

FACTORS AFFECTING EFFECTIVE ADMINISTRATION OF OPEN-BOOK EXAMINATION IN THE NATIONAL OPEN UNIVERSITY OF NIGERIA

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Abstract

Open-book examination (OBE) has increasingly gained recognition as an innovative assessment strategy capable of evaluating higher-order cognitive abilities, critical thinking, analytical reasoning, and problem-solving competencies among learners in higher education. The growing adoption of digital learning platforms and online instructional delivery, particularly in open and distance learning (ODL) institutions, has further strengthened the relevance of open-book examinations as alternatives to traditional closed-book assessment methods. In Nigeria, the National Open University of Nigeria (NOUN), a leading ODL institution, has increasingly integrated technology into its assessment processes to support accessible, flexible, equitable, and learner-centred evaluation within a large and geographically dispersed student population. Despite these efforts, concerns remain regarding the effective administration of open-book examinations due to infrastructural deficiencies, inadequate digital literacy, inconsistent examination policies, limited staff preparedness, concerns about academic integrity, and unequal access to technological resources among learners. This paper examined the determinant factors influencing the effective administration of open-book examinations in NOUN. The study adopted a conceptual review and synthesis of literature spanning educational assessment, open and distance learning, digital assessment, technology adoption, academic integrity, and quality assurance to critically examine the opportunities, challenges, and quality implications of technology-mediated assessment in ODL. Recent reviews similarly emphasise the need to consider technological, pedagogical, integrity, and quality dimensions collectively when examining digital assessment. The paper further discussed the implications of these factors for educational management and sustainable assessment practices in Nigerian higher education. Practical suggestions were offered to strengthen the implementation of open-book examinations in NOUN and similar higher education institutions.

Keywords: Open-book examination, Open and Distance Learning, Educational Management, Assessment Practices, Digital Assessment.

Introduction

Assessment is a fundamental component of higher education because it provides evidence of students' learning and enables institutions to make decisions about academic progress, programme effectiveness, standards, and quality. Beyond measuring the acquisition of knowledge, contemporary assessment is increasingly expected to determine how effectively learners can apply, analyse, evaluate, and create knowledge in authentic contexts. This shift reflects growing recognition that higher education should develop competencies such as critical

thinking, problem-solving, creativity, communication, adaptability, and digital literacy rather than merely promote the recall of information. Recent scholarship on authentic assessment similarly emphasises the capacity of appropriately designed assessment tasks to develop and evaluate higher-order and professionally relevant competencies (Bond et al., 2024).

Within this changing assessment landscape, the distinction between closed-book and open-book examinations is becoming less straightforward. Traditional closed-book examinations restrict access to external resources and consequently place considerable emphasis on memory and rapid retrieval. Open-book examinations, by contrast, permit access to specified learning resources and can shift the assessment emphasis towards interpretation, application, synthesis, evaluation, and problem-solving. However, an open-book examination is not inherently a higher-quality form of assessment simply because students are permitted to consult materials. Its effectiveness depends on whether the examination questions are appropriately aligned with intended learning outcomes, whether the permitted resources and conditions are clearly defined, and whether the assessment environment supports valid demonstration of learning. According to Santos and Serpa (2023), contemporary scholarship therefore suggests that examination restrictions should be determined by the learning outcomes being assessed, authenticity, feasibility, consequential validity, and the values underpinning assessment.

The conceptual significance of open-book examination administration consequently lies in the interaction between assessment design and assessment conditions. Questions that require direct reproduction of information may undermine the rationale for allowing access to resources, whereas authentic, problem-based, analytical, and evaluative tasks can make resource access educationally meaningful. In this sense, open-book examinations are most effective when they assess what students can do with knowledge rather than simply whether they can locate information. Evidence from higher education also indicates that remote online open-book examinations can support higher-order cognitive skills and reduce reliance on memorisation, although their effectiveness is affected by concerns about time, technological reliability, academic integrity, and preparedness (Mueller et al., 2023).

Open-book examination has therefore emerged as an innovative assessment strategy that permits students to consult approved learning materials while responding to examination questions. Unlike conventional examinations, open-book assessments emphasize interpretation, synthesis, application, evaluation, and problem-solving rather than memorization. The educational philosophy underpinning open-book examinations aligns closely with constructivist learning theory, which views learning as an active process involving the construction and application of knowledge rather than passive acquisition of information (Joughin, 2023). The global disruption caused by the COVID-19 pandemic prompted many educational institutions to adopt remote, online, and alternative assessment formats, including open-book examinations, to sustain teaching, learning, and evaluation during periods of restricted physical access.

Although the emergency circumstances initially motivated these changes, numerous studies have demonstrated that well-designed open-book examinations can effectively evaluate higher-order learning outcomes while reducing examination anxiety and encouraging meaningful learning (Bilen & Matros, 2021). The growing acceptance of open-book examinations has been accompanied by substantial technological innovations in learning management systems, artificial intelligence-supported assessment tools, remote invigilation technologies, plagiarism detection software, and digital authentication systems. These developments have enabled universities to administer secure, flexible, and scalable examinations while supporting geographically dispersed learners. Nevertheless, challenges relating to digital inequality, cybersecurity, academic dishonesty, institutional readiness, and technological reliability continue to affect implementation in many developing countries (UNESCO, 2023).

However, the successful implementation of open-book examinations extends beyond merely allowing students to access textbooks during examinations. Effective administration requires comprehensive institutional planning involving examination policy formulation, technological infrastructure development, digital security systems, staff training, student orientation, quality assurance procedures, question design, academic integrity mechanisms, and continuous monitoring and evaluation. Failure to adequately address these components may undermine assessment validity, institutional credibility, and stakeholder confidence (Martin et al., 2023). Academic integrity constitutes another central dimension of this system. The openness of an examination creates legitimate access to information but also raises questions concerning unauthorised collaboration, plagiarism, impersonation, contract cheating, and the use of prohibited digital tools, including generative artificial intelligence. These concerns mean that openness must be accompanied by clearly communicated assessment boundaries and appropriate integrity safeguards. Importantly, academic integrity cannot be addressed solely through surveillance technologies. Recent reviews indicate that institutional policies, staff and student education, assessment redesign, technological measures, and multifaceted approaches need to operate together. Digital proctoring may strengthen examination security, but evidence also shows continuing technological, ethical, and implementation challenges (Olatunji & Popoola, 2023).

Quality assurance provides the mechanism through which these interconnected elements can be evaluated and continuously improved. Effective open-book examination administration requires more than successful delivery of an examination; it requires evidence that the assessment is valid, reliable, fair, transparent, secure, and aligned with programme and institutional learning outcomes (Ottan & Ahmed, 2023). Question moderation, assessment validation, standardisation of procedures, monitoring of examination processes, analysis of assessment outcomes, stakeholder feedback, and periodic review are therefore integral to maintaining confidence in the assessment system. This is particularly important in digitally mediated environments, where technical problems, unequal access to technology, and variations in digital competence can introduce forms of assessment inequality that are less visible in conventional examination settings (Ottan & Masud, 2019).

These considerations are especially important within Open and Distance Learning (ODL). Unlike conventional campus-based institutions, ODL providers must design assessment systems for learners who may be geographically dispersed and differ substantially in age, employment status, digital experience, socioeconomic circumstances, and access to technological resources (Olatunji, 2025). Consequently, assessment in ODL must reconcile flexibility and accessibility with validity, reliability, fairness, academic integrity, and institutional credibility. Open-book examinations can potentially support this balance by permitting controlled access to learning resources and emphasising authentic application of knowledge; however, their success depends on the alignment of assessment design, technological infrastructure, institutional policy, learner preparedness, integrity mechanisms, and quality assurance. Research on remote online open-book examinations demonstrates precisely this tension: although students and faculty may recognise their capacity to promote higher-order learning and reduce memorisation, concerns about academic integrity, technological instability, training, and examination validity remain.

The Nigerian context adds further significance to these issues. The National Open University of Nigeria (NOUN), as a leading institution dedicated to Open and Distance Learning, operates within a context characterised by large-scale and geographically distributed participation (Olatunji, 2025). Its reliance on technology-mediated teaching, learning, learner support, and assessment makes the quality of its examination systems particularly consequential. For an institution serving diverse learners across different locations and circumstances, effective open-book examination administration requires a balance between flexibility and control,

accessibility and security, learner autonomy and academic accountability, and technological innovation and quality assurance. The NOUN context therefore provides an important setting in which to examine how the different conditions necessary for effective open-book assessment can be brought together within a large-scale ODL environment.

Despite the growing literature on digital assessment, online examinations, academic integrity, authentic assessment, and open-book examinations, these strands of scholarship are often considered separately. Research has addressed examination design, technology adoption, digital proctoring, academic integrity, learner preparedness, and institutional quality assurance as distinct concerns, but less attention has been given to how these dimensions interact as an integrated system for the effective administration of open-book examinations in large-scale ODL institutions, particularly in the Nigerian context (Santos & Serpa, 2023). This conceptual fragmentation creates an important gap because the effectiveness of open-book examinations is unlikely to depend on any single factor in isolation. Rather, it is likely to emerge from the alignment and interaction of assessment design, institutional policy, technological infrastructure, staff competence, student preparedness, digital literacy, academic integrity, and quality assurance (Mueller et al., 2023).

Against this background, the present conceptual review synthesises literature across these interconnected dimensions to develop a more integrated understanding of effective open-book examination administration in ODL. Rather than treating the identified factors as independent conditions, the review conceptualises them as mutually reinforcing components of an assessment ecosystem in which weaknesses in one dimension may constrain the effectiveness of others. Particular attention is given to the NOUN context, where the scale, geographical dispersion, technological dependence, and diversity of learners make the alignment of flexibility, validity, fairness, security, and quality assurance especially important. The review therefore seeks to address the conceptual gap in the existing literature by bringing these dimensions together into an integrated framework for understanding and improving open-book examination administration in a large-scale Nigerian ODL institution.

Concept of Open-Book Examination

Open-book examination (OBE) is an assessment approach that permits candidates to consult approved learning resources while responding to examination questions. Unlike conventional closed-book examinations that primarily evaluate students' ability to recall memorized information, open-book examinations are intentionally designed to measure learners' capacity to interpret, synthesize, analyse, evaluate, and apply knowledge to solve authentic problems (Johanns et al., 2023). The emphasis of open-book examination is therefore shifted from memory reproduction to higher-order thinking skills consistent with the upper levels of Bloom's Taxonomy, including analysis, evaluation, and creation. The increasing adoption of competency-based education across higher education institutions has contributed significantly to the growing popularity of open-book examinations. Competency-based education recognizes that graduates should demonstrate practical knowledge, critical reasoning, creativity, collaboration, and problem-solving abilities rather than merely possessing factual knowledge. Consequently, assessment methods have evolved to accommodate these emerging educational expectations (UNESCO, 2023).

Open-book examinations may be classified into different categories depending on institutional policies. The first is the restricted open-book examination, where students are permitted to consult only specified textbooks, lecture notes, statutes, formula sheets, or officially approved materials. The second is the unrestricted open-book examination, which allows candidates to consult any printed or electronic resources considered relevant to answering examination questions. With advances in educational technology, many universities have introduced digital open-book examinations, enabling students to access electronic resources through Learning

Management Systems (LMS), institutional repositories, or approved online databases during online examinations (Bozkurt et al., 2023). Recent literature suggests that the effectiveness of open-book examinations depends less on students' access to information and more on the quality of examination questions. Poorly designed questions that merely ask students to define concepts or reproduce textbook content may encourage excessive reliance on reference materials and fail to discriminate between high- and low-performing students. Conversely, authentic assessment tasks involving case studies, simulations, data interpretation, policy analysis, decision-making, and real-world problem solving require students to demonstrate conceptual understanding rather than information retrieval (Mueller et al., 2023).

Within Open and Distance Learning (ODL), open-book examination aligns with learner-centred education because it reflects the realities of professional practice. Professionals in medicine, engineering, law, education, business, and public administration rarely rely exclusively on memory when making decisions. Instead, they consult manuals, policies, research reports, regulations, databases, and digital resources before arriving at informed decisions. Open-book examination therefore mirrors authentic workplace behaviour, thereby enhancing assessment validity (Commonwealth of Learning [COL], 2024).

Objectives of Open-Book Examination

The primary objective of open-book examination is to evaluate learners' ability to utilize available information effectively rather than merely recalling memorized facts. Contemporary assessment literature identifies several specific objectives of open-book examination. Open-book examination promotes deep learning by encouraging students to understand concepts rather than memorise isolated facts. Students preparing for open-book examinations tend to focus on conceptual relationships, organisation of learning materials, and application of knowledge because they recognise that access to books alone does not guarantee examination success (Johanns et al., 2023). Open-book examination enhances critical thinking. Since examination questions often require interpretation, evaluation, comparison, justification, and problem-solving, students are expected to demonstrate analytical reasoning beyond textbook definitions (Martin et al., 2023).

Open-book examination promotes lifelong learning competencies. Modern workplaces demand professionals capable of locating, evaluating, interpreting, and applying information from multiple sources. Open-book examinations cultivate these information literacy skills, making graduates more adaptable to rapidly changing professional environments (UNESCO, 2023). It also reduces excessive examination anxiety associated with memorization-intensive assessments. Numerous studies have reported that students perceive open-book examinations as less stressful because they can consult learning materials during examinations. Reduced anxiety may positively influence academic performance, confidence, and student well-being (Santos & Serpa, 2023). And, it encourages instructional alignment. Lecturers become more inclined to design learning activities emphasising conceptual understanding, inquiry-based learning, collaborative learning, and authentic problem solving because these approaches correspond more closely with assessment expectations.

Administration of Open-Book Examination

Administration of open-book examination refers to the systematic planning, organization, implementation, supervision, monitoring, and evaluation of assessment activities conducted using open-book examination procedures. Effective administration encompasses multiple interrelated activities occurring before, during, and after examination sessions. The planning stage involves policy formulation, scheduling, examination regulations, development of assessment guidelines, preparation of examination questions, staff training, and communication with students. During implementation, institutions ensure secure examination

platforms, authentication of candidates, monitoring of examination processes, technical support, and adherence to institutional regulations. Following examinations, activities include marking, moderation, quality assurance reviews, psychometric evaluation, result processing, and stakeholder feedback (Bond et al., 2024). Within NOUN, administration of open-book examination requires coordination among multiple administrative units, including the Directorate of Examination and Assessment, Information and Communication Technology Directorate, Faculties, Study Centres, Learner Support Services, Academic Planning Unit, and Quality Assurance Directorate. Effective collaboration among these units determines the efficiency, credibility, and integrity of examination administration.

Factors Affecting Effective Administration of Open-Book Examination in the National Open University of Nigeria (NOUN)

The effective administration of open-book examinations in an ODL institution such as NOUN depends on the interaction of several institutional, pedagogical, technological, learner-related, and quality-assurance factors. Evidence from research on remote open-book examinations indicates that effective implementation requires appropriately designed questions, clear guidelines, faculty preparation, technological support, academic-integrity measures, and quality-assurance processes rather than merely permitting students to consult learning resources. Against this background, the following interrelated factors are particularly important.

Assessment and Question Design: The quality of an open-book examination begins with the design of its assessment tasks. Questions should be aligned with stated learning outcomes and should emphasise application, analysis, evaluation, synthesis, interpretation, and problem-solving rather than simple recall. Research shows that access to resources can influence performance differently across cognitive domains, making careful question design particularly important in open-book examinations. Bansal (2022) similarly argues that open-book examinations require corresponding changes in pedagogical and assessment practices. At NOUN, therefore, effective open-book administration requires well-constructed questions, appropriate difficulty levels, clear marking schemes, and alignment between examination tasks and course learning outcomes.

Institutional Examination Policies and Guidelines: Clear institutional policies provide the regulatory foundation for effective examination administration. Such policies should specify examination procedures, permitted and prohibited materials, duration, authentication requirements, student responsibilities, misconduct procedures, grading arrangements, and mechanisms for resolving technical or administrative difficulties. NOUN's Quality Assurance Directorate lists specific policies on assessment, ODL/e-learning, examination misconduct, plagiarism, learning infrastructure, virtual learning, and artificial intelligence, demonstrating the institutional importance of regulatory frameworks for technology-mediated assessment.

Technological Infrastructure and Reliability: Open-book examinations delivered through digital platforms depend heavily on reliable technological infrastructure. Internet connectivity, stable servers, appropriate examination platforms, electricity supply, device availability, system security, and technical support can directly affect students' ability to participate successfully. The OECD notes that digital examination systems require investment in infrastructure as well as staff training and digital literacy. Evidence from remote open-book examinations likewise identifies internet instability and the availability of adequate technological support as important implementation concerns. For NOUN, which operates across a geographically dispersed learner population, technological reliability is therefore central to examination accessibility and fairness.

Staff Competence and Professional Development: Effective open-book examination administration requires competent lecturers, examination officers, ICT personnel, invigilators,

and other support staff. Lecturers need particular competence in constructing higher-order questions, establishing appropriate examination conditions, preparing marking schemes, and using digital assessment platforms. Research on remote open-book examinations found that the transition from conventional examinations requires change management, faculty training, clear guidelines, and technical support. NOUN's Quality Assurance Unit also identifies staff sensitisation and capacity building in quality assurance and examination processes as institutional priorities.

Student Preparedness and Digital Literacy: Students' readiness to participate in open-book examinations is another important determinant. Although students have access to learning resources, effective performance requires conceptual understanding, information-search skills, digital literacy, time management, and familiarity with the examination platform. Evidence from remote open-book examinations indicates that students may find such assessments challenging because of the need to search for and apply information within limited examination time. NOUN's virtual examination policy similarly requires students to demonstrate computer literacy and prior engagement with course materials.

Academic Integrity and Examination Security: The openness of the examination environment creates particular concerns regarding plagiarism, unauthorised collaboration, impersonation, contract cheating, and prohibited use of digital resources or artificial intelligence. Academic integrity therefore requires a combination of clear rules, student education, appropriate examination design, authentication, monitoring, and proportionate technological safeguards. Studies of online distance learning identify cheating behaviour as a continuing challenge requiring institutional and technological responses. Evidence from open-book assessments also suggests that tightly controlled examination conditions and appropriately designed tasks can reduce opportunities for misconduct.

Examination Administration and Operational Logistics: Effective administration also depends on operational arrangements such as examination scheduling, registration, question management, invigilation or proctoring, communication of instructions, technical support, incident management, submission procedures, and timely resolution of examination-related complaints. NOUN's Directorate of Examinations and Assessment specifically identifies examination scheduling, question-bank coordination, provision of facilities and logistics, examination security, discipline, and timely release of results among its functions.

Quality Assurance, Moderation, and Standardisation: Quality assurance ensures that open-book examinations remain valid, reliable, fair, and consistent. Question moderation, blueprinting, peer review, validation of assessment instruments, standard setting, monitoring of examination processes, and post-examination review are important mechanisms. Research on remote open-book examinations specifically identifies assessment blueprinting, peer review, question vetting, and standard setting as important quality-assurance activities. NOUN also maintains formal quality-assurance structures and policies covering examination moderation and the quality of examination questions and marking schemes.

Accessibility, Equity, and Digital Inclusion: An open-book examination cannot be considered effective if technological or environmental conditions systematically disadvantage particular groups of learners. Differences in internet access, device ownership, electricity availability, digital competence, disability, location, and socioeconomic circumstances may influence students' capacity to participate. This is particularly relevant to ODL institutions whose mandate involves widening access to higher education. NOUN's ODL policy explicitly connects openness with the removal of barriers to learning opportunities and support for learners' digital-readiness gaps.

Continuous Monitoring, Feedback, and Improvement: Open-book examination systems require continuous evaluation rather than one-time implementation. Student and staff feedback, examination performance, technical incident reports, misconduct records, item analysis,

complaints, and quality-assurance findings can provide evidence for improving subsequent examinations. NOUN's quality-assurance framework emphasises systematic evaluation, monitoring, and continuous improvement of institutional processes.

Implications for Educational Management

The effective administration of open-book examinations has significant implications for educational management, particularly within large-scale Open and Distance Learning (ODL) institutions such as the National Open University of Nigeria (NOUN). Since effective open-book assessment depends on the alignment of assessment design, institutional policy, technology, staff competence, student preparedness, academic integrity, and quality assurance, educational managers must adopt a system-wide approach rather than treat examination administration as the responsibility of the examinations unit alone. Research on online open-book examinations similarly emphasises institutional governance, assessment blueprinting, question vetting, authentication, marking, results processing, and continuous quality assurance as interconnected processes.

First, educational managers should strengthen institutional policies and standard operating procedures for open-book examinations. Clear guidelines should specify permissible learning resources, examination duration, authentication requirements, acceptable use of digital tools and artificial intelligence, procedures for technical disruptions, misconduct protocols, marking arrangements, appeals, and results processing. This is particularly relevant to NOUN, which already maintains separate policies on assessment, ODL/e-learning, plagiarism, examination misconduct, artificial intelligence, learning analytics, and quality assurance.

Second, management should prioritise investment in reliable technological infrastructure. Effective digital examination requires dependable examination platforms, server capacity, internet connectivity, data security, electricity, authentication systems, and responsive technical support. For an ODL institution serving geographically dispersed learners, technological failure can become an assessment-equity issue rather than merely a technical inconvenience. Consequently, institutional planning and budgeting should incorporate infrastructure resilience, redundancy, maintenance, cybersecurity, and emergency-response mechanisms.

Third, educational managers should institutionalise continuous professional development for academic and administrative personnel. Lecturers require training in authentic and higher-order question construction, digital assessment, marking and moderation, academic-integrity safeguards, and appropriate use of emerging technologies. Examination officers, ICT personnel, invigilators, and support staff similarly require role-specific training. NOUN's Quality Assurance Directorate already identifies sensitisation, training, monitoring, moderation, and review of examination processes among its quality-assurance activities.

Fourth, management should strengthen student orientation and digital preparedness before implementing or expanding open-book examinations. Students need explicit guidance on the purpose and nature of open-book assessment, permissible resources, time management, information-search strategies, examination procedures, academic-integrity requirements, and appropriate use of technology. Such orientation can reduce misconceptions that open-book examinations are necessarily easier than conventional examinations and can help learners develop the skills required to demonstrate knowledge through application and analysis.

Fifth, educational managers should integrate academic integrity into examination design rather than relying exclusively on surveillance technologies. Open-book questions should emphasise interpretation, application, evaluation, case analysis, and problem-solving so that success depends on understanding rather than copying information. Authentication, plagiarism detection, appropriate monitoring, clear misconduct regulations, and responsible use of AI should complement, not replace, sound assessment design. NOUN's examination

administration framework explicitly identifies academic integrity and fairness as central objectives of its Directorate of Examinations and Assessment.

Sixth, management should embed quality assurance throughout the examination cycle. Quality assurance should begin with assessment blueprinting and question development and continue through moderation, examination delivery, marking, results processing, post-examination analysis, and review. Evidence from online open-book examination practice recommends question vetting, validity and reliability checks, standard setting, psychometric analysis, and documented procedures across the assessment cycle. This is consistent with NOUN's quality-assurance framework, which conceptualises quality assurance as a continuous process of planning, implementation, monitoring, review, and improvement.

Seventh, educational managers should use data and feedback to support continuous improvement. Examination performance, technical incidents, student complaints, misconduct reports, item statistics, completion rates, and staff feedback should be systematically collected and analysed. Such evidence can identify weaknesses in question design, technological infrastructure, examination procedures, or learner preparedness and provide a basis for evidence-informed management decisions. NOUN's quality-assurance framework explicitly links data collection and analysis with institutional delivery, strategic planning, performance evaluation, and continuous improvement.

Finally, management should balance flexibility with fairness, credibility, and accountability. The central managerial challenge is not simply to make examinations more technologically advanced but to ensure that technological innovation improves the quality and accessibility of assessment without compromising academic standards. This requires coordination among academic departments, the Directorate of Examinations and Assessment, ICT units, Quality Assurance, libraries, study centres, student-support services, and institutional management. Such coordination is particularly important in ODL, where assessment quality is inseparable from the wider institutional system supporting learners.

Conclusion

The effective administration of open-book examinations in Open and Distance Learning (ODL) is a multidimensional process that extends beyond permitting students to access learning resources during examinations. This conceptual review establishes that the effectiveness, credibility, and educational value of open-book examinations depend on the alignment of assessment design, institutional policies, technological infrastructure, staff competence, student preparedness, digital literacy, academic integrity, examination logistics, accessibility, and quality assurance. These dimensions are interconnected, such that weaknesses in one area may undermine the effectiveness of the entire assessment system.

The review further demonstrates that open-book examinations can support higher-order learning when assessment tasks are designed to emphasise application, analysis, evaluation, synthesis, and authentic problem-solving. However, their potential benefits can be compromised by unreliable technology, inadequate staff and student preparation, poorly defined examination procedures, academic-integrity concerns, unequal access to digital resources, and inadequate quality-assurance mechanisms. Consequently, technological adoption alone cannot guarantee effective open-book assessment; pedagogical appropriateness, institutional readiness, ethical safeguards, and continuous evaluation are equally important.

For the National Open University of Nigeria (NOUN), these considerations are particularly significant because of the institution's large and geographically dispersed learner population and its reliance on technology-mediated teaching, learning, and assessment. The NOUN context requires an integrated approach that balances flexibility and accessibility with validity, fairness, security, academic integrity, and quality assurance. Effective administration should

therefore be understood as an institutional ecosystem in which academic, technological, administrative, learner-related, and quality-assurance processes operate in alignment.

A major conceptual implication of the review is that existing literature tends to examine these dimensions separately, with relatively limited integration of their interrelationships within large-scale ODL environments, particularly in the Nigerian context. The review consequently provides a basis for conceptualising open-book examination administration at NOUN as an interconnected system rather than a collection of independent factors. Future empirical research should test the relationships among these dimensions and determine which factors, individually and collectively, most strongly influence the effectiveness, fairness, integrity, and quality of open-book examinations in NOUN and comparable ODL institutions.

Suggestions

Based on the literature reviewed, the following suggestions are advanced:

- NOUN management should develop a comprehensive institutional policy on open-book examinations that clearly specifies examination procedures, assessment standards, academic integrity requirements, and quality assurance mechanisms.
- The University should continue investing in modern ICT infrastructure, including secure examination platforms, cloud-based technologies, reliable servers, enhanced cybersecurity systems, and uninterrupted technical support during examination periods.
- Academic staff should undergo regular professional development in authentic assessment design, digital pedagogy, artificial intelligence literacy, educational technology integration, and competency-based assessment methods.
- Students should participate in compulsory orientation programmes and mock open-book examinations before each examination season to improve digital literacy, examination preparedness, and understanding of assessment expectations.
- The Directorate of Quality Assurance should strengthen continuous monitoring and evaluation through systematic moderation of examination questions, statistical item analyses, post-examination reviews, and stakeholder feedback mechanisms.
- NOUN should institutionalize robust academic integrity measures, including secure candidate authentication systems, plagiarism detection software, randomized question banks, AI-use guidelines, and clear sanctions for examination misconduct.
- University management should provide sustainable funding to support continuous technological upgrades, staff development, learner support services, and research on innovative assessment practices.
- Interdepartmental collaboration should be strengthened among faculties, the Directorate of Examinations and Assessment, ICT Directorate, Study Centres, Learner Support Services, and Quality Assurance Directorate to ensure seamless examination administration.
- Periodic evaluation of open-book examination implementation should be conducted using empirical evidence to identify strengths, challenges, and opportunities for continuous improvement.

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