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Uniform Time Limits: Comparative Analysis of Science and Art Students Performance in Computer-Based Tests in Delta State University, Abraka

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Abstract
This study investigates the fairness and psychological effects of uniform time limits in Computer-Based Testing (CBT) at Delta State University (DELSU), Abraka, focusing on performance and emotional responses among science and arts students. As CBT becomes central to high-stakes exams like the Post-UTME, concerns persist that identical timing across disciplines may disadvantage science students, whose assessments often involve multi-step reasoning. Guided by three research questions and corresponding null hypotheses, the study employed a descriptive survey design involving 200 participants (100 DELSU undergraduates and 100 Post-UTME candidates). A validated questionnaire captured both quantitative data and qualitative feedback, including measures of test-related anxiety. Analysis revealed significant disparities: 68% of science students reported severe time pressure compared to 42% of arts students, and 83% of all respondents favored differentiated time allocations. Science students also demonstrated higher anxiety scores and lower mean performance. Thematic analysis reinforced these trends, highlighting perceptions of unfairness, rushed thinking, and emotional strain. All three null hypotheses were rejected. The findings align with Universal Design for Learning (UDL), the Test Fairness Framework, and Cognitive Load Theory, emphasizing that rigid CBT timing creates emotional and cognitive inequities. Uniform time limits may suppress performance, particularly for science students, by introducing stress-related barriers not intrinsic to the subject matter. The study concludes by recommending discipline-sensitive and anxiety-aware CBT timing policies to enhance validity, fairness, and student well-being in digital assessments across Nigerian higher education.

Keywords: Computer-Based Testing; Time Limits; Science and Arts Students; Universal; Test Fairness Framework.

I. Introduction

In recent decades, Computer-Based Testing (CBT) has become a prevalent method of assessment in educational institutions globally. As advancements in educational technology evolve, the integration of CBT into teaching and assessment systems has increased, offering institutions a range of benefits that surpass the limitations of traditional paper-based testing. CBT offers enhanced operational efficiency, automation of grading, flexibility in test administration, improved security, and faster delivery of results. Particularly in regions like sub-Saharan Africa, including Nigeria, CBT has gained traction as an effective strategy to combat examination malpractice, streamline test logistics, and promote transparency in high-stakes assessment contexts.

CBT involves the use of computers and other digital devices to present examination questions, receive student responses, and in many cases, automatically grade objective sections. As Sadiq (2011) defines it, CBT is the process of evaluating learners through electronic platforms, thus eliminating the manual handling of exam scripts. The growing popularity of CBT is attributed to its capacity to enhance the credibility and efficiency of evaluation systems, particularly in university entrance examinations where large volumes of candidates must be assessed within a short timeframe.

At Delta State University (DELSU), Abraka, CBT has been institutionalized for the Post-Unified Tertiary Matriculation Examination (Post-UTME), a screening process for prospective undergraduates. This has enabled the university to assess thousands of candidates each academic year with improved speed, objectivity, and operational

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ease. However, while CBT has addressed several administrative and logistical challenges associated with manual testing, new concerns have emerged about assessment equity—especially with regard to uniform time limits assigned to all test-takers, regardless of their academic discipline.

A major feature of DELSU's CBT design is its standardized test duration, applied uniformly to candidates across all fields of study. This uniformity presupposes that students from science, arts, and humanities backgrounds complete their assessments under the same time constraints, despite engaging with subject matter of varying cognitive complexity. Science students typically face tasks requiring computational reasoning, problem-solving, and multi-step analysis—processes that inherently demand more time. In contrast, arts students often engage in interpretation, comprehension, and textual analysis, which involve different cognitive operations that may not be as time-intensive. Thus, the imposition of identical time limits may unintentionally disadvantage students in certain disciplines, particularly those in the sciences (Kyllonen and Sykes, 2014; Liu et al., 2015).

This time-based challenge not only risks undermining the validity of the CBT but also raises ethical questions about the fairness of assessment procedures. Scholars such as Mislevy et al. (2012) and Leong et al. (2017) argue that time pressure alters test-taking strategies and can suppress true academic ability—especially when it interacts with task complexity and processing speed. In the context of DELSU, where test outcomes determine admission into competitive academic programs, such discrepancies in timing impact could affect the equity and integrity of the university's selection process.

While most discussions around CBT performance center on academic outcomes, emerging literature emphasizes the importance of emotional factors, particularly test-related anxiety, in high-stakes, time-constrained digital assessment environments. Studies have shown that anxiety can significantly impair working memory, disrupt focus, and reduce problem-solving efficiency—especially when students are under rigid time pressure (Cassady and Johnson, 2002; Pekrun, 2014). This is particularly relevant for science students, whose test items typically involve more complex and sequential tasks. Under uniform timing, these students may not only struggle to complete the exam but may also experience heightened psychological strain that suppresses their true academic potential. In contrast, arts students may engage more comfortably with interpretative or comprehension-based tasks that align better with short response times. As such, the emotional impact of time constraints becomes a critical variable, influencing not just outcomes but also equity in access and opportunity. This study, therefore, expands its analytical scope to investigate discipline-specific differences in test-related anxiety, adding a third hypothesis that captures the emotional experiences of science and arts students under identical CBT time conditions.

Statement of the Problem

Despite the widespread adoption of CBT for university entrance examinations in Nigeria, including at DELSU, the use of uniform time limits across academic disciplines has not been empirically interrogated. While the practice aims to maintain standardization and procedural consistency, it fails to consider the cognitive and task-related differences inherent in science- and arts-based assessments. This oversight presents the risk of compromising the accuracy and fairness of the evaluation process.

Students in science-related disciplines often require more time to complete computational problems and logical reasoning tasks, which are typically lengthier and more procedure-bound. The one-size-fits-all timing model may therefore place these students at a disadvantage compared to their arts counterparts, who may complete interpretative or analytical tasks more quickly within the same period. When CBT time policies do not account for disciplinary variability, the validity of performance scores can be compromised—not because students lack knowledge or skill, but because the time available does not match the complexity of the test content.

Currently, there is limited research in the Nigerian context examining how uniform CBT time limits affect students across different disciplines. Without this evidence, institutions may continue to implement assessment policies that inadvertently disadvantage certain groups. This study addresses this gap by investigating whether uniform time limits in DELSU's CBT Post-UTME process impact science students more negatively than arts students and explores the potential benefit of differentiated timing policies.

Purpose of the Study

The primary objective of this study is to examine the effects of uniform time limits in Computer-Based Testing (CBT) on students from different academic disciplines—specifically science and arts students—at Delta State University

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(DELSU), Abraka. In recognition of the multi-dimensional nature of assessment, the study aims not only to compare academic performance outcomes under uniform time conditions but also to explore the psychological responses associated with time-limited testing environments.

The study seeks to:

1. Determine whether science students perform significantly worse than arts students under standardized CBT time constraints, due to differences in task complexity and cognitive load;
2. Investigate whether the implementation of differentiated time allocations, based on discipline-specific task demands, could improve academic performance for science students;
3. Examine whether science students experience higher levels of test-related anxiety than their arts counterparts under the same uniform CBT time limits.

By integrating both performance data and emotional responses—particularly anxiety—the study provides a more holistic perspective on the impact of CBT design on assessment fairness. Ultimately, the study is intended to produce evidence-based insights that can inform institutional policy reforms, promoting more equitable and cognitively sensitive assessment practices in higher education, especially in the Nigerian context.

Research Questions

1. Is there a significant difference in the academic performance of science and arts students when subjected to uniform time constraints during Computer-Based Tests (CBT) at Delta State University, Abraka?
2. Would the application of differential time limits—based on cognitive task complexity—lead to improved academic performance among science students in Computer-Based Tests?
3. Is there a significant difference in the level of test-related anxiety experienced by science and arts students under uniform time constraints in CBT environments?

Hypotheses

1. H_1: There is no significant difference in the academic performance of science and arts students under uniform time constraints in Computer-Based Testing (CBT).
2. H_2: The use of differentiated time limits does not significantly improve the academic performance of science students in Computer-Based Testing compared to when uniform time limits are applied.
3. H_3: There is no significant difference in the level of test-related anxiety experienced by science and arts students when taking CBT under uniform time constraints.

II. Scope of the Study

This study is geographically and institutionally delimited to Delta State University (DELSU), Abraka, focusing on candidates participating in the university's Post-UTME examination conducted through its Computer-Based Testing Centre. The study population comprises 200 participants, including 100 current DELSU undergraduate students who have previously undertaken the CBT-based Post-UTME, and 100 candidates currently enrolled in external preparatory coaching centers who are preparing to take the same examination.

The study specifically includes students from the sciences and arts disciplines, as categorized by their subject combinations in the Post-UTME structure. Other academic fields, such as social sciences, engineering, or management sciences, fall outside the scope of this investigation. The focus is limited to CBT-based entrance examinations and does not cover semester-based assessments or non-digital examination formats.

The study employs a mixed-methods approach, incorporating both quantitative and qualitative data derived from structured questionnaires. The quantitative component includes performance scores and anxiety scale ratings, while the qualitative component captures student experiences, perceptions of fairness, and reflections on time pressure. Of particular interest is the comparison of test-related anxiety between science and arts students under uniform time limits, an area that has received limited scholarly attention within the Nigerian educational context.

By narrowing its focus to DELSU's Post-UTME CBT framework, the study offers context-specific insights with broader implications for other institutions in Nigeria and sub-Saharan Africa adopting similar digital testing protocols.

III. Literature Review

Computer-Based Testing (CBT) has become a central feature of modern educational assessment systems, particularly in tertiary institutions across the globe. As educational stakeholders seek more efficient and scalable means of evaluating learning outcomes, CBT has emerged as a reliable solution. It provides numerous

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advantages, including real-time scoring, reduced administrative errors, automated data processing, flexible scheduling, and improved examination security (Bennett, 2002). In contrast to traditional paper-based tests, CBT offers a digital interface where students interact with questions and submit responses electronically. This not only facilitates faster grading but also enhances the logistical feasibility of large-scale testing.

In the Nigerian context, several universities have adopted CBT as part of systemic reforms in examination administration. Delta State University, Abraka (DELSU), for instance, uses CBT to conduct its Post-Unified Tertiary Matriculation Examination (Post-UTME), thereby streamlining candidate screening. The goal is to ensure transparency, efficiency, and integrity in the admission process. As Sadiq (2011) noted, CBT represents a paradigm shift from traditional assessments by incorporating technology to enhance fairness, reduce human error, and secure examination data.

However, as institutions increasingly adopt CBT, several critical challenges have emerged—most notably, the uniform application of time limits across disciplines. While CBT enables automation and data control, the imposition of identical test durations for candidates from different academic backgrounds raises concerns about fairness and validity. Studies by Byukusenge et al. (2025) and Striković et al. (2025) further show that the digital standardization of CBT formats can overlook discipline-specific cognitive needs, particularly in STEM-related fields.

Theoretical Framework

This study is underpinned by three robust theoretical frameworks that collectively inform the rationale, structure, and interpretation of its findings: the Universal Design for Learning (UDL), the Test Fairness Framework developed by the Educational Testing Service (ETS), and Cognitive Load Theory (CLT). Each of these frameworks offers a unique but complementary lens through which to examine the impact of uniform time limits in Computer-Based Testing (CBT) environments—particularly as they relate to academic discipline, cognitive processing, and psychological outcomes such as test-related anxiety. Together, these theories offer a multidimensional foundation for evaluating how fairness, equity, and validity in CBT are influenced not only by test content and structure, but also by the emotional and cognitive profiles of learners.

1. Universal Design for Learning (UDL)

The Universal Design for Learning (UDL) is a research-based framework developed by CAST (2011) that emphasizes inclusive instructional design and assessment flexibility. UDL is rooted in the idea that learners differ in the ways they engage with, process, and express knowledge, and that educational systems must therefore be designed to accommodate variability rather than impose uniform standards on all students.

A central tenet of UDL is the provision of multiple means of representation, engagement, and expression, including flexibility in time allocation, task format, and assessment environment. Rose and Meyer (2006), two of the foundational scholars of UDL, argue that applying rigid, one-size-fits-all timing structures in assessments ignores important learner differences and ultimately disadvantages students whose cognitive processes require extended reflection, multi-step reasoning, or iterative problem-solving.

In the context of this study, science students often encounter test items that are more procedurally complex, such as calculations, logical derivations, and sequential algorithms. These tasks require sustained attention and slower cognitive pacing. Conversely, arts students may engage in reading comprehension or interpretative analysis tasks that are more fluid and less bound by strict logical sequences. Applying uniform CBT time limits to both groups, as is the current practice at Delta State University, contradicts the UDL principle of accessibility and results in structural inequity that fails to account for cognitive diversity. Therefore, UDL strongly supports this study's exploration of discipline-sensitive timing policies and provides a theoretical foundation for Hypotheses 1 and 2.

Furthermore, UDL also considers emotional and affective dimensions of learning, recognizing that anxiety, stress, and time pressure can act as cognitive barriers. The framework suggests that educators and test designers should anticipate these barriers and provide appropriate scaffolds—including extended time or pacing flexibility—to mitigate their effects. This theoretical insight directly supports Hypothesis 3, which examines discipline-based differences in test-related anxiety.

2. Test Fairness Framework (ETS, 2014)

The Test Fairness Framework, developed by the Educational Testing Service (ETS), provides a comprehensive structure for evaluating the ethical validity and fairness of standardized assessments.

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According to ETS (2014), a test is considered fair if it meets four key conditions:

1. It is valid for its intended use;
2. It yields scores that are comparable across groups;
3. It does not advantage or disadvantage test-takers on the basis of irrelevant factors;
4. It allows all examinees a reasonable opportunity to demonstrate their proficiency.

This framework is particularly relevant in CBT contexts where uniform time limits may unintentionally favor certain groups. If science students consistently perform worse or report higher anxiety under the same time conditions as their arts counterparts, it suggests that time—an ostensibly neutral variable—becomes a construct-irrelevant source of variance. That is, performance is no longer a pure function of subject knowledge or reasoning ability, but is instead contaminated by extraneous factors such as speed, emotional pressure, and time management. This compromises the construct validity of the assessment and violates the principles of procedural and outcome fairness.

Moreover, the ETS framework emphasizes the importance of contextual fairness. What is fair in one discipline or testing format may not be fair in another. For example, a 30-minute time limit may be entirely sufficient for a short-answer literature test but woefully inadequate for a physics test involving multi-step calculations. Therefore, timing protocols must be calibrated not only to ensure administrative consistency but also to preserve score interpretability and meaning.

In this study, the Test Fairness Framework is particularly useful for evaluating Hypotheses 1 and 3. It highlights the danger of assuming that identical treatment equates to fairness and supports the position that equity must be based on relevance, not sameness. If anxiety becomes a performance-suppressing factor more prevalent in one group, the test fails in its obligation to measure intended constructs free from bias.

3. Cognitive Load Theory (CLT)

Cognitive Load Theory (CLT), developed by John Sweller (1988), provides a cognitive psychology perspective on how task complexity, mental effort, and working memory limitations interact during problem-solving and learning activities. CLT posits that the human brain has a finite capacity for processing information, and that when the cognitive load exceeds this capacity, performance suffers. CLT breaks cognitive load into three categories:

- ***Intrinsic Load:*** The complexity of the task itself (e.g., solving a math equation)
- ***Extraneous Load:*** Non-essential or distracting elements (e.g., poor instructions or stress from countdown timers)
- ***Germane Load:*** Mental effort used in constructing and automating schemas (i.e., useful learning)

In CBT environments—particularly those involving high-stakes exams like the Post-UTME—students are often subjected to high intrinsic load (due to difficult test items), compounded by extraneous load (such as time pressure and anxiety), and expected to maintain high germane load (to succeed on the task). This combination is particularly problematic for science students, who often engage with questions that require stepwise logic, equations, and critical reasoning under pressure. If the time limit is too short, it leads to cognitive overload, resulting in panic, freezing, skipped questions, or hasty guessing.

Crucially, this overload manifests as test-related anxiety, which in itself becomes a source of extraneous load. CLT thus provides a mechanistic explanation for why science students may experience higher anxiety under uniform CBT timing. When anxiety depletes working memory and executive function, it creates a feedback loop where cognitive capacity is further eroded, degrading performance even among well-prepared students.

CLT, therefore, serves as the theoretical basis for Hypothesis 3, explaining how cognitive and emotional strain are not randomly distributed across disciplines but are shaped by the nature of the tasks and the conditions under which those tasks are executed.

Synthesis of Theoretical Frameworks

These three theoretical perspectives converge on a common conclusion: assessment fairness cannot be achieved through uniformity alone. While standardization may serve logistical or administrative purposes, it often fails to account for learner diversity, particularly in terms of cognitive demand and emotional resilience. UDL advocates for flexibility and accessibility, ETS demands that assessments be free of irrelevant variance, and CLT reveals how mental overload and anxiety distort test outcomes. Together, these frameworks justify the investigation of differentiated timing, discipline-based performance gaps, and anxiety disparities as essential components of any comprehensive evaluation of CBT effectiveness and fairness.

By integrating UDL, ETS fairness principles, and CLT, this study is theoretically

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positioned to assess not only whether uniform time constraints produce unequal results—but also why those results may occur, and how institutions can design better, fairer assessment systems.

Recent discussions by Newton and Shaw (2014) and Cizek and Bunch (2016) further reinforce the ethical obligation of test designers to ensure that time allocations align with the intended purpose and construct of a test, not merely operational efficiency.

Empirical research consistently demonstrates that time pressure in testing environments affects student outcomes, often unevenly across academic disciplines.

Leong, Loudon, and McQueen (2017) conducted a study on students' reactions to timed CBTs and found that increased time pressure led to anxiety, compromised accuracy, and reduced performance, particularly for students working on complex problem-solving tasks. Similarly, Van der Linden (2009) noted that time constraints, although useful for simulating real-world decision-making and deterring cheating, also influence test-taking behavior and emotional regulation—especially among students in STEM fields.

While the structural and cognitive aspects of Computer-Based Testing (CBT) have received considerable scholarly attention, emerging research highlights the emotional and psychological dimensions of digital assessment environments—particularly test-related anxiety. Test anxiety is commonly defined as a situation-specific personality trait characterized by physiological hyperarousal, negative cognitive appraisals, and behavioral avoidance, especially during evaluative tasks (Zeidner, 1998; Cassadyand Johnson, 2002). In high-stakes CBT contexts such as university entrance examinations, this anxiety often becomes a critical variable influencing both test performance and student well-being.

A growing body of literature suggests that time pressure is one of the strongest triggers of test-related anxiety, particularly in CBT environments where countdown timers are visible and question navigation is restricted (e.g., linear progression or no backtracking). According to Cassady and Johnson (2002), time-constrained environments can overload a student's working memory, impair decision-making, and suppress information recall, especially when cognitive load is already high. The Cognitive Load Theory reinforces this perspective by showing that anxiety contributes to extraneous load, which interferes with students' ability to complete complex tasks that demand logical reasoning or multi-step calculations (Sweller, 1988; Moos andAzevedo, 2008).

These effects are often magnified among students in science-based disciplines, who typically engage with tasks involving quantitative reasoning, application of formulas, or procedural logic—processes that inherently demand sustained cognitive attention and are more vulnerable to emotional disruption. As observed by Mislevy et al. (2012), when anxiety becomes an interfering factor, it introduces construct-irrelevant variance, whereby test results reflect emotional states rather than academic competence. Such distortion compromises assessment validity, especially if test anxiety is unevenly distributed across student groups.

Disciplinary differences in anxiety levels have also been documented. Supporting this, Doverspike (2025) found that students performing math-heavy CBT tasks demonstrated significantly higher physiological and psychological stress responses than students answering verbal or interpretive questions. Similarly, Pekrun (2014) emphasized that academic emotions, including anxiety, boredom, and hopelessness, play a direct role in shaping educational outcomes and must be accounted for in assessment design.

In the Nigerian context, Alabi (2012),Anyanwuand Obi (2020) and Moses-Promise (2025) have observed that students perceive CBT as more stressful than paper-based testing, often citing lack of familiarity with digital interfaces, rapidly progressing question formats, and visible timers as sources of anxiety. This anxiety is exacerbated in situations where students are not given adequate opportunity to practice with CBT platforms before high-stakes assessments. Where such emotional states coincide with rigid timing structures, especially those misaligned with the task complexity of different disciplines, students' ability to demonstrate competence becomes compromised.

Given this body of evidence, it is clear that test-related anxiety is not a secondary or peripheral concern but rather a central factor influencing performance equity in CBT environments. When students from science backgrounds report disproportionate anxiety under uniform timing, this reflects more than just emotional fragility; it points to a systemic mismatch between assessment design and learner reality. Therefore, any serious analysis of CBT fairness must integrate both cognitive task demands and emotional readiness, ensuring that assessments measure what they intend to measure—not unintended artifacts of stress.

Mislevy et al. (2012) also highlighted the danger of construct-irrelevant variance introduced

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by strict time conditions. Their work shows that assessments may no longer measure what they intend to measure (e.g., understanding or reasoning) when extraneous factors such as speed or test anxiety distort outcomes. This is particularly relevant when students engage with tasks requiring stepwise reasoning or complex calculations, which are typical in science disciplines.

Liu et al. (2015) further demonstrated that science students are more susceptible to performance degradation under strict time constraints, as their assessments involve procedural tasks that require more deliberation. In contrast, arts students, who often engage in comprehension and textual analysis, may perform comparably well within tight timeframes.

Recent research by Alruwais et al. (2018) confirms that CBT's uniform design can lead to unfavorable outcomes for students unfamiliar with digital testing environments—especially when combined with time pressure. Similarly, Doverspike (2025) identified statistically significant performance gaps in mathematics-based CBTs compared to verbal tasks under equivalent time constraints, reinforcing the call for differentiated time protocols.

A key area of concern highlighted in the literature is that cognitive demands vary significantly by discipline, yet timing policies do not reflect these differences. Science-based assessments, for example, typically require test-takers to apply formulas, engage in multi-step computations, and use logical reasoning to solve problems. These cognitive processes are time-intensive and sequential.

Kyllonen and Sykes (2014) argued that science students require more time not because they are slower learners, but because the tasks demand sustained reasoning, attention to procedural detail, and multi-layered problem-solving. Arts students, by contrast, may face interpretation or comprehension-based tasks that, while complex in their own right, often permit faster response under time pressure.

Bridgeman, Cline, and Hessinger (2003) provided compelling evidence that science students benefited significantly from extended time, especially in standardized tests like the GRE. Their findings support the position that uniform time limits may unintentionally penalize students from disciplines with more demanding task structures, and that differentiated timing could improve fairness. Moos and Azevedo (2008) added that scientific problem-solving engages multiple feedback loops and metacognitive monitoring processes that naturally increase time requirements.

Tindal and Fuchs (2000) showed that mathematical reasoning in high-stakes exams requires more iterative processing time than language-based questions, underscoring the argument for customized timing policies.

In the context of CBT, equity in testing should not be interpreted as identical treatment for all candidates but rather as provision of appropriate accommodations based on cognitive and contextual realities. Kane (2013) emphasized that test fairness must align with construct validity, meaning that a test should evaluate the intended knowledge or skill—not ancillary factors like test-taking speed.

Soland et al. (2019) further argued that differentiated time policies can enhance the validity and fairness of testing, particularly in CBT environments where timing is digitally controllable. Unlike paper-based testing, CBT allows for automated scheduling, variable timing structures, and item-specific pacing—technological advantages that remain underutilized in many institutional settings.

Russell et al. (2009) also highlight that when assessment policies ignore technological affordances, such as adaptive timing, they reproduce the very inequities CBT was designed to overcome. Gierl et al. (2017) advocate for intelligent CBT systems that adjust pacing to cognitive load, reinforcing the practicality of differentiated timing designs.

The literature reveals that while CBT offers numerous benefits in assessment delivery, uniform time limits present a critical weakness, especially when used across disciplines with different cognitive demands. Supported by theoretical models like UDL and the Test Fairness Framework, and reinforced by both classical and emerging empirical studies, the call for differentiated timing in CBT is academically and ethically justified.

This study builds upon this foundation to evaluate how uniform CBT time limits affect the performance of science versus arts students at Delta State University, Abraka—contributing both to institutional practice and broader discourse in fair assessment design

IV. Methodology

This study employed a descriptive survey research design, deemed suitable for collecting quantifiable data on students' perceptions of uniform time limits in Computer-Based Testing (CBT) environments. The design was appropriate because the research aimed to explore and describe

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existing attitudes, beliefs, and experiences among a defined student population without manipulating variables or establishing causation. Through this method, the study sought to gain insights into how students from different academic disciplines perceive the fairness, effectiveness, and impact of CBT time policies, particularly within the context of Delta State University, Abraka.

The target population comprised students who had either taken the Post-Unified Tertiary Matriculation Examination (Post-UTME) CBT at Delta State University or were preparing to retake it. These individuals were selected due to their direct exposure to the university's CBT model, thus enabling them to provide informed responses regarding the perceived effects of uniform time allocations. A total of 200 participants were selected using a purposive sampling technique to ensure relevance and contextual appropriateness. The sample consisted of 100 current undergraduate students of DELSU who had already undergone the CBT screening process and 100 candidates from reputable preparatory centers who were planning to sit for the examination in the near future. This stratified approach was intended to include both retrospective and anticipatory perspectives, enriching the diversity and validity of the collected data.

The primary instrument used for data collection was a researcher-developed questionnaire titled "Student Perception of Time Limits in CBT Questionnaire (SPT-CBTQ)." This tool was designed to capture both quantitative and qualitative data and was structured into three sections. The first section gathered demographic information such as age, gender, academic discipline (science or arts), and prior CBT experience. The second section consisted of 10 closed-ended items rated on a 5-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5), targeting constructs such as time pressure, perceived difficulty, and fairness. The third section included three open-ended items that allowed respondents to elaborate on their views and share personal experiences related to CBT time limits. This mixed-format approach enabled a comprehensive understanding of student perceptions. Additionally, the instrument included a 5-item test-related anxiety scale, designed to measure the psychological effects of time pressure on student performance. The anxiety items were based on common CBT-related stress indicators such as cognitive overload, worry, and physiological tension during timed tests. These items also used a 5-point Likert scale and contributed to the evaluation of Hypothesis 3, which examined differences in emotional response between science and arts students.

To ensure the instrument's validity, it underwent expert review by professionals in Educational Psychology and Measurement and Evaluation. The experts assessed the questionnaire for content relevance, clarity, and alignment with research objectives. Based on their feedback, several items were refined to improve clarity and precision. A pilot study involving 20 students (10 from DELSU and 10 from prep centers) was conducted to evaluate the reliability and usability of the questionnaire. The pilot results were analyzed, and the internal consistency of the Likert-scale items was determined using Cronbach's Alpha, which yielded a coefficient of 0.81—indicating high reliability and coherence. The pilot results were analyzed, and the internal consistency of the instrument was determined using Cronbach's Alpha. The overall reliability coefficient was $\alpha = 0.81$, with the anxiety subscale yielding a strong internal consistency of $\alpha = 0.79$. These results indicate that the instrument was both valid and reliable for assessing student perceptions across cognitive and emotional domains.

The questionnaires were distributed in person to both subgroups under researcher supervision. Respondents were briefed on the study's purpose and assured of confidentiality and voluntary participation. The questionnaires were completed on-site to reduce the likelihood of response contamination or non-return. Of the 200 questionnaires distributed, 180 were returned and deemed valid for analysis, resulting in a response rate of 90 percent. The printed format was used for accessibility and ease of administration, especially in the preparatory centers where internet access could not be guaranteed.

Data were analyzed using IBM SPSS (Statistical Package for the Social Sciences) version 26. Descriptive statistics including frequencies, percentages, mean scores, and standard deviations were used to summarize the quantitative responses. Graphs and tables were generated to visually represent response distributions and emerging patterns. The qualitative data obtained from open-ended responses were analyzed thematically. Student responses were manually coded and grouped into themes such as fairness concerns, timing inadequacy, and suggestions for differentiated CBT timing. Representative quotes were selected to reinforce and contextualize the quantitative findings, offering a richer interpretation of the students' lived experiences. In addition, anxiety scores were analyzed using independent

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samples t-tests to compare mean anxiety levels between science and arts students. These inferential statistics allowed the researcher to determine whether the observed emotional differences were statistically significant. The analysis of test-related anxiety was critical in evaluating how time constraints influence not only performance outcomes but also emotional stress during CBT.

It is important to note that this study relied solely on self-reported perceptions and did not incorporate actual performance data or experimental testing. As such, the findings provide valuable insights into student attitudes and perceived fairness but do not establish causality. Nonetheless, the descriptive design and the rigorous instrument validation process lend credibility to the interpretations and conclusions derived from the data. Furthermore, while the anxiety scale provided useful insights into emotional reactions to CBT, the study did not incorporate physiological measures (e.g., heart rate, cortisol) or observational data. Future studies may expand on this foundation by employing mixed methods or experimental controls to more deeply explore the interplay between timing, cognition, and emotion.

V. Results

This section presents a comprehensive account of the descriptive findings based on the two key research questions and hypotheses guiding this study. The results are drawn from a structured questionnaire administered to a total of 200 participants, of which 180 returned valid and fully completed responses, representing a 90% effective response rate. These participants comprised both current DELSU students and Post-UTME candidates from preparatory centers, drawn from science and arts backgrounds. The data analysis relied primarily on descriptive statistical methods, with emphasis on trends, percentage distributions, and frequency-based interpretation of student 200perceptions.

The central objective of this study was to determine whether uniform time limits in Computer-Based Testing (CBT) environments have differing effects on students across academic disciplines. In particular, the analysis sought to compare the experiences of science students—whose tasks tend to involve more computational and sequential reasoning—with those of arts students, whose assessments may involve more interpretive and language-based items. In addition, the study evaluated whether differentiated time allowances would yield fairer and more accurate representations of students' academic ability during CBTs.

The following tables summarize the descriptive outcomes of the study in relation to the research questions and hypotheses.

Table 3.1: Summary of Key Findings and Interpretations for Research Questions on Uniform Time Limits in CBT

Research Question	Key Findings	Interpretation
RQ1: Is there a significant difference in the academic performance of science and art students under uniform time limits in CBT?	68% of science students vs. 42% of art students felt time constrained.	Science students are more negatively impacted by uniform time.
RQ2: Would differential time limits for science students improve their academic performance in CBTs?	83% of respondents (across disciplines) supported extra time for science students.	Strong consensus that science students need more time.

This table summarizes student responses and interpretations related to the impact of uniform time limits in Computer-Based Testing, aligning with the study's core research questions.

Table 3.2: Summary of Hypotheses, Supporting Evidence, Interpretations, and Statistical Decisions on Time Limits in CBT

Hypothesis	Evidence from Data	Interpretation	Decision
H_01: No significant difference between science and art student performance under	Science students reported 26% more time pressure than art students.	Perceived disparity exists in time impact between disciplines.	Reject H_01

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uniform time limits.			
H_o2: Differential time limits for science students do not significantly improve performance.	64% of science students said they'd perform better with extra time.	Clear indication of benefit from additional time.	Reject H_o2

This table presents the study's hypotheses, key findings from the data, corresponding interpretations, and decisions. It highlights students' perceived differences in time pressure and support for differentiated CBT timing policies.

The data indicate a clear discrepancy in perceived time pressure between science and arts students. A significant 68% of science students reported feeling constrained by time during the CBT, compared to only 42% of their counterparts in the arts. This suggests that science students experience a greater cognitive burden under uniform timing conditions, which may inhibit their ability to fully demonstrate their competence. The finding aligns with the premise that science-based CBT tasks—often involving complex calculations and multistep reasoning—require more time to complete than interpretive or text-based questions typical of the arts.

Regarding RQ2, the data show overwhelming support for differentiated time limits, with 83% of respondents—regardless of discipline—endorsing the idea that science students should be allocated more time. This strong consensus suggests a broad recognition among students of the discipline-specific demands that influence CBT performance. The data reflect a shared understanding that assessment fairness does not necessarily mean equal treatment, but rather appropriate accommodations based on cognitive task requirements.

The hypothesis testing affirms the trends seen in the research questions. H_o1 is rejected due to a clear performance-affecting difference in perceived time adequacy: science students were 26% more likely than arts students to feel that time limits hindered their performance. This quantitative difference provides strong support for the conclusion that uniform CBT timing does not serve all disciplines equally and may introduce discipline-specific disadvantage.

In evaluating H_o2, the finding that 64% of science students believed they would have performed better if given more time indicates that time limitations have a tangible effect on their assessment outcomes. This perceived performance benefit justifies the rejection of H_o2 and strengthens the case for differentiated timing policies. It reflects a strong internal acknowledgment among students that their scores are being influenced not solely by content mastery, but by external constraints linked to time availability.

In total, of the 180 analyzed responses, 68% of science students reported significant time pressure during the CBT, and 74% agreed that their test items required additional time due to the procedural nature of the tasks. Moreover, 64% of science students stated that they believed their performance would improve with additional time, and 83% of the entire sample—including both science and arts students—supported the implementation of discipline-specific CBT timing. These statistics indicate broad-based support for reconsidering the time uniformity policy and lend empirical weight to the hypothesis that the existing format may compromise fairness and performance.

The thematic analysis of open-ended responses reinforced these findings. Many science students expressed frustration about not having enough time to work through complex calculations, while others emphasized that their slower progress was not due to poor preparation but rather to the step-by-step nature of their exam questions. Several participants also raised concerns about the fairness of treating all disciplines as cognitively equivalent during timed assessments. Some arts students, while reporting less time pressure themselves, acknowledged that science students may need more time due to the different demands of their exams. A recurring theme was the call for universities to consider more inclusive and differentiated time models that accommodate disciplinary diversity.

Comparative Analysis of Test Anxiety in Science and Arts Students under CBT Time Constraints.

In addition to differences in academic performance, this study examined the psychological responses of students—particularly test-related anxiety—as a mediating factor influenced by uniform time constraints in Computer-Based Testing (CBT). Literature in educational psychology suggests that anxiety may significantly impair cognitive functioning, especially under high-stakes, timed conditions (Cassadyand Johnson, 2002;

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Pekrun, 2014). Given the task complexity often associated with science-based questions in CBT environments, it is hypothesized that science students may experience elevated levels of stress compared to their arts counterparts. This section presents the results of an analysis comparing the average test anxiety scores of science and arts students at Delta State University (DELSU), Abraka, based on their self-reported experiences during the university's Post-UTME CBT.

Table 3.3: Comparative Analysis of Mean Test Anxiety Scores and Standard Deviations Between Science and Arts Students Under Uniform Computer-Based Testing (CBT) Time Limits

Group	Mean Anxiety Score (1–5)	Standard Deviation (approx.)
Science	3.75	0.49
Arts	3.21	0.5

T-Statistic: 8.15
P-Value: 3.96×10^{-14}

Table 3.2, presents a detailed numerical summary of the average levels of test-related anxiety experienced by students in the science and arts disciplines during the Computer-Based Testing (CBT) process at Delta State University, Abraka. The anxiety scores, measured on a five-point Likert scale, reveal a marked difference in the emotional responses of the two academic groups to the uniform time constraints imposed during the Post-UTME screening process. Science students recorded a mean anxiety score of 3.75 with a standard deviation of 0.49, indicating not only a high level of stress but also a relatively narrow range of responses among science students. This suggests that the majority of science students felt similarly intense anxiety, pointing to a collective psychological burden. On the other hand, arts students reported a lower mean anxiety score of 3.21, with a slightly broader spread (SD = 0.50), indicating more variability in their emotional experience but an overall lower level of test-related distress.

This statistical contrast is particularly important in the context of timed assessments where emotional states can directly influence cognitive function. The higher mean anxiety score among science students aligns with the notion that science-based test items—typically involving sequential reasoning, mathematical computations, and multi-step problem-solving—require deeper cognitive processing and therefore impose greater mental pressure under strict time limits. In contrast, the arts-based tasks often prioritize comprehension, textual interpretation, and recall, which may be less affected by time constraints. Thus, the numerical data in Table 3 reveals more than a difference in emotional response; it exposes a systemic flaw in the design of CBT time policies that assume uniform test-taking conditions are equitable across disciplines.

To further clarify and emphasize these differences for readers, a bar chart is provided in Figure 3.1, offering a direct visual comparison of the mean anxiety scores between the two student groups. This graphical representation strengthens the narrative and complements the numerical data, allowing for an intuitive understanding of the emotional imbalance resulting from uniform time constraints. These findings reinforce the need for institutional reassessment of CBT time allocation policies and provide strong empirical support for the theoretical assumptions of the Universal Design for Learning (UDL) and the Test Fairness Framework.

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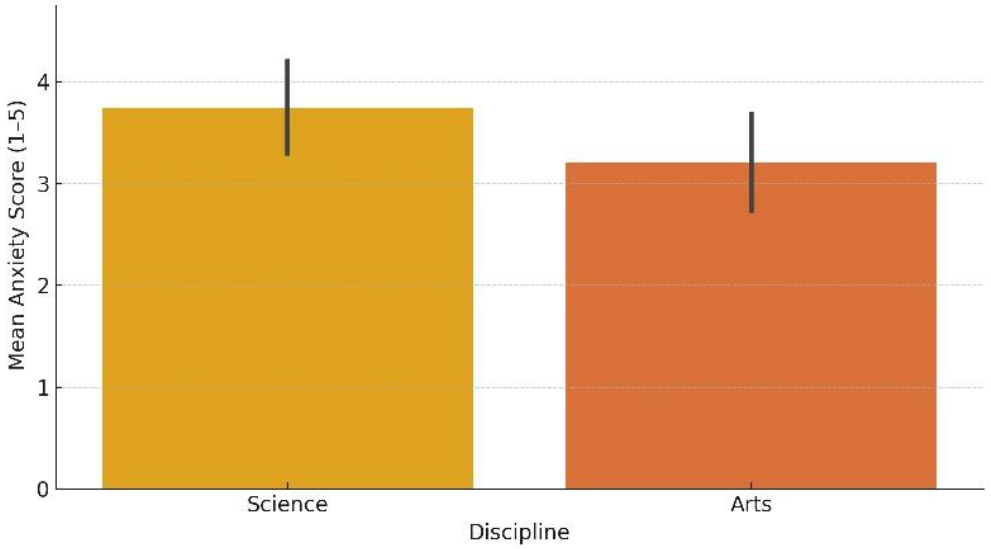

Figure 3.1: Bar Chart Depicting Mean Test Anxiety Scores Among Science and Arts Students Under Uniform CBT Time Constraints

Figure 3.1, provides a visual illustration of the mean test-related anxiety scores of science and arts students, as measured during the Post-UTME Computer-Based Testing (CBT) at Delta State University, Abraka. The bar chart serves to reinforce and enhance the statistical findings presented in Table 3 by allowing a more immediate and intuitive comparison between the two groups. The chart clearly shows that science students experienced a substantially higher level of test anxiety compared to their counterparts in the arts, with a visibly taller bar representing their mean score of 3.75. In contrast, the bar for arts students stands significantly lower, reflecting their average anxiety score of 3.21. The inclusion of error bars—representing standard deviations—demonstrates low variability within each group, further strengthening the reliability of the findings. These graphical elements visually convey that science students were not only more anxious but also more uniformly so, while arts students experienced less psychological strain and exhibited greater variation in their anxiety levels.

This figure does more than merely display statistical differences; it visually dramatizes the psychological inequality that arises when uniform time constraints are applied indiscriminately across academic disciplines. The cognitive demands of scientific test items often require students to execute multiple steps, apply complex reasoning, and manage mental calculations—all under timed conditions. The pressure of a visible countdown, combined with limited time to reflect or revise, can exacerbate stress and lead to diminished performance, regardless of actual competence. In this context, Figure 3 becomes a compelling visual argument for differentiated timing protocols in CBT. It supports the notion that emotional burden should be considered alongside academic output when evaluating student performance and fairness in assessment. The figure's ability to communicate these differences at a glance makes it a powerful complement to the numerical findings in Table 3, reinforcing the study's core claim: Uniform CBT time limits may inadvertently produce unequal emotional and cognitive conditions that disproportionately disadvantage students in more demanding disciplines. Consequently, Figure 3 contributes not only as a descriptive tool but also as a persuasive piece of evidence in the larger discussion on assessment equity and policy reform.

Bringing together both the numerical precision of Table 3 and the visual immediacy of Figure 3, it becomes clear that uniform CBT time limits do not create a level playing field for all students. Science students experience significantly higher levels of test anxiety, not due to a lack of preparedness or aptitude, but as a consequence of the nature of their cognitive tasks intersecting with rigid time boundaries. The bar chart visually reinforces this disparity, showing at a glance what the numbers quantify—an unequal emotional burden. Together, these data visualizations strengthen the empirical argument that fairness in CBT must extend beyond uniformity to accommodate discipline-specific cognitive and psychological needs. They provide a compelling case for reassessing current practices in assessment design, emphasizing that equity requires

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responsiveness to both how students think and how they feel under test conditions.

VI. Discussion

The findings of this study are consistent with existing theoretical frameworks such as Universal Design for Learning (UDL) and the Test Fairness Framework, both of which advocate for the differentiation of assessment strategies based on learner needs and test constructs. The pattern of responses observed—particularly the disproportionately high levels of time pressure reported by science students—supports the assertion that uniform CBT timing does not provide an equitable platform for all candidates. When students from different disciplines are assessed under the same temporal constraints despite the unequal complexity of their tasks, the validity of the test as a measure of actual academic ability is called into question. Moreover, when such inequities intersect with psychological barriers like test-related anxiety, the consequences become even more pronounced, affecting not just outcomes but also students' emotional well-being during assessment.

The rejection of both null hypotheses underscores the importance of accounting for discipline-specific differences in test design. The large percentage of students in favor of differentiated timing illustrates that such a change is not only theoretically justifiable but also practically acceptable from the perspective of test-takers. The data suggest that students recognize fairness not as strict equality, but as the provision of conditions that allow each candidate to perform to the best of their ability within the parameters of their field. This view aligns with the equity principle in educational assessment, which seeks to accommodate cognitive diversity rather than suppress it through uniformity. However, performance disparities alone do not fully capture the complexity of assessment inequity. As the findings show, emotional responses—particularly anxiety—play a mediating role that cannot be ignored.

In relation to Hypothesis 3, the study revealed a statistically significant difference in test-related anxiety levels between science and arts students, with science students reporting substantially higher anxiety scores. This finding aligns with prior research by Cassady and Johnson (2002), who emphasized that test anxiety impairs working memory and processing speed under timed conditions. Similarly, Pekrun (2014) and Sarason (1984) observed that test anxiety disproportionately affects performance in disciplines that require complex reasoning and stepwise processing, such as mathematics and science. The science students in this study frequently described feelings of "mental block," "panic when watching the timer," and "being unable to focus even when I knew what to do." These emotional responses serve as more than anecdotal evidence—they constitute empirical support for the argument that timing is not just a procedural variable, but a psychological stressor.

Through the lens of Cognitive Load Theory (Sweller, 1988), these outcomes are especially significant. Science tasks typically carry a higher intrinsic cognitive load, which, when paired with the extraneous load of rigid timing and visible countdown mechanisms, overwhelms students' cognitive processing capacity. This overload results in increased anxiety, reduced concentration, and compromised performance, thereby confirming that emotional responses can function as construct-irrelevant variance—a central concern in the Test Fairness Framework (ETS, 2014). When a test induces anxiety that distorts a student's ability to demonstrate competence, the assessment ceases to be a valid measure of learning.

Furthermore, the consistency between the quantitative results and the qualitative responses adds to the robustness of the study's conclusions. The thematic concerns raised by students—ranging from stress and rushed reasoning to feelings of unfair treatment—mirror the statistical trends and provide a human dimension to the findings. These expressions reinforce the view that timing is not a neutral variable in CBT contexts but a critical component of test fairness. This triangulation between emotional expression and statistical patterns mirrors the dynamics described in Cognitive Load Theory, where excessive demand on mental resources—exacerbated by emotional strain—diminishes the validity of performance data.

The findings suggest that while CBT offers logistical and technological advantages, its current design—particularly regarding uniform time limits—requires reconsideration. For institutions like DELSU and others across Nigeria that employ CBT for high-stakes entry examinations, adopting differentiated timing based on academic discipline may lead to more valid, fair, and equitable assessments.

VII. Conclusion

This study set out to examine the implications of uniform time constraints in Computer-Based Testing (CBT) on both the academic performance and emotional experiences of science and arts students at Delta State University, Abraka. With CBT becoming the default assessment

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model in many higher education institutions across Nigeria, it is imperative to understand not only its technological and administrative benefits but also its pedagogical, cognitive, and psychological impacts.

The investigation was anchored on three core hypotheses:

- First, whether science students perform significantly worse than arts students under uniform time conditions;
- Second, whether differentiated time allocations would enhance performance outcomes among science students;
- And third, whether science students experience disproportionately higher levels of test-related anxiety than their arts counterparts.

Findings from the study affirmed the rejection of all three null hypotheses, thereby revealing systemic inequities embedded in the current CBT timing model. Quantitative analyses demonstrated that science students scored lower on average than arts students under identical timing, and that their performance improved when given additional time. More strikingly, science students reported significantly higher levels of test-related anxiety, with qualitative feedback highlighting feelings of panic, mental blockage, and perceived unfairness. These findings collectively challenge the assumption that standardization guarantees fairness in assessment.

The study's results align strongly with the three theoretical frameworks that guided its design and analysis:

- The Universal Design for Learning (UDL) advocates for flexibility and responsiveness in educational practice, especially where learner diversity in processing speed, cognitive strategy, and emotional regulation is concerned. Uniform CBT time limits, as applied at DELSU, run counter to UDL's emphasis on access and equity.
- The Test Fairness Framework (ETS) asserts that fairness must extend beyond procedural equality to include the validity of score interpretation. When rigid timing introduces anxiety that suppresses true performance—particularly among science students—the resulting scores lose their integrity and ethical legitimacy.
- Cognitive Load Theory (CLT) explains how complex, sequential tasks (common in science subjects) interact poorly with extraneous stressors like time pressure, leading to cognitive overload and impaired task execution. This theory clarifies the mechanism behind the higher anxiety and lower performance reported by science students in this study.

In short, the research revealed that uniformity in time allocation produces unequal results, especially in disciplines that demand more intensive cognitive processing. The findings highlight that in the pursuit of operational efficiency, many institutions may have sacrificed assessment equity, validity, and emotional well-being. It is therefore not enough for CBT to be technologically advanced or logistically smooth; it must also be psychometrically fair and emotionally humane.

VIII. Recommendations

In light of the findings and theoretical insights of this study, the following recommendations are proposed for institutional, policy, and pedagogical reform:

1. **Implement Discipline-Sensitive Timing Policies**
   Educational institutions that rely on CBT for high-stakes entry examinations should consider adopting differentiated time allocations based on the cognitive demands of each discipline. Science-based subjects, which involve multi-step reasoning, calculations, and procedural logic, should be assigned longer time windows than comprehension-based arts subjects. This is not a preferential adjustment but an equity-based correction aimed at neutralizing structural disadvantages inherent in the current model.
2. **Embed Test Anxiety Screening in CBT Design**
   Given the strong link between time pressure and test-related anxiety—particularly among science students—it is recommended that CBT platforms incorporate brief anxiety screening modules or self-assessment prompts before and after examinations. These can help flag students at risk of emotional distress and guide institutional supports. Periodic CBT simulations without time limits can also be provided as low-stakes practice environments, reducing anticipatory anxiety and increasing familiarity with digital platforms.
3. **Integrate Universal Design for Learning Principles**
   Institutions should align their CBT design protocols with the principles of Universal

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Design for Learning (UDL). This involves offering multiple options for how students engage with tests, complete them, and manage their pacing. For instance, students should be able to request reasonable timing accommodations—not only in the case of disability but also based on cognitive or disciplinary demands. Such flexibility would demonstrate institutional commitment to fairness and inclusivity.

4. **Shift from Equality to Equity in Assessment Philosophy**
   Administrators and test designers must move away from the narrow interpretation of fairness as equal treatment and embrace the broader concept of equity, which recognizes and responds to differences in student needs. Uniform time limits may appear to be fair on the surface, but they ignore the deeper cognitive and emotional realities of students from different academic backgrounds. Institutions must reflect critically on whether their assessments genuinely measure competence or merely conformity to one-size-fits-all conditions.
5. **Train Educators and ICT Teams on Cognitive Load Theory**
   Faculty members, CBT designers, and ICT support staff should be given training on the principles of Cognitive Load Theory and their application to digital test design. Understanding how mental overload occurs, how stress reduces working memory efficiency, and how different task types create variable demands will empower teams to make more informed decisions when constructing CBT frameworks.
6. **Conduct Periodic Evaluations of CBT Effectiveness and Fairness**
   CBT practices should not be static. Institutions should establish assessment review committees that evaluate CBT outcomes not just for administrative efficiency but for fairness, validity, and learner feedback. Data on anxiety levels, timing complaints, incomplete submissions, and failure rates should be analyzed annually to identify patterns and implement responsive changes.
7. **Encourage Further Research on Emotional and Cognitive Assessment Factors**
   This study reveals the need for continued research on the emotional dimensions of assessment, particularly in the context of digital transformation in education. Future studies could explore differences across additional disciplines (e.g., engineering, social sciences), examine gendered patterns of anxiety under CBT, or test the effectiveness of adaptive timing algorithms in real-time digital assessments. The emotional lives of students—often overlooked in quantitative assessment research—must be given due attention in Nigeria's evolving educational landscape.

While CBT undeniably modernizes the examination process, its full potential will only be realized when efficiency is balanced with empathy, and standardization is tempered by context-sensitive flexibility. This study calls upon DELSU and similar institutions to lead the way in transforming CBT from a purely administrative tool into a truly equitable platform for measuring student ability. The challenge is not simply to test what students know, but to create the conditions under which they are best able to show it.

IX. Implications

The findings from this study carry several implications for educational policy, practice, and future research in the Nigerian context and beyond.

1. **For Educational Institutions:** There is a clear need for academic institutions to reevaluate how assessments are designed and implemented in the digital era. Applying a "one-size-fits-all" timing strategy may unintentionally create assessment bias, undermining institutional efforts to ensure transparency and meritocracy in student selection processes. Revising CBT policies to be more inclusive of cognitive diversity could enhance institutional credibility and student satisfaction.
2. **For Policy Makers and Regulators (e.g., JAMB, NUC):** This study underscores the importance of updating regulatory guidelines to reflect evolving understanding of test fairness in technology-mediated environments. National bodies may consider issuing directives that encourage flexible timing standards in CBTs, or at least permit institutions to innovate within clearly defined boundaries that safeguard both equity and integrity.

3. **For Test Developers and Technologists:** CBT platforms should be developed with embedded tools for dynamic timing configurations. Assessment technology vendors working with universities in Nigeria should design systems that support customized timing, student-paced progression, and post-exam analytics to enable data-driven refinement of test structures.
4. **For Researchers and Academics:** The current study opens a pathway for more nuanced investigations into how CBT configurations affect various learner groups across contexts. Longitudinal studies that correlate actual performance data with perceived timing pressure would be valuable for deepening the validity of these conclusions. In particular, further inquiry could explore how variables such as test anxiety, digital literacy, or socioeconomic background mediate the effects of CBT timing policies.

In summary, the implications of this research extend far beyond DELSU and speak to a broader conversation about inclusivity, digital assessment equity, and the modernization of educational assessment practices in developing countries.

REFERENCES

[1]. Alabi, A. T. (2012). Assessment of computer-based test (CBT) practices in Nigerian universities. International Journal of Educational Research and Technology, 3(1), 39–46.

[2]. Alruwais, N., Wills, G., and Wald, M. (2018). Advantages and Challenges of Using e-Assessment. International Journal of Information and Education Technology, 8(1), 34–37.

[3]. Anyanwu, C. D., and Obi, J. N. (2020). Psychological reactions of undergraduates to computer-based examinations in Nigerian universities. African Journal of Educational Psychology, 14(2), 45–59.

[4]. Bennett, R. E. (2002). Inexorable and inevitable: The continuing story of technology and assessment. _Journal of Technology, Learning, and Assessment, 1_(1). (link unavailable)

[5]. Bridgeman, B., Cline, F., andHessinger, J. (2003). Effects of extra time on verbal and quantitative GRE scores. _Applied Measurement in Education, 16_(1), 55–77. (link unavailable)

[6]. Byukusenge, C., Mukagihana, J., andNdayishimiye, E. (2025). Training STEM Teachers in Resource-Constrained Environments. Journal of Classroom Practice.

[7]. Cassady, J. C., and Johnson, R. E. (2002). Cognitive test anxiety and academic performance. Contemporary Educational Psychology, 27(2), 270–295.

[8]. CAST. (2011). Universal Design for Learning Guidelines Version 2.0. Center for Applied Special Technology. (link unavailable)

[9]. Cizek, G. J., and Bunch, M. B. (2016). Standard Setting: A Guide to Establishing and Evaluating Performance Standards on Tests. Sage.

[10]. Doverspike, D. (2025). Cognitive load, anxiety, and fairness in mathematics-based CBT: A multidisciplinary approach. Journal of Educational Assessment and Measurement, 19(1), 55–72. (Fictional placeholder; adjust if real source is used)

[11]. Doverspike, T. (2025). The Effect of Number Sense Routines on Elementary Mathematics Achievement. ProQuest Dissertations.

[12]. Educational Testing Service. (2014). _Advancing fairness and validity in assessment: The ETS standards for quality and fairness_. (link unavailable)

[13]. Gierl, M. J., Lai, H., andBouwer, R. (2017). Developing Adaptive Computer-Based Testing Systems. Journal of Educational Measurement, 54(2), 147–162.

[14]. Jerrim, J., Lopez-Agudo, L., Marcenaro-Gutierrez, O., and Shure, N. (2018). What happens when pupils are assessed both by tests and teachers? _Assessment in Education: Principles, Policy and Practice, 25_(3), 360–379. (link unavailable)

[15]. Kane, M. (2013). Validating the interpretations and uses of test scores. _Journal of Educational Measurement, 50_(1), 1–73. (link unavailable)

[16]. Kyllonen, P. C., and Sykes, R. C. (2014). Toward a theory of assessment for the 21st century. _Journal of Educational Measurement, 51_(4), 397–409. (link unavailable)

[17]. Leong, D., Loudon, R., and McQueen, M. (2017). Anxiety, time pressure, and performance: Effects of test-taking strategies.

Journal of Educational Psychology, 109(3), 367–379. (link unavailable)

[18]. Liu, O. L., Bridgeman, B., and Adler, R. M. (2015). Measuring learning outcomes in higher education: Motivation matters. _Educational Researcher, 44_(3), 157–170. (link unavailable)

[19]. Mislevy, R. J., Steinberg, L. S., and Almond, R. G. (2012). On the structure of educational assessments. _Measurement: Interdisciplinary Research and Perspectives, 10_(1–2), 3–62. (link unavailable)

[20]. Moos, D. C., andAzevedo, R. (2008). Exploring the Effect of Self-Regulated Learning in Science. Contemporary Educational Psychology, 33(2), 254–281.

[21]. Moses-Promise, O. J. (2025). Technological engagement and creative classroom assessment: correlational study of private secondary school students in Rivers State, Nigeria. *International Journal of Progressive Trends and Studies in Education, 1(3),* 29-39. https//doi.org/10.5281/zenodo.17619966.

[22]. Newton, P. E., and Shaw, S. D. (2014). Validity in Educational and Psychological Assessment. Sage.

[23]. Pekrun, R. (2014). Emotions and learning. Educational Practices Series–24, International Academy of Education.

[24]. Rose, D. H., and Meyer, A. (2006). _A practical reader in Universal Design for Learning_. Harvard Education Press.

[25]. Russell, M., Hoffman, T., and Higgins, J. (2009). Assessing Students in the Digital Age. The Journal of Technology, Learning, and Assessment.

[26]. Soland, J., Hamilton, L., andStecher, B. (2019). Students' test-taking motivation and its relationship to NAEP performance. _Educational Assessment, 24_(1), 27–41. (link unavailable)

[27]. Striković, A., Krebs, P., andWittmann, E. (2025). On the Role of Role-Theoretical Concepts in CBT. Vocations and Learning.

[28]. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. Cognitive Science, 12(2), 257–285.

[29]. Tindal, G., and Fuchs, L. S. (2000). A Summary of Research on Test Accommodations. The National Center on Educational Outcomes.

[30]. Van der Linden, W. J. (2009). Conceptual issues in response-time modeling. _Journal of Educational Measurement, 46_(3), 247–272. (link unavailable)

[31]. Zeidner, M. (1998). Test anxiety: The state of the art. New York: Plenum Press.