



Teachers' Perception and Digital Readiness for the Implementation of Computer-Based WAEC Examinations by 2030 in Nigerian Secondary Schools

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ABSTRACT

This study examined how teachers' perception and digital readiness influence their preparedness for the implementation of computer-based WAEC examinations in Nigerian secondary schools by 2030. A quantitative approach, combining ex post facto and correlational designs, was employed to assess existing conditions and relationships among variables. The study population comprised 12,483 secondary school teachers in Ebonyi State, from which a stratified random sample of 1,248 teachers was drawn. The data were collected using the Teachers' Perception and Digital Readiness Inventory (TPDRI), consisting of 46 items, with acceptable reliability (Cronbach's alpha = 0.74 for perception and 0.78 for digital readiness). The descriptive and inferential statistics were used for analysis. The Findings from the one-sample t-test ($M = 37.65$, $t = 0.57$, $p = 0.567$) revealed that teachers' overall perception of computer-based testing does not significantly deviate from the baseline, indicating a statistically neutral stance characterized by lingering hesitation and uncertainty. In contrast, self-reported digital readiness was significantly above baseline ($M = 66.85$, $p < 0.001$), though constrained by infrastructure gaps. Furthermore, regression analysis ($R^2 = 0.17$) indicated a significant predictive association between perception and digital readiness. The study contributes to existing knowledge by highlighting that readiness for computer-based examinations is not solely dependent on technical capacity but is also shaped by teachers' perceptions. It underscores the need for targeted sensitization, continuous professional development, and improved access to digital resources to ensure effective and equitable implementation of CBT in Nigerian secondary schools.

Keywords: computer-based testing, teachers' perception, digital readiness, WAEC, secondary education, Nigeria

INTRODUCTION

The rapid integration of digital technology in education has changed teaching, learning, and assessment practices across many parts of the world. Schools and examination bodies now use technology to improve the efficiency, reliability, and transparency of large-scale assessments. One important development in this area is computer-based testing (CBT), which many countries now use for national and professional examinations. In Nigeria, the West African Examinations Council (WAEC) has announced plans to introduce computer-based examinations for secondary school candidates by the year 2030. This plan marks a major shift from the traditional paper-and-pencil examination system that has operated for many decades. Research indicates that computer-based examination systems can reduce examination malpractice and improve the speed and accuracy of result processing (Nkaanee & Mgbomo, 2025; Sukare & Usman, 2025). The success of this transition will depend largely on the readiness of major stakeholders within the school system. Teachers occupy a central position in this process because they prepare students academically and guide them in adapting to new examination formats (Ayomide, 2025).

Additionally, teachers' perception of educational reforms often contributes to how successfully such reforms operate within schools. When teachers view an innovation as useful and relevant to teaching and learning, they are more willing to accept and apply it in their classroom practice. In contrast, negative perceptions may lead to resistance or limited participation in the reform process (Luik & Taimalu, 2021). The planned introduction of computer-based WAEC examinations requires teachers to understand digital examination environments and guide students on how to use computer-based testing interfaces. Research on technology use in education indicates that teachers' attitudes toward digital tools influence the level of technology integration in schools (Scherer et al., 2019; Siddiq & Scherer, 2017). In many Nigerian secondary schools, teaching still depends largely on traditional instructional methods because teachers have limited access to digital tools and professional training. As a result, teachers may form opinions about computer-based examinations based on factors such as the usefulness of the technology, ease of use, and availability of technological facilities (Thomas & Oladejo, 2017). For this reason, it is important to examine teachers' perceptions of the proposed CBT system for WAEC examinations.

Also, digital readiness is another important factor that will influence the successful introduction of computer-based examinations in Nigerian secondary schools. Digital readiness refers to the level of technological knowledge, skills, and confidence that teachers possess for effective use of digital tools in teaching and assessment activities. This readiness includes basic computer literacy, familiarity with digital learning platforms, and the ability to guide students in technology-supported learning environments (Illumäki et al., 2016). In the case of CBT implementation, teachers must prepare students to navigate digital examination platforms and manage time within computer-based testing systems. However, many teachers in developing countries still experience challenges related to limited digital skills and restricted access to technological resources (Rahimi & Tafazoli, 2022). In Nigeria, inequalities in access to information and communication technology between urban and rural schools further complicate this situation. As a result, an assessment of teachers' digital readiness is necessary in order to determine whether secondary schools are adequately prepared for the proposed WAEC computer-based examinations scheduled for 2030.

Over the years, the Nigerian education system has introduced several initiatives aimed at integrating technology into teaching and learning activities. Despite these efforts, many challenges continue to limit the effectiveness of these initiatives. Common problems include inadequate technological infrastructure, unstable electricity supply, poor internet connectivity, and limited professional training for teachers (Fahm et al., 2022; Toyo, 2017). Many public secondary schools still lack functional computer laboratories and reliable digital facilities that can support computer-based examinations. These limitations may create serious difficulties for the implementation of CBT examinations if they are not properly addressed. In addition, teachers

who have little experience with digital technologies may experience uncertainty when preparing students for computer-based examinations (Ottenbreit-Leftwich et al. 2018). For this reason, the successful implementation of CBT examinations will require strong investment in technological infrastructure as well as continuous professional development programmes that will improve teachers' digital competence.

Teachers play a central role in the implementation of educational innovations within schools. Their level of preparedness often influences how students respond to new instructional and assessment practices. For this reason, an examination of teachers' perceptions and digital readiness toward the proposed computer-based WAEC examinations is timely and necessary. Teachers serve as the main link between educational policies and classroom practice, and their level of readiness can influence how effectively students adjust to digital examination systems. An understanding of teachers' views about CBT implementation will assist policymakers in identifying important areas that require attention, such as teacher training, infrastructural provision, and institutional support. In addition, an evaluation of teachers' digital readiness will provide useful information about the capacity of secondary schools to support technology-based examination systems. Evidence from such investigations can guide policy decisions and support effective preparation for the planned transition to computer-based WAEC examinations in Nigerian secondary schools (Sang et al., 2010).

Objectives

The general objective of this study is to examine teachers' perceptions and digital readiness for the implementation of Computer-Based Testing (CBT) in WAEC examinations by the year 2030 in Nigerian secondary schools. The study has the following specific objectives

1. To examine secondary school teachers' perceptions toward the planned introduction of Computer-Based Testing (CBT) in WAEC examinations by 2030.
2. To determine the level of digital readiness among secondary school teachers for the implementation of Computer-Based Testing (CBT) in WAEC examinations.
3. To examine the relationship between teachers' digital readiness and their acceptance of the planned Computer-Based Testing (CBT) WAEC examinations by 2030.

Research Question

- What relationship exists between teachers' perception and their digital readiness for the planned Computer-Based Testing (CBT) in WAEC examinations by 2030?

Hypotheses

1. The Perception of secondary school teachers toward the planned introduction of Computer-Based Testing (CBT) in WAEC examinations by 2030 is not significantly higher than the baseline mean.
2. The level of digital readiness of secondary school teachers toward the planned introduction of Computer-Based Testing (CBT) in WAEC examinations by 2030 is not significantly higher than the baseline means.
3. The Perception of secondary school teachers toward the planned introduction of Computer-Based Testing (CBT) in WAEC examinations by 2030 does not significantly predict the level of their digital readiness.

Statement of the Problem

The planned introduction of computer-based WAEC examinations by 2030 requires teachers to be practically prepared to train students using digital tools. However, many secondary school teachers still lack adequate ICT skills, access to functional computers, reliable internet, and regular training. In addition, some teachers remain uncertain about the operation of computer-based testing and how to guide students effectively. These conditions raise a key practical concern about whether teachers are sufficiently equipped, in both skills and attitude, to support computer-based examinations in classroom practice. At present, limited empirical evidence exists on the actual level of teachers' digital readiness and the extent to which their perceptions influence student preparation. This study therefore examines whether teachers are practically ready for the implementation of computer-based WAEC examinations and identifies the gaps that require attention.

LITERATURE REVIEW

The conceptual framework from **Figure 1** presents the conceptual framework for examining the predictive relationship between teachers' perception of computer-based testing (CBT) and their digital readiness for the planned implementation of computer-based WAEC examinations by 2030. Teachers' perception serves as the independent variable, while digital readiness constitutes the dependent variable. Teachers' perception reflects their views regarding the usefulness, reliability, feasibility, and acceptability of CBT, whereas digital readiness refers to their self-reported digital skills, confidence, and preparedness to use computer-based assessment platforms. The framework assumes that teachers' perceptions are statistically associated with their level of digital readiness.

Theoretical Literature Review

The following theories guided the study:

1. Technology Acceptance Model (TAM) by Davis (1989)
2. Diffusion of Innovation Theory by Rogers (1962)
3. Digital Competence Theory

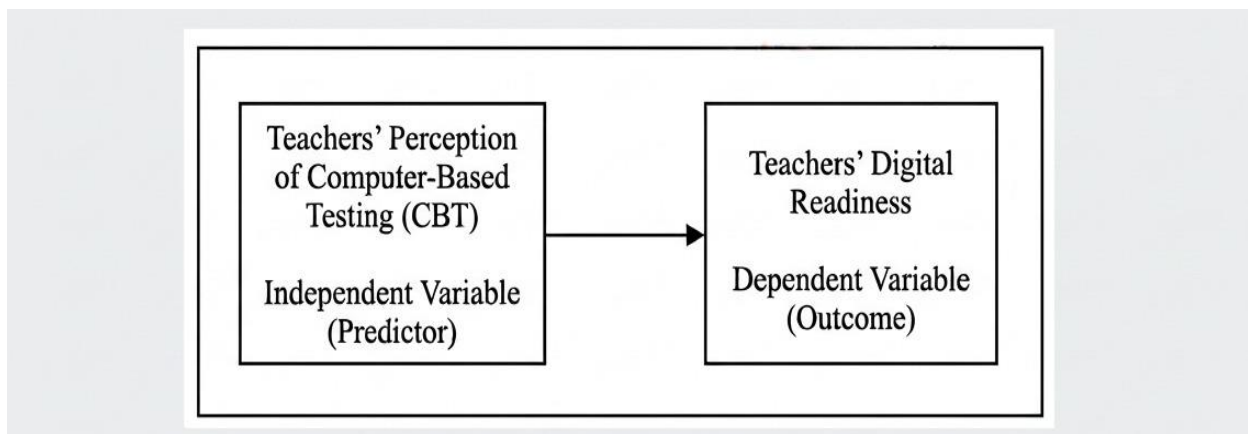


Figure 1. Conceptual Framework Showing the Predictive Relationship Between Teachers' Perception of Computer-Based Testing and Digital Readiness (Source: Researcher's conceptualisation, informed by Davis (1989), Rogers (1962), Ferrari et al. (2013), and relevant empirical literature)

Technology Acceptance Model (TAM) by Fred Davis in 1989

The Technology Acceptance Model (TAM) was developed by Davis (1989) to explain how individuals accept and use new technologies. The theory proposes that two major factors influence technology adoption, namely perceived usefulness and perceived ease of use. The Technology Acceptance Model is therefore relevant to this study because it helps explain how teachers' perception of the usefulness and ease of computer-based testing may influence their readiness to support the implementation of computer-based WAEC examinations in Nigerian secondary schools.

Diffusion of Innovation Theory by Everett Rogers in 1962

The Diffusion of Innovation Theory was developed by Rogers (1962) to explain how new ideas, technologies, or practices spread within a social system over time. According to the theory, the adoption of innovation depends on several factors, including relative advantage, compatibility, complexity, trialability, and observability. This theory is useful to the present study because it explains how the adoption of computer-based testing may vary among teachers depending on their exposure to technology, level of training, and access to digital resources within Nigerian secondary schools.

Digital Competence Theory

The Digital Competence Theory explains the knowledge, skills, attitudes, and abilities required for individuals to function effectively in technology-driven environments. The theory emphasizes that effective use of digital technology involves more than basic computer literacy; it requires the ability to access, evaluate, manage, and apply digital information in various tasks. The Digital Competence Framework (DIGCOMP) was primarily developed by Ferrari (2013), with significant contributions from Ferrari et al. (2012) in earlier conceptual work on digital competence within the European Commission projects. This theory is therefore relevant to the study because it provides a framework for understanding how teachers' level of digital readiness and technological skills may influence the successful implementation of computer-based WAEC examinations in Nigerian secondary schools.

Empirical Literature Review

The Perception of Computer-Based Testing (CBT)

Empirical studies consistently indicate that teachers' perception of computer-based testing significantly influences how ready they are to support and implement technology-driven assessments in schools. Research using technology acceptance frameworks has found that teachers who perceive CBT as relevant, beneficial, and manageable tend to engage more actively with digital assessment tools and preparation activities (Al-Nuaimi & Al-Emran, 2021). Luik and Taimalu's (2021) investigation into teachers' attitudes toward educational technologies revealed that positive perceptions of usefulness and ease of use are strong predictors of teachers' willingness to integrate ICT in assessment. Similarly, Nyathi (2022) reported positive attitudes among teachers who had some exposure to computer-based instructional tools, but also noted anxiety among those with limited experience. In the Nigerian context, Thomas and Oladejo (2017) study highlighted that many teachers held mixed perceptions toward CBT, often influenced by previous training, resource availability, and institutional encouragement. Other research in Sub-Saharan Africa confirms that teachers' perceptions are often shaped by the degree of support they receive from school leadership and opportunities for professional development (Mabalane Junior, 2025). Collectively, these findings indicate that teachers' perceptions are not fixed but shaped by both individual beliefs and environmental support structures, which in turn affects the extent to which they prepare students for computer-based examinations.

In other words, despite this body of evidence, there remains limited empirical research specifically exploring teachers' perceptions of CBT in the context of high-stakes examinations such as those administered by the

West African Examinations Council. Most existing studies focus on general ICT acceptance or technology use in teaching rather than on perceptions uniquely associated with computer-based assessment formats. For example, John (2015) examined teachers' attitudes toward e-learning broadly but did not isolate perceptions related to high-stakes testing. Similarly, research in Nigeria largely centres on tertiary institutions or general classroom ICT adoption, leaving secondary school teachers under-represented in the literature (Ayomide 2025). There is also scant research examining how demographic factors such as age, years of teaching experience, and subject specialization influence teachers' perception of CBT. Furthermore, few studies investigate the relationship between teachers' perception of CBT and actual classroom practices relating to assessment preparation. These gaps suggest the need for a focused empirical investigation into how Nigerian secondary school teachers perceive computer-based testing in relation to the upcoming WAEC CBT implementation, ensuring that the unique challenges of large-scale examination contexts are adequately captured.

The Level of Digital Readiness for Computer-Based Testing (CBT)

Empirical research highlights that digital readiness is a critical foundation for effective implementation of computer-based testing in educational contexts. Studies by Granić and Marangunić (2019) demonstrate that teachers with higher levels of digital competence are more likely to incorporate digital assessment tools and manage computer-based testing environments. Similarly, Ilomäki et al. (2016) emphasize that teacher readiness encompasses not only technical skills but also pedagogical understanding of how to integrate technology into teaching and assessment practices. In the African context, Ally (2024) observed that teachers' digital skills were closely linked to access to professional development and ICT resources, while Agyei (2021) found that limited infrastructure and inadequate training reduced teachers' confidence to use digital technologies in assessment. Specific to Nigeria, Srinivasan (2024) reported significant disparities in digital readiness between urban and rural schools, with rural teachers often lacking basic computer access and skills. Research by Ukwueze and Uzoagba (2021) and Siddiq and Scherer (2017) also indicates that many Nigerian teachers have low exposure to structured ICT training, further limiting their readiness for computer-based examinations. These findings collectively show that digital readiness is multi-dimensional, involving access to infrastructure, availability of training, and individual competence with technology.

However, in recognizing the importance of digital readiness, existing literature shows several gaps. Most studies on teacher readiness focus on general ICT or e-learning readiness rather than readiness specific to computer-based testing and high-stakes examination environments. For instance, studies by Thomas and Oladejo (2017) chiefly address ICT acceptance in teaching, without exploring teachers' specific preparedness for computer-based assessment formats. In Nigeria, empirical research tends to concentrate on undergraduate contexts or classroom technology use, leaving secondary school environments under-examined (Fahm et al., 2022). Furthermore, limited empirical evidence examines the combined influence of infrastructure availability, institutional support, and teachers' individual digital skills on readiness for CBT. There is also a lack of comparative studies across different geopolitical zones of Nigeria, which could reveal regional variations in digital readiness. Finally, while some research notes disparities between urban and rural schools, few studies investigate how these disparities affect teachers' actual performance and confidence in managing computer-based examinations. Addressing these gaps is essential for providing policymakers and educational planners with evidence-based insights into how to support teachers' digital readiness for CBT, particularly in preparation for WAEC's planned implementation by 2030.

The Perception and the Level of Digital Readiness

Research suggests a strong interrelationship between teachers' perception of technology and their level of digital readiness, with both factors playing complementary roles in the adoption of computer-based assessment practices. Al-Nuaimi and Al-Emran (2021) found that teachers who hold positive beliefs about the usefulness and ease of digital tools were more likely to engage in professional development and build their

digital skills. Similar findings were reported by Luik and Taimalu (2021), who linked technology acceptance to both attitudes toward ICT and the extent of teachers' ICT competence. In the African context, Mabalane Junior (2025) observed that teachers who recognized the value of digital systems were more proactive in seeking training and ICT resources, which enhanced their readiness to integrate technology into assessment. Thomas and Oladejo (2017) also point out that teachers' perception of computer-based testing influences their motivation to develop the necessary digital skills. These empirical studies indicate that perception and digital readiness should not be studied in isolation; rather, each factor interacts to influence teachers' capacity to implement and adapt to new assessment paradigms such as computer-based examinations.

Notwithstanding this recognition of interplay between perception and digital readiness, there remain important empirical gaps, particularly within the Nigerian secondary school context. Much of the existing literature examines either perception of technology or digital competence separately, without analyzing how these factors jointly influence readiness for computer-based testing. For example, John (2015) focuses mainly on teachers' attitudes toward educational technologies, while Rahimi and Tafazoli (2022) address digital competence without integrating perception measures. In Nigeria, empirical studies rarely examine the combined effect of perception and readiness on teachers' ability to prepare students for high-stakes computer-based examinations such as WAEC. Moreover, there is limited research investigating how this relationship may vary across different teacher demographics, school types, or subject areas. This gap underscores the need for comprehensive studies that assess both perception and digital readiness simultaneously, providing a clearer understanding of how these factors interact to shape teachers' preparedness for computer-based WAEC examinations in Nigerian secondary schools.

METHODOLOGY

Research Design

The study employed a structured multi-phase quantitative research design that integrated both ex post facto and correlational approaches in a sequential manner. In the first phase, an ex post facto design was utilized to examine pre-existing conditions among teachers, particularly their prior exposure to technology, experience with ICT, and existing levels of digital readiness. These variables were not manipulated but observed as they naturally occurred, providing a baseline understanding of teachers' technological background within the context of computer-based WAEC examinations. Following this, the second phase adopted a correlational design to analyze the relationships among the key variables identified in the study. Specifically, this phase examined the extent to which teachers' perception and digital readiness predict their preparedness for the implementation of computer-based testing (CBT). Data collected from the first phase informed the correlational analysis, allowing for the determination of both the strength and direction of relationships among the variables. By structuring the study in this sequential manner, the research moves beyond merely justifying the choice of design to clearly demonstrating how each phase contributes to addressing the research problem. The population comprised all registered secondary school teachers in public and private schools in Ebonyi State, Nigeria, who are directly involved in teaching and assessment in preparation for national examinations.

Population, Sampling Technique and Sample Size

According to the Ebonyi State Ministry of Education (2025), the study population comprised 12,483 registered secondary school teachers across public and private schools located in both urban and rural areas. To ensure that key subgroups within this population were adequately represented, a stratified random sampling technique was adopted. Stratification was based on school location (urban and rural) and subject discipline, as these variables were considered relevant to differences in teachers' digital readiness and perceptions of computer-based examinations. To operationalize the sampling process, an official and comprehensive list of

registered teachers was obtained from the Ebonyi State Ministry of Education following formal administrative approval. The sampling frame was subsequently organized according to the identified strata. Proportional allocation was then applied to determine the number of respondents to be selected from each stratum in line with their relative proportions in the population. Within each stratum, simple random sampling using a computer-generated randomization procedure was employed to ensure that every teacher had an equal and unbiased chance of selection. The selected participants were contacted through their respective school administrations. Formal letters of invitation and informed consent forms were distributed via school principals, who acted as institutional gatekeepers. Participation in the study was entirely voluntary, and respondents completed the research instrument through a coordinated in-school administration process. A total of 1,248 teachers, representing approximately 10% of the population, constituted the study sample. The decision to use 10% was not arbitrary but was guided by statistical and methodological considerations. First, for large populations exceeding 10,000, sample size determination is more appropriately based on statistical adequacy rather than fixed percentage conventions. Using standard sample size determination approaches (e.g., Cochran's formula), a minimum sample of approximately 370 - 400 respondents would have been sufficient at a 95% confidence level and 5% margin of error. Therefore, the selected sample of 1,248 substantially exceeds this minimum threshold, ensuring high statistical power.

Second, the study employed multiple regression analysis with two predictor variables, which requires an adequate sample size to produce stable and reliable estimates. Based on established guidelines (e.g., $N \geq 50 + 8m$, where m is the number of predictors), the minimum required sample would be fewer than 100 respondents. Thus, the chosen sample size is considerably robust for the intended analysis. Third, practical considerations such as geographical spread, accessibility of schools, time constraints, and resource availability also informed the decision, ensuring that data collection remained feasible without compromising representativeness. Importantly, the use of stratified sampling with proportional allocation ensured that the 10% sample accurately reflected the population structure across key variables, thereby enhancing the generalizability and reliability of the findings.

Instrumentation

Data for the study were collected using a structured self-administered questionnaire titled the Teachers' Perception and Digital Readiness Inventory (TPDRI). The instrument was adapted from existing validated scales on technology acceptance and digital competence, particularly constructs derived from the Technology Acceptance Model (e.g., perceived usefulness and ease of use) and established digital readiness frameworks. However, the items were modified and contextualized by the researcher to align specifically with the implementation of computer-based WAEC examinations in Nigerian secondary schools. As such, the TPDRI is a researcher-adapted instrument tailored to the objectives and context of this study. The questionnaire was divided into three sections. Section A consisted of 6 items capturing demographic information such as age, gender, teaching experience, subject area, and school type. Section B contained 15 items measuring teachers' perception of computer-based testing, focusing on perceived usefulness, ease of use, and attitudes toward CBT. Section C comprised 25 items assessing digital readiness, including self-reported computer competence, access to ICT resources, frequency of digital tool usage, and confidence in operating computer-based assessments. All items were rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). To ensure the validity of the instrument, the adapted questionnaire was subjected to expert review by specialists in educational technology and measurement and evaluation, who assessed the items for content relevance, clarity, and contextual appropriateness. A pilot study was subsequently conducted with 30 teachers from secondary schools outside the main study sample. The reliability of the instrument was established using Cronbach's alpha, yielding coefficients of 0.74 for the perception scale and 0.78 for the digital readiness scale, indicating acceptable internal consistency. The data collection was carried out over a four-week period. Three trained research assistants administered the questionnaire in person across selected schools, providing clarification where necessary to enhance response accuracy. For schools with accessibility constraints, an

online version of the instrument was distributed via a secure platform. Participants were given clear instructions and approximately 30 minutes to complete the questionnaire. Ethical considerations were strictly observed: participation was voluntary, confidentiality was ensured through secure handling of responses, and participants were informed of their right to withdraw at any stage without penalty. Follow-up reminders were issued to improve response rates, ensuring comprehensive and reliable data collection across diverse school settings.

Data Analysis and Ethical Consideration

The data analysis involved descriptive statistics (frequencies, percentages, means, and standard deviations) to summarize teachers' perceptions and digital readiness, a one-sample t-test, and simple regression analysis, chosen because it allows for the examination of the simultaneous predictive effects of teachers' perceptions and digital readiness on preparedness for CBT, as well as the determination of their relative contributions. Ethical standards were rigorously upheld throughout the data gathering process to ensure the protection, privacy, and rights of all participants. Prior to data collection, ethical approval was obtained from the relevant institutional review board, and formal permission was secured from the Ebonyi State Ministry of Education and participating school authorities. All selected teachers were provided with an information sheet detailing the purpose of the study, procedures involved, and their rights as participants. Written informed consent was obtained before participation. To ensure data privacy and confidentiality, no personally identifiable information (such as names or staff identification numbers) was collected on the questionnaire. Each response was assigned a unique code for tracking purposes. Paper-based questionnaires were collected immediately after completion and stored in locked cabinets accessible only to the principal researcher. Digital data obtained through the online version of the questionnaire were encrypted and stored on a password-protected device and secure cloud storage, with access restricted solely to the research team. In line with data protection protocols, all data were used strictly for academic purposes and will be retained for a specified period (e.g., five years) after publication, after which they will be securely destroyed. The data were analyzed and reported in aggregate form, ensuring that no individual participant or school could be identified in the findings. Also, regarding the roles of the research team, the principal researcher was responsible for overall coordination, instrument design, and data management. Three trained research assistants facilitated questionnaire distribution and collection at the school level, provided clarifications to participants where necessary, and ensured adherence to ethical procedures during administration. They were trained on confidentiality obligations and did not have access to identifiable or sensitive data beyond the collection phase. The participants were explicitly informed of their right to decline participation or withdraw from the study at any stage without any penalty. These measures collectively ensured compliance with established research ethics principles, including respect for persons, beneficence, and justice, as well as adherence to standard publication ethics guidelines.

RESULTS

Perception and Readiness of Secondary School Teachers on Computer-Based Testing in WAEC by 2030

Table 1 presents the mean and standard deviation of teachers' perceptions of computer-based testing (CBT). The results indicate that teachers generally exhibit a neutral perception of CBT, with mean scores ranging from 2.86 to 3.10 on a 4-point scale. Items related to willingness to participate in training ($M = 3.10$, $SD = 0.90$) and adaptability of teaching methods ($M = 3.06$, $SD = 0.92$) recorded the highest mean values, suggesting openness among teachers toward professional development and instructional adjustment in response to CBT implementation.

Table 1. Teachers' Perception of CBT (N = 1,248)

Item	Description	Mean	SD
1	CBT improves academic performance	3.03	0.95
2	Confident assisting students	2.96	0.98
3	CBT is more reliable	3.01	0.94
4	Motivated to learn CBT tools	3.05	0.92
5	Feasible in school	2.99	0.96
6	Reduces examination malpractice	2.86	1.00
7	Teachers' support is necessary	2.99	0.95
8	Enhances student engagement	3.03	0.94
9	Willing to participate in training	3.10	0.90
10	Provides quicker feedback	3.02	0.94
11	Students perform better	2.99	0.95
12	Aligns with modern assessment	3.04	0.93
13	Comfortable adapting teaching	3.06	0.92
14	School management encourages CBT	3.00	0.94
15	Improves credibility of WAEC	3.04	0.93

However, relatively lower mean scores were observed in areas such as the perceived ability of CBT to reduce examination malpractice ($M = 2.86$, $SD = 1.00$) and its feasibility within school contexts ($M = 2.99$, $SD = 0.96$). These findings suggest underlying concerns regarding infrastructural readiness and the broader effectiveness of CBT. The standard deviation values across items indicate moderate variability in responses, reflecting differences in experiences and exposure among teachers. Overall, the findings suggest that while teachers demonstrate a general disposition toward CBT, this perception is not uniformly strong and is influenced by contextual and resource-related factors.

Digital Readiness of Secondary School Teachers for Computer-Based Testing

Table 2 presents the mean and standard deviation of teachers' digital readiness for CBT implementation. The results reveal that digital readiness is moderate but not yet optimal, with mean scores ranging from 2.48 to 2.77. Higher mean values were recorded for items related to basic digital competencies, such as the ability to guide students on CBT platforms ($M = 2.77$, $SD = 1.03$) and the use of digital communication tools ($M = 2.77$, $SD = 1.03$), indicating some level of confidence in foundational digital skills.

In contrast, lower mean scores were observed for access-related variables, particularly reliable internet connectivity ($M = 2.48$, $SD = 1.09$) and access to functional computers ($M = 2.54$, $SD = 1.06$), highlighting infrastructural limitations as a significant barrier to readiness. Similarly, items related to technical support and training also recorded moderate scores, suggesting gaps in institutional support systems. The standard deviation values indicate variability in responses, suggesting that digital readiness differs across teachers depending on factors such as access to resources, training opportunities, and prior exposure to ICT. However, while teachers possess some foundational digital competencies, their overall readiness for CBT implementation is constrained by inadequate infrastructure and limited institutional support, indicating the need for targeted interventions.

Table 2. The Teachers' Digital Readiness for CBT

Item	Mean	SDv
1. Adequate ICT skills	2.60	1.05
2. Access to functional computers	2.54	1.06
3. Reliable internet connectivity	2.48	1.09
4. Confident navigating CBT platforms	2.75	1.02
5. Participated in ICT training	2.69	1.05
6. School provides technical support	2.63	1.05
7. Can troubleshoot basic problems	2.55	1.07
8. Can guide students on CBT platforms	2.77	1.03
9. Access to personal devices	2.71	1.04
10. Familiar with WAEC CBT guidelines	2.70	1.04
11. Confident using LMS for assessment	2.64	1.05
12. Integrate digital tools into lessons	2.69	1.04
13. Handle data entry and results	2.63	1.06
14. Assist students with login issues	2.71	1.04
15. Comfortable using digital presentation tools	2.77	1.03
16. Manage online exam schedules	2.70	1.05
17. Monitor students' activity	2.74	1.04
18. Use spreadsheet/grading software	2.64	1.06
19. Help students with technical difficulties	2.71	1.04
20. Ensure security during CBT	2.64	1.06
21. Participated in ICT workshops	2.70	1.05
22. Confident using email/digital communication	2.77	1.03
23. Comfortable adopting new software updates	2.71	1.04
24. Believe fully prepared for CBT	2.64	1.06
25. Overall confidence in digital readiness	2.71	1.05

Hypothesis One

Comparison of Teachers' Perception of Computer-Based Testing

A one-sample t-test was conducted to determine whether the overall perception of secondary school teachers toward the planned introduction of computer-based testing (CBT) in WAEC examinations by 2030 is significantly higher than the neutral baseline of 37.5.

From **Table 3**, the observed mean perception score of 37.65 is marginally above the baseline, with a standard deviation of 9.45, indicating variability across the teacher population. The calculated t-value ($t = 0.57$, $df = 1,247$, $p = 0.567$) shows that the observed mean is not significantly higher than the baseline at the 0.05 significance level.

Table 3. The summary of a One-Sample t-Test Analysis of Teachers' Perception of CBT (N = 1,248)

Variable	N	Mean	SD	Test Value (Baseline)	t	df	p-value
Teachers' Perception of CBT	1,248	37.65	9.45	37.5	0.57	1,247	0.567

This finding demonstrates that teachers' overall perception of CBT is statistically neutral. While descriptive item scores show minor variations such as a willingness to participate in training (Item 9, $M = 3.10$) the aggregate test reveals no significant deviation from the theoretical baseline. This neutral disposition reflects widespread uncertainty and hesitation regarding the implementation of computer-based WAEC examinations. Approximately 30-42% of teachers selected Strongly Disagree or Disagree on multiple items, confirming mixed perceptions. The results indicate a critical need for professional development, sensitization programmes, and awareness campaigns to strengthen teachers' understanding and acceptance of CBT. Without addressing these gaps, the planned 2030 WAEC CBT rollout may face resistance or suboptimal teacher engagement, which could compromise the effectiveness of implementation in Nigerian secondary schools.

Hypothesis Two

Comparison of Teachers' Readiness for Computer-Based Testing

A one-sample t-test was conducted to determine whether the level of digital readiness of secondary school teachers toward the planned introduction of computer-based testing (CBT) in WAEC examinations by 2030 is significantly higher than the baseline score of 62.5. The results in **Table 4** show an observed mean score of 66.85, which is higher than the baseline, and a standard deviation of 14.52, indicating moderate variability in digital readiness across the sample. The computed t-value ($t = 10.25$, $df = 1,247$, $p < 0.001$) is statistically significant, demonstrating that the teachers' digital readiness is significantly higher than the baseline at the 0.05 level.

This finding suggests that, in general, teachers possess a moderate-to-high level of digital readiness, reflecting exposure to ICT tools, familiarity with digital platforms, and some ability to navigate computer-based systems. However, despite the overall significant readiness, the item-level data from **Table 2** show that substantial proportions of teachers still report low readiness in specific areas, such as reliable internet access (Item 3, $SD + D = 49.6\%$) and access to functional computers (Item 2, $SD + D = 49.6\%$). This indicates that infrastructure limitations, inconsistent training, and uneven access to resources may hinder the full implementation of CBT. Moreover, while the aggregate digital readiness score is significantly above baseline, suggesting that teachers are moderately prepared to adopt CBT, targeted interventions in ICT infrastructure, technical support, and capacity-building programmes remain necessary to ensure all teachers achieve full readiness for WAEC CBT by 2030.

Hypothesis Three

Relationship of Teachers' Perception and Readiness for Computer-Based Testing

The independent variable in this hypothesis is teachers' perception of computer-based testing (CBT), while the dependent variable is the level of digital readiness of secondary school teachers toward the planned introduction of CBT in WAEC examinations by 2030. Simple linear regression analysis was employed to test this hypothesis. The result of the analysis is presented in **Table 5**. The simple regression analysis in **Table 5** on the relationship between teachers' perception and digital readiness produced an R^2 of 0.044. This implies that 0.043% of the variance in digital readiness can be predicted from teachers' perception. The Analysis of Variance (ANOVA) produced an F-value of 57.49 with a p-value of <0.001 at 1 and 1,246 degrees of freedom, indicating statistical significance at the 0.05 level. The null hypothesis was therefore rejected.

Table 4. One-Sample t-Test Analysis of Teachers' Digital Readiness for CBT ($N = 1,248$)

Variable	N	Mean	SD	Test Value (Baseline) t	df	p-value
Teachers' Digital Readiness for CBT	1,248	66.85	14.52	62.5 10.25	1,247	<0.001

Table 5. The Summary of Simple Regression Analysis, Showing the Contribution of Teachers' Perception to Digital Readiness

Model	Sum of Squares	df	Mean Square	F	Sig.	
Regression	3,529.84	1	3,529.84	57.49	<0.001	
Residual	76,442.21	1,246	61.27			
Total	79,972.05	1,247				
Variables	Unstandardized Coefficients (B)		Std. Error	Standardized Coefficients (Beta)	t	Sig.
Constant	44.12		1.02		43.24	<0.001
Teachers' Perception	1.82		0.24	0.41	7.58	<0.001

Note. $R = 0.41$, $R^2 = 0.044$, Adjusted $R^2 = 0.043$, Predictor: Teachers' Perception, Dependent Variable: Digital Readiness

This result signifies that teachers' perception significantly contributes to their level of digital readiness, accounting for a moderate proportion of the variance. The regression coefficient shows that teachers' perception ($B = 1.82$, $Beta = 0.41$, $t = 7.58$, $p < 0.05$) is a predictor. This indicates that as teachers' perception of CBT improves, their digital readiness also increases. The regression equation to explain this relationship is:

$$\text{Digital Readiness} = 44.12 + 1.82 (\text{Teachers' Perception})$$

The regression model indicates that teachers' perception accounts for 17% of the variance in digital readiness ($R^2 = 0.17$, $F = 57.49$, $p < 0.001$). Given the cross-sectional nature of the data, this result demonstrates a statistically significant predictive association at a single point in time, rather than a direct causal relationship or a guarantee of increased readiness over time. The improving perception through awareness campaigns, professional development, and sensitization programmes may therefore lead to measurable improvements in teachers' preparedness for CBT implementation. The table shows that teachers' perception significantly predicts digital readiness of secondary school teachers, explaining 17% of the variance. The Beta value (0.41) indicates a moderate effect, suggesting that teachers with more perceptions of CBT are more likely to engage with ICT tools and demonstrate higher digital readiness for WAEC computer-based examinations.

DISCUSSION

The first hypothesis examined teachers' perception of the planned introduction of computer-based testing (CBT) in WAEC examinations by 2030. The non-significant one-sample t-test confirms that teachers' baseline perception is neutral. This statistical neutrality underlines an attitude of hesitation and uncertainty, demonstrating that teachers have not yet fully embraced or rejected the transition to CBT. This pattern indicates that awareness of CBT exists, but it has not yet translated into firm acceptance or rejection. The implication is that perception remains unstable and sensitive to contextual factors such as exposure to technology, training opportunities, and institutional readiness. This finding both aligns with and extends existing literature. It supports studies which argue that teacher perception is shaped by access to ICT training and exposure to digital tools, particularly in environments where such exposure is inconsistent (Mabalane Junior, 2025; Nyathi, 2022; Thomas & Oladejo, 2017). At the same time, it differs from evidence in more technologically advanced contexts where teachers tend to show stronger acceptance of digital assessment systems (Rahimi & Tafazoli, 2022). The Nigerian situation, therefore, suggests a gap between global digital assessment trends and local readiness conditions. The result points to a concern that perception alone cannot be assumed to be supportive of policy implementation. It indicates a need for structured engagement strategies that move teachers from

uncertainty towards informed acceptance. The finding is neither fully positive nor negative, but it signals hesitation that could slow down the successful adoption of CBT if not addressed through targeted interventions.

The second hypothesis examined teachers' digital readiness for CBT. The results indicate a moderate level of readiness, suggesting that teachers possess basic familiarity with digital tools but lack consistent competence across all required areas. This implies partial preparedness, where willingness exists but is constrained by uneven skills development and infrastructural limitations. This outcome is consistent with studies that emphasize the importance of combining technical competence with pedagogical integration in achieving effective digital assessment practices (Ilomäki et al., 2016; Rahimi & Tafazoli, 2022). It also reflects findings from Nigerian contexts where disparities in ICT access between urban and rural schools continue to influence teacher competence and confidence (Ayomide, 2025; Ukwueze & Uzoagba, 2021). In this sense, the study complements existing literature by reinforcing the argument that digital readiness is uneven and context-dependent. However, the moderate level of readiness observed is somewhat unexpected given persistent infrastructural challenges reported in similar environments. This suggests that informal learning, personal interest, and self-driven ICT engagement may be contributing to teachers' digital development outside formal training structures. The implication is that readiness is emerging, but it remains fragile and requires sustained institutional support to become fully functional for WAEC CBT implementation.

The third hypothesis investigated the relationship between teachers' perception and their digital readiness for CBT. While perception predicts digital readiness, this statistical dependency captured at a single cross-sectional point in time. Higher perceived usefulness is associated with greater readiness, but structural factors remain critical co-determinants. This indicates that teachers who view CBT more favourably are more likely to engage in activities that improve their digital competence. This finding aligns with research that links technology attitudes to increased engagement with digital tools and professional learning (Granić & Marangunić, 2019; Mabalane Junior, 2025; Thomas & Oladejo, 2017). It also supports the view that perception plays a motivational role in shaping teachers' willingness to develop digital skills. However, the result also shows that perception alone does not fully account for digital readiness. This aligns with literature that emphasizes structural and environmental constraints such as infrastructure, training quality, and institutional support (Agyei, 2021; Thomas & Oladejo, 2017).

The moderate predictive strength suggests that while perception is important, it operates alongside other practical factors. This finding implies that improving teachers' perception of CBT is necessary but not sufficient. It must be accompanied by investment in infrastructure and sustained professional development. This creates a more realistic pathway toward CBT implementation. The result is therefore both encouraging and cautionary, as it confirms potential readiness while also exposing structural limitations that could hinder effective implementation if left unaddressed.

CONCLUSION

The study examined secondary school teachers' perceptions and digital readiness for the planned implementation of computer-based WAEC examinations by 2030. Beyond describing attitudes and competence levels, the findings provide a clearer understanding of how psychological and structural factors interact in shaping readiness for large-scale digital assessment reform in Nigeria. A key finding is that teachers' perception of computer-based testing is not fixed. It develops through exposure, experience, and institutional support. Perception does not automatically lead to full preparedness, but it encourages engagement in training and ICT-related learning. In this way, perception functions as an entry point for digital adjustment rather than an outcome in itself. The study also indicates that digital readiness is uneven across teachers and strongly influenced by context. The differences in school location, access to ICT resources, and training opportunities contribute to variations in competence and confidence. This suggests that readiness is not only an individual

attribute but also depends on the conditions within which teachers work. The findings further point to a clear relationship between perception and digital readiness. Perception supports the development of digital skills, while improved competence strengthens confidence in computer-based assessment. This interaction explains how teachers gradually move towards or away from readiness for digital examination systems. The study therefore adds new understanding that the successful implementation of computer-based WAEC examinations depends on the interaction between perception and structural readiness conditions. Both factors must be addressed together through improved training opportunities and better access to ICT resources in order to support effective and fair implementation. The findings confirm a clear predictive association between perception and digital readiness. Addressing teachers' hesitancy while simultaneously improving infrastructure provides the most realistic framework for WAEC CBT implementation by 2030.

RECOMMENDATIONS

1. Education authorities and school administrators may consider introducing continuous professional development programmes aimed at improving teachers' competence in computer-based testing. Such programmes could include practical exposure to CBT platforms, basic troubleshooting skills, and strategies for integrating digital assessment into classroom practice.
2. Attention may be given to improving technological infrastructure in schools, particularly in rural and underserved areas. This may include strengthening access to functional computer laboratories, improving electricity supply stability, expanding internet connectivity, and ensuring the availability of updated assessment software to support CBT implementation.
3. Schools may find value in introducing phased or pilot computer-based assessments before full implementation. This approach could help teachers and students become familiar with CBT processes while also allowing institutions to identify and address technical or operational challenges early.
4. Education policymakers and school leadership structures may consider providing clearer implementation guidelines alongside sustained technical support for teachers. In addition, recognition systems or motivational incentives may encourage greater teacher engagement with CBT practices and improve willingness to adapt.
5. Efforts may be directed towards reducing disparities between urban and rural schools through context specific interventions. Possible strategies include mobile ICT training support, shared digital resources, and partnerships with technology providers to support schools with limited infrastructure.
6. Further studies may focus on specific dimensions of teacher readiness, such as differences across age groups, teaching experience, or subject areas. Additional research may also examine particular aspects of readiness where teachers feel more or less confident, in order to provide more detailed evidence for policy and practice.

LIMITATION OF THE STUDY AND FUTURE RESEARCH DIRECTIONS

This study is limited by its geographical scope, as it was conducted only in Ebonyi State, Nigeria. Although the sample of 1,248 teachers was drawn using stratified random sampling to improve representativeness, the findings may not fully capture the diversity of teachers' perceptions and digital readiness across other states or geopolitical zones in Nigeria. A central limitation of this study is its heavy reliance on self-reported survey data via the TPDRI instrument, which renders the findings susceptible to common-method variance and social

desirability bias. Specifically, self-assessed digital readiness (\$M = 66.85\$) may represent an overestimation of actual competence due to participants' desire to present themselves as technologically capable. Observed classroom performance evaluations, practical ICT stress-testing, or direct technical audits could yield different readiness outcomes. Future research should combine self-reported inventories with objective, performance-based assessments and longitudinal tracking to monitor how perception and competence evolve prior to the 2030 rollout. This approach may introduce response bias, as participants might overestimate or underestimate their actual digital competence and attitudes toward computer-based testing. In addition, the use of structured items limits the depth of responses, as teachers were not able to fully explain the reasons behind their perceptions or readiness levels. Another limitation is the cross-sectional design of the study. The data were collected at a single point in time, which means the findings reflect the situation at that period only. Changes in teachers' perceptions and digital readiness over time, especially as ICT training and CBT policies evolve, were not captured. Furthermore, although the sample size was statistically adequate for the analysis conducted, variations in school infrastructure, access to ICT resources, and training opportunities may have influenced responses in ways that were not fully controlled for in the study.

Future studies may consider expanding the geographical scope to include multiple states or regions in Nigeria in order to improve generalizability and provide a broader national perspective on teachers' readiness for computer-based examinations. Further research may also adopt a mixed-methods approach to gain deeper insight into teachers' experiences, particularly through interviews or focus group discussions that can explain why certain perceptions or readiness levels exist. In addition, future studies may examine specific factors influencing readiness, such as age, teaching experience, subject specialization, and school type, to better understand differences among teachers. Research could also focus on specific dimensions of digital readiness, such as technical competence, infrastructural access, or training exposure, to provide more detailed evidence for policy and intervention planning.

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