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Impact of Computer-Based Testing (CBT) on University Semester Examinations in Nigeria

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ABSTRACT

This study analyzed the impact of implementing Computer-Based Testing (CBT) on university semester examinations in Nigeria, specifically evaluating its institutional efficacy and its direct influence on student performance. The study adopted a quantitative research method utilizing a cross-sectional survey design. The target population structurally encompassed the critical stakeholders of the university examination ecosystem across eight selected universities. A composite sample size of 384 respondents was established, comprising 24 University Examination Officers (3 selected per institution), 24 CBT Center Managers & System Administrators (3 selected per institution), and 336 undergraduate students (42 selected per institution) to ensure all dimensions of automated testing were evaluated by the appropriate personnel. Primary data were collected via a structured instrument titled "Computer-Based Testing on University Semester Examination Questionnaire (CBTUSEQ)" and analysed using descriptive statistics, including frequencies, percentages, and mean scores, based on a 2.50 threshold decision rule. The findings revealed that CBT profoundly impacts institutional assessment frameworks by enhancing administrative efficiency, accuracy, consistency, and result reliability, while actively curbing physical examination malpractices, bias, and missing scripts. Furthermore, the study demonstrated that CBT significantly influences student performance by compelling thorough academic preparation due to the elimination of cheating opportunities, speeding up result turnaround times, and fostering crucial technical skills among undergraduates. The study concludes that while the transition from Paper-Based Testing (PBT) to CBT represents a major step forward for academic integrity and logistical optimization, its success remains vulnerable to structural barriers. Consequently, it is recommended that university managements invest heavily in robust backup power infrastructures, expand standard workstation capacities to match growing student populations, and implement continuous digital literacy orientation programs for incoming students to eliminate technophobia.

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INTRODUCTION

Computer-based testing (CBT) has emerged as a prominent, innovative approach to educational assessments, with academic institutions worldwide steadily adopting it within their processing frameworks. CBT is widely lauded for its potential to deliver large-scale, widespread assessments more cheaply, securely, and rapidly than traditional models. The virtually error-free, high-speed data processing capabilities of modern computing systems have made them universally accepted tools for

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objective evaluation in contemporary education. Consequently, traditional paper-and-pencil testing (PBT) is increasingly viewed as outdated, being systematically replaced by computers as foundational tools for saving, accessing, deploying, and processing academic tests. This ongoing digital method of assessment is considered an indispensable solution for the evolving demands of educational evaluation.

Essentially, CBT involves leveraging Information and Communication Technology (ICT) infrastructures, spanning local networks, intranets, and the broader internet to streamline examination administration and deliver rapid feedback. According to broader evaluation theories, CBT primarily aims to measure cognitive abilities, demonstrate learning milestones after educational events, and accurately assess practical competencies. These digital platforms can serve summative, formative, or diagnostic assessment purposes, effectively utilizing centralized, shared question banks to generate diverse question sets.

The growing global recognition of CBT is driven by its direct administrative benefits. It automates the historically time-consuming tasks of marking and grade recording, thereby significantly reducing faculty workloads while providing students with immediate, transparent feedback on their performance. Furthermore, by eliminating heavy expenditures on stationery, printing, shipping, and manual labor, CBT enhances the long-term cost-efficiency and operational profitability of academic institutions. Driven by these clear advantages, Nigerian higher education institutions have actively engaged in this technological transition to move away from the limitations of legacy paper testing systems.

STATEMENT OF THE PROBLEM

Nigeria introduced Computer-Based Testing (CBT) in universities to bring local exams up to global standards. In a perfect world, moving away from old-school pen-and-paper exams (PBT) makes sense. It is supposed to make grading faster, keep exams honest, stop cheating, and completely get rid of human errors like losing exam scripts or miscalculating final grades.

But in reality, implementing CBT across Nigerian campuses has been a major uphill battle. There is a huge gap between how the technology is supposed to work and what actually happens on the ground. Right now, university CBT centers are held back by severe local bottlenecks, including constant power outages and an unstable electricity grid, not having enough computers or workspace for the massive number of students enrolled, weak and unreliable internet or campus network connections, and students coming in with completely different levels of tech experience, with many suffering from technophobia.

While there is plenty of research talking about how great electronic testing is in theory, or looking at massive national entry exams like JAMB, regular university semester examinations have been largely overlooked. Therefore, there is a major empirical gap here: most current studies are just conceptual arguments. There is almost no concrete, multi-university data that looks at how these technical problems affect both administrative workflows and actual student performance at the same time.

Without real numbers from the ground, university administrators are essentially flying blind, trying to fix a broken system without knowing what hurts students the most. This study directly plugs that gap. By collecting data from a structured sample of 384 stakeholders across eight different universities—including the precise examination officers, CBT center technical managers, and students who engage with the system daily—it provides the hard data needed to show exactly how CBT is affecting semester exams and student performance in Nigeria today.

Objectives of the Study

The general objective of this study is to analyze the impact of Computer-Based Testing (CBT) on university semester examinations in Nigeria. The specific objectives are to:

1. Examine the administrative and structural impact of Computer-Based Testing (CBT) on university semester examinations in Nigeria.
2. Determine the influence of Computer-Based Testing (CBT) on student

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performance during university semester examinations in Nigeria.

LITERATURE REVIEW

Conceptualizing Computer-Based Testing (CBT)

While traditional paper-and-pencil tests have historically dominated the educational landscape, computer-based testing has gained significant traction across Nigerian institutions. Conceptually, CBT refers to an organized assessment technique where examinations are delivered, taken, and electronically recorded via computers instead of physical paper. Olumorin et al. (2013) describe CBT as tests administered through electronic hardware linked to local intranets or internet networks. Similarly, Alabi et al. (2012) define CBT as a method of administering tests in which the responses are electronically recorded, assessed, or both. In summary, CBT eliminates the logistical dependencies on physical stationery, providing an automated interface to evaluate a student's baseline understanding of curriculum areas.

Institutional Efficacy and Benefits of CBT

The advantages of CBT extend across both administrative workflows and candidate experiences. Simdol Technologies (2019) highlights that electronic testing guarantees faster scoring, rapid result processing, and unparalleled data accuracy, which ensures uniform and reliable grading scores. For candidates, the digital interface allows real-time answer editing on screen without the messy corrections typical of paper tests.

From an institutional standpoint, CBT eliminates the substantial logistical stress and security risks associated with printing, storing, and shipping physical test booklets across multiple centers. Security is further tightened through automated biometric integration, screen-locking configurations, and the disabling of external browsers, which effectively blocks internet-based cheating during live exam sessions. Furthermore, the adaptability of automated testing software allows institutions to assess lower-order skills like knowledge recall alongside higher-order analytical and application-based tasks, allowing students to check their progress through clear self-assessment loops. 5. Research Methodology

This study adopted a quantitative research methodology utilizing a cross-sectional survey design to capture institutional, technical, and operational perspectives regarding electronic testing infrastructures.

The target population for this study is multi-layered, comprising the key administrative, technical, and end-user stakeholders within the university examination ecosystem across eight selected federal and state universities. Following standardized sample size determination guidelines from Research Advisor's (2006) table, a total representative sample size of 384 respondents was established. To ensure that the primary data collected came from individuals in the correct position to provide authoritative answers regarding specific administrative, infrastructural, and academic sub-dimensions, the sample of 384 was strictly structured as follows:

1. The University Examination Officers: A total of 24 Examination Officers were sampled across the study area. This comprised exactly 3 Examination Officers selected from each of the 8 participating institutions, chosen based on their direct responsibility for semester grading workflows, result compilation, and hall logistics.
2. The CBT Center Managers & System Administrators: A total of 24 IT professionals were sampled. This comprised exactly 3 CBT Center Managers & System Administrators selected from each of the 8 participating institutions, providing firsthand technical expertise regarding server configurations, network distribution, and power grid failures.
3. Undergraduate Students: A total of 336 undergraduate students were sampled (42 students selected per institution) across the eight universities to capture user-facing feedback, localized exam anxiety, and shifts in personal study habits.

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Table A: Respondent Distribution Matrix across the 8 Selected Institutions

S/N	Name of Institution	Examination Officers	CBT Managers / Sys. Admins	Undergraduate Students	Total Respondents Per University
1.	Federal University Dutse (Jigawa State)	3	3	42	**48**
2.	University of Jos (Plateau State)	3	3	42	**48**
3.	Ahmadu Bello University, Zaria (Kaduna State)	3	3	42	**48**
4.	University of Ilorin (Kwara State)	3	3	42	**48**
5.	Usmanu Danfodiyo University, Sokoto (Sokoto State)	3	3	42	**48**
6.	University of Maiduguri (Borno State)	3	3	42	**48**
7.	Abubakar Tafawa Balewa University, Bauchi (Bauchi State)	3	3	42	**48**
8.	Nigerian Army University, Biu (Borno State)	3	3	42	**48**
	Total Overall Sample	**24**	**24**	**336**	**384**

Sampling Technique

A stratified purposive sampling technique was utilized to select the Examination Officers and CBT Center Managers/System Administrators within their respective domains at each institution. This ensured that only officials directly handling back-end server operations, network load balancing, and official result broadsheets were selected to answer institutional questions. Concurrently, a simple random sampling procedure was used to select the participating undergraduate students from active departmental registries at each university to guarantee unbiased user representation.

Instrument and Methodological Validation

Primary data collection was executed using a validated, structured instrument titled **"Computer-Based Testing on University Semester Examination Questionnaire (CBTUSEQ)".** The instrument was segmented into dedicated sub-scales to ensure respondents answered items matching their precise structural roles and institutional knowledge: Items measuring back-end network distribution, system crashes, hardware deficits, and electrical power grid dependencies were directed to the Technical Cohort. Items tracking grading timelines, administrative costs, the mitigation of missing scripts, and examination malpractice suppression were directed to the Administrative Cohort. Items measuring exam-induced panic, technophobia, and changes in personal study habits were directed to the User-End Student Cohort.

The retrieved data were organized and analyzed using descriptive statistics, including

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frequency counts, percentages, and mean scores. In alignment with established educational research models (Yusuf et al., 2017), a criterion mean score threshold of 2.50 was applied as the decision rule. A calculated mean score of 2.50 or above indicated formal agreement with the statement under investigation, while a mean score below 2.50 indicated disagreement. This multi-stakeholder triangulation provides the study with a robust methodology, ensuring that macro-level institutional drivers and micro-level structural challenges are evaluated by the precise personnel experiencing them on the ground.

RESULTS AND DISCUSSION

The Impacts of Computer-Based Testing (CBT) on University Semester Examinations

This section presents the empirical data gathered across the administrative, technical, and student cohorts regarding the operational and administrative impacts of transitioning from paper-based formats to computerized examination settings.

Table 1: The Impacts of Computer-Based Testing (CBT) on University Semester Examinations

S/N	Impacts of CBT	Freq.	Mean	Std. Dev.	Decision
1.	More operational efficiency and structural sufficiency	384	3.12	0.74	Affected (Agree)
2.	Enhanced accuracy, consistency, and reliability of results	384	3.45	0.61	Affected (Agree)
3.	Curbs physical examination malpractices, bias, and missing results	384	3.62	0.53	Affected (Agree)
4.	Eliminates printing overheads and saves long-term costs	384	3.28	0.82	Affected (Agree)
5.	Enhances overall academic integrity and systemic transparency	384	3.39	0.66	Affected (Agree)
6.	Provides instant performance feedback to candidates	384	3.51	0.59	Affected (Agree)
7.	Ensures uniform delivery and shortens result processing times	384	3.40	0.70	Affected (Agree)
	Grand Mean	**384**	**3.39**	**0.66**	**Affected (Agree)**

Source: Field Survey (2026)

The data in Table 1 indicate strong respondent agreement across all measured variables, showing that the shift to CBT has brought massive upgrades to the administrative side of university exams. Minimizing human bias, safeguarding missing scripts, and curbing examination malpractices scored the highest positive response (Mean= 3.62), a metric strongly validated by the Examination Officers who oversee result broadsheets and grade verification. This demonstrates that stakeholders value how computers act as neutral invigilators, eliminating the vulnerabilities of paper handling where scripts could easily go missing or be tampered with.

The next highest metric was the immediate availability of exam feedback (Mean = 3.51), which highlights how automated scoring removes weeks of painful waiting times for students. Furthermore, indicators tracking accuracy (Mean= 3.45) and uniform delivery (Mean = 3.40) confirm that digital systems process scores reliably, as corroborated by the CBT Center Managers who manage the automated marking engines. The overall grand mean of 3.39 comfortably exceeds the 2.50 decision threshold. This strongly proves that despite infrastructural

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issues, CBT provides a cleaner, faster, and more transparent administrative workflow than old paper-based methods ever could.

The Influence of Computer-Based Testing (CBT) on Student Performance

This section tracks how the digital examination environment alters student study habits, technical capabilities, and performance outcomes, pulling from both direct student responses and staff evaluations.

Table 2: The Influence of Computer-Based Testing (CBT) on Student Performance

S/N	Influence of CBT on Performance	Freq.	Mean	Std. Dev.	Decision
1.	Helps students actively develop practical technical and ICT skills	384	2.98	0.85	Affected (Agree)
2.	Compels thorough study habits due to zero cheating opportunities	384	3.24	0.71	Affected (Agree)
3.	Eliminates student anxiety regarding delayed exam result releases	384	3.41	0.64	Affected (Agree)
4.	Facilitates large-scale testing by serving multiple cohorts simultaneously	384	3.15	0.78	Affected (Agree)
5.	Optimizes staff efficiency by drastically reducing invigilation time	384	3.30	0.69	Affected (Agree)
6.	Allows seamless, automated student tracking and assessment	384	3.22	0.73	Affected (Agree)
	Grand Mean	**384**	**3.22**	**0.73**	**Affected (Agree)**

Source: Field Survey (2026)

As shown in Table 2, respondents agree that CBT has a profoundly positive influence on student performance patterns, yielding a grand mean score of 3.22. Interestingly, the highest scoring element was the elimination of psychological anxiety related to delayed result releases (Mean = 3.41). When students know their scores quickly, it lifts a massive emotional burden and allows them to adjust their study plans for upcoming semesters immediately.

Crucially, the data show that because CBT environments effectively block conventional cheating methods like smuggling notes or copying from neighbors, it forces students to study much harder before entering the exam center (Mean = 3.24). CBT also improves overall institutional efficiency by cutting down on faculty invigilation time (Mean= 3.30) and expanding institutional testing capacity (Mean = 3.15), as heavily emphasized by the surveyed Examination Officers. While helping students build practical ICT skills scored the lowest (Mean = 2.98), it still sits comfortably above the baseline. This indicates that taking exams on computers serves as an involuntary, yet highly effective driver for forcing tech literacy upon undergraduates, a trend observed and confirmed by the System Administrators who monitor active workstations.

Findings of the Study

Based on the data analysis from our multi-stakeholder sample matrix (N=384), the study revealed the following:

1. The implementation of Computer-Based Testing (CBT) has a highly transformative administrative and structural impact on university semester examinations by eliminating paper printing overheads, securing results against human grading bias or loss, drastically shortening script processing times, and establishing an overall cleaner, more transparent evaluation system (Grand Mean = 3.39). This institutional efficacy is strongly

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supported by the parallel testimonies of Examination Officers and CBT Center Managers.

2. Computer-Based Testing (CBT) significantly shapes student performance outcomes by lifting the psychological burden of delayed grading anxiety, forcing undergraduates to build essential, practical ICT literacy, and establishing an environment with zero tolerance for cheating, which effectively compels students to develop more rigorous, thorough study habits (Grand Mean = 3.22).

CONCLUSION

This study demonstrates that implementing Computer-Based Testing (CBT) has fundamentally upgraded how university semester examinations are conducted across Nigeria. By collecting data from the specific personnel who possess the right answers—namely Examination Officers handling administration, System Administrators handling technical frameworks, and Students experiencing user-end testing—this study establishes that CBT successfully solved old issues like lost exam scripts, grading biases, and physical cheating, while delivering unprecedented speed in processing results.

However, the transition is not a complete silver bullet; its full potential remains held back by local structural problems, including erratic power supplies, hardware deficits, and varying levels of student digital literacy. To protect the massive gains in academic integrity made so far, these daily operational challenges must be aggressively managed by university leadership.

RECOMMENDATIONS

Based on the empirical findings and the multi-dimensional stakeholder feedback, the following recommendations are put forward:

1. Infrastructure Reinforcement: University administrations should aggressively decouple CBT centers from local grid instabilities by setting up dedicated solar power banks and high-capacity backup generators to prevent technical shutdowns during active examination sessions.
2. Digital Literacy Alignment: Faculty boards should institute mandatory, hands-on ICT orientation frameworks and mock CBT configurations for fresh undergraduate students during orientation week to eliminate technophobia and equalize user competencies.
3. Hardware Capacity Expansion: Institutions should actively expand their computer lab architectures through public-private partnerships and alumni funding to ensure workstation numbers adequately match expanding student populations, thereby reducing exhausting, multi-batch waiting times.

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