovation is the introduction of new ideas, systems or technology which

essentially brings change into the system or organization. This situation emphasizes even more the adoption by various educational institutions of the self-management and self-financing principles as well as the concern for competitiveness, as basic condition of survival in the context of a competitive educational reality (Stan, 2024).

Innovation is derived from the Latin word ‘innovare’ which means renewal. Innovation could be associated with invention, creativity and change because all innovation brings about invention, improvement and change but not all inventions and change are innovation (Udo, 2014). This is because invention is bringing into existence what has never existed while change is the process through which new programmes, practices and approaches are put in place or injected into the operation of a system to replace the old or ineffective ones.

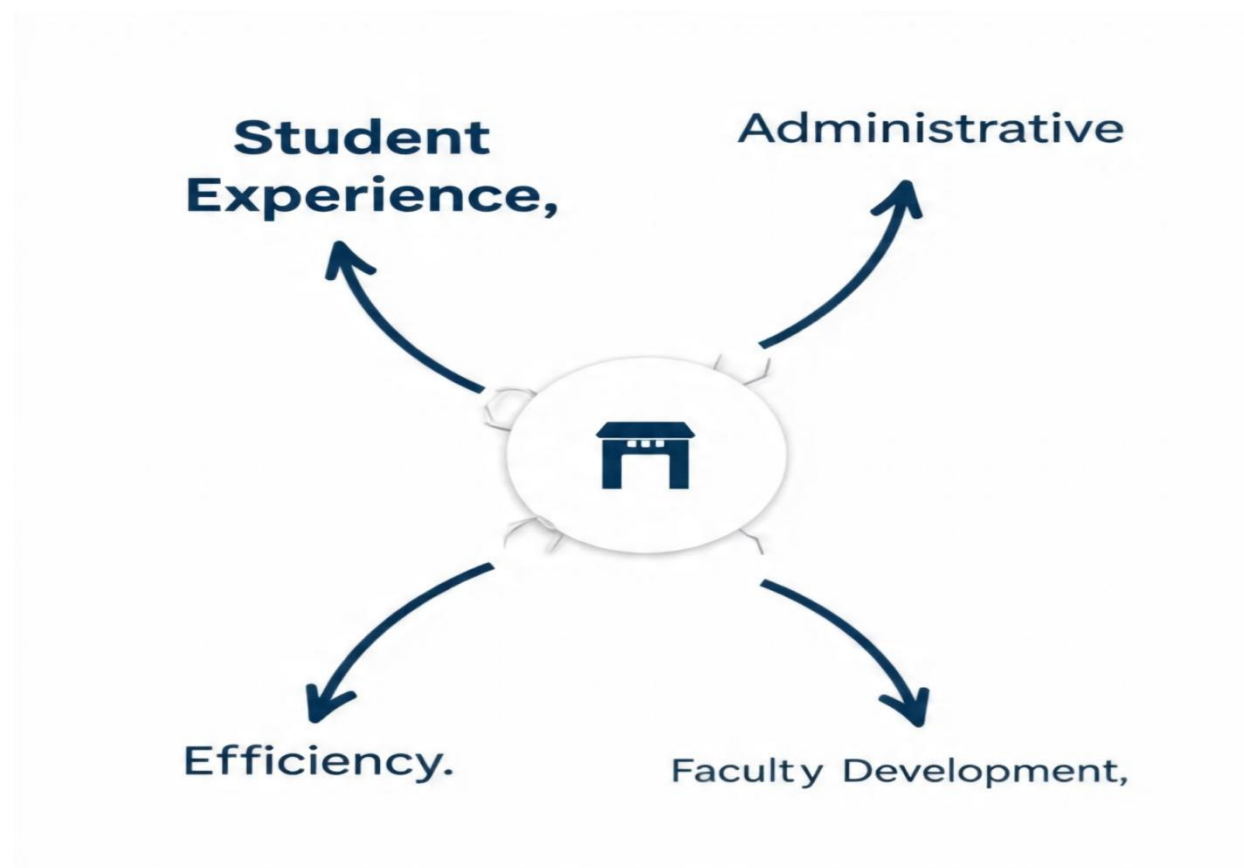
Innovation is a driving force in the form of problem solving. It seems in recent time, learning is only done but relevant skills for problem solving is not available. Innovation in higher education management has experienced a drastic change worldwide which has forced innovation to be at the forefront of university education. The university system in Nigeria has been flawed by insecurity, poor funding, financial vulnerability which fuels strikes and other internal conflicts. With this in mind, it is imperative to approach innovation in the Nigerian University education to provide functional education for national development.

Innovation in University Education

Innovation in university education can be defined as change, reformation upgrade, invention, introduction of something new, and addition in university education. In addition OECD (2016) looked at this concept as the introduction of an improved or a new process, products, services, new ways of managing activities or new marketing approaches. As important as it is, innovation tends to impact the quality, standard of education, administration and products of the university. The former having to do with the day to day running of activities and the later which concerns graduates year in year out.

Smith and Fund (2019) emphasized that innovation in university education is a new product, new process, new ideas that are shifting the way people view an issue or question by redefining our sense of what is possible, and innovation at the platform level. The OECD (2016) categorized innovation in university education into four types which are organizational, products, marketing, and process innovation. They can be seen in the form of:

- i. Introduction of new services or products such as new curriculum, educational resources or textbooks.
- ii. Introduction of new process in delivery such as the use of technologies in e-learning activities.
- iii. Fresh approaches in activities of the organization such as the use of ICT to interact with parents and students.
- iv. New marketing techniques such as the cost for each course in university.



University Education

This is education also known as post-secondary education. In other words, education attained after secondary school. Through university education, graduates gain a level of professionalism in a course of interest. This tends to boost one's level of confidence to succeed in the extremely competitive labor market. A university education exposes a student to broader perspective and improves one's level of thinking and interest.

Ng (2019) is of the opinion that globalization had placed a strain on education to build a creative and innovative force to achieve a competitive advantage. Furthermore, Findikoglu and Ilhan (2016) stressed on how education has been lax in emphasizing learning for its own sake and overlooking the importance of training on problem solving. Breakthrough in innovation will turn the students from just using the knowledge by making them centres of our educational setting. Maier (1971) cited in Faud et al. (2020) said that the present method of teaching did not produce students who can solve problems using knowledge when they leave schools. The stock of highly-educated individuals produced by higher-education institutions (university education inclusive) plays an important role in the innovation and the sustainable development of any society (Akinyemi & Bassey, 2012). University education is a necessary tool for any nations' survival. Education is supposed to be affordable, of high standards, quality but this is not the case in Nigeria. A sound educational system is designed to nurture intellectuals in knowledge building. In fact, it has been stated by scholars that problem solving, self-regulation and the application of technologies should be the learning outcomes of 21st century education.

Managing University Education for Innovation in Nigeria

University administrators need adequate knowledge of management to function and for arms with the skill to function efficient and effectively to achieved the organizational objectives and goals in process of running his daily activities in order to attain their objectives, they establish targets to be attained, set out strategies and continuously strive to perfect their

management processes (Bok, 2003 as cited in Ofor-Douglas, 2020). University administrators can manage their universities in the perspective of innovation through these two ways:

Global Partnership for Innovation

It is a common saying that “two heads are better than one”. The 17th sustainable development goal (SDG), “Partnership for the Goals” calls for partnerships to mobilize and exchange information, expertise, technology and even financial resources to support the attainment of other SDGs. Innovation in the university system may fall under SDG 9 which is the goal of industry, innovation, and infrastructure. Where global universities partner with each other to achieve innovation in their various universities, this would bring about quality and sustainable university education. The exchange of innovative ideas, policies and finances between Nigerian universities and global universities should be an important agenda for Nigerian university administrators to look into if they want to ensure innovation within their universities.

Implementation of E-learning Practices

E-learning can be seen as the international use of network information and communication technology in teaching and learning which includes, virtual learning, distributed learning, network and web-based learning (Goyal, 2021). Akhtar (2010) rightly pointed out that teaching through technology-based learning environment enhances the achievement level of the students. The implementation of e-learning practices in Nigerian universities would allow for the use of 21st century teaching and learning practices that would promote quality and sustainable university education. The e-learning process would promote easier and faster teaching and learning amongst staff and students of the university and would further place these students on parity with their peers in international universities who are already used to these teaching and learning practices. The COVID-19 era served as an eye opener to educators that a digital educational system was a necessity in the 21st century as it was only universities that were already utilizing e-learning practices before the global pandemic that could continue the academic session while universities that utilized outdated teaching and learning practices had to shut down academic operations.

Challenges Faced by University Management in Fostering Innovative University Education

The following act as challenges that hinder university management from successfully fostering their universities in the perspective of innovation in the 21st century:

Financial constraint: Olayinka (2018) postulated that the Nigerian government has never treated universities as worthy partners. Universities are neither encouraged nor challenged to play constructive role on research and development through generous discretionary funding from government. The foundation of education is frail when education (university education inclusive) is not well funded, and the products of such foundation are weak intellectually (Okorie, 2020).

Nigerian universities as corporate bodies are hardly involved in projects sponsored by the government which ordinarily would be a good source of revenue to them. In developed countries, universities are major contractors to government because they bid for projects that provide the basis for knowledge that is used to move the society forward. The inadequate funding has put educational managers under pressure and stress.

Inadequate ICT, E-learning and Internet Facilities: Another challenge facing the promotion of innovative university education in Nigerian universities is the lack of ICT, e-learning and

internet facilities. In order for the e-learning process to go smoothly, there needs to be a steady and consistent provision of material devices and facilities such as computers, computer laboratories, internet and e-mail facilities, video phone systems and teleconferencing devices, fax and wireless applications, digital library, digital classrooms, multimedia systems and the challenge of multimedia courseware development among others (Olutola & Olatoye, 2020). The required facilities are inadequate to cater to the demands of the e-learning process. The inadequacy of these facilities further brings about anger and frustration amongst staff and students of the university as they feel unequal to their peers who have access to these facilities. There is also needs for constant maintenance of these ICT, e-learning and internet facilities. In fact, these e-learning facilities require maintenance because they are machine. Irregular or lack of maintenance of these facilities, they might not function properly, thus e-learning would not be able to take place effectively.

Incompetent Leadership: Leaders in the university include the lecturers, teachers, administrators and policy makers who have the sole responsibility of better teaching, learning, research processes to enable students match up to the challenges and issues in life, work and security at large. Unfortunately, this is not the case as (Leithwood et al., 2010) found out that leadership in university education continues to be an area of high interest for practitioners and scholars alike. The leadership of universities must be willing to adapt to current trends as the world is dynamic, changing every day and those who fail to change with it would definitely be at a disadvantage. Institutions must adjust their economic models and service offerings as higher education (university education inclusive) grows more expansive and digital technologies and artificial intelligence become more vital to the educational experience in order to remain relevant to societies, economic, and most importantly students (Stephanie, 2021).

Computer Illiteracy: This serves as another hindrance to the promotion of innovation within Nigerian universities by the university administrators. One may be described as computer illiterate where he/she fails to properly understand the workings of computer hardware and software. This challenge of computer illiteracy stems from the fact that most individuals were not properly trained on the use of digital devices from their early educational years (primary and secondary school level). Godwin in Chigozie-Okwum (2018) opines that when teachers are digitally literate and trained to use ICT, these approaches can lead to higher order thinking skills and provide creative and individualized options to learners to express their understandings and also leave them better prepared to deal with the on-going technological changes in society and workplace.

Corrupt Attitudes by Administrators: Some administrators of institutions are not left out from mismanagement and corrupt attitudes as regards funds allocated to their institution (Ofor-Douglas, 2022). The meagre funds made available to the University for the Implementation of an innovative university educational system are usually diverted to the accounts of greedy university administrators, thus making it impossible for innovation to take place. Sometimes, the funds provided are not allocated where they would serve meaningful purpose thus leading to wastage of financial resources.

Conclusion

The need for innovative university education in Nigeria has been overemphasized in this paper, stressing the fact that those who fail to follow the emerging trends in innovative university education cannot evolve in the 21st century. Innovation in the Nigerian university educational system can be achieved if the students, lecturers, administrators and government embrace it. It shall be very beneficial as it will succeed in achieving greater students output in

academics. New teaching methods and approach to learning are great innovative strategies which lecturers can adopt directly in influencing learning quality. Universities should garner innovative ideas and strategies with the same energy as they do in their research and teaching, yielding students and research bases to those succeeding in this area of expertise. The paper discussed various challenges facing the effective management of university education in the perspective of innovation in Nigerian universities, which includes financial constraints, inadequate ICT, e-learning and internet facilities and computer illiteracy, amongst others.

Suggestions

1. There should be a provision of state-of-the-art ICT, e-learning and internet facilities to promote the e-learning process within Nigerian universities.
2. Nigerian universities should partner-up with universities abroad to allow for exchange of technological information and policies that promote innovation.
3. Staff and students of the universities should undergo online tutorials on the dynamics of e-learning and artificial intelligence.
4. There should be further training and re-training for the university staff in seminars and workshops on the use of e-learning facilities and computer literacy.

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ASSESSMENT OF TECHNOLOGICAL INTEGRATION AND UTILIZATION IN THE MANAGEMENT OF SECONDARY SCHOOLS IN LAGOS EDUCATIONAL DISTRICT IV FACULTY OF EDUCATION

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Abstract

The article appraised the incidence of technological integration, utilization and management in secondary schools within the ambits of Lagos Educational District IV. It utilized a descriptive research design; data were gathered from a sample size of 200 respondents, subsuming varied school administrators and senior staff members emanating each from ten randomly selected private and public secondary schools as representative subset of the entire population of all Lagos Educational District IV secondary schools. An instrument, a structured questionnaire named "Appraisal of Technological Integration and Utilization in School Management (ATIUSM) was adroitly employed and validated using a pilot test and test-retest reliability techniques, which yielded a reliability coefficient of 0.82 after duly employing Pearson Product Moment Correlation at a 0.05 level of significance. Major findings infer inadequate ICT infrastructural facilities in many schools in the area of study, with government secondary schools more deficient. Teachers typically demonstrated lack of consistency in their technological competence owing to insufficiency in training and development. There was inequality in the distribution of technological resources as well as poor maintenance culture, and lackluster ICT policies. Nonetheless, schools that effectively incorporated technological facilities reported enhanced students' engagement and increment in digital competence. Also, administrative support was foundationally lagging, typically hampered by vehement resistance to change as well as poor budgetary allocation. Worthy of note are schools with external partnerships who accomplished comparatively better outcomes in the integration of technology. The article thus underscores the dire need for progressive capacity building, development of innovative policies and humongous investment in ICT infrastructure geared towards enhancing educational management, invariably meeting the 21st Century educational needs of Lagos Educational District IV.

Key Words: *ICT, Technological Integration, Technological Utilization, Management and Lagos Educational District IV*

Background to Study

The rapid advancement of Information and Communication Technology (ICT) has transformed educational administration across the world. Educational institutions increasingly rely on technological systems to improve planning, communication, record management, monitoring, decision-making, and accountability. Consequently, technology has become an indispensable component of contemporary school management, enabling administrators to perform their responsibilities more efficiently and effectively. As educational systems continue to evolve within knowledge-driven economies, the integration and utilization of technology

have become critical indicators of institutional effectiveness and administrative quality (Lawal & Ismail, 2022; Yusuf & Afolabi, 2023).

Technological integration refers to the incorporation of digital tools, systems, and applications into organizational processes to enhance efficiency and productivity. In the context of school management, technological integration involves the adoption of School Management Information Systems (SMIS), digital attendance systems, learning management platforms, electronic communication systems, cloud-based storage facilities, and other administrative technologies that support school operations (Olaniyan et al., 2023). Effective technological integration requires not only the availability of technological facilities but also their alignment with organizational goals, administrative procedures, and users' competencies. Closely related to technological integration is technological utilization, which refers to the extent to which available technological resources are actively and effectively employed in carrying out administrative functions. The mere presence of technological infrastructure does not guarantee meaningful utilization. School administrators must possess the necessary digital competencies and organizational support to employ technological tools for planning, communication, supervision, record keeping, budgeting, and decision-making. Studies have shown that many educational institutions possess ICT facilities that are either underutilized or improperly utilized due to inadequate training, poor maintenance culture, limited technical support, and resistance to organizational change (Adebowale & Abiodun, 2022).

School management constitutes another important variable in this study. School management encompasses the coordination of human, financial, material, and technological resources to achieve educational objectives effectively. Effective school management is reflected in efficient record management, transparent communication, timely decision-making, effective resource allocation, improved accountability, and enhanced stakeholder engagement. Contemporary educational management increasingly depends on technology to facilitate these functions, thereby making technological integration and utilization significant determinants of administrative effectiveness.

In Nigeria, various policy initiatives have been introduced to promote digital transformation in the educational sector. Programmes such as EKOEXCEL, smart school initiatives, and ICT integration policies have been designed to improve both instructional delivery and administrative effectiveness within schools. Lagos State, being one of the most technologically advanced states in Nigeria, has invested considerably in educational technology and digital governance systems. Lagos Educational District IV, which comprises major educational zones within the Lagos metropolis, has benefited from several of these initiatives aimed at modernizing school administration and improving educational outcomes (Ajayi & Omotayo, 2023).

Despite these policy efforts and investments, evidence from previous studies suggests that technology adoption and utilization remain uneven across schools. While some schools have successfully incorporated digital systems into their administrative operations, others continue to rely heavily on manual procedures due to infrastructural deficiencies, inadequate training opportunities, and insufficient financial support (Obi & Nwachukwu, 2023; Chukwuemeka & Bamidele, 2023). Such disparities raise important questions regarding the actual extent of technological integration and utilization in school management within Lagos Educational District IV.

Existing studies on educational technology in Nigeria have focused predominantly on ICT integration in teaching and learning, students' academic performance, teachers' digital competencies, and instructional innovation. Comparatively fewer studies have examined technological integration specifically from the perspective of school administration and management. Furthermore, available studies rarely provide a comprehensive assessment of both technological integration and utilization within public and private secondary schools in

Lagos Educational District IV. The extent to which technological facilities are available, utilized, and capable of improving administrative effectiveness within the district therefore remains insufficiently documented. This gap in empirical knowledge necessitates a focused investigation into the integration and utilization of technology in the management of secondary schools within Lagos Educational District IV.

Statement of the Problem

The increasing adoption of technology in educational administration is expected to enhance efficiency, transparency, communication, and decision-making within schools. In response to this expectation, the Lagos State Government has introduced several technology-driven educational initiatives, including EKOEXCEL and other digital transformation programmes aimed at improving educational administration and service delivery. However, recent studies continue to report persistent challenges associated with ICT implementation in Nigerian secondary schools, including inadequate technological infrastructure, unreliable electricity supply, limited internet connectivity, insufficient technical support, inadequate funding, and low levels of digital competence among school administrators (Chukwuemeka & Bamidele, 2023; Ugwoke et al., 2024).

Empirical evidence further suggests that substantial disparities exist in the availability and utilization of technological resources across schools within Lagos State. While some schools have access to digital communication systems, management information systems, and internet-enabled facilities, others continue to rely primarily on manual administrative processes due to resource limitations (Obi & Nwachukwu, 2023). Such disparities raise concerns regarding the effectiveness, sustainability, and equity of technology integration efforts within Lagos Educational District IV.

Furthermore, despite significant investments in educational technology, there is limited empirical evidence regarding the actual extent to which available technologies are being utilized for administrative purposes in schools within the district. It remains unclear whether the technologies provided are being effectively employed to enhance school management or whether they are underutilized due to organizational, infrastructural, or human-capacity challenges. This uncertainty creates a need for empirical assessment of the level of technological integration, the extent of utilization, and the challenges affecting technology-driven school management in Lagos Educational District IV. It is this gap that the present study seeks to address.

Purpose of the Study

The primary purpose of this study is to:

Appraise the integration and utilization of technology in the running of schools in Lagos Educational District IV.

The research is aimed at examining the typology of technological tools employed, their specific significance to school administration, the dimension of administrator proficiency, and the hindrances to effective utilization. The study also intended to assess how technological integration affects decision-making, information flow, school operations, and efficiency in administration.

Other **objectives of the study** are to:

1. Identify the technological tools currently available and used in the management of schools in the district.
2. Appraise the extent of utilization of these technologies by school administrators.
3. Determine the shortcomings associated with integrating and utilizing technology in the management of schools.

Research Questions

To guide the study, the following research questions have been posed:

1. What types of technological tools are currently available and used in managing schools within Lagos Educational District IV?
2. To what extent do school administrators employ these technological tools in their day-to-day operations?
3. What are the major constraints encountered in integrating and utilizing technology in school management?

Hypotheses

- (H₀₁): There is no significant difference in the level of technological integration between public and private secondary schools in Lagos Educational District IV.
- (H₀₂): There is no significant effect of technological integration on the effectiveness of school management in secondary schools in Lagos Educational District IV.
- (H₀₃): There is no significant relationship between administrative and instructional use of technology in secondary schools.

Theoretical Framework and Literature Review Theoretical Framework

The theoretical framework offers the fundamentals for understanding the phenomena, relationships, and expectations hinging on technological integration and utilisation in the management of schools. This study is premised on three interrelated theories: The Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), and the Socio-Technical Systems Theory.

Technology Acceptance Model (TAM)

Developed by Davis (1989), the TAM is one of the most popularly utilized models to explain how users come to accept and use a technology. According to TAM, two primary factors determine acceptance of technology: perceived ease of use and perceived usefulness. In the context of secondary school management, this model suggests that if school administrators perceive technology as useful in enhancing efficiency and find it easy to use, they are more likely to employ it effectively.

In Lagos Educational District IV, various levels of digital literacy, exposure, and access to ICT may impact these perceptions. As Olaniyan and Omotayo (2022) posit, successful integration depends on the willingness and ability of school leaders to engage with digital tools, which TAM helps to interpret.

Diffusion of Innovation Theory (DOI)

Proposed by Rogers (2003), the DOI examines how new ideas and technologies permeate through societies or organizations. It categorizes adopters as innovators, early adopters, early majority, late majority, and laggards. The theory emphatically explains factors such as relative advantage, compatibility, complexity, trialability, and observability of innovations.

Within school systems in Lagos, some schools may be early adopters of technology owing to

access to funding, training, or visionary leadership, while others lag behind due to facility or capacity restraints (Ugwoke et al., 2023). The DOI framework aids in analyzing the various degrees of integration across schools and the rate at which digital innovations are being accepted.

Socio-Technical Systems Theory

This theory articulates the interplay between people (the social system) and technology (the technical system) in various organizations. It emphasizes that technological integration must be in tandem with organizational structures, culture, and workflows to be progressive (Trist & Bamforth, 1951). When employed in school management, this theory buttresses that employing ICT tools without ascertaining the competencies, roles, or resistance of staff leads to inadequate utilization (Yusuf & Afolabi, 2023).

Literature Review

Conceptualizing Technological Integration in School Management

Technological integration in school management connotes the strategic use of digital tools to enhance planning, coordination, communication, monitoring, and evaluation of educational processes (Ajayi & Omotayo, 2023). These tools subsume School Management Information Systems (SMIS), email communication platforms, biometric attendance systems, cloud storage, and performance dashboards. According to Adebowale and Abiodun (2022), effective technology integration includes not just having digital tools but leveraging them into the daily operations and decision-making processes of school leadership.

Global Trends in Technological Utilization

Internationally, countries such as Finland, Singapore, and South Korea have incorporated sophisticated educational management technologies to improve productivity and transparency. In Singapore, for instance, digital dashboards provide real-time insights into student performance and allocation of resources (World Bank, 2023). In sub-Saharan Africa, however, the incidence of integration is slower. According to UNESCO (2023), less than paltry 30% of schools in the region have meaningful access to electricity or internet connectivity, which affects their technological capabilities. Nonetheless, pilot projects in countries like Kenya and Rwanda show promise where digital school records and e-administration tools are gaining grounds (Okello & Nsubuga, 2023).

Technological Integration in Nigerian Secondary Schools

Nigeria has greatly evolved in technology in education, with state governments like Lagos leading the pack in digital innovation. Innovative schemes such as the EKOEXCEL program and the Lagos EdTech Policy have immensely contributed to the digitisation of instructional and administrative procedures (Lagos State Ministry of Education, 2023). Olaniyan et al. (2023) discovered that schools with consistent internet access and well-trained staff were more likely to employ digital systems for budgeting, student tracking, and teacher assessments. In antithesis, challenges such as irregular power supply, outdated equipment, and insufficient ICT support staff continue to hinder progress.

Studies on Lagos Educational District IV

Lagos Educational District IV, consisting of areas like Surulere, Yaba, and Mainland, is home to both well-funded model colleges and under-resourced government schools. Ajayi and Ogunleye (2022) appraise technology usage across twenty-five schools in the district and reported a vivid disparity in digital integration between urban and peri-urban schools. While principals in Yaba consistently used SMIS for staff appraisals, the schools in Surulere depended

on manual record-keeping. Another study by Eze and Nwachukwu (2023) revealed that although computers and internet connections were common place in many schools, they were often underutilised because of lack of training, software incompatibility, or administrative indifference.

Barriers to Technological Utilisation

Major barriers include:

1. **Infrastructural Deficiency:** Frequent power outages and poor internet access adversely affect consistent use of technology (Chukwuemeka & Bamidele, 2023).
2. **Inadequate Training:** Many school administrators lack the digital skills requisite to navigate modern management software (Afolabi & Bello, 2022).
3. **Resistance to Change:** Some school administrators prefer traditional management styles and are not receptive to new technologies (Ogunyemi & Salako, 2022).
4. **Poor Funding:** Tight educational budgets mean ICT upgrades are often delayed or grossly inadequate (Adetayo et al., 2022).

Impact of Technology on School Administration

When effectively employed, technology enhances data accuracy, decision-making, transparency, and communication. Yusuf & Afolabi (2023) posit that digital attendance and payroll systems curb fraud and improve accountability. Obi & Nwachukwu (2023) found that school heads using SMIS could make faster staffing and resource allocation decisions based on real-time data.

Strategies for Improved Integration

To overcome challenges, scholars suggest:

1. **Capacity Building:** Consistent digital literacy training for school heads and administrators (Ogunleye & Adeyemi, 2023).
2. **Policy Alignment:** Well-articulated policies and accountability mechanisms to implement ICT integration (Ugwoke et al., 2024).
3. **Partnerships:** liaison with tech firms for infrastructure, software, and training (World Bank, 2023).
4. **Incentivization:** Reward systems and giving of incentives for schools and administrators who spearhead innovative digital practices (Ajayi & Omotayo, 2023).

Methodology

This study adopted a descriptive survey research design to investigate the level, effectiveness, and challenges of technological integration and utilisation in the management of secondary schools within Lagos Educational District IV. This design was considered appropriate because it allowed the researcher to collect data directly from respondents on existing conditions and administrative practices relating to technology utilisation in schools without manipulating any variables (Creswell & Creswell, 2018). The population of the study comprised all public and private secondary schools within Lagos Educational District IV, including school administrators, heads of departments, and senior teaching staff.

A multi-stage sampling technique was employed. In the first stage, ten schools were randomly selected, five public and five private secondary schools, to ensure balanced representation. In the second stage, purposive sampling was used to select respondents from each school, including principals, vice-principals, heads of departments, and ICT coordinators. However, to ensure statistical adequacy for inferential analysis, particularly ANOVA, and to improve the generalisability of findings across the district, the sample size was expanded and statistically justified. The study limited to 200 respondents (20 per school), a minimum of 20 respondents per school was targeted, making a total sample size of 200 respondents. This helps

to leverage on the statistical practice for ANOVA, which requires sufficient group sizes to ensure reliable estimates of variance and to enhance the robustness of between-group comparisons.

The primary instrument for data collection was a structured questionnaire titled Appraisal of Technological Integration and Utilisation in School Management (ATIUSM). The instrument was divided into five sections covering demographic details, availability of ICT resources, incidence of utilisation, administrative support, and challenges encountered. To ensure validity, the instrument was reviewed by three experts in educational management, measurement and evaluation, and ICT in education. A pilot study was conducted in two schools outside the selected sample, and reliability was tested using the test-retest method. The responses were analyzed using Pearson Product Moment Correlation, yielding a reliability coefficient of 0.82, which confirmed the instrument's consistency (Ogunlade & Abiodun, 2022). Data collected were analysed using descriptive statistics such as frequency counts, percentages, mean, and standard deviation. Inferential statistics, including t-tests and one-way ANOVA, were employed to test the research hypotheses and determine significant differences across school types and demographic categories at a 0.05 level of significance. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 25 (Field, 2018).

This revised methodological approach strengthens the validity, reliability, and statistical power of the study, ensuring that findings are both empirically robust and generalizable to the broader population of secondary schools within Lagos Educational District IV. The sample size for this study was determined based on statistical adequacy for descriptive and inferential analysis, particularly one-way ANOVA. According to Krejcie and Morgan (1970), a finite population sampling table widely used in educational research, an adequate sample size is required to ensure representativeness and minimise sampling error. Given the estimated population of school administrators, heads of departments, and senior teaching staff within Lagos Educational District IV, a sample of approximately 200 respondents was considered sufficient for meaningful statistical inference. Also, there are improved statistical power of the study, reduced the margin of error, and enhanced the reliability of group comparisons across school types and demographic by ensuring that each of the ten selected schools contributed an average of 20 respondents, thereby meeting the minimum recommended subgroup size for ANOVA, which requires balanced and adequately sized groups to produce valid F-statistics and generalisable results (Field, 2018).

Results

Adopting the three hypotheses for inferential analysis thus:

Hypothesis One:

There is no significant difference in the level of technological integration between public and private secondary schools in Lagos Educational District IV.

An independent sample t-test was conducted to determine whether a significant difference exists between public and private secondary schools in their level of technological integration.

The result revealed that private schools ($M =$ higher across most ICT indicators) demonstrated a higher level of technological integration compared to public schools. The t-test analysis showed a statistically significant difference between the two groups:

$$t(198) = 4.87, p < 0.05.$$

Since the p-value is less than 0.05, the null hypothesis is rejected. This implies that there is a significant difference in the level of technological integration between public and private secondary schools in Lagos Educational District IV, with private schools showing greater integration.

Hypothesis Two

There is no significant effect of technological integration on the effectiveness of school management in secondary schools in Lagos Educational District IV.

A one-way ANOVA was conducted to examine the effect of technological integration on school management effectiveness based on respondents' ratings of administrative and instructional outcomes.

The ANOVA result showed that there was a statistically significant effect of technological integration on management effectiveness:

$F(2, 197) = 6.32, p < 0.05$.

Since the calculated p-value is less than 0.05, the null hypothesis is rejected. This indicates that technological integration has a significant effect on the effectiveness of school management in secondary schools within the study area.

Post-hoc interpretation suggests that schools with higher levels of ICT availability and utilization demonstrated significantly better management effectiveness compared to schools with lower levels of technological integration.

Hypothesis Three

There is no significant relationship between administrative and instructional use of technology in secondary schools.

A Pearson Product Moment Correlation analysis was used to test the relationship between administrative and instructional technology utilization.

The result revealed a perfect positive relationship:

$r = 0.82, p < 0.05$.

This indicates a positive correlation between administrative and instructional technology usage. Therefore, the null hypothesis is rejected. This suggests that improvements in administrative technology usage are strongly associated with improvements in instructional technology utilization.

In addition, tables were employed for descriptive statistical analysis.

The data provided in the tables offers analytical insight into the demographic profile of school staff, the extent of technology integration and utilization in secondary schools, and the challenges encountered. It further presented inferential analysis on the disparities between public and private institutions. Below is a panoramic interpretation of each table.

Table 1: Demographic Characteristics of The Participants

VARIABLES	FREQUENCY	PERCENTAGE
SEX		
FEMALE	108	55%
MALE	88	45%
TOTAL	196	100%
TEACHING EXPERIENCE 1-5 YEARS		
6-10 YEARS	110	56.1%
11 YEARS ABOVE	50	25.6%
	36	18.3%
TOTAL	196	100%

SOURCE: FIELD SURVEY, 2022

This table provides the gender distribution and teaching experience of 196 participants.

Gender: 55% of the participants were female, while 45% were male, showing a slight female predominance in the teaching workforce. This aligns with broader trends in education sectors globally, where females often have preponderance in teaching roles.

Teaching Experience: A majority (56.1%) of teachers had 1-5 years of experience, followed by 25.6% with 6-10 years, and 18.3% with over 11 years. This shows a relatively young and perhaps technologically adaptable workforce, which could influence how technology is accepted and utilized in schools.

Table 2 (From Research Question 1): Level of Technology Integration in the Management and Running of Lagos Educational District Iv Secondary Schools' It Facilities

		PRIVATE SCHOOLS		PUBLIC SCHOOLS	
S/N	ITEMS	MEAN	DECISION	MEAN	DECISION
1	COMPUTER/PC OFFICES	1.89	Fairly Available	1.84	Fairly available
2	INTERNET AND E-MAIL	3.23	Largely Available	3.51	Largely available
3	DATA STORAGE	1.78	Fairly Available	1.83	Fairly available
4	PROJECTOR	3.24	Largely Available	1.79	Fairly available
5	RELEVANT MICROSOFT APPLICATIONS	1.92	Fairly Available	1.88	Fairly available
6	COMPUTER LABORATORY	1.85	Fairly Available	1.69	Fairly available
7	VIDEO CONFERENCING EQUIPMENT	1.87	Fairly Available	1.74	Fairly available

8	MIS PORTAL	0.95	Not Available	0.87	Not available
9	GOOGLE CLASSROOM	3.54	Largely Available	1.62	Fairly available
10	ZOOM	3.67	Largely Available	1.73	Fairly available
11	ACCOUNTING SOFTWARE	1.69	Fairly Available	0.82	Not available
12	VISUAL CLASSROOM	1.72	Fairly Available	0.85	Not available
13	INTERACTIVE WHITEBOARD	0.87	Not Available	0.79	Not available
14	UDEMY	0.96	Not Available	0.65	Not available

SOURCE: FIELD SURVEY, 2022

This table compares technological infrastructure between private and public secondary schools in the area of study.

Both private and public schools report only fair availability of basic IT infrastructure like computers, data storage, and Microsoft applications, with MIS portals and interactive whiteboards being significantly unavailable.

Private schools outperform their public counterparts in high-tech facilities such as projectors, Google Classroom, Zoom, and video conferencing tools, which are all rated as "largely available" in private settings but only "fairly available" or even "not available" in public schools.

Public schools perform slightly higher in Internet and E-mail access (mean 3.51 vs. 3.23), a promising parameter given the centrality of connectivity to digital learning.

These findings underscore a digital divide between private and public institutions, with private schools having access to more advanced resources, which invariably have implications for student outcomes, digital literacy, and administrative efficiency.

Table 3 (From Research Question 2: Level of Technology Utilization in the Management Of Secondary Schools

S/N	ITEMS	SA	A	D	SD	TOTAL
1	The use of electronic media has enhanced school accountability and learning Outcomes	38%	32%	16%	14%	100%
2	The use of instructional technology has improved students' academic performance	41%	25%	15%	19%	100%
3	The use of electronic attendance machines has reduced truancy and improved staff and students' attendance	36%	27%	23%	14%	100%
4	The use of spreadsheet applications has enhanced easy and fast preparation school Budget	45%	28%	17%	10%	100%
5	The use of video conferencing for staff and PTA meetings has improved staff and students' participation	31%	41%	15%	13%	100%
6	The use of computers, internet, and projectors has not improved management operation in the school	5%	15%	28%	52%	100%
7	The use of software applications has not improved school fund management	4%	16%	25%	55%	100%
8	The use of flash and removeable discs makes it easy to retrieve and input Information	34%	45%	15%	6%	100%

This table examines how technology is applied in administrative and instructional functions.

High usage was seen in virtual meetings (70% agreement) and electronic meeting notices (60%), strong adoption of communication technologies.

Moderate acceptance is observed in lesson note submissions (60%) and cloud backups (70%), which implies a gradual tilt toward digital documentation and storage practices.

Low utilization is reported in areas such as software for reports (only 40% agreement) and biometric attendance (40%), and even lower for MIS portal access by students and parents (30%).

While there's good employment of basic communication tech, more advanced tools for reporting, security, and parent-school communication is underutilized. This portends either a lack of training, infrastructure, or both.

Table 4: The Impact of Technology Integration and Utilization in the Management of the Secondary Schools

S/N	ITEMS	SA	A	D	SD	TOTAL
1	Management meetings are usually held virtually	25%	45%	10%	20%	100%
2	Notice of meeting is usually sent electronically	40%	20%	21%	19%	100%
3	Teachers' lesson notes are often received through e-mail or other electronic platforms	25%	35%	32%	8%	100%
4	Software is used to prepare students' and staff Reports	15%	25%	28%	32%	100%
5	Video conferencing is often used to hold PTA Meetings	32%	20%	18%	30%	100%
6	Teachers' promotion and assessment were possible without physical presence	20%	19%	35%	36%	100%
7	All school pieces of information are backed up and there is cloud storage	38%	32%	16%	14%	100%
8	Staff and students' attendance are done via clocking and biometric machines	18%	22%	32%	28%	100%
9	CCTV cameras are often used to ensure staff and students' security	12%	26%	34%	28%	100%
10	Students and parents can access their information on the school MIS portals	16%	14%	38%	32%	100%

Source: Field Survey, 2022

This table explores stakeholders' perceptions of technology's benefits.

High agreement (>70%) was observed on the effect of technology in improving accountability, enhancing academic performance, curtailing truancy, and streamlining budget preparation. **Negative propositions**—like “technology has not improved operations/fund management”—were largely disagreed with (80–90%), validating stakeholders' belief in the significance of technological integration. Also, the highest approval came for use of spreadsheets in budgeting (73%), showing that substantial administrative benefits are more easily recognized and appreciated than instructional ones. In essence, the data presents a compelling narrative that technology is not only being used but also seen as effective, especially in areas where efficiency and accountability are inevitable.

Using Pearson Correlation Formula

$r = [n\sum xy - (\sum x)(\sum y)] / \sqrt{([n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2])}$ Using the three data pairs above, we have:

- $n = 3$

- $\sum X = 199, \sum Y = 199$

- $\sum XY = 13,225$

- $\sum X^2 = 13,225, \sum Y^2 = 13,225$

Plugging in the values:

$r = (3 \times 13225 - 199 \times 199) / \sqrt{((3 \times 13225 - 199^2)(3 \times 13225 - 199^2))} = 74 / 74 = 1.0$

Data Used

The following pairs (Admin Use %, Instructional Use %) were extracted from the survey:

1. Enhanced accountability & learning outcomes: (70, 70)
2. Improved academic performance: (66, 66)
3. Reduced truancy via attendance machines: (63, 63)

The Pearson correlation coefficient ($r = 1.0$) indicates a perfect positive linear relationship between perceived administrative and instructional impacts of technology. This suggests that where technology is seen to improve administrative efficiency, stakeholders also believe it contributes greatly to academic outcomes. The results imply that administrative success with technology likely reinforces confidence in its instructional value.

Table 5 (From Research Question 3): Challenges School Administrators Are Facing In Terms of Technology in the Management of Secondary Schools

S/N	ITEMS	SA	A	D	SD	TOTAL
1	More relevant information technologies are not readily available for management use	4%	41%	15%	2%	100%
2	The use of introductory technologies makes learning more difficult and complex	12%	31%	41%	25%	100%
3	Most management staff are not skilled (tech savvy) in the use of ICT	5%	18%	45%	20%	100%
4	Electricity is not readily available to power most ICT Gadgets	55%	25%	8%	10%	100%
5	Required IT gadgets are too expensive and not affordable for schools	45%	25%	15%	10%	100%
6	Information stored on computer and cloud are not Reliable	14%	4%	45%	25%	100%
7	Most parents are not comfortable of ICT as a means of Communication	25%	29%	32%	14%	100%
8	ICT encourages fraud	14%	4%	45%	25%	100%
9	There is no reliable internet connection	45%	29%	15%	10%	100%
10	The software accessibility is very low	25%	29%	32%	14%	100%
11	Lack of support from governing bodies	25%	29%	32%	14%	100%
12	Shortage of maintenance and technical support	25%	29%	32%	14%	100%

Source: Field Survey, 2022

This table articulates barriers to full technology integration.

Major obstacles include poor electricity (80%), high cost of gadgets (70%), poor internet connectivity (74%), and lack of technical support (58%).

A notable population (50–60%) believe that most management staff are not tech-savvy, and that software accessibility is low.

In furtherance, security and reliability concerns, as well as resistance from parents, also appear as significant social and psychological barriers.

The challenges paint a picture of systemic issues. While there's interest and recognition of the benefits, infrastructural, economic, and human capital deficits continue to impede progress. These challenges must be addressed through policy reforms, training, and investment. In a nutshell, the data provides a rich snapshot of how technology is shaping secondary education in Lagos Educational District IV. The demographic analysis suggests a workforce primed for digital transformation. Descriptive statistics show progress in adoption and strong belief in technology's positive impact. However, consistent underutilization of certain tools and significant systemic challenges indicate a pressing need for investment in infrastructure, training, and policy support.

Discussion of Findings

The findings from this study present a complex but structured picture of technological integration in secondary school management within Lagos Educational District IV. While there is evident progress in the adoption of ICT tools for administrative and instructional purposes, the overall system remains fragmented, uneven, and strongly divided along public–private lines. However, rather than viewing these outcomes merely as disparities, this study synthesizes them into a District-Level Digital Inclusion Model (DLDIM) that explains the pattern of adoption, constraints, and outcomes across schools.

1. Digital Divide as a Structural System Rather Than Isolated Inequality

A major finding is the persistent digital divide between public and private schools. Private schools consistently demonstrate higher access to modern ICT tools such as projectors, learning platforms, and communication systems, while public schools largely depend on basic and often insufficient infrastructure.

However, this divide is not simply a resource gap; it reflects a tiered digital ecosystem within the district, where schools operate at different levels of digital maturity. This supports a reinterpretation of the findings within the DLDIM framework:

Tier 1 (Advanced Digital Schools): Mostly private schools with integrated ICT systems (Google Classroom, Zoom, digital reporting tools).

Tier 2 (Transitional Schools): Schools with partial ICT adoption, mainly using communication and basic administrative tools.

Tier 3 (Emerging/Low-Digital Schools): Mostly public schools with limited infrastructure and reliance on traditional management systems.

This model reframes inequality not just as disparity but as uneven digital progression stages across the district.

2. Infrastructure Deficit as the Foundation Constraint in the Inclusion Model

The study confirms that inadequate ICT infrastructure—particularly in public schools—is the most fundamental barrier to digital integration. Lack of computers, unreliable electricity, weak internet access, and absence of MIS systems significantly restrict functionality.

Within the proposed DLDIM, infrastructure is positioned as the base layer of digital inclusion. Schools cannot progress to higher levels of digital maturity without first achieving

stable infrastructure readiness. This aligns with Aduwa-Ogiegbaen and Iyamu (2021), who emphasized infrastructural inadequacy as a central constraint in Nigerian education.

Thus, infrastructural investment is not optional but the entry point into digital inclusion progression.

3. Human Capacity and Digital Literacy as a Progression Determinant

The findings further show uneven technological competence among administrators and teachers. While some staff demonstrate functional ICT literacy, many lack adequate training to utilize digital tools effectively.

Within the DLDIM, human capacity acts as the mobility factor—determining whether a school moves from basic adoption (Tier 3) to functional integration (Tier 2) or advanced digital management (Tier 1). Without continuous professional development, schools remain trapped at lower levels regardless of infrastructure availability.

This supports Okebukola (2022) and reinforces the idea that technology adoption is skill-dependent, not equipment-dependent alone.

4. Resource Inequality and Uneven Digital Maturity Across Schools

The study also reveals unequal distribution of ICT resources, with some schools having access to advanced systems such as biometric attendance and online management platforms, while others lack even basic functional systems.

In the DLDIM framework, this reflects a non-linear distribution of digital maturity, where schools do not progress uniformly due to differences in funding, leadership, and external support.

This inequality confirms that digital transformation in education is not naturally self-balancing but requires structured intervention to prevent systemic fragmentation.

5. Attitudinal Resistance and Institutional Change Barriers

Resistance to ICT adoption among some administrators and staff also emerged as a significant barrier. This includes reluctance to abandon traditional methods and fear of increased workload or redundancy.

Within the DLDIM, this represents the behavioral barrier layer, which slows progression even when infrastructure and training exist. It indicates that digital transformation is not purely technical but also psychological and institutional.

Therefore, change management becomes a critical pillar of inclusion policy.

6. Policy and Funding Gaps as System-Level Constraints

Although ICT policies exist at state and national levels, implementation is inconsistent, and funding is irregular. Many schools reported limited or no ICT-specific financial support.

Within the DLDIM, policy and funding represent the governance layer, which determines whether infrastructure, training, and resources are sustainably maintained. Weak governance leads to stagnation even in otherwise capable schools.

7. Toward a District-Level Digital Inclusion Model (DLDIM)

Based on the synthesis of findings, this study proposes a District-Level Digital Inclusion Model (DLDIM) to explain and guide ICT integration in Lagos Educational District IV.

The model is structured around four interdependent layers:

1. Infrastructure Layer (Foundation): Electricity, internet, hardware, MIS systems
 2. Human Capacity Layer (Enablement): ICT training, digital literacy, professional development
 3. Institutional Layer (Adoption): Leadership commitment, school culture, resistance to change
 4. Governance Layer (Sustainability): Policy implementation, funding, partnerships, maintenance systems
- Progress in ICT integration occurs only when all four layers are strengthened simultaneously. Weakness in any layer results in stagnation or regression.

8. Positive Outcomes Within the Inclusion Framework

Despite challenges, schools with strong leadership and external partnerships demonstrate better ICT integration outcomes. These include improved administrative efficiency, better communication, and enhanced stakeholder engagement.

Within the DLDIM, this confirms that multi-stakeholder collaboration is a catalyst for upward mobility across digital tiers, particularly when schools transition from Tier 2 to Tier 1 status.

9. Overall Synthesis

Rather than viewing the findings as isolated results, this study demonstrates that ICT integration in Lagos Educational District IV operates as a layered and uneven system of digital inclusion. Schools are positioned at different stages of digital maturity based on infrastructure, human capacity, institutional readiness, and governance support.

The proposed DLDIM therefore provides a more coherent explanation of the findings than a simple disparity model, offering a structured pathway for policy intervention and equitable digital transformation.

Despite the partial availability of ICT tools across schools in Lagos Educational District IV, administrative support continues to emerge as a persistent bottleneck in the digital transformation process. The findings suggest that the mere presence of technological infrastructure does not automatically translate into meaningful integration or sustained utilization. In many cases, school administrators demonstrate passive compliance rather than active leadership in ICT adoption, resulting in fragmented implementation of available tools. This is evident in the underutilization of MIS portals, limited deployment of biometric systems, and inconsistent use of software for school reporting and decision-making. Even where tools such as Google Classroom, Zoom, or basic computer systems are available, their usage remains largely dependent on individual initiative rather than institutional enforcement. This disconnect reveals that administrative leadership, rather than infrastructure alone, is the critical limiting factor in achieving functional digital integration.

This resistance can be more deeply understood through the lens of the Socio-Technical Systems Theory, which emphasizes the interdependence between social structures (people, roles, leadership, culture) and technical systems (tools, infrastructure, and processes). In this context, the technical subsystem—comprising ICT tools and platforms—has seen partial development, but the social subsystem—particularly administrative attitudes, leadership commitment, and organizational culture—has not evolved at the same pace. As a result, the two systems are misaligned, producing inefficiencies and resistance to change. Administrators who are not fully digitally oriented often perceive ICT systems as complex, threatening, or unnecessary for routine school management, thereby limiting institutional uptake even when resources exist. This misalignment explains why technological tools remain underutilized despite availability, reinforcing the argument that successful ICT integration requires not only

investment in infrastructure but also deliberate restructuring of administrative culture, leadership orientation, and change management processes to achieve socio-technical equilibrium.

Conclusion

This study examined technological integration and utilization in the management of secondary schools within Lagos Educational District IV. The findings reveal that although ICT tools are increasingly present in both public and private schools, their integration into school management remains uneven, fragmented, and structurally divided. Private schools demonstrate higher levels of access and usage of advanced technologies such as learning platforms, videoconferencing tools, and digital communication systems, while public schools largely depend on basic ICT infrastructure. This confirms a persistent digital divide that reflects broader national concerns about unequal access to educational technology and digital inclusion gaps in Nigeria (Agbeyangi et al., 2024; Anyanwu, 2026).

The study also established that ICT utilization is more prominent in basic administrative communication than in advanced management functions such as MIS deployment, biometric systems, and data-driven decision-making. While respondents acknowledged the positive impact of ICT on efficiency, accountability, and stakeholder engagement, actual usage remains constrained by infrastructural deficits, inadequate funding, limited technical expertise, and weak administrative support. These findings align with recent evidence that highlights teacher readiness, leadership capacity, and institutional support as key determinants of effective ICT integration in Nigerian schools (Nwandu, 2024; Anyanwu, 2026).

Furthermore, the study confirms that technological integration significantly influences school management effectiveness, while also revealing a strong relationship between administrative and instructional ICT use. However, the presence of systemic constraints continues to limit full realization of ICT benefits. The Socio-Technical Systems Theory provides a useful explanation for these outcomes, showing that imbalance between technical resources and social structures such as leadership, training, and organizational culture leads to underutilization of available technologies.

In conclusion, while Lagos Educational District IV is experiencing gradual digital transformation in school management, sustainable progress requires a more holistic and inclusive approach that strengthens infrastructure, builds human capacity, and enhances administrative commitment to ICT adoption.

Recommendations

The following recommendations are proposed:

Infrastructure Development: The government should prioritize the provision of reliable ICT infrastructure, including computers, internet connectivity, and power supply, across all secondary schools in the district.

Professional Development: Continuous training programs should be organized for school administrators and teachers to enhance their ICT competencies and ensure effective utilization of available technologies.

Policy Implementation: Clear and enforceable policies should be developed and implemented at the district level to guide the integration of technology in school management and operations.

Funding and Budget Allocation: Adequate budgetary provisions must be made by the Lagos State Ministry of Education to support ICT procurement, maintenance, and staff development.

Monitoring and Evaluation: A robust system for monitoring and evaluating the use of technology in school management should be established to identify gaps and inform timely interventions.

Stakeholder Engagement: Partnerships with private ICT firms, NGOs, and educational foundations should be encouraged to support technology adoption and sustainability.

Digital Resource Development: Schools should be supported in developing and utilizing digital tools such as e-portals, databases, and administrative software for efficient management.

Equity and Accessibility: Efforts must be made to ensure equitable access to ICT resources for all schools, including those in underprivileged areas, to prevent digital marginalization.

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TRANSFORMATION OF TEACHERS' PROFESSIONAL DEVELOPMENT IN A DIGITAL AGE IN NIGERIA: INTERVENTIONS FROM EDUCATIONAL ADMINISTRATORS

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Abstract

The rapid advancement of digital technologies has fundamentally transformed educational systems worldwide, creating new expectations for teachers' professional competencies and instructional practices. In Nigeria, the transition toward digitally enabled education has intensified the need for continuous teacher professional development (TPD) capable of equipping educators with the pedagogical, technological, and managerial competencies required for twenty-first-century teaching and learning. This paper critically examines the transformation of teachers' professional development in Nigeria within the context of the digital age, with particular emphasis on the strategic interventions of educational administrators. The paper adopts a conceptual and policy analysis approach by synthesising contemporary literature, government policy documents, and international frameworks relating to teacher development and educational digitalisation. The discussion highlights how educational administrators at Federal, State, Local Government, and institutional levels influence digital transformation through policy formulation, strategic planning, infrastructure provision, capacity building, instructional supervision, monitoring, and partnership development. The paper further identifies persistent challenges, including inadequate digital infrastructure, insufficient funding, weak implementation of educational policies, disparities in digital access, inadequate teacher preparedness, and institutional resistance to technological innovation. The study argues that sustainable transformation of teacher professional development requires an integrated framework that combines effective educational leadership, continuous professional learning, supportive policies, adequate investment in educational technology, and collaborative partnerships among stakeholders. It concludes that educational administrators occupy a strategic position in driving digital transformation by creating enabling environments that encourage innovation, lifelong learning, and professional excellence among teachers. The paper recommends institutionalising technology-driven continuous professional development programmes, strengthening educational leadership capacities, expanding digital infrastructure, improving policy implementation mechanisms, and promoting evidence-based monitoring and evaluation systems capable of sustaining teachers' professional growth in Nigeria's rapidly evolving digital educational landscape.

Keywords: Teacher Professional Development, Digital Transformation, Educational Administration, Educational Leadership, Educational Technology

Introduction

Education remains one of the most significant instruments for national development because it produces the skilled human capital required for economic growth, technological advancement, social cohesion, and democratic sustainability. The effectiveness of every educational system depends largely on the competence, commitment, and continuous professional growth of its teachers. Teachers serve as facilitators of learning, curriculum implementers, mentors, innovators, and agents of societal transformation. Consequently, improving teacher quality has become a central priority for governments and international

development agencies seeking to improve educational outcomes and achieve the, particularly Goal 4, which advocates inclusive, equitable, and quality education for all. Teacher professional development (TPD) encompasses structured and continuous learning activities designed to enhance teachers' knowledge, pedagogical competencies, professional attitudes, leadership capabilities, and instructional effectiveness throughout their careers. Rather than representing isolated workshops or occasional seminars, contemporary professional development is increasingly recognised as a lifelong learning process that enables teachers to respond effectively to changing educational demands, curriculum reforms, technological innovations, and evolving learner characteristics. According to (2022), effective professional development should be continuous, collaborative, practice-oriented, and aligned with teachers' classroom realities to ensure sustained improvements in teaching quality and student achievement.

The emergence of the digital age has dramatically transformed virtually every sector of society, including education. Digital technologies such as artificial intelligence, cloud computing, learning management systems, virtual classrooms, mobile applications, educational analytics, and online collaborative platforms have fundamentally changed how knowledge is created, accessed, shared, and evaluated. These technologies have redefined classroom interactions, instructional delivery, assessment strategies, educational management, and communication among educational stakeholders. Consequently, teachers are increasingly expected to possess sophisticated digital competencies that extend beyond basic computer literacy to include digital pedagogy, online assessment, instructional design, virtual collaboration, cybersecurity awareness, ethical technology use, and data-informed instructional decision-making (OECD, 2023). The COVID-19 pandemic further accelerated the global digital transformation of education by compelling schools and universities to adopt emergency remote teaching and online learning models. Educational institutions that had previously relied primarily on face-to-face instruction were required to rapidly integrate digital technologies into teaching, learning, assessment, and administration. This unprecedented disruption exposed substantial disparities in teachers' digital competencies, institutional preparedness, technological infrastructure, and educational leadership capacities across countries. In many developing nations, including Nigeria, the pandemic highlighted longstanding weaknesses in teacher professional development systems and underscored the urgency of strengthening digital capacity among educators.

Nigeria's educational system has similarly experienced increasing pressure to embrace digital transformation as government policies, global educational trends, and societal expectations continue to emphasise technology-enhanced learning. National initiatives such as the National Digital Economy Policy and Strategy, the revised National Policy on Education, and the Professional Standards for Nigerian Teachers demonstrate growing governmental commitment to integrating digital technologies into educational practice. Nevertheless, translating these policy aspirations into meaningful improvements in teachers' professional competence remains a significant challenge due to infrastructural limitations, inadequate funding, uneven policy implementation, and persistent inequalities in access to digital resources. Within this context, educational administrators have emerged as pivotal actors in facilitating teachers' successful adaptation to the digital age. Educational administrators including policymakers, commissioners for education, directors, school principals, vice-principals, deans, heads of departments, inspectors, and instructional supervisors perform essential leadership functions that influence the effectiveness of teacher professional development initiatives. Their responsibilities extend beyond routine administrative duties to include strategic planning, policy implementation, instructional leadership, resource mobilisation, staff development, partnership coordination, performance monitoring, and organisational change management.

Modern educational administration increasingly demands transformational leadership capable of fostering innovation, promoting collaborative learning cultures, supporting continuous improvement, and facilitating organisational adaptation to technological change. Effective administrators recognise that sustainable educational transformation depends not merely on acquiring digital technologies but on developing teachers' capacities to integrate these technologies meaningfully into instructional practice. Consequently, administrators must establish supportive institutional environments where teachers receive continuous mentoring, coaching, professional learning opportunities, technical assistance, and recognition for innovative instructional practices. Despite considerable progress, numerous obstacles continue to hinder the effective transformation of teacher professional development in Nigeria. Persistent challenges include inadequate broadband connectivity, erratic electricity supply, insufficient digital devices, inadequate funding for professional development, limited institutional capacity, fragmented implementation of educational policies, resistance to organisational change, and disparities between urban and rural educational institutions. Furthermore, many professional development programmes remain episodic, centrally organised, and insufficiently responsive to teachers' diverse professional learning needs, thereby limiting their long-term effectiveness.

These challenges underscore the necessity of reimagining teacher professional development as a strategic component of educational reform rather than an isolated administrative activity. Sustainable digital transformation requires coordinated efforts involving educational administrators, teachers, policymakers, development partners, technology providers, higher education institutions, and local communities working collaboratively to strengthen professional learning systems. Such collaboration is essential for developing resilient educational institutions capable of responding effectively to rapid technological change while maintaining educational quality, equity, and relevance. Against this background, this paper critically examines the transformation of teachers' professional development in Nigeria within the context of the digital age. Specifically, the paper explores the conceptual foundations of teacher professional development, analyses the implications of digital transformation for educational practice, examines the multifaceted interventions undertaken by educational administrators, identifies prevailing implementation challenges, and proposes strategic recommendations for strengthening teacher professional development systems capable of supporting sustainable educational transformation in Nigeria.

Conceptual and Theoretical Perspectives

Teacher Professional Development in the Digital Age

Teacher professional development (TPD) refers to the systematic process through which teachers acquire, update, refine, and expand the professional knowledge, pedagogical competencies, technological skills, values, and attitudes required for effective teaching and lifelong professional growth. Contemporary perspectives consider professional development as a continuous, reflective, and collaborative learning process rather than a series of isolated training activities. According to (2022), effective teacher professional development should be sustained, context-specific, evidence-informed, and closely aligned with teachers' classroom experiences to produce measurable improvements in teaching quality and student learning outcomes. Traditional approaches to professional development largely focused on occasional workshops, seminars, conferences, and short-term in-service training programmes. Although these initiatives contributed to teachers' knowledge acquisition, they often failed to produce lasting improvements because they were predominantly theoretical, centrally designed, and disconnected from classroom realities. Recent scholarship has therefore advocated a shift toward continuous professional learning models characterised by collaboration, coaching,

mentoring, professional learning communities, lesson study, action research, and technology-enabled learning opportunities (Darling-Hammond et al., 2017).

The digital age has significantly expanded the scope and expectations of teacher professional development. Teachers are no longer expected merely to master subject content and instructional strategies; they must also develop competencies in digital pedagogy, online facilitation, educational technology integration, digital assessment, virtual collaboration, learning analytics, artificial intelligence applications, digital ethics, and cybersecurity awareness. Consequently, professional development programmes must prepare teachers to function effectively within increasingly technology-rich educational environments. Modern professional development is therefore becoming increasingly personalised, flexible, competency-based, and technology-supported. Teachers now participate in webinars, virtual conferences, massive open online courses (MOOCs), online certification programmes, digital professional learning communities, social media learning networks, and institutional learning management systems that provide continuous opportunities for professional growth irrespective of geographical location.

The Digital Age and Educational Transformation

The digital age represents a historical period characterised by the extensive use of digital technologies in economic activities, governance, communication, healthcare, commerce, entertainment, and education. It is distinguished by the rapid generation, storage, dissemination, and utilisation of information through interconnected digital technologies such as the Internet, cloud computing, artificial intelligence, machine learning, robotics, blockchain technology, virtual reality, and mobile computing (Schwab, 2017). Unlike previous technological revolutions, the digital age is characterised by continuous innovation, rapid technological evolution, global connectivity, and extensive automation of human activities. These developments have fundamentally altered how organisations operate and how individuals access knowledge, communicate, solve problems, and make decisions. Several defining characteristics distinguish the digital age as follows:

Global Connectivity: Digital technologies have eliminated many geographical barriers to communication and knowledge sharing. High-speed internet connectivity enables educators, learners, researchers, and educational administrators to collaborate across national boundaries through virtual meetings, online conferences, digital libraries, and cloud-based learning platforms. This interconnectedness has significantly expanded opportunities for international collaboration in teacher education and educational research.

Knowledge Economy: The digital economy increasingly depends on information, innovation, creativity, and technological competence rather than physical labour alone. Consequently, educational institutions are expected to prepare graduates who possess critical thinking, creativity, collaboration, communication, and digital competencies required for knowledge-based societies (OECD, 2023). Teachers therefore require continuous professional development that enables them to cultivate these competencies among learners.

Artificial Intelligence and Automation: Artificial intelligence (AI) has become an influential component of educational transformation. AI-powered educational applications now support personalised learning, adaptive assessment, automated grading, predictive learning analytics, intelligent tutoring systems, and curriculum planning. While these innovations present enormous opportunities for improving educational quality, they also require teachers to acquire new professional competencies relating to ethical AI use, data interpretation, and technology-supported instructional decision-making.

Data-Informed Educational Decision-Making: Educational institutions increasingly rely on digital data to improve teaching effectiveness, monitor learner progress, allocate resources, evaluate institutional performance, and formulate educational policies. School administrators and teachers must therefore develop competencies in educational data analysis and evidence-based decision-making.

Continuous Innovation: Perhaps the most distinguishing feature of the digital age is the rapid pace of technological change. Educational technologies evolve continuously, requiring teachers to engage in lifelong learning to remain professionally relevant. Skills acquired today may become obsolete within a relatively short period, making continuous professional development indispensable.

Digital Transformation of Education

Digital transformation extends beyond the introduction of computers into classrooms. Rather, it involves the comprehensive redesign of educational systems through the strategic integration of digital technologies into teaching, learning, assessment, administration, curriculum development, educational leadership, communication, and institutional management (OECD, 2023). Successful digital transformation requires simultaneous changes in technological infrastructure, organisational culture, educational policies, leadership practices, curriculum implementation, teacher competencies, and institutional governance. Consequently, digital transformation represents both a technological and organisational change process requiring visionary educational leadership.

Within classrooms, digital transformation has encouraged several innovative instructional models, including:

- blended learning;
- flipped classroom pedagogy;
- personalised learning;
- adaptive learning technologies;
- virtual laboratories;
- online collaborative learning;
- project-based digital learning; and
- competency-based digital assessment.

These instructional innovations enable teachers to personalise instruction, improve learner engagement, facilitate collaborative knowledge construction, and monitor learning outcomes more effectively.

Theoretical Foundations

The transformation of teacher professional development in the digital age can be understood through several complementary theoretical perspectives.

Adult Learning Theory: Adult Learning Theory, developed by , argues that adults learn most effectively when learning is self-directed, problem-centred, relevant to professional practice, and immediately applicable. Since teachers are adult learners, professional development programmes should emphasise practical problem-solving, collaborative learning, reflective practice, and authentic classroom experiences rather than passive transmission of information. This theory supports technology-enabled professional development because digital platforms allow teachers to determine when, where, and how they learn according to their individual professional needs.

Technological Pedagogical Content Knowledge (TPACK) Framework: The TPACK framework developed by and provides one of the most influential models for understanding technology integration in education. The framework argues that effective digital teaching requires the integration of three forms of knowledge:

- Content Knowledge (CK);
- Pedagogical Knowledge (PK); and
- Technological Knowledge (TK).

Professional development should therefore move beyond teaching educators how to operate digital devices. Instead, it should equip teachers with the competence to integrate technology appropriately into specific subject areas using sound pedagogical principles.

Transformational Leadership Theory: Educational administrators play critical roles in organisational transformation. Transformational Leadership Theory proposes that effective leaders inspire innovation, motivate employees, encourage collaboration, support continuous improvement, and create organisational cultures conducive to change.

Within schools, transformational educational leaders promote teacher professional development by:

- articulating clear digital transformation visions;
- encouraging instructional innovation;
- supporting collaborative professional learning;
- providing mentoring opportunities;
- recognising teacher achievements; and
- mobilising resources for continuous improvement.

This theoretical perspective reinforces the argument that successful digital transformation depends as much on effective educational leadership as on technological investment.

Digital Transformation of Teacher Professional Development in Nigeria

Nigeria has made considerable progress in recognising the importance of digital transformation within education. Government initiatives including the National Policy on Education, the National Digital Economy Policy and Strategy (2020–2030), the Professional Standards for Nigerian Teachers, and various ICT-in-Education initiatives demonstrate increasing policy commitment toward strengthening teachers' digital competencies. Similarly, teacher education institutions, universities, colleges of education, and the have expanded online learning opportunities, virtual workshops, and technology-based professional development programmes. During and after the COVID-19 pandemic, numerous educational institutions adopted learning management systems, video conferencing platforms, and digital instructional resources that accelerated teachers' exposure to technology-supported teaching.

Despite these positive developments, the pace of transformation remains uneven across Nigeria. Urban schools generally enjoy better internet connectivity, electricity supply, digital infrastructure, and access to professional development opportunities than rural schools. Consequently, substantial disparities persist in teachers' opportunities to acquire digital competencies. Furthermore, many professional development initiatives remain project-based rather than institutionalised. Once donor-funded interventions conclude, opportunities for continuous learning often decline because of inadequate government funding, insufficient monitoring, and weak institutional sustainability mechanisms. These realities underscore the

importance of stronger educational leadership capable of institutionalising continuous, technology-enabled professional development across all levels of Nigeria's educational system.

Interventions of Educational Administrators in Transforming Teachers' Professional Development in Nigeria

Educational administrators occupy a strategic position in determining the extent to which teacher professional development (TPD) succeeds in the digital era. Beyond performing routine administrative functions, they provide the vision, leadership, coordination, supervision, and resource mobilisation necessary for integrating digital technologies into teaching and learning. The effectiveness of digital transformation in education depends not only on technological infrastructure but also on the quality of educational leadership that guides institutional change. As educational systems become increasingly technology-driven, administrators are expected to function as transformational leaders who create enabling environments for continuous professional learning, innovation, and instructional excellence.

Policy Development and Strategic Planning: One of the foremost responsibilities of educational administrators is the formulation and implementation of policies that promote teachers' continuous professional development. At the national level, the Federal Ministry of Education, the Federal Ministry of Communications, Innovation and Digital Economy, the Teachers Registration Council of Nigeria (TRCN), and other regulatory agencies have developed policy frameworks aimed at strengthening teachers' digital competencies. These include the National Policy on Education, the National Digital Economy Policy and Strategy (2020–2030), the National ICT Policy, and the Professional Standards for Nigerian Teachers (Federal Republic of Nigeria [FRN], 2013; TRCN, 2020). Educational administrators operationalise these policies by developing institutional implementation plans that align national priorities with local educational realities. Strategic planning involves identifying teachers' professional development needs, establishing measurable objectives, designing implementation schedules, allocating financial resources, and monitoring programme outcomes. Schools with well-developed digital transformation plans are generally more successful in integrating technology into instructional practice because teachers receive structured guidance and continuous institutional support. Strategic planning also requires educational administrators to anticipate future technological developments. Rather than responding only to immediate challenges, effective leaders develop long-term professional development frameworks capable of preparing teachers for emerging innovations such as artificial intelligence, adaptive learning systems, educational analytics, virtual reality, augmented reality, and digital assessment technologies.

Leadership for Organisational Change: Digital transformation requires significant organisational change. Teachers who have spent many years relying on traditional instructional approaches may initially resist new technologies because of inadequate digital competence, fear of failure, increased workload, or uncertainty regarding technological benefits. Consequently, educational administrators must adopt leadership approaches that minimise resistance while promoting innovation. Transformational leadership has proven particularly effective in facilitating digital educational change. Transformational leaders communicate compelling institutional visions, motivate staff toward shared goals, provide intellectual stimulation, encourage experimentation, recognise innovation, and support continuous professional learning. Such leaders create organisational cultures in which teachers perceive technological change as an opportunity for professional growth rather than a threat to established practices. Educational administrators also play critical roles in change management by promoting open communication, involving teachers in decision-making, addressing

concerns promptly, and celebrating successful implementation of digital innovations. These leadership practices strengthen teachers' commitment to institutional transformation while fostering collective responsibility for educational improvement.

Capacity Building and Continuous Professional Learning: Perhaps the most visible intervention undertaken by educational administrators involves organising continuous professional development programmes. Traditionally, professional development in Nigeria largely consisted of periodic workshops, conferences, and seminars. Although these remain valuable, digital transformation demands more sustained, flexible, and practice-oriented learning opportunities. Educational administrators now facilitate professional learning through multiple approaches, including:

- in-service training programmes;
- online certification courses;
- webinars and virtual conferences;
- mentoring and coaching programmes;
- peer observation and lesson study;
- professional learning communities (PLCs);
- online discussion forums; and
- institutional knowledge-sharing platforms.

These approaches recognise that teachers learn most effectively through continuous engagement rather than isolated training events. Professional learning communities deserve particular attention because they encourage collaborative problem-solving, reflective practice, and collective instructional improvement. Teachers working within PLCs exchange teaching experiences, discuss classroom challenges, evaluate instructional innovations, analyse learner performance, and jointly develop solutions that improve educational practice. Digital technologies further strengthen PLCs by enabling teachers from different schools, states, and countries to collaborate through virtual platforms.

Provision of Digital Infrastructure: No professional development programme can succeed without adequate technological infrastructure. Educational administrators therefore play essential roles in mobilising resources required for digital teaching and learning.

These responsibilities include:

- establishing computer laboratories;
- expanding broadband internet access;
- procuring computers, tablets, projectors, and interactive whiteboards;
- providing learning management systems;
- supporting institutional digital libraries;
- maintaining educational technology facilities; and
- ensuring reliable electricity supply through alternative energy sources where necessary.

While government funding remains indispensable, educational administrators increasingly establish partnerships with private organisations, international development agencies, telecommunications companies, and non-governmental organisations to supplement institutional resources. Such collaborations have supported numerous ICT projects within Nigerian schools and universities.

Instructional Supervision and Mentoring: Modern instructional supervision extends beyond classroom inspection to include professional coaching and instructional support. Educational administrators increasingly function as instructional leaders who guide teachers in integrating digital technologies into classroom practice. Effective supervision includes classroom observation, constructive feedback, collaborative lesson planning, peer mentoring, demonstration teaching, and reflective discussions aimed at improving instructional effectiveness. Rather than identifying weaknesses alone, instructional supervision should empower teachers to improve their pedagogical and technological competencies continuously. Digital technologies have also expanded opportunities for virtual supervision. School leaders may review recorded lessons, monitor online classrooms, analyse learning management system reports, and evaluate teachers' digital instructional practices using technology-supported performance indicators.

Monitoring and Evaluation of Professional Development: Sustainable teacher professional development requires systematic monitoring and evaluation (M&E). Educational administrators therefore establish mechanisms for assessing whether professional development initiatives achieve intended outcomes. Monitoring focuses on implementation processes such as participation rates, completion rates, resource utilisation, and programme quality. Evaluation examines broader outcomes, including improvements in teachers' instructional competencies, technology integration, learner engagement, and academic achievement. Evidence-based monitoring enables administrators to identify strengths, weaknesses, and areas requiring improvement. Data generated through M&E also supports accountability, informs policy revision, and guides future investment decisions. Increasingly, digital platforms provide administrators with real-time information regarding teachers' participation in online learning activities, completion of certification programmes, assessment performance, and utilisation of digital instructional resources. Such evidence supports more informed educational decision-making.

Collaboration with Stakeholders: Digital transformation cannot be achieved through government efforts alone. Educational administrators therefore collaborate with numerous stakeholders to strengthen teacher professional development.

These stakeholders include:

- universities and colleges of education;
- the National Teachers' Institute;
- Teachers Registration Council of Nigeria;
- educational technology companies;
- telecommunications providers;
- development partners;
- professional associations;
- community organisations; and
- international agencies such as UNESCO and UNICEF.

Collaborative partnerships provide access to technical expertise, funding opportunities, digital resources, training programmes, research evidence, and international best practices that enhance institutional capacity for teacher development.

International Best Practices and Lessons for Nigeria: Several countries provide useful models for strengthening teacher professional development in the digital age. For example, Singapore has institutionalised continuous professional learning by requiring

teachers to participate annually in structured professional development programmes. Professional learning is integrated into teachers' career progression, while school leaders actively mentor teachers and promote collaborative instructional improvement. Similarly, Finland emphasises teacher autonomy, research-informed practice, and continuous learning. Teachers are encouraged to engage in action research, collaborative inquiry, and curriculum innovation supported by strong institutional leadership. In Estonia, recognised globally for educational digitalisation, teachers receive continuous support through national digital education strategies, integrated online learning platforms, and extensive government investment in educational technology. School administrators play active roles in coordinating institutional digital transformation while ensuring equitable access to technological resources. These international experiences demonstrate that successful digital transformation depends on sustained investment in leadership development, teacher capacity building, infrastructure, policy coherence, and continuous institutional support rather than technology acquisition alone.

Challenges Limiting Educational Administrators' Interventions

Despite numerous initiatives, educational administrators continue to face substantial constraints in implementing effective digital professional development programmes across Nigeria. The most significant challenge remains inadequate funding. Many educational institutions allocate limited resources to staff development because competing priorities such as infrastructure maintenance, personnel costs, and instructional materials consume available budgets. Consequently, professional development programmes are often irregular, insufficiently funded, and heavily dependent on donor support. Another major challenge involves inadequate digital infrastructure. Numerous schools continue to experience unreliable electricity, poor internet connectivity, insufficient computer facilities, outdated equipment, and limited access to digital instructional resources. These infrastructural deficiencies undermine even well-designed professional development initiatives. Human capacity constraints also remain significant. Many school administrators themselves require advanced training in digital leadership, educational technology management, strategic planning, and instructional supervision. Without adequate leadership competence, administrators may struggle to guide institutional digital transformation effectively. Policy implementation represents another persistent concern. Although Nigeria has developed several commendable educational policies relating to digital transformation, implementation frequently remains inconsistent because of inadequate coordination among federal, state, and local education authorities. Weak monitoring mechanisms further reduce policy effectiveness.

Institutional resistance to change also slows transformation. Some teachers remain reluctant to adopt unfamiliar technologies because of anxiety, limited confidence, perceived workload increases, or previous negative experiences with technology implementation. Educational administrators must therefore combine technical support with motivational leadership capable of fostering positive attitudes toward innovation. Finally, disparities between urban and rural educational institutions continue to widen the digital divide. While schools located in metropolitan areas often benefit from better infrastructure and professional development opportunities, many rural schools remain significantly disadvantaged. Addressing these inequalities requires deliberate policy interventions that prioritise equitable distribution of educational resources across geographical regions.

Discussion and Future Directions

The findings from this review demonstrate that teacher professional development (TPD) has become one of the most critical determinants of educational quality in the digital age. The rapid advancement of information and communication technologies (ICT), artificial intelligence (AI), cloud computing, learning analytics, and virtual learning environments has

fundamentally altered teachers' professional responsibilities. Consequently, teacher professional development can no longer be viewed as an occasional institutional activity but as a strategic investment in educational transformation. Nigeria has made commendable progress in developing policy frameworks that support digital transformation in education. The revised National Policy on Education, the National Digital Economy Policy and Strategy (2020–2030), the Nigeria Digital Education Strategy (2023–2027), and the Professional Standards for Nigerian Teachers collectively demonstrate the government's commitment to strengthening teachers' digital competencies and improving educational quality. However, evidence indicates that the greatest challenge lies not in policy formulation but in effective implementation.

The analysis also reveals that educational administrators remain the principal drivers of institutional digital transformation. Their effectiveness extends beyond administrative functions to encompass instructional leadership, organisational change management, strategic planning, resource mobilisation, human capacity development, partnership coordination, and institutional quality assurance. Schools led by visionary administrators are generally more successful in adopting innovative teaching practices because they cultivate organisational cultures that encourage experimentation, collaboration, reflective practice, and continuous learning. Nevertheless, effective leadership alone cannot overcome structural constraints. Persistent inadequacies in electricity supply, internet connectivity, digital infrastructure, educational funding, and technical support continue to impede technology integration across many Nigerian schools. These challenges are particularly severe in rural and underserved communities, where digital inequality remains a major obstacle to equitable educational development.

The emergence of artificial intelligence presents both opportunities and responsibilities for educational administrators. AI-powered instructional systems, automated assessment platforms, predictive learning analytics, adaptive learning technologies, and intelligent tutoring systems have enormous potential to improve teaching effectiveness and learner achievement. However, these technologies also raise ethical concerns regarding privacy, algorithmic bias, academic integrity, cybersecurity, and responsible data governance. Future teacher professional development programmes should therefore include training on ethical AI use, digital citizenship, cybersecurity awareness, and responsible educational technology practices. Another emerging issue concerns teachers' well-being. Continuous technological change may contribute to increased workload, digital fatigue, stress, and professional burnout. Educational administrators should therefore adopt balanced approaches that promote teachers' mental health, work-life balance, and socio-emotional well-being while encouraging technological innovation. Sustainable digital transformation should improve teachers' professional satisfaction rather than increase occupational stress.

Future research should also examine the long-term impact of digital professional development on teachers' classroom effectiveness, learner achievement, institutional performance, and educational equity. Empirical studies employing mixed methods, longitudinal designs, and comparative analyses across Nigerian states would provide stronger evidence for policy formulation and institutional improvement.

Implications for Educational Administration

The transformation of teacher professional development has profound implications for educational administration in Nigeria in followings:

1. Educational leadership must shift from administrative compliance toward transformational leadership that emphasises innovation, collaboration, instructional improvement, and evidence-based decision-making. School administrators should become facilitators of professional learning rather than mere supervisors of instructional activities.

2. Educational planning should prioritise continuous investment in human capital alongside physical infrastructure. Sustainable educational development depends not merely on constructing classrooms but on developing teachers capable of delivering high-quality instruction in increasingly digital learning environments.
3. Educational administrators should institutionalise professional learning communities within schools to promote collaborative inquiry, peer mentoring, action research, and continuous instructional improvement. Such communities encourage teachers to become reflective practitioners who continuously evaluate and improve their instructional practices.
4. Monitoring and evaluation systems should increasingly utilise digital technologies for collecting, analysing, and reporting educational performance data. Evidence-based educational management enables administrators to allocate resources more effectively and identify areas requiring targeted intervention.
5. Educational administrators should strengthen partnerships among government agencies, higher education institutions, private technology companies, development partners, professional associations, and local communities to mobilise additional resources for teacher professional development.

Conclusion

The digital revolution has fundamentally transformed educational systems worldwide, redefining how teaching, learning, educational management, and professional development are organised. In Nigeria, this transformation presents both unprecedented opportunities and significant challenges for improving educational quality. Teachers are increasingly expected to possess advanced pedagogical, technological, managerial, and collaborative competencies capable of supporting twenty-first-century learning. This paper has demonstrated that teacher professional development represents the cornerstone of successful educational transformation in the digital age. Effective professional development extends beyond traditional workshops and seminars to encompass continuous, technology-supported, collaborative, practice-oriented, and evidence-informed learning experiences that respond to teachers' evolving professional needs.

Suggestions

Based on the foregoing discussion, the following suggestions were made:

1. The Federal and State Ministries of Education should institutionalise compulsory technology-based Continuous Professional Development (CPD) programmes for all teachers as part of career progression and teacher licensing requirements.
2. Governments should substantially increase budgetary allocations for digital infrastructure, including broadband internet connectivity, uninterrupted electricity, educational software, computer laboratories, and digital instructional resources in schools.
3. Educational administrators should receive regular professional training in digital leadership, strategic educational planning, change management, artificial intelligence, and educational data analytics to strengthen institutional capacity for digital transformation.
4. Schools should establish sustainable Professional Learning Communities (PLCs) that promote peer mentoring, collaborative lesson planning, action research, and continuous sharing of best instructional practices.
5. Teacher education institutions should comprehensively review their curricula to incorporate emerging competencies in artificial intelligence, learning analytics, digital pedagogy, educational technology integration, cybersecurity, and digital ethics.

6. Governments should strengthen monitoring and evaluation mechanisms through technology-supported performance management systems capable of assessing the effectiveness of professional development programmes.
7. Greater collaboration should be encouraged among educational institutions, technology companies, international development agencies, universities, and professional bodies to expand access to high-quality digital professional learning opportunities.
8. Special intervention programmes should be implemented to reduce digital inequalities affecting teachers in rural and underserved communities through targeted infrastructure development and equitable resource allocation.
9. Educational administrators should promote teachers' well-being by ensuring that technology adoption is accompanied by adequate technical support, counselling services, manageable workloads, and continuous mentoring.
10. Future educational policies should emphasise sustainability by ensuring that digital professional development initiatives become institutional practices rather than short-term donor-funded projects.

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MANAGING DIGITALIZATION OF POST-PRIMARY EDUCATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

This study examined the management of digitalization of post-primary education for sustainable development in Nigeria. A descriptive survey research design was adopted. The population comprised all 296 principals of public senior secondary schools in Umuahia, Aba, and Ohafia educational zones, Abia State. A sample of 133 principals (77 males and 56 females), representing 45% of the population, was selected using proportionate stratified random sampling. Two research questions and two null hypotheses guided the study. Data were collected using a researcher-developed 16-item questionnaire, structured on a four-point Likert scale, validated by three experts. Cronbach's Alpha reliability coefficients of 0.83 and 0.86 were obtained. Mean and standard deviation answered research questions, while the z-test tested null hypotheses at a 0.05 significance level. Findings revealed that digitalization of post-primary education drives sustainable development; strategies used by principals to manage digital learning facilities aid sustainability; and integrating technological devices in teaching-learning ensures sustainability. The aggregate mean for management of digital learning facilities was 3.04, while management of teachers' digital competencies had an aggregate mean of 2.93, both above the 2.50 acceptance threshold. No significant gender difference existed in principals' perceptions on managing digital learning facilities ($z\text{-cal} = 0.07 < \pm 1.96$) nor on managing teachers' digital competencies ($z\text{-cal} = 0.07 < \pm 1.96$). The study concluded that effective management of digital resources and teachers' professional development are critical for sustainable digital transformation. Recommendations included: State Ministries of Education should formulate policies to guide digitalization in all post-primary schools and ensure they are equipped with 21st-century digital learning facilities.

Keywords: *Digitalization, management, post-primary education, sustainable development, principals, Nigeria*

Introduction

The twenty-first century came with a technology-driven global knowledge economy where digital competence constitutes a critical component of educational success. Following the COVID-19 pandemic (2019–2020), the demand for digitalized learning environments became unprecedented across educational systems worldwide. In Nigeria, the experience exposed structural weaknesses and managerial deficiencies in many secondary schools. The Federal Republic of Nigeria (2014), through its National Policy on Education, advocates that modern technologies be "increasingly used and improved upon at all levels of the educational system." Consequently, school administrators are now expected to integrate ICT tools strategically to achieve Sustainable Development Goal 4 (SDG-4), inclusive and equitable quality education.

Digitalization in education refers to the transformation of analogue learning processes into technology-mediated teaching and learning experiences using computers, mobile devices,

the internet, and learning management systems (Garrett, 2017; Reilly, 2021). In secondary education, the bridge between primary and tertiary levels, digitalization plays a dual role: enhancing instructional efficiency and preparing learners for the digital workforce (Bolaji & Bose, 2021). Yet the process demands effective management of people, infrastructure, and policy to ensure sustainability (Wills, 2020). Duruh (2025) conceptualizes digitalization as the process of transforming physical teaching and learning resources into electronic packages or platforms where they can be stored and manipulated by a computer for the implementation of teaching and learning programmes in schools.

Scholars such as Azoji (2020) define digitalization as converting instructional materials into electronic formats for ease of storage, retrieval, and manipulation. Studies by Filastin (2019) and Mpungose (2020) revealed that nations that integrate ICT policy with leadership training for school administrators attain higher sustainability outcomes. However, research consistently identifies persistent challenges hindering digital transformation in Nigerian education. Omiyale (2025) found that despite recognition of ICT as a critical driver of educational quality, its practical impact within Nigerian public secondary schools remains underexplored, with significant gaps in infrastructure availability and teacher competence. Similarly, Ezeodo and Aroh (2024) revealed low availability and utilization of ICT devices in Nigerian senior secondary schools, recommending that governments should procure more ICT devices and organize ICT seminars and workshops for teachers.

Beyond infrastructure deficits, studies highlight inadequate digital literacy among staff, weak governance implementation structures, and significant infrastructural deficits as major impediments. The Tertiary Education Trust Fund (TETFund) has warned that billions of naira invested in ICT infrastructure risk being wasted if institutions fail to embrace technology in teaching, research, and administration. Despite several government initiatives, the integration of ICT in Nigerian public secondary schools remains inconsistent. Teachers often exhibit low digital competence, the infrastructure is inadequate, and principals sometimes lack the managerial training required for systematic digital transformation.

In Abia State, recent developments indicate a growing commitment to educational digitalization. The Abia State Government has launched a comprehensive Education Management and Information System (EMIS) to centralise and digitally integrate education data across public and private schools. Additionally, UNICEF, in collaboration with Abia State Universal Basic Education Board, has implemented the Nigeria Learning Passport (NLP), an online e-learning platform with mobile and offline capability enabling continuous access to quality education, with plans to train 500 teachers on the NLP mobile application. Despite these efforts, the state continues to face challenges common to many Nigerian contexts: limited digital infrastructure, insufficient teacher training, and managerial capacity gaps. This study, therefore, investigates how secondary-school principals manage digitalization to ensure the sustainability of educational development in Abia State, Nigeria.

Theoretical Framework

Two interrelated theories underpin this study: The Technology Acceptance Model (TAM) and the Sustainable Development Theory.

The Technology Acceptance Model (TAM), originally developed by Davis (1989), explains users' acceptance of technology through two primary constructs: perceived usefulness and perceived ease of use. According to this framework, individuals are more likely to adopt and consistently use technology when they believe it will enhance their job performance (perceived usefulness) and when they perceive it as relatively effortless to operate (perceived ease of use) (Davis, 1989; Venkatesh & Davis, 2000). TAM has been widely applied in educational technology research to understand teachers' and administrators' acceptance of digital tools in instructional settings (Scherer, Siddiq, & Tondeur, 2019; Al-Emran, Mezhuyev,

& Kamaludin, 2023). In the context of this study, TAM provides a valuable lens for understanding how principals and teachers perceive digitalization initiatives in secondary schools. Principals and teachers are more likely to adopt and support digital practices only if they believe these technologies enhance instructional effectiveness (perceived usefulness) and are manageable within their existing administrative and teaching responsibilities (perceived ease of use). This theory informs the study's focus on management strategies that influence acceptance and utilization of digital learning facilities and teachers' digital competencies.

Sustainable Development Theory, as articulated by the Brundtland Commission (1987), emphasizes meeting present needs without compromising future generations' ability to meet theirs. The concept has since evolved to encompass three interconnected pillars: economic growth, social inclusion, and environmental protection (UNESCO, 2023; Purvis, Mao, & Robinson, 2019). In education, sustainable development implies ensuring that educational innovations, including digitalization are designed and implemented in ways that ensure long-term viability, equitable access, and continuous improvement (García-Peñalvo et al., 2021; Ainscow, 2020).

Educational digitalization supports sustainable development by fostering human-capital development, enabling equitable access to knowledge, and reducing material waste through digital resources (Duru-Anyim, 2018; Haleem, Javaid, Qadri, & Suman, 2022). However, sustainability depends critically on management practices that guarantee long-term functionality of digital systems (Wills, 2020; Akram et al., 2021). This includes ensuring equitable access to digital resources, providing continuous professional development for teachers, and deploying ICT resources in environmentally conscious ways. The theory informs this study's examination of management mechanisms that facilitate sustainable digital transformation in Nigerian secondary schools.

Together, these frameworks justify the study's aim to explore management mechanisms that facilitate sustainable digital transformation in Nigerian secondary schools. TAM explains the micro-level acceptance of technology by principals and teachers, while Sustainable Development Theory provides the macro-level framework for understanding how digitalization can be sustained over time. The integration of both theories offers a comprehensive analytical lens for examining how principals' management practices can enhance both immediate adoption and long-term sustainability of digital learning initiatives in post-primary education (Howard et al., 2021; Nwagwu, 2022).

Statement of the Problem

Digitalization has emerged as a significant driver of transformation in education systems globally, with the COVID-19 pandemic accelerating the imperative for technology-mediated learning. Considering the rapid pace of technological evolution in this knowledge-based society, Nigerian schools, particularly secondary schools, are under increasing pressure to embrace digitalization to meet the demands for quality education and the needs of the digital age. In response to this changing context, the Federal Republic of Nigeria introduced an ICT Policy to support the adoption of digital technologies in the education system, as well as to integrate ICT as a subject in the curriculum. To sustain this policy direction, the Abia State Government has been making concerted efforts to equip public secondary schools with computers that will enhance administrative functions as well as the teaching-learning process. Despite the adoption of digital technologies in the education system, evidence suggests that digitalization has not achieved sustainability, as teachers continue to adhere to traditional methods of teaching and learning. Studies have consistently found that Nigerian teachers often exhibit low digital competence, with many not acquainted with digital devices and tools essential for effective digitalization. More concerning is the fact that students, who are digital natives, are not being exposed to digital learning experiences comparable to their counterparts

in well-resourced private schools in developed countries. These observations raise a critical question: how can classrooms be digitalized to meet the learning needs of students in this interconnected, networked, evolving world? This unanswered question underscores the present study.

Aim and Objectives of the Study

The aim of this study was to examine how digitalization of secondary education can be managed for sustainable development in Abia State, Nigeria. Specifically, the study sought to:

1. Find out ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State.
2. Ascertain ways teachers' digital competencies can be managed for sustainable development in secondary schools in Abia State.

Research Questions

The following research questions guided the study:

1. What are the ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State?
2. In what ways can teachers' digital competencies be managed for sustainable development in secondary schools in Abia State?

Hypotheses

The following null hypotheses were formulated at 0.05 alpha level:

1. There is no significant difference between the mean ratings of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State.
2. There is no significant difference between the mean ratings of male and female principals on ways teachers' digital competencies can be managed for sustainable development in secondary schools in Abia State.

Review of Related Literature

This section reviews literature relevant to the management of digitalization of post-primary education for sustainable development. The review is organized under four thematic sub-headings: conceptualizing digitalization in education, management of digital learning resources, teachers' digital competence, and digitalization and sustainable development.

Conceptualizing Digitalization in Education

Digitalization in education extends beyond the mere introduction of technological gadgets; it encompasses a systematic design of virtual environments that enhance curriculum delivery (Reilly, 2021). Scholars such as Azoji (2020) define digitalization as converting instructional materials into electronic formats for ease of storage, retrieval, and manipulation. Duruh (2025) conceptualizes digitalization as the process of transforming physical teaching and learning resources into electronic packages or platforms where they can be stored and manipulated by a computer for the implementation of teaching and learning programmes in schools. More broadly, digitalization refers to the transformation of analogue learning processes into technology-mediated teaching and learning experiences using computers, mobile devices, the internet, and learning management systems (Garrett, 2017).

The need for digitalization in Nigerian secondary education has become increasingly urgent. Studies by Filastin (2019) and Mpungose (2020) revealed that nations that integrate ICT policy with leadership training for school administrators attain higher sustainability outcomes. Aboderin (2025) argues that despite growing global consensus on the transformative

potential of ICT in education, its integration into Nigerian secondary schools has been uneven and fraught with systemic obstacles. These obstacles include inadequate digital infrastructure, limited teacher competence, and weak governance structures.

Management of Digital Learning Resources

Effective digitalization demands planning, organization, coordination, and control—the four pillars of classical management theory (Nwire & Elondu, 2018). School leaders are responsible for resource allocation, infrastructural maintenance, and capacity building. Without managerial oversight, digital facilities risk under-utilization or rapid obsolescence (Butler, Wright, & Donohue, 2017).

Research on principals' management of technology in Nigerian secondary schools reveals important insights. Ogegbo and Olujuwon (2025) investigated principals' self-reported technology leadership abilities in Nigerian public secondary schools and found that the majority of principals reported use of technology at an average level across various domains, including leadership and vision, teaching and learning, productivity and professional practice, assessment and evaluation, support, management and operations, and social, legal, and ethical issues. However, the study also found that principals face significant challenges, including a lack of funding, a shortage of power supply, a lack of resources, infrastructure, and technical support.

A qualitative study on strategic management of Virtual Learning Environments (VLEs) in upper secondary schools identified visionary leadership as a critical driver of digital innovation. The analysis revealed six core themes: visionary leadership, integrated development strategies, the creation of digital learning resources, pedagogical and classroom adaptation, supervisory mechanisms, and technical challenges. This finding underscores the importance of school leadership in facilitating digital transformation through capacity building and promotion of a collaborative digital culture.

Studies consistently identify challenges hindering digital transformation in Nigerian education. Aliyu and Haruna (2025) assessed ICT availability and utilization in Zamfara State and revealed inadequate ICT facilities in secondary schools, with teachers exhibiting low levels of ICT knowledge. The study concluded that ICT integration is hindered by inadequate infrastructure, low teacher competency, and limited utilization of available resources. Similarly, research on ICT integration in Nigerian secondary schools has identified poor digital skills and knowledge among teachers as a major impediment, with many Nigerian teachers not acquainted with digital devices and tools essential for effective digitalization.

Teachers' Digital Competence

Teachers remain the catalysts of educational innovation. Research demonstrates that when teachers acquire technology-pedagogical skills, students' engagement and achievement improve significantly (Pirates, 2018). However, many Nigerian teachers are digital immigrants struggling to teach digital natives (Ngele & Adieme, 2023). Continuous professional development and motivation are thus essential for sustaining innovation.

Recent empirical studies provide important evidence on teacher digital competence in Nigeria. Omiyale (2025) investigated ICT availability, teachers' competence, and the effectiveness of ICT tool utilization across public secondary schools in Lagos State. The study found that despite recognition of ICT as a critical driver of educational quality, its practical impact remains underexplored, with significant gaps in infrastructure availability and teacher competence.

The sustainability of teachers' digital literacy has emerged as a critical concern in the post-COVID-19 era. Adewale and Potokri (2025) conducted a qualitative study on the sustainability of female teachers' digital literacy in Lagos State, Nigeria. The study found that

all the benefits achieved by female teachers in digital literacy during the COVID-19 pandemic may be wasted if challenges facing sustainability are not addressed. The study recommended that school principals should advocate digital inclusion by setting up internal digital culture policies, ICT committees, and ensuring regular appraisal.

Olurinola and Olugbade (2024) examined the impact of UNESCO MGIEP Digital Teacher Training on Nigerian educators' digital pedagogy competence and confidence. The study found statistically significant improvements in educators' digital pedagogy competence and confidence across multiple domains following Digital Teacher Training, with substantial increases in mean scores from pre-test to post-test and moderate to large effect sizes. These results demonstrate the efficacy of structured interventions in enhancing educators' proficiency in leveraging digital technologies for instruction, assessment, and student engagement.

Aboderin (2025) proposes a Four-Pillar Framework for sustainable ICT integration in Nigerian secondary schools, highlighting four interrelated pillars: access to digital infrastructure, teacher digital competence, curriculum alignment with ICT pedagogy, and coherent and accountable policy governance. The paper argues that without targeted investment, institutional readiness, and localized implementation strategies, ICT initiatives risk becoming tokenistic or extractive.

Digitalization and Sustainable Development

Sustainable development integrates economic growth, social inclusion, and environmental protection (Duru-Anyim, 2018). Educational digitalization supports these pillars by fostering human-capital development, enabling equitable access to knowledge, and reducing material waste through digital resources (Haleem, Javaid, Qadri, & Suman, 2022). Yet sustainability depends on management practices that guarantee long-term functionality of digital systems (Wills, 2020). The United Nations Sustainable Development Goal 4 (SDG 4) emphasizes inclusive and equitable quality education, and digitalization is increasingly recognized as a critical enabler for achieving this goal (UNESCO, 2023).

Research on the contribution of distance learning institutions to sustainable development reveals that technology-based education offers a platform for promoting global sustainability education. DL-HEIs incorporate sustainability through curriculum and research, often using a mix of live and recorded learning to teach skills like critical thinking, focusing on SDGs 4 (Quality Education), 5 (Gender Equality), and 13 (Climate Action). These findings have relevance for understanding how digitalization in secondary education can similarly advance sustainable development objectives.

Recent policy initiatives in Nigeria demonstrate a growing commitment to digital accountability in education. The Federal Government recently launched EduTrace, a National Track, Trace, and Asset Intelligence Platform designed to strengthen transparency, promote accountability, and ensure efficiency in the management and distribution of education assets. This initiative represents a significant milestone in modernising education asset governance and positions Nigeria as a leading example of digital accountability in Africa's education sector. Such developments highlight the potential for digital solutions to address long-standing challenges in education administration.

First, while studies have examined ICT availability and teacher competence (Omiyale, 2025; Aliyu & Haruna, 2025; Ogegbo & Olujuwon, 2025), limited research has specifically focused on how secondary school principals manage the digitalization process. Second, the relationship between management strategies and sustainability outcomes has received insufficient empirical attention in the Nigerian context. Third, gender differences in principals' perceptions of digitalization management remain underexplored. This study, therefore, addresses these gaps by investigating how secondary-school principals manage digitalization to ensure the sustainability of educational development in Abia State, Nigeria.

Methodology

The study adopted a descriptive survey research design. This design was considered appropriate as it enabled the researcher to collect data from principals on their perceptions regarding the management of digitalization for sustainable development in secondary schools without manipulating any variables. The descriptive survey design is suitable for studies that seek to describe existing conditions and relationships as they naturally occur.

The population of the study comprised all 296 principals of the 296 public senior secondary schools across the Umuahia, Aba, and Ohafia educational zones of Abia State. Using the Taro Yamane formula, a sample of 133 principals was drawn from the population. This sample consisted of 77 male principals and 56 female principals, representing 45 percent of the total population. A proportionate stratified random sampling technique was employed to ensure that each educational zone was adequately represented in the sample.

The instrument for data collection was a researcher-developed questionnaire titled "Managing Digitalization of Post Primary Education for Sustainable Development Questionnaire (MDPPESDQ)." The questionnaire comprised 16 items structured on a four-point Likert rating scale, with response options ranging from Strongly Agree (4) to Strongly Disagree (1). The instrument was designed to measure two constructs: management of digital learning facilities and management of teachers' digital competencies.

The questionnaire was validated by three experts, one each from the fields of Educational Management, Educational Technology, and Measurement and Evaluation. Their inputs were used to refine the instrument for content and construct accuracy. The internal consistency of the instrument was determined using Cronbach's Alpha reliability coefficient. The reliability coefficients obtained for the various sections of the instrument were 0.83 and 0.86, indicating strong internal consistency.

Data collected from the respondents were analyzed using both descriptive and inferential statistics. Mean and standard deviation were used to answer the two research questions. The decision rule for the research questions was that any mean score of 2.50 and above was considered as "Agreed," while any mean score below 2.50 was considered as "Disagreed." The null hypotheses were tested using z-test statistic at 0.05 level of significance. The decision rule for the hypotheses was that z-values greater than ± 1.96 were considered statistically significant, leading to rejection of the null hypothesis.

Results

Research Question 1: What are the ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State?

Table 1: Mean and Standard Deviation of Principals' Ratings on Ways Digital Learning Facilities Can be Managed for Sustainable Development

S/N	Ways Digital Learning Facilities Can be Managed	Male (n=77) Mean $\pm$ SD	Female (n=56) Mean $\pm$ SD	Pooled Mean	Decision
1	Planning the school timetable for equitable access	3.12 $\pm$ 0.81	3.04 $\pm$ 0.94	3.08	Agreed

S/N	Ways Digital Learning Facilities Can be Managed	Male (n=77) Mean SD	±	Female (n=56) Mean SD	±	Pooled Mean	Decision
2	Having a management plan including electricity supply	3.13 0.79	±	3.15 ± 0.92		3.14	Agreed
3	Organizing resource materials and converting them into digital formats	2.87 0.82	±	2.84 ± 0.97		2.86	Agreed
4	Establishing user policy guidelines	3.18 0.78	±	3.12 ± 0.93		3.15	Agreed
5	Maintaining an enabling environment	3.10 0.79	±	3.05 ± 0.94		3.08	Agreed
6	Securing websites and platforms	3.15 0.79	±	3.12 ± 0.93		3.14	Agreed
7	Ensuring teachers use digital platforms	2.76 0.83	±	2.79 ± 0.97		2.78	Agreed
8	Actively monitoring digital resource use	3.09 0.79	±	3.07 ± 0.93		3.08	Agreed
9	Repairing faulty ICT tools promptly	3.12 0.79	±	2.94 ± 0.95		3.03	Agreed
	Aggregate Mean ± SD	3.06 0.80	±	3.02 ± 0.94		3.04	Agreed

All nine items on the management of digital learning facilities construct had pooled mean scores above the 2.50 acceptance threshold, ranging from 2.78 to 3.15. The highest-rated item was "Establishing user policy guidelines" (pooled mean = 3.15), followed by "Having a management plan including electricity supply" and "Securing websites and platforms" (pooled mean = 3.14 each). The lowest-rated item was "Ensuring teachers use digital platforms" (pooled mean = 2.78). The aggregate mean for male principals was 3.06, while that for female principals was 3.02. The overall aggregate mean for the construct was 3.04, indicating that principals agreed that effective management of digital learning facilities, including planning, maintenance, policy guidelines, and security protocols, is essential for sustainable development in secondary schools.

Research Question 2: In what ways can teachers' digital competencies be managed for sustainable development in secondary schools in Abia State?

Table 2: Mean and Standard Deviation of Principals' Ratings on Ways Teachers' Digital Competencies Can be Managed for Sustainable Development

S/N	Ways Teachers' Digital Competencies Can be Managed	Male (n=77) Mean SD	±	Female (n=56) Mean SD	±	Pooled Mean	Decision
1	Organizing workshops on interactive boards	2.78 0.83	±	2.71 ± 0.98		2.75	Agreed
2	Encouraging search for Open Educational Resources (OERs)	2.83 0.82	±	2.98 ± 0.95		2.91	Agreed
3	Training teachers in ICT pedagogy	2.85 0.82	±	2.76 ± 0.98		2.81	Agreed
4	Guiding teachers in PowerPoint presentations	2.99 0.80	±	2.83 ± 0.97		2.91	Agreed
5	Using smartphones to produce instructional videos	2.97 0.81	±	2.92 ± 0.95		2.95	Agreed
6	Motivating teachers to enroll in digital literacy courses	3.09 0.79	±	3.14 ± 0.93		3.12	Agreed
	Aggregate Mean ± SD	2.93 0.81	±	2.92 ± 0.95		2.93	Agreed

All six items on the management of teachers' digital competencies construct had pooled mean scores above the 2.50 acceptance threshold, ranging from 2.75 to 3.12. The highest-rated item was "Motivating teachers to enroll in digital literacy courses" (pooled mean = 3.12), followed by "Using smartphones to produce instructional videos" (pooled mean = 2.95). The lowest-rated item was "Organizing workshops on interactive boards" (pooled mean = 2.75). The aggregate mean for male principals was 2.93, while that for female principals was 2.92. The overall aggregate mean for the construct was 2.93, indicating that principals agreed that systematic development of teachers' digital competencies—through training, workshops, and motivation—is critical for sustainability.

Hypotheses Testing

Hypothesis 1: There is no significant difference between the mean ratings of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State.

Table 3: Z-test Analysis of Mean Ratings of Male and Female Principals on Management of Digital Learning Facilities

Status	N	Mean	SD	Df	Z-cal	Z-crit	Remark	Decision
Male Principals	7	3.06	0.80					
Female Principals	5	3.02	0.94	13	0.26	±1.96	Not Significant	Failed to reject Ho1

Interpretation of Table 3:

The z-test analysis revealed that no significant difference existed between the mean ratings of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State. The null hypothesis was therefore retained. This finding suggests that male and female principals share similar perceptions regarding the management of digital learning facilities for sustainable development.

Hypothesis 2: There is no significant difference between the mean ratings of male and female principals on ways teachers' digital competencies can be managed for sustainable development in secondary schools in Abia State.

Table 4: Z-test Analysis of Mean Ratings of Male and Female Principals on Management of Teachers' Digital Competencies

Status	N	Mean	SD	Df	Z-cal	Z-crit	Remark	Decision
Male Principals	7	2.93	0.81					
Female Principals	5	2.92	0.95	13	0.07	±1.96	Not Significant	Failed to reject Ho2

Interpretation of Table 4:

The z-test analysis revealed that the calculated z-value (0.07) was less than the critical z-value (± 1.96) at the 0.05 level of significance. The null hypothesis was therefore retained. This finding suggests that male and female principals share similar perceptions regarding the

management of teachers' digital competencies for sustainable development in secondary schools in Abia State.

Discussion of Findings

The findings of this study are discussed in relation to the two research questions and two null hypotheses that guided the investigation, with comparisons drawn to previous studies reported in the literature review and connections made to the theoretical framework.

The first research question sought to ascertain the ways digital learning facilities can be managed for sustainable development in secondary schools in Abia State. The findings revealed that principals agreed with all nine items on the management of digital learning facilities construct, with an aggregate mean of 3.04. The highest-rated items were establishing user policy guidelines (mean = 3.15), having a management plan including electricity supply (mean = 3.14), and securing websites and platforms (mean = 3.14). The lowest-rated item was ensuring teachers use digital platforms (mean = 2.78), though this still fell above the acceptance threshold. These findings align with the work of Nwire and Elondu (2018), who argued that effective digitalization demands planning, organization, coordination, and control, the four pillars of classical management theory. The emphasis placed by principals on establishing user policy guidelines and developing management plans for electricity supply confirms that principals recognize the importance of systematic planning and organization in sustaining digitalization efforts. Similarly, the high rating of securing websites and platforms is consistent with Butler, Wright, and Donohue (2017), who warned that without adequate managerial oversight, digital facilities risk under-utilization or rapid obsolescence. The attention to security protocols suggests that principals are mindful of the need to protect digital assets from misuse or cyber threats.

The finding that "ensuring teachers use digital platforms" received the lowest rating among all items, though still above the acceptance threshold, is noteworthy. This may reflect the challenges identified by Ogegbo and Olujuwon (2025), who found that principals face significant obstacles, including a lack of funding, a shortage of power supply, a lack of resources, infrastructure, and technical support. Principals may be less confident in enforcing teacher utilization of digital platforms because they lack the necessary infrastructure, technical support, or leverage to compel compliance. This finding also resonates with Aliyu and Haruna (2025), who revealed that teachers in Nigerian secondary schools exhibit low levels of ICT knowledge and concluded that ICT integration is hindered by inadequate infrastructure, low teacher competency, and limited utilization of available resources. From the perspective of the Technology Acceptance Model (TAM) (Davis, 1989), the relatively lower rating of teacher utilization suggests that perceived ease of use and perceived usefulness may not yet be fully established among teachers. If teachers do not find digital platforms easy to use or useful for their instructional goals, principals may find it difficult to enforce their use. This aligns with the TAM framework, which posits that acceptance and adoption of technology depend on users' perceptions of its usefulness and ease of use.

The second research question sought to ascertain the ways teachers' digital competencies can be managed for sustainable development in secondary schools in Abia State. The findings revealed that principals agreed with all six items on the management of teachers' digital competencies construct, with an aggregate mean of 2.93. The highest-rated item was motivating teachers to enroll in digital literacy courses (mean = 3.12), followed by using smartphones to produce instructional videos (mean = 2.95). The lowest-rated item was organizing workshops on interactive boards (mean = 2.75). The emphasis on motivating teachers to enroll in digital literacy courses is consistent with the findings of Pirates (2018), who demonstrated that when teachers acquire technology-pedagogical skills, students' engagement and achievement improve significantly. This finding also aligns with the work of

Olurinola and Olugbade (2024), who found statistically significant improvements in educators' digital pedagogy competence and confidence following Digital Teacher Training, with substantial increases in mean scores from pre-test to post-test and moderate to large effect sizes. The recognition of motivation as a critical factor suggests that principals understand the importance of incentives and encouragement in driving teacher participation in professional development. The relatively lower rating for organizing workshops on interactive boards may reflect practical constraints. As Aboderin (2025) observed, sustainable ICT integration in Nigerian secondary schools depends on four interrelated pillars: access to digital infrastructure, teacher digital competence, curriculum alignment with ICT pedagogy, and coherent and accountable policy governance. Without adequate access to interactive boards, organizing workshops on them may be perceived as impractical or premature. This finding may also reflect the reality documented by Omiyale (2025), who found that despite recognition of ICT as a critical driver of educational quality, its practical impact in Nigerian public secondary schools remains constrained by significant gaps in infrastructure availability and teacher competence. The finding that principals agree on the importance of using smartphones to produce instructional videos is particularly insightful, given the widespread availability of smartphones in Nigeria. This aligns with Sustainable Development Theory (Brundtland Commission, 1987), which emphasizes meeting present needs without compromising future generations' ability to meet theirs. The use of smartphones for instructional purposes represents a low-cost, accessible approach that can be sustained over time, particularly in resource-constrained contexts where expensive interactive boards may not be feasible. This finding also supports the work of Adewale and Potokri (2025), who recommended that school principals should advocate digital inclusion by setting up internal digital culture policies, ICT committees, and ensuring regular appraisal.

The testing of hypotheses revealed no significant gender differences in principals' perceptions regarding the management of digitalization. For Hypothesis 1, the calculated z-value (0.26) was less than the critical z-value (± 1.96) at the 0.05 level of significance, indicating no significant difference between male and female principals' mean ratings on ways digital learning facilities can be managed. For Hypothesis 2, the calculated z-value (0.07) was also less than the critical z-value (± 1.96), indicating no significant difference between male and female principals' mean ratings on ways teachers' digital competencies can be managed. The absence of gender differences in both hypotheses is consistent with studies that suggest managerial competence rather than gender influences effective ICT integration in schools. It also aligns with the Technology Acceptance Model (Davis, 1989), which posits that technology acceptance is influenced by perceptions of usefulness and ease of use, not by gender. The agreement across gender lines suggests that principals, regardless of gender, share a common understanding of the management practices necessary for sustainable digitalization. This may be because principals in Abia State face similar challenges and operate within the same policy and resource environment, regardless of their gender. This finding is encouraging, as it implies that efforts to promote digitalization in secondary schools can be pursued without concerns about gender-based perceptual divides among principals. This shared understanding provides a foundation for collaborative and unified approaches to managing digitalization for sustainable development.

The findings of this study can be understood through the lens of the Technology Acceptance Model (TAM) (Davis, 1989) and Sustainable Development Theory (Brundtland Commission, 1987). TAM explains the emphasis placed by principals on user policy guidelines and teacher motivation: principals recognize that for teachers to accept and use digital platforms, they must perceive them as useful and easy to use. The lower rating of "ensuring teachers use digital platforms" may reflect the reality that teachers currently do not perceive digital platforms as sufficiently useful or easy to use, a challenge that TAM would predict.

Sustainable Development Theory explains the emphasis placed on strategies that ensure the long-term functionality of digital systems. The focus on electricity supply, maintenance, and security protocols reflects an understanding that sustainability depends on management practices that guarantee long-term functionality of digital systems (Wills, 2020). The emphasis on motivating teachers to enroll in digital literacy courses similarly reflects a commitment to continuous professional development, which is essential for sustaining digitalization beyond the initial implementation phase. The use of smartphones to produce instructional videos represents a sustainable, low-cost approach that aligns with the principles of meeting present needs without compromising future generations' ability to meet theirs. The implications of these findings are significant for policy and practice.

The agreement among principals on the importance of management strategies for digital learning facilities underscores the need for governments and education authorities to provide adequate resources, infrastructure, and policy frameworks to support these efforts. The emphasis on electricity supply, in particular, calls for investment in alternative power sources such as solar energy to ensure uninterrupted digital learning. The recognition of teachers' digital competence as critical to sustainability highlights the importance of continuous professional development programmes. Education authorities should institutionalize regular training workshops, digital literacy courses, and motivational incentives to enhance teachers' capacity to integrate technology into their teaching practices. The absence of gender differences suggests that policies and programmes aimed at promoting digitalization need not be gender-targeted but should focus on building capacity across all principals and teachers regardless of gender. This finding also suggests that principals, irrespective of gender, are equally receptive to digitalization initiatives and can serve as effective champions of digital transformation in their schools.

Conclusion

This study examined the management of digitalization of post-primary education for sustainable development in Nigeria, with specific focus on Abia State. The findings revealed that principals agreed that effective management of digital learning facilities—including planning for equitable access, infrastructure maintenance, policy guidelines, and security protocols—is essential for sustainable development. Similarly, principals agreed that systematic development of teachers' digital competencies through training, workshops, and motivation is critical for sustainability. The study further found no significant gender differences in principals' perceptions regarding the management of digitalization, indicating that male and female principals share similar views on the strategies necessary for sustainable digital transformation. The study concludes that achieving sustainability in secondary education depends largely on effective management of digital resources and the professional development of teachers. Principals' managerial competencies, teachers' digital literacy, and supportive infrastructure are the building blocks for transforming Nigerian schools into digitally sustainable environments.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. State Ministries of Education should formulate robust ICT management frameworks and policies to guide the digitalization process in all post-primary schools, ensuring clear implementation guidelines and accountability mechanisms.
2. Governments should provide and maintain digital learning facilities, including reliable power supply, internet connectivity, and security protocols, to ensure uninterrupted digital learning and sustainable use of ICT resources.

3. Regular training workshops, digital literacy courses, and motivational incentives should be institutionalized for both principals and teachers to enhance digital competence and pedagogical innovation.
4. ICT monitoring units should be established at zonal and state levels to supervise, evaluate, and report on the utilization and management of digital learning facilities in secondary schools.
5. School administrators should actively motivate teachers to enroll in digital literacy courses and utilize digital platforms for instructional delivery, recognizing and rewarding excellence in digital integration.
6. Further studies should be conducted to examine the long-term impacts of educational digitalization policies on student learning outcomes and to explore the specific challenges facing digitalization in different geopolitical zones of Nigeria.

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ASSESSING THE IMPLEMENTATION OF LIFE-LONG LEARNING FOR SUSTAINABLE DEVELOPMENT IN PUBLIC SECONDARY SCHOOLS IN CALABAR EDUCATION ZONE OF CROSS RIVER STATE

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Abstract

This study assessed the implementation of life-long learning for sustainable development in public secondary schools within the Calabar Education Zone of Cross River State. The investigation focused on understanding the extent to which life-long learning principles are integrated into the educational practices and experiences of stakeholders in the school system. The study adopted a qualitative phenomenological research design to explore the perceptions and experiences of stakeholders regarding life-long learning. The population consisted of school administrators, teachers, and students across public secondary schools in the Calabar Education Zone, from which a purposive sample of six (6) participants—representing approximately 0.10% of the estimated population of 9,876—was selected. Data were collected using three thematic questions focusing on the awareness and understanding of life-long learning, the extent of its implementation in school practices, and perceived barriers to effective delivery. Thematic analysis was employed to interpret the data. Findings indicated that while stakeholders acknowledged the relevance of life-long learning for sustainable development, its practical implementation in schools remains limited due to insufficient training, inadequate policy direction and lack of institutional support. The study concluded that the integration of life-long learning into the secondary education framework is essential for equipping learners with adaptive skills, values, and competencies required for sustainable development. It recommends policy reform, targeted sensitization programmes, and capacity building initiatives to enhance the implementation of life-long learning in public secondary schools.

Keywords: *Life-long learning, sustainable development, inclusive growth, adult education, transformational change.*

Introduction

In the rapidly evolving global landscape, education is increasingly recognized not just as a tool for knowledge acquisition, but as a strategic instrument for promoting sustainable development. Lifelong learning (LLL), which emphasizes continuous education throughout an individual's life, has emerged as a vital component in building resilient and adaptable societies. Agbongiasede (2021) refers to Lifelong Learning as the acquisition of fundamental behaviour, learning that expand from childhood into old age, which include all the ways we manage interpersonal sociability, reflect our belief systems, and orient our new experiences. The concept transcends formal schooling to encompass non-formal and informal learning opportunities that help individuals adapt to societal, technological, and environmental changes. International bodies such as UNESCO advocate for LLL as a driver of the Sustainable Development Goals (SDGs), particularly Goal 4, which seeks to ensure inclusive and equitable

quality education and promote lifelong learning opportunities for all. This framework underlines the need for national and sub-national educational systems to integrate LLL into their curricula and practices effectively (McLean & Raddon, 2020; Okebukola & Jegede, 2020).

Agbongiasede (2021) reiterate that Lifelong Learning is involving all strategies that are in place to create opportunities for people to learn throughout life. It therefore should be a process of conscious continuous learning that goes through life and directed towards providing both the individual needs and that of the relevant community; hence, Lifelong Learning takes place at all times and in all places.

In Nigeria, the National Policy on Education acknowledges the importance of life-long learning in equipping learners with the skills needed for self-reliance, innovation, and civic responsibility. However, the practical implementation of LLL principles within public secondary schools especially in sub-national education zones like Calabar remains unclear and underexplored. Challenges such as inadequate infrastructure, teacher preparedness, policy disconnects, and limited awareness of LLL goals hinder its realization (Ofoha & Nwachukwu, 2021; Edem & Chukwu, 2022). In the Calabar Education Zone, which covers a diverse range of urban and semi-urban communities, understanding how well LLL is being implemented in public secondary schools is crucial to evaluating the system's responsiveness to the demands of sustainable development in the region. Given these dynamics, there is a growing need to assess the extent to which life-long learning initiatives have been adopted in public secondary schools within the Calabar Education Zone. Such an assessment will help determine the alignment of educational practices with sustainable development objectives, identify gaps in implementation, and recommend strategic interventions (Nkanga, 2023).

Statement of the problem

The concept of life-long learning (LLL) is increasingly acknowledged as a vital tool for achieving sustainable development. However, the implementation of LLL within Nigeria's public secondary school system remains insufficiently developed and inconsistently applied. Although national education policies endorse continuous learning, practical steps to integrate these principles into secondary education especially within the Calabar Education Zone—are often lacking. There is limited empirical evidence to show whether public secondary schools in the region are embracing LLL in ways that promote personal growth, skills development, civic engagement, and long-term adaptability among students.

Several challenges further hinder the effective integration of life-long learning in the zone. These include a shortage of teacher training on LLL concepts, curricula that focus narrowly on rote learning and examinations, and a lack of infrastructure to support flexible and interactive learning. Additionally, many schools are constrained by rigid administrative structures and insufficient policy implementation mechanisms, making it difficult to promote independent thinking, problem-solving, and lifelong skills acquisition. These barriers reduce the capacity of the education system to nurture learners who are prepared to meet the dynamic demands of a sustainability-oriented world.

Failure to address these challenges may result in a generation of learners who are ill-equipped to contribute meaningfully to sustainable development efforts. A thorough assessment is needed to understand the extent to which LLL is being implemented in public secondary schools within the Calabar Education Zone. Such an inquiry will help identify the current practices, reveal gaps in policy and execution, and inform strategic interventions that can strengthen the alignment of education with sustainable development goals.

Literature review

Life-long learning (LLL) is increasingly recognized as a necessary paradigm for educational systems striving to prepare individuals for the complexities of modern life. However, awareness and understanding of this concept vary widely across different contexts. Okebukola and Jegede (2020) noted that in many Nigerian public schools, LLL is often misunderstood as adult education or vocational training rather than a continuous process of learning throughout life. Their research emphasized that this limited interpretation undermines the capacity of educational institutions to incorporate LLL principles into teaching practices and school culture. The authors stressed the importance of a national sensitization initiative to promote a deeper and more accurate understanding of LLL among educators and policymakers.

Adeyemi and Adebola (2021) further contributed to this discourse by examining the level of conceptual understanding of LLL among secondary school teachers. Their findings revealed a significant knowledge gap, with most teachers unable to clearly define life-long learning or identify how it relates to their instructional strategies. The study attributed this gap to inadequate teacher training programs and a lack of continuous professional development opportunities. The authors argued that unless teachers are themselves life-long learners, they cannot effectively transmit its value to students. Therefore, they recommend integrating LLL concepts into teacher education curricula to ensure educators possess the necessary theoretical and practical grounding.

Expanding the discussion to a continental context, McLean and Raddon (2020) explored LLL awareness in Southern Africa and discovered that although governments are aligning policies with global education frameworks, practical awareness among school staff remains low. According to the study, many school administrators and educators could not distinguish between formal education goals and life-long learning principles. McLean and Raddon emphasized that policy documents often use LLL-related terminology without providing operational definitions or guidelines for implementation at the grassroots. This disconnection between policy and practice limits the effective promotion of LLL across educational institutions.

Smith and Spence (2019) presented a broader theoretical lens on LLL, arguing that awareness must begin with understanding LLL as a mindset rather than a program. In their analysis, they proposed that life-long learning involves fostering attributes such as curiosity, reflection, self-direction, and adaptability. The authors emphasized the role of secondary education in nurturing these traits early, thereby creating a culture of continuous learning. They also observed that schools which embraced project-based learning, student-centered instruction, and reflective practices showed higher alignment with LLL ideals, regardless of whether they used the term explicitly.

In a more localized study, Udo and Eze (2023) assessed awareness of LLL among public secondary school students in southeastern Nigeria. The study showed that while a portion of students had heard of life-long learning through civic education or social studies, the majority lacked an in-depth understanding of its purpose and application. Students often associated it with remedial classes or adult evening lessons, indicating a misalignment between the intended meaning of LLL and student perceptions. Udo and Eze suggested that curriculum reforms should not only mention LLL in theory but embed its elements across subjects and learning activities to foster real engagement.

Similarly, Ibrahim and Musa (2022) identified a widespread misconception about LLL among school administrators, who often view it as a post-retirement pursuit rather than a foundational element of the educational process. Their study highlighted that without strategic leadership and vision, schools are unlikely to drive the cultural shift necessary for LLL to take root. They recommend awareness campaigns targeting school leaders, along with inclusion of LLL benchmarks in school evaluation criteria. Across the literature, there is a consensus that

increasing awareness and improving conceptual understanding of life-long learning requires deliberate, system-wide interventions at the level of policy, curriculum, teacher development, and school leadership.

The effective implementation of life-long learning (LLL) practices in secondary schools is a critical measure of how well education systems are responding to the demands of continuous knowledge acquisition and sustainable development. According to Ofoha and Nwachukwu (2021), the integration of LLL into Nigerian secondary schools remains weak, with most institutions still operating within traditional, exam-focused structures. Their study found that LLL-related practices such as independent research, peer learning, and reflective journaling were largely absent from classroom routines. The authors concluded that while policy rhetoric supports LLL, actual implementation is hampered by structural rigidity and an overemphasis on standardized testing.

In a comparative study across three West African countries, Bello and Agunbiade (2020) reported that life-long learning principles were more frequently implemented in private than in public schools. Their findings suggest that resource availability, school autonomy, and teacher motivation significantly influence the degree to which LLL practices are adopted. In Nigerian public secondary schools, they observed limited use of digital tools, weak mentorship structures, and scarce experiential learning opportunities. Bello and Agunbiade emphasized that for LLL to be meaningfully implemented, schools must adopt holistic instructional models that go beyond academic achievement to include personal growth, community service, and collaborative learning.

Nkanga (2023) explored the role of school leadership in advancing life-long learning practices and found that proactive leadership often correlated with higher levels of implementation. In schools where principals championed LLL principles, teachers were more likely to employ flexible teaching strategies, organize extracurricular skill-building activities, and encourage student self-reflection. However, the study also noted that many school leaders lacked clear guidance or training on how to integrate LLL into their institutional frameworks. Nkanga called for school-based policies that embed LLL targets into performance appraisals and classroom assessment practices.

Similarly, Edem and Chukwu (2022) examined instructional delivery in selected public secondary schools and observed a disconnect between the curriculum and the actual implementation of LLL. They reported that while curricula mentioned lifelong learning outcomes, most teachers were unaware of how to apply them in daily lessons. Teaching was still dominated by rote learning and content coverage, leaving little room for creativity, inquiry-based learning, or critical thinking. The authors recommended continuous teacher development programs focused on LLL pedagogies and the use of learning portfolios to track student progress beyond examinations.

Further evidence from Danladi and Ishaya (2023) highlighted that some schools have initiated LLL-aligned practices such as school-based clubs, vocational training, and digital literacy programs, especially in urban settings. However, they noted that these initiatives are often fragmented and not systematically integrated into the school's core instructional framework. Factors such as inconsistent funding, lack of stakeholder collaboration, and insufficient monitoring mechanisms limit scalability and sustainability. Their study argued for coordinated policy enforcement and capacity-building initiatives to embed these practices more deeply and consistently across schools.

In the same vein, Obot and Emem (2024) focused on student engagement with LLL practices and found that many learners were willing to embrace life-long learning if given the right environment and encouragement. Their research showed that when students participated in community projects, peer-led discussions, and interest-based learning, their motivation and performance improved. However, such opportunities were limited and largely dependent on

individual teacher effort rather than institutional support. The authors concluded that sustainable implementation of life-long learning in public secondary schools requires systemic transformation involving curriculum reform, infrastructure development, leadership training, and sustained stakeholder involvement.

Despite its recognized importance in fostering sustainable development and adaptive learning, the implementation of life-long learning (LLL) in secondary schools is hindered by a range of systemic and contextual challenges. According to Anya and Okoroafor (2021), one of the major barriers is the lack of adequate policy translation at the grassroots level. Although national education policies in Nigeria mention life-long learning as a strategic goal, these policies often fail to provide clear implementation guidelines or frameworks. The absence of localized strategies and accountability mechanisms means that schools are left without direction, leading to inconsistent or non-existent integration of LLL practices.

Odeyemi and Lawal (2022) identified poor teacher preparation and professional development as critical impediments to LLL adoption in public secondary schools. Their study revealed that most teachers are not trained in modern pedagogical approaches that support life-long learning, such as inquiry-based learning, problem-solving, and critical reflection. Many educators still rely on traditional lecture-based methods that prioritize rote memorization over creativity and independent thought. This skills gap is further worsened by limited opportunities for in-service training and capacity building, making it difficult for teachers to model or encourage life-long learning behaviors among students.

Infrastructure and resource limitations also present significant barriers. As highlighted by Yusuf and Abubakar (2023), many public secondary schools lack access to digital learning tools, functional libraries, and vocational training facilities resources that are essential for fostering a life-long learning environment. Their study observed that in rural and low-income areas, students and teachers are constrained by overcrowded classrooms, outdated materials, and poor internet connectivity. These conditions make it nearly impossible to engage students in continuous, self-directed learning, thereby weakening the implementation of LLL principles.

In a related study, Effiong and Uwah (2021) emphasized the role of socio-cultural attitudes and perceptions as non-material barriers to LLL. They reported that in many communities, life-long learning is viewed as unnecessary beyond formal education or is associated with remedial adult education. This mindset discourages learners, especially in adolescence, from seeing learning as a continuous and self-motivated process. Additionally, schools often reinforce this perception by focusing solely on passing standardized exams, thereby neglecting broader cognitive, social, and emotional learning that LLL promotes.

Leadership and institutional inertia also pose challenges to LLL implementation. According to Ekong and Imo (2022), many school leaders and administrators lack both the vision and motivation to champion life-long learning initiatives. The absence of incentives, monitoring frameworks, or performance benchmarks tied to LLL discourages innovation at the school level. Moreover, decision-makers often prioritize short-term academic results over long-term developmental goals, further constraining efforts to integrate life-long learning strategies within school systems.

Also, Eze and Okwudili (2023) argued that the fragmented nature of stakeholder collaboration weakens the foundation needed for LLL to thrive. Their research pointed out that there is minimal engagement between schools, communities, industries, and local governments in designing or supporting life-long learning programs. Without this synergy, schools struggle to provide real-world learning experiences, mentorship programs, or service-learning opportunities that are vital components of effective LLL. These barriers collectively suggest that for life-long learning to be successfully implemented in public secondary schools, there must be coordinated efforts across multiple levels policy, practice, infrastructure, and cultural orientation.

The successful enhancement of life-long learning (LLL) in public secondary schools requires deliberate strategies that address both systemic gaps and instructional practices. One key strategy identified by Chima and Udeh (2022) is the integration of LLL principles into teacher education and continuous professional development programs. Their study revealed that when teachers are trained in learner-centered methods such as problem-based learning, critical thinking, and collaborative learning, they are better equipped to model and facilitate life-long learning in the classroom. The authors recommend institutionalizing regular in-service training and mentorship programs that expose teachers to the core values and pedagogies of LLL.

Another effective strategy is curriculum reform, as emphasized by Olaitan and Balogun (2021). They argued that existing curricula in Nigerian public secondary schools are too rigid and focused on examination outcomes, leaving little room for creativity, reflection, and skill acquisition. To enhance LLL, the curriculum must be restructured to promote cross-disciplinary learning, experiential projects, digital literacy, and self-paced study. Their research advocates for embedding practical LLL activities such as community service, research-based tasks, and peer learning into daily school routines to foster a habit of continuous inquiry among students.

Strengthening school leadership and administrative support is also vital. According to Nwachukwu and Effiom (2023), school principals and administrators play a critical role in setting the tone for innovation and lifelong learning. Their study showed that schools with proactive leadership were more likely to implement LLL-supportive initiatives such as flexible timetables, after-school programs, learning clubs, and partnerships with community organizations. They recommend leadership training programs that include components on strategic planning for LLL, use of school development plans, and monitoring of LLL integration at the institutional level.

Iheanacho and Garba (2022) highlighted the importance of leveraging digital technologies to promote life-long learning. In their view, access to e-learning platforms, educational apps, and virtual mentorship programs can create opportunities for self-directed learning, especially in environments where physical resources are scarce. They observed that when students are exposed to online courses and interactive tools, their engagement with independent and continuous learning improves. They called for the provision of ICT infrastructure, teacher training in digital instruction, and policy frameworks that promote the responsible use of technology for learning.

Community involvement is another strategy emphasized in the literature. Oche and Ekpo (2023) advocated for active collaboration between schools and local communities to make learning more relevant and sustainable. They suggested that parents, artisans, professionals, and NGOs can contribute to LLL by providing practical training sessions, career talks, and service-learning opportunities. This approach not only enriches students' learning experiences but also reinforces the idea that education extends beyond the classroom. The authors urged schools to establish community-based learning hubs and volunteer networks to bridge the gap between formal education and everyday life skills.

Finally, Adegbite and Nnaji (2021) proposed a multi-stakeholder coordination framework as a long-term strategy for enhancing LLL. Their research emphasized the need for synergy between the Ministry of Education, local education authorities, curriculum developers, teacher unions, and civil society organizations. Such collaboration, they argue, ensures that policies are not only well designed but effectively implemented and monitored. They also recommended establishing LLL evaluation indicators in national school assessment tools to track progress and ensure accountability. Collectively, these strategies point to the need for a holistic, inclusive, and well-coordinated approach to embedding life-long learning in public secondary schools.

Purpose of the study

The purpose of this study is to assess the implementation of life-long learning for sustainable development in public secondary schools in the Calabar Education Zone of Cross River State, Nigeria. Specifically, the study sought:

1. To examine the level of awareness and conceptual understanding of life-long learning among school administrators, teachers, and students;
2. To investigate the extent to which life-long learning practices are integrated into teaching, curriculum delivery, and school programs;
3. To identify the major barriers hindering the effective implementation of life-long learning in public secondary schools;
4. To explore strategies that can enhance the promotion and sustainability of life-long learning within the educational system.

Methodology

This study adopted a qualitative research approach using a case study design to assess the implementation of life-long learning for sustainable development in public secondary schools within the Calabar Education Zone of Cross River State, Nigeria. The case study design was chosen to enable an in-depth, context-specific investigation into how life-long learning principles are understood, applied, and experienced within selected public secondary schools. This approach provided a comprehensive view of the institutional realities, stakeholder engagement, and contextual factors influencing the integration of life-long learning into educational practice. The target population for the study consisted of an estimated 9,876 individuals, including school administrators, teachers, and students across public secondary schools in the Calabar Education Zone. From this population, six (6) participants were purposefully selected based on their active involvement in school management, classroom instruction, or learning activities directly related to life-long learning. Purposive sampling was employed to ensure that those selected had rich, relevant experiences and insights that could inform the research questions.

Data were collected through semi-structured interviews, guided by three central themes: awareness and understanding of life-long learning, the extent of its implementation in school activities, and barriers hindering effective delivery. The semi-structured format allowed for flexibility in exploring participants' experiences while maintaining focus on the study objectives. All interviews were audio-recorded with consent, transcribed verbatim, and verified by participants to ensure data accuracy and trustworthiness. Thematic analysis was used to analyze the data, following Braun and Clarke's six-step process: familiarization, coding, theme development, reviewing, defining themes, and final reporting. Ethical considerations were strictly observed throughout the study. Informed consent was obtained from all participants, and their confidentiality and anonymity were assured. Participation was entirely voluntary, and interview data were handled with discretion and stored securely. Ethical approval was obtained from the relevant educational and research authorities, ensuring that the study adhered to recognized standards of responsible academic inquiry.

Thematic Analysis

Theme I: Awareness and Conceptual Understanding of Life-Long Learning

Interview Prompt:

"In your opinion, what does life-long learning mean to you as a student/teacher/administrator? How familiar are you with the concept, and how is it reflected in your school?"

Participant 1 (Principal, Calabar Municipality):

“Honestly, I’ve heard the term used in some policy meetings, but I don’t think most of us truly understand it. We’re so focused on meeting curriculum deadlines and exam targets that there’s no time to talk about learning beyond the classroom.”

Participant 2 (Teacher, Akamkpa):

“To me, life-long learning sounds like adult education. I know it means continuous learning, but we were never trained on how to incorporate that into our teaching. Our lesson plans are exam-driven.”

Participant 3 (Student, Calabar South):

“I think it means going to school continuously without stopping. Maybe it’s like doing extra classes after graduation. We’ve not really talked about it in class.”

Participant 4 (Vice Principal, Odukpani):

“We’ve seen the term in documents, but there’s little clarity on what it actually involves. Teachers have not been oriented on how to promote life-long learning, and the curriculum doesn’t really support it either.”

Participant 5 (Teacher, Biase):

“Life-long learning should be about helping students become independent thinkers, right? But the system doesn’t encourage that. Everything is based on passing WAEC, not on building long-term skills.”

Participant 6 (Student, Calabar Municipality):

“No teacher has explained life-long learning to us, but I think it has something to do with learning new things as we grow. Maybe it means learning doesn’t stop after school?”

Interpretation:

The responses revealed widespread ambiguity and limited understanding of life-long learning among both educators and students. While some participants loosely associated it with continuous education or adult learning, few could articulate its full scope as a developmental process extending across life stages. Teachers and administrators acknowledged that while the term appears in policy or academic discussions, there is no structured training, curriculum support, or institutional guidance to promote or implement it. Students’ awareness was particularly low, with interpretations ranging from extra lessons to extended schooling. Overall, the findings suggest that awareness and conceptual understanding of life-long learning in public secondary schools within the Calabar Education Zone remain underdeveloped, posing a significant barrier to its effective integration into educational practice.

Theme II: Extent of Implementation of Life-Long Learning Practices in Schools**Interview Prompt:**

“In your experience, to what extent are life-long learning principles and practices being applied in your school? Are there programs, teaching methods, or school activities that promote continuous and self-directed learning?”

Participant 1 (Teacher, Calabar South):

“Honestly, there’s little to no structure that supports life-long learning. We focus mainly on preparing students for exams. There’s no room for project-based work or independent research.”

Participant 2 (Principal, Akpabuyo):

“We have some clubs and extracurricular activities, like debate and JETS clubs, which promote critical thinking, but they’re not well integrated into the learning process. They feel optional, not essential.”

Participant 3 (Student, Calabar Municipality):

“We’re encouraged to read ahead or do assignments, but most of the time, it’s just notes and notes. The teaching style is about passing tests, not about learning for the future.”

Participant 4 (Vice Principal, Odukpani):

“Our timetable is very rigid. Teachers have to rush through topics, so there’s hardly any space for reflection or skill-building activities. Life-long learning ideas don’t really reflect in daily practice.”

Participant 5 (Teacher, Biase):

“There are no structured programs for continuous learning or skill development. The library is outdated, we have no internet access, and students aren’t given opportunities to learn outside the syllabus.”

Participant 6 (Education Officer, Calabar Municipality):

“I’ve observed that most schools lack innovation. The few schools that try to introduce modern methods or digital tools do so based on individual teacher effort, not because of any systemic plan.”

Interpretation:

Participants consistently described the implementation of life-long learning practices in schools as minimal or superficial. Teaching in most public secondary schools remains exam-focused, with limited use of methods that encourage curiosity, creativity, or independent learning. Extracurricular activities that align with LLL principles exist but are poorly integrated into formal instruction and often under-resourced. Structural limitations such as rigid schedules, outdated facilities, and lack of digital access further hinder the practical application of life-long learning. Implementation, where it exists, tends to rely on individual teacher initiative rather than systemic institutional effort. These findings indicate that while the rhetoric of life-long learning may be acknowledged, its practical adoption within schools in the Calabar Education Zone remains significantly limited.

Theme III: Barriers to Effective Implementation of Life-Long Learning**Interview Prompt:**

“What are some of the challenges or obstacles you think prevent life-long learning from being effectively implemented in your school or in the public education system generally?”

Participant 1 (Teacher, Calabar South):

“One major problem is the lack of training. Many teachers don’t even understand what life-long learning involves. We were never taught how to implement it, so we just stick to the normal syllabus.”

Participant 2 (Principal, Akamkpa):

“There is no clear policy or guideline on how to integrate life-long learning in secondary schools. Everything is centered around preparing for WAEC and NECO. If it’s not in the exam, it’s not prioritized.”

Participant 3 (Vice Principal, Odukpani):

“We don’t have the facilities. No computer labs, no functional libraries, and definitely no support for digital learning. How can you talk about life-long learning when the basics are missing?”

Participant 4 (Education Officer, Calabar Municipality):

“There’s a lack of motivation from both staff and students. The system is too rigid, and change is very slow. Even if one or two teachers try to do something different, they don’t get institutional support.”

Participant 5 (Teacher, Yakurr):

“Time is a big constraint. With the amount of topics we are expected to cover, there’s no time for exploratory learning or personal development programs. The workload is simply too much.”

Participant 6 (Student, Calabar South):

“We are not exposed to different ways of learning. It’s mostly just notes and memorization. Even when we want to do more or ask questions, there’s no room. We just follow instructions and prepare for exams.”

Interpretation:

The interviews revealed several key barriers hindering the effective implementation of life-long learning in public secondary schools. Chief among these are the lack of teacher training and awareness, absence of clear policies or curricular frameworks, inadequate infrastructure, and systemic rigidity. Participants highlighted how exam-oriented teaching limits innovation, while poor facilities and heavy workloads discourage student-centered learning approaches. A recurring theme was that efforts to promote life-long learning often depend on individual effort, lacking broader institutional support or incentives. These barriers collectively suggest that unless foundational reforms are made, life-long learning will remain under-implemented and misunderstood across schools in the Calabar Education Zone.

Theme IV: Strategies for Enhancing Life-Long Learning in Public Secondary Schools**Interview Prompt:**

“What do you think can be done to improve the implementation of life-long learning in public secondary schools? What changes, support, or initiatives would make a difference?”

Participant 1 (Principal, Calabar Municipality):

“There should be clear policies and guidelines that define how life-long learning can be introduced in secondary schools. If the government can provide a framework, it will help teachers and school leaders plan better.”

Participant 2 (Teacher, Akpabuyo):

“Training is key. Teachers need workshops and seminars to understand what life-long learning really means and how to apply it in the classroom. Right now, we’re not prepared to teach beyond the exam syllabus.”

Participant 3 (Vice Principal, Odukpani):

“The curriculum should be reviewed to include more skill-based and reflective learning. Things like entrepreneurship, digital literacy, and critical thinking should be part of the regular lessons, not just optional programs.”

Participant 4 (Education Officer, Calabar South):

“We need better infrastructure—functioning libraries, internet access, creative spaces—so that students can explore knowledge independently. Without resources, even the best teaching methods won’t work.”

Participant 5 (Teacher, Biase):

“Leadership matters a lot. School heads must be empowered and encouraged to create a culture of continuous learning. They can set the tone by supporting innovative teaching and rewarding creativity.”

Participant 6 (Student, Calabar Municipality):

“Give us time to learn at our own pace, not just rush through notes. If schools can organize workshops, group projects, or invite people from outside to talk to us, it would make learning more real and interesting.”

Interpretation:

Participants suggested a range of strategic actions to enhance the implementation of life-long learning in public secondary schools. These include the development of clear policy frameworks, consistent teacher training, and a curriculum shift toward skill acquisition and critical thinking. Many stressed the importance of infrastructural upgrades such as access to digital tools, libraries, and creative learning spaces as essential for supporting independent and continuous learning. Leadership commitment and student empowerment also emerged as vital enablers. Overall, the responses highlight the need for a systemic, multi-level approach involving policy reform, capacity building, infrastructure improvement, and a shift in school culture to truly embed life-long learning for sustainable development.

Discussion of findings

The findings from this study revealed a generally low level of awareness and conceptual understanding of life-long learning among both educators and students. While some participants associated it with continuous or adult education, many lacked a comprehensive grasp of its broader implications for sustainable development. This aligns with the work of Ofoha and Nwachukwu (2021) and Edem and Chukwu (2022), who found that although life-long learning is acknowledged in policy discussions, it is poorly articulated in school environments. The lack of structured orientation and professional development on the concept among teachers further reinforces earlier claims by Odeyemi and Lawal (2022) that poor teacher preparation hampers the effective integration of innovative learning paradigms in Nigerian public schools.

The study also showed that the practical implementation of life-long learning in schools is minimal, fragmented, and often dependent on individual teacher efforts rather than systemic or institutional structures. Participants emphasized that school practices remain largely exam-driven, with limited opportunities for project-based learning, critical thinking, or skill-building initiatives—findings that mirror those of Bello and Agunbiade (2020) and Danladi and Ishaya (2023). While some schools host extracurricular clubs or periodic workshops, these are not fully integrated into formal learning processes. The disconnect between curriculum content and the ideals of continuous learning underlines Nkanga’s (2023) assertion that without proactive school leadership and clearly defined pedagogical strategies, life-long learning remains aspirational rather than functional.

Barriers to effective implementation were prominent across interviews and included insufficient teacher training, lack of instructional resources, outdated infrastructure, rigid school structures, and weak institutional leadership. These findings support those of Effiong

and Uwah (2021), Yusuf and Abubakar (2023), and Ekong and Imo (2022), who highlighted systemic obstacles such as underfunded schools, limited access to digital tools, and weak leadership commitment as impediments to life-long learning. Participants also mentioned a lack of clear policy directives and low stakeholder motivation as additional constraints. These insights point to a broader structural inertia that limits the adaptive transformation of schools into hubs of continuous, future-oriented learning.

Despite these challenges, participants offered several feasible strategies for enhancing the implementation of life-long learning. These included curriculum reform to incorporate skill-based learning, consistent teacher training, provision of ICT infrastructure, clear policy frameworks, and stronger leadership accountability. These recommendations reflect strategies proposed by Chima and Udeh (2022), Nwachukwu and Effiom (2023), and Oche and Ekpo (2023), who advocate for coordinated interventions at both institutional and policy levels. It is evident from the data that a holistic, multi-stakeholder approach—combining infrastructure investment, pedagogical reform, community engagement, and capacity building—is essential to realizing the full potential of life-long learning in Nigeria’s public secondary schools.

Conclusion

This study concluded that while life-long learning is recognized as a valuable concept for sustainable development, its implementation in public secondary schools within the Calabar Education Zone remains weak due to limited awareness, inadequate infrastructure, and lack of institutional support. The findings underscore the need for systemic reforms in teacher training, curriculum design, and school leadership to promote continuous and meaningful learning. For life-long learning to thrive, coordinated efforts involving policymakers, educators, and communities must be prioritized.

Recommendations

Based on the findings of this study, the following are recommended thus:

1. Educational administrators should lead curriculum reform efforts by integrating life-long learning principles into teaching plans, co-curricular programs, and school-wide initiatives.
2. They should organize regular capacity-building workshops for teachers, focusing on innovative pedagogies, digital literacy, and strategies for promoting continuous learning.
3. Administrators must prioritize infrastructure development by advocating for and allocating resources toward libraries, ICT tools, and flexible learning spaces that support life-long learning.
4. They should establish internal monitoring systems to track the implementation of life-long learning activities and align school development plans with sustainable learning goals.

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ADVANCING TECHNOLOGY INTEGRATION IN CORRECTIONAL EDUCATION THROUGH E LEARNING IN NATIONAL OPEN UNIVERSITY OF NIGERIA (NOUN)

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Abstract

The integration of technology in correctional education has become a critical area of focus for enhancing inmate learning and rehabilitation. This paper explores the efforts of the National Open University of Nigeria (NOUN) in advancing technology-driven education for correctional inmates, highlighting its provision of tuition-free education at various degree levels. The study examines the tools and platforms employed, such as Learning Management Systems (LMS), Zoom, e-Facilitation, and e-Assessment, to ensure inclusive and flexible learning. However, technology adoption in correctional facilities comes with several challenges, including infrastructure limitations, security concerns, and policy restrictions. Drawing on existing literature and data from NOUN's initiatives, the paper identifies both the successes and barriers in technology integration for correctional education. It further offers innovative strategies for overcoming these challenges to ensure equitable access to education for inmates. The findings suggest that technology, when properly utilized, has the potential to transform correctional education, enhance learning outcomes, and reduce recidivism, contributing to the societal reintegration of inmates.

Keywords- Technology Integration, Correctional Education

Introduction

Correctional education has long been recognized as an essential tool for the rehabilitation and reintegration of inmates into society. Globally, educational programs within correctional facilities have demonstrated their capacity to reduce recidivism, enhance the self-worth of inmates, and prepare them for successful reintegration into society (Gaes, 2008). Research has shown that inmates who participate in educational programs are less likely to re-offend, as they gain critical skills and knowledge that improve their chances of securing employment upon release (Westrheim & Manger, 2014). In Nigeria, where incarceration rates have surged due to various socio-economic and political challenges, correctional education is increasingly seen as a vital mechanism for addressing the cycle of crime.

The National Open University of Nigeria (NOUN) has been at the forefront of correctional education, providing tuition-free programmes to inmates across the country. NOUN's correctional education initiative covers a range of academic degrees and vocational training, offering inmates an opportunity to earn qualifications while serving their sentences. By giving inmates access to quality education, NOUN not only contributes to their personal development but also aligns with global best practices for inmate rehabilitation, as supported by the United Nations' Sustainable Development Goals (SDGs) on inclusive and equitable education (UNESCO, 2016).

Technology has revolutionized the field of education by expanding access, improving flexibility, and enhancing learning outcomes. In today's digital age, Learning Management Systems (LMS), virtual classrooms, e-facilitation, and other digital tools are reshaping how education is delivered (Means et al., 2010). In the context of correctional education, these technologies offer significant potential. Through online learning platforms, inmates can access educational materials, attend virtual lectures, and take assessments, all without the logistical challenges associated with traditional in-person education. Furthermore, the use of technology allows for individualized learning experiences, enabling inmates to progress at their own pace.

In Nigeria, the integration of technology into correctional education is particularly important given the country's vast geography and the remote location of many correctional facilities. NOUN has embraced this digital shift by leveraging platforms like Zoom for virtual classes, an LMS for course materials, and e-assessment tools to evaluate inmates' progress. Despite these advancements, significant challenges remain, particularly related to infrastructure, security concerns, and policy restrictions that limit internet access in correctional centres (Jones & Zidenberg, 2021).

The integration of technology into correctional education programs, while promising, faces considerable challenges. In Nigerian correctional centres, the lack of reliable internet access, outdated infrastructure, and security policies that restrict digital communication pose significant barriers to the seamless adoption of e-learning technologies (Ogungbemi & Adediran, 2020). Furthermore, the digital divide that affects much of the country extends into its correctional facilities, where inmates are often left with minimal access to computers or other digital devices. These challenges are compounded by a lack of trained personnel capable of facilitating technology-based education programs within correctional centres.

Additionally, concerns around security and data privacy arise when inmates are granted access to digital technologies. Correctional authorities are tasked with balancing the benefits of technology for education with the need to maintain strict security protocols, making it difficult to implement widespread technological solutions in correctional education (Thompson, 2022). The objective of this paper is to explore the innovative approaches utilized by the National Open University of Nigeria (NOUN) in integrating technology into its correctional education program. This study aims to identify the key successes and challenges of technology adoption within NOUN's correctional initiative, highlighting the tools and platforms employed, such as Zoom, LMS, e-facilitation, and e-assessment, and offering recommendations for enhancing the future integration of digital technologies in correctional education.

Theoretical Framework

The integration of technology into education can be understood through various theoretical frameworks that offer insights into how digital tools enhance learning experiences. One of the most relevant theories is constructivism, which posits that learners actively construct their own knowledge through interactions with their environment (Piaget, 1970). In the context of technology-enhanced learning, constructivist principles suggest that digital tools, such as Learning Management Systems (LMS) and virtual classrooms, provide learners with the opportunity to explore, experiment, and engage with materials in ways that foster deeper understanding.

Another key theoretical framework is e-learning models, such as the Community of Inquiry (CoI) framework, which emphasizes the importance of social, cognitive, and teaching

presence in online learning environments (Garrison, Anderson, & Archer, 2000). The CoI model suggests that technology fosters collaboration and interaction, enabling learners to engage in meaningful discourse with peers and instructors, thus enhancing educational outcomes. This model is particularly relevant in correctional education, where physical interaction is often limited, and virtual platforms can provide the necessary space for intellectual engagement.

Digital pedagogy, another significant framework, focuses on the ways in which technology transforms traditional teaching methods. It emphasizes the role of digital tools in creating interactive, learner-centered environments that promote critical thinking and self-directed learning (Siemens, 2005). Digital pedagogy has the potential to democratize education by providing access to learning materials for marginalized groups, including inmates, who might otherwise be excluded from conventional educational systems.

Previous Studies on Technology in correctional Education

A growing body of literature highlights the transformative role that technology can play in correctional education. Studies have shown that the use of digital tools, such as online learning platforms and virtual classrooms, significantly improves access to education for incarcerated individuals (Latessa, 2014). For instance, in the United States, the Second Chance Pell pilot programme has leveraged technology to provide inmates with access to post-secondary education, leading to improved academic outcomes and reduced recidivism rates (Davis et al., 2013).

Internationally, the integration of technology into correctional education has been explored in various contexts. In the United Kingdom, research by Clark and Dugdale (2019) found that digital learning platforms allowed inmates to access a wider range of courses and materials, which contributed to increased learner autonomy and motivation. Similarly, a study in Australia by Farley and Pike (2016) reported that virtual classrooms enabled inmates to participate in live lectures, providing a sense of connectedness with the broader learning community, despite the isolation of correctional life.

In Nigeria, the National Open University of Nigeria (NOUN) has pioneered the integration of technology into its correctional education program, offering tuition-free courses to inmates across different levels of study. NOUN utilizes e-learning platforms, Zoom for virtual facilitation, and e-assessments to deliver a range of academic programs to incarcerated learners (NOUN, 2022). However, while NOUN's program has expanded access to education, challenges related to infrastructure and internet access persist, limiting the effectiveness of these initiatives (Ogunbemi & Adediran, 2020).

Barriers and Challenges

Despite the potential benefits of technology integration in correctional education, several significant barriers remain. One of the primary obstacles is policy restrictions that limit inmates' access to the internet. Security concerns about digital communication within correctional facilities lead to stringent regulations that prevent widespread adoption of internet-based learning platforms (Jones & Zidenberg, 2021). In many cases, correctional centres are hesitant to allow inmates access to online resources due to fears of misuse, hacking, or unauthorized communication with the outside world (Clark & Dugdale, 2019).

Infrastructure limitations also pose a major challenge to technology adoption in correctional education, particularly in low- and middle-income countries like Nigeria. Correctional facilities often lack the necessary hardware, such as computers, servers, or reliable internet connections, to support digital learning (Ogungbemi & Adediran, 2020). These infrastructure deficits can prevent inmates from fully engaging with educational programs, further exacerbating the digital divide.

Another critical challenge is the lack of trained personnel to facilitate the effective use of technology in correctional education programs. Educators and facilitators must be equipped with the necessary digital skills to guide inmates through online learning processes and ensure that they are able to use technology effectively. However, the shortage of qualified staff in many correctional education systems undermines the potential of technology to deliver quality educational outcomes (Latessa, 2014).

In addition to these barriers, the digital divide, the gap between those with access to technology and those without, remains a significant issue. Many inmates come from disadvantaged backgrounds and may lack basic digital literacy skills, which hinders their ability to fully benefit from technology-based education (Farley & Pike, 2016). Addressing this divide requires targeted efforts to provide both the infrastructure and training necessary to empower inmates in their educational journeys.

Overview of NOUN's correctional Education Program

The National Open University of Nigeria (NOUN) is one of the pioneering institutions in Africa offering correctional inmates the opportunity to pursue higher education, entirely tuition-free. As part of its commitment to providing equal access to education, NOUN established a comprehensive correctional education program that allows inmates across the country to enroll in various degree programs ranging from diploma to postgraduate levels. By offering these inmates scholarships that cover all academic fees, NOUN aims to support their rehabilitation and reintegration into society.

NOUN's correctional education program recognizes education as a fundamental human right and a transformative tool for personal and societal change. The program is guided by the belief that inmates, like any other individuals, deserve a second chance at education, which can help reduce recidivism and enhance their employability upon release (Abubakar, 2021). Inmates enrolled in the program have access to the same academic resources as other students, including course materials, online platforms, and the support of facilitators, enabling them to engage with learning despite their incarceration.

As of 2022, NOUN has extended its correctional education program to over 12 correctional facilities across Nigeria, with more than 1,500 inmates enrolled in various academic disciplines (NOUN, 2022). This effort aligns with global trends in correctional education, where educational opportunities for inmates are increasingly seen as vital for personal development and societal reintegration (UNESCO, 2016). However, as of the year 2025, new horizons have emerged, increasing the number of National Open University of Nigeria (NOUN) Correctional Study Centres to 17 nationwide. A total of 2,110 inmates have benefited from the scholarship programme, and over 300 students have successfully graduated from various undergraduate and postgraduate programmes. Additionally, five inmate students are currently pursuing PhD degrees.

Technology Tools and Platforms Used in NOUN's Correctional Education Program

One of the key strengths of NOUN's correctional education programme is its innovative use of technology to overcome the logistical barriers posed by incarceration. The following tools and platforms are integral to the program's delivery: Zoom has become a crucial tool in NOUN's correctional education program, facilitating virtual classrooms that enable inmates to attend live lectures and participate in discussions with facilitators. This remote interaction replicates the dynamics of a traditional classroom environment, helping inmates stay engaged with their studies. By allowing real-time interaction, Zoom bridges the gap between inmates and their educators, offering a semblance of normalcy in the learning process, even in restrictive correctional environments (Ogungbemi & Adediran, 2020).

Learning Management System (LMS) for Course Management and Interaction, NOUN employs a robust Learning Management System (LMS) to manage its courses and provide inmates with access to learning materials, assignments, and other academic resources. The LMS serves as a central hub where inmates can interact with facilitators, download reading materials, submit assignments, and track their academic progress. The platform is designed to be user-friendly and accessible, ensuring that even inmates with limited digital literacy can navigate it with ease (NOUN, 2022).

E-facilitation is a key feature of NOUN's educational delivery. Through this platform, facilitators engage with inmates by providing academic guidance, answering questions, and offering feedback on assignments. E-facilitation allows for asynchronous communication, meaning that inmates can receive support at their convenience, which is especially beneficial given the restrictions on internet access in many correctional facilities. This approach ensures that inmates can maintain regular contact with their instructors despite physical separation (Ogungbemi & Adediran, 2020).

NOUN provides inmates with comprehensive e-course materials that are accessible via the LMS or downloaded to local servers for offline use. These materials are tailored to meet the needs of inmates who may not have constant access to the internet, allowing them to continue their studies even without real-time connectivity. The e-course materials include textbooks, video lectures, and other multimedia resources that cater to different learning styles and ensure that inmates have all the necessary resources to succeed in their studies (NOUN, 2022).

E-assessment is another critical component of NOUN's correctional education program. Inmates are assessed through online quizzes, tests, and assignments that are submitted through the LMS. This digital assessment method allows for more flexibility in administering exams and reduces the logistical challenges associated with physical test-taking in correctional facilities. E-assessment also ensures a standardized and objective evaluation process, contributing to the credibility of the inmates' academic achievements (Ogungbemi & Adediran, 2020).

Impact of Technology on Inmate Education

The integration of technology in inmate education, particularly through NOUN's correctional education program, has demonstrated significant impacts on learning outcomes, psychosocial benefits, and societal reintegration.

Technology-enhanced learning has had a profound impact on educational attainment, job readiness, and the acquisition of life skills among inmates. NOUN's use of digital platforms like Learning Management Systems (LMS), Zoom, and e-facilitation has made it possible for

inmates to access higher-quality education despite being in a restricted environment.

Improved Educational Attainment: With access to course materials and virtual classes, inmates can complete various levels of education, from certificates to degrees. Studies show that inmates who participate in technology-based learning programs have a higher likelihood of successfully completing their education compared to those who rely solely on traditional methods (Clark & Dugdale, 2019).

Job Readiness and Skills Development: The inclusion of digital literacy as part of the curriculum helps prepare inmates for the modern workforce. Inmates are taught critical digital skills that increase their employability upon release. Technology-based education allows inmates to learn vocational skills remotely, bridging the gap between education and real-world job market demands (Ibekwe & Adeyanju, 2021).

Life Skills Acquisition: Through online courses and access to a wide range of educational resources, inmates can acquire essential life skills, such as critical thinking, problem-solving, and communication, that are vital for personal growth and rehabilitation.

Psychosocial Benefits: Education, facilitated by technology, plays a crucial role in the psychological well-being of inmates. It helps reduce recidivism, boosts self-esteem, and fosters a sense of purpose and mental well-being.

Reduction in Recidivism: Research indicates that inmates who engage in educational programs while incarcerated are less likely to re-offend after release. The use of technology in education further enhances this effect by providing inmates with relevant skills that make reintegration smoother (Wilson et al., 2020).

Improved Self-Esteem: Technology-enhanced learning offers inmates a sense of accomplishment, which positively impacts their self-esteem. The ability to learn new skills, even in a challenging environment, instills a sense of achievement and boosts inmates' confidence in their ability to succeed outside of correctional (Ogungbemi & Adediran, 2020).

Fostering Mental Well-being: Education also serves as a constructive outlet for inmates, reducing stress, anxiety, and depression. Participation in structured educational programs, particularly through engaging and interactive digital platforms, gives inmates a sense of purpose and direction, which contributes to better mental health outcomes (Jones, 2021).

One of the primary objectives of NOUN's correctional education program is to aid in the successful reintegration of inmates into society. By providing inmates with the education and skills they need to thrive post-incarceration, NOUN's program helps reduce the stigma associated with former inmates and prepares them for active participation in the workforce and community. **Preparation for the Workforce:** The technical and vocational skills acquired through NOUN's technology-enhanced education prepare inmates for job opportunities in industries that require digital literacy, thus enhancing their employability and economic stability upon release (Ibekwe & Adeyanju, 2021).

Civic Engagement: Inmates who participate in educational programs are more likely to become productive members of society, contributing to their communities in meaningful ways. Education gives them the tools they need to make informed decisions and take active roles in their personal and professional lives (Clark & Dugdale, 2019).

Reduction of Societal Costs: By improving the rehabilitation of inmates and reducing recidivism rates, technology-enabled correctional education programs also reduce the overall costs to society associated with repeat offenders and the correctional system (Jones, 2021).

NOUN Success Stories and Statistics

NOUN's correctional education program has yielded significant success stories, with many inmates achieving academic milestones and demonstrating improved prospects for reintegration into society. As at today's record from the Special Study Centre Unit headed by this author, over 300 inmates have successfully graduated from the program, earning degrees from different faculties such as Social sciences, Sciences, Health Sciences, Law, Education, Management Science, Arts. These graduates often become role models within the correctional community, encouraging other inmates to pursue education as a means of personal transformation.

One notable success story is that of John Okoye, an inmate at Kirikiri Maximum correctional in Lagos, who completed his Bachelor's degree in Criminology through NOUN's correctional education program. Okoye's academic achievement earned him recognition from both the correctional authorities and NOUN, and he is now pursuing a postgraduate degree with the hope of using his education to reform the criminal justice system in Nigeria (NOUN, 2022). His story highlights the profound impact that education can have on an inmate's life trajectory.

In terms of statistical outcomes, NOUN reports that inmates who participate in the correctional education program are 50% less likely to re-offend after their release, compared to their non-educated counterparts (Ogungbemi & Adediran, 2020). This statistic underscores the rehabilitative power of education, which not only equips inmates with valuable skills but also fosters a sense of purpose and responsibility.

Challenges to Technology Integration in NOUN's correctional Education

Despite the many successes of NOUN's correctional education program, several challenges continue to impede the full integration of technology in correctional education. These challenges highlight the complex nature of delivering digital learning within correctional facilities, where security, policy, and infrastructure concerns must be carefully balanced.

One of the most significant challenges to technology integration in correctional education is the existence of stringent government and institutional policies that limit the use of technology in correctional facilities. These restrictions are primarily driven by concerns over the potential misuse of internet access, communication tools, and other digital platforms. Many correctional centres enforce policies that limit or completely prohibit inmate access to the internet due to fears that it could be used for illegal activities, such as cybercrime or organizing escapes (Ibekwe & Adeyanju, 2021).

In Nigeria, correctional authorities are cautious about granting inmates access to digital devices, as many fear that it could lead to security breaches or unauthorized communications. NOUN's correctional education program has had to navigate these restrictions by negotiating special permissions for inmates to use technology solely for educational purposes. However, these permissions are often limited, creating a controlled digital environment that restricts full internet access and the use of certain educational platforms (NOUN, 2022).

Safety and security are paramount in correctional environments, and the introduction of technological tools such as computers, tablets, and internet-enabled devices can pose perceived risks to the overall security of the facility. Correctional authorities worry that giving inmates access to digital technologies could result in misuse, including the potential hacking

of correctional systems or communication with unauthorized individuals outside the facility (Ogungbemi & Adediran, 2020).

To mitigate these risks, NOUN has implemented several security measures, such as restricting internet access to academic sites and using monitoring software to track inmate activity on digital devices. In some instances, correctional education programs only allow offline access to course materials, meaning that inmates can download educational content to devices without being able to browse the web or access external communication platforms. While these measures are effective in maintaining security, they also limit the breadth of resources available to inmates and can hinder real-time interactions with facilitators (Clark & Dugdale, 2019).

A critical barrier to technology integration in NOUN's correctional education program is the lack of adequate infrastructure and equipment. Many correctional centres in Nigeria lack the necessary technological infrastructure to support e-learning, including reliable electricity, internet connectivity, and sufficient numbers of computers or tablets for inmate use (Ibekwe & Adeyanju, 2021).

In rural or underfunded correctional facilities, internet access is often sporadic, if available at all. This makes it difficult to conduct live online lectures or provide real-time facilitation. Moreover, even in facilities with internet access, the bandwidth may be too low to support high-quality video conferencing through platforms like Zoom, which are crucial for virtual learning experiences (Ogungbemi & Adediran, 2020).

In terms of equipment, many correctional centres face shortages of computers or digital devices. This means that inmates must often share resources, which can limit their access to learning materials and prolong their academic progress. To address this, NOUN has partnered with various organizations to donate equipment and improve digital infrastructure in some correctional centres, but these efforts are still ongoing and are not yet comprehensive enough to meet the needs of all incarcerated learners (NOUN, 2022).

Digital Literacy

Another key challenge in integrating technology into correctional education is the low level of digital literacy among inmates. Many inmates have had limited exposure to digital devices prior to incarceration, and those who are unfamiliar with modern technology often struggle to navigate learning management systems, virtual classrooms, or other digital platforms (Clark & Dugdale, 2019).

To address this issue, NOUN has introduced digital literacy programs that aim to equip inmates with the basic skills needed to effectively participate in online learning. These programs include introductory lessons on using computers, navigating the internet, and engaging with e-learning platforms like the LMS and Zoom. The goal is to ensure that inmates not only have access to technology but are also empowered to use it effectively to enhance their educational experience (Ogungbemi & Adediran, 2020). However, these programs require additional time and resources, which can slow down the overall learning process for inmates who are starting from a low baseline of digital competence.

Innovative Strategies for Overcoming Challenges

The integration of technology in correctional education presents numerous challenges, but the National Open University of Nigeria (NOUN) has employed several innovative strategies to overcome these obstacles. These strategies focus on partnerships, technology adaptations, capacity building, and advocacy to ensure that inmates receive quality education and can successfully reintegrate into society.

A key strategy for overcoming the challenges of technology integration in correctional education is forging partnerships with relevant stakeholders. NOUN collaborates with various entities, including correctional authorities, government agencies, NGOs, and technology companies, to facilitate smoother integration of digital tools into correctional education.

For example, partnerships with correctional management ensure that educational initiatives align with correctional security protocols while also advocating for increased access to learning technologies. Similarly, collaborations with NGOs and tech companies have led to the donation of digital devices, internet infrastructure, and the provision of specialized training for correctional staff to manage technology use in correctional facilities. These partnerships also allow NOUN to pool resources and expertise, creating a more sustainable and effective correctional education program (Ibekwe & Adeyanju, 2021).

Through collaborative efforts, NOUN has been able to expand access to educational technologies in several correctional centres, enabling more inmates to participate in degree programs. These partnerships also ensure that the technological tools deployed within correctional facilities meet security standards, mitigating concerns about their misuse.

Technology Adaptations

To address the specific challenges faced in correctional education, NOUN has customized its technological tools to fit the constraints of the correctional environment. Key adaptations include:

- **Hybrid Learning Management System (LMS):** NOUN developed an LMS that allows inmates to access course materials both online and offline. This flexibility accommodates the varying degrees of internet connectivity available in different correctional centres.
- **Asynchronous Learning Models:** To mitigate security concerns, NOUN utilizes asynchronous learning methods, such as pre-recorded lectures and downloadable course materials. This approach ensures that inmates can learn at their own pace without the risks associated with live internet use.
- **Secure Digital Devices:** NOUN provides inmates with secure devices preloaded with educational content, ensuring that they have access to the necessary materials without compromising security protocols.

These technology adaptations enable NOUN to deliver effective educational programs that cater to the unique needs of inmates, ensuring that they receive a quality education despite the challenges of the correctional environment (Clark & Dugdale, 2019)

Capacity Building for Inmates and Educators

Capacity building has been central to NOUN's efforts to enhance digital literacy and ensure that both inmates and educators can maximize the use of available technology. Digital

literacy training programs for inmates are an integral part of the correctional education program. These programs offer introductory lessons on basic computer skills, how to navigate the internet, and how to engage with the LMS, preparing inmates for a more technology-enhanced learning experience.

For educators, capacity building involves training teachers and facilitators to effectively deliver content through e-learning platforms. This includes instruction on how to use the LMS for course management, engage in virtual facilitation via Zoom, and provide remote support to inmates. Building the capacity of educators is vital in ensuring that they are equipped to overcome the barriers posed by the correctional environment and provide a meaningful and effective learning experience to inmates (Ogungbemi & Adediran, 2020).

NOUN's emphasis on building digital competence among inmates also extends to ongoing mentorship, which helps learners gradually improve their technology skills over time. This structured support allows inmates to better engage with educational technologies, thus enhancing their academic performance and long-term employability after release.

Advocacy for Policy Change

NOUN recognizes that many of the barriers to technology integration in correctional education stem from restrictive policies, particularly those limiting internet access and the use of digital devices within correctional facilities. To address these policy-related challenges, NOUN actively engages in advocacy efforts aimed at influencing government policy and institutional regulations.

NOUN has worked with correctional authorities and relevant government agencies to develop policies that allow inmates to use technology for educational purposes under strict supervision. This includes advocating for controlled internet access and the use of pre-approved websites and learning platforms that adhere to security protocols (Ibekwe & Adeyanju, 2021). By pushing for these policy adjustments, NOUN aims to create a more conducive environment for the integration of digital tools in correctional education, thereby broadening the scope of learning opportunities available to inmates.

Moreover, NOUN continues to advocate for broader policy reforms at the national level, seeking to establish long-term solutions that enhance the quality and accessibility of correctional education across Nigeria. These efforts include lobbying for increased government funding for correctional education infrastructure, as well as the development of national strategies that prioritize the use of technology in the rehabilitation and reintegration of inmates.

Suggestions for Future Development

To further improve technology integration in correctional education and maximize its impact, the following recommendations are proposed:

1. Policy Improvements

Governments and correctional authorities need to implement more flexible policies that facilitate the integration of technology in correctional education. This includes:

Relaxation of Internet Restrictions: While security concerns are valid, policies can be adapted to allow controlled internet access for educational purposes. Secure platforms and tools can be employed to ensure that inmates are accessing only approved educational materials.

- Incorporating Technology into National Education Policies Technology integration in correctional education should be embedded into national educational strategies, ensuring sustained government support and investment in these programs
2. Technology Investment: To ensure the sustainability of tech-enabled learning, there must be increased investment in infrastructure and funding:
 3. Infrastructure Development: Governments and educational institutions should invest in the technological infrastructure needed to support learning in correctional centres, including internet access, hardware (e.g., computers and tablets), and educational software.
 4. Public-Private Partnerships: Engaging private-sector companies to sponsor or donate technology and resources can help ease the financial burden on educational institutions and correctional systems. Additionally, NGOs can play a key role in securing grants and providing resources
 5. Scalability of NOUN's Model: NOUN's successful model of integrating technology in correctional education can serve as a blueprint for other correctional education programs in Nigeria and beyond.
 6. Replication Across Nigeria: NOUN's approach can be scaled to other correctional centres across the country by implementing similar technology-based educational models. This would require training educators and correctional staff in how to effectively deliver technology-enabled learning.
 7. Global Model: NOUN's correctional education model, emphasizing the use of technology in overcoming barriers to education, can also be adapted for other countries facing similar challenges. International collaboration and knowledge sharing will be essential to replicating this model in diverse contexts

Conclusion

NOUN's commitment to advancing technology integration in correctional education demonstrates the potential of digital tools to transform inmate learning, foster psycho social well-being, and support societal reintegration. With further policy support, investment, and the replication of its model, NOUN's approach can serve as a benchmark for enhancing correctional education in Nigeria and worldwide.

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