Attitudes, Perceptions, and Academic Performance: A Study of Computer-Based Examination Among Nursing Students in Osun State

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Article Info	ABSTRACT
	The study determined the attitude and perception of nursing students towards computer-based examination in Osun State. It also examined nursing students' examination performances while using CBT and traditional methods. These were with a view to providing empirical information on the attitude and perception of student nurses towards the use of computer-based tests in Osun State. The study adopted a descriptive survey research design of the correlation type. The population for the study comprised all schools of nursing in Osun State. Out of this, six nursing schools were randomly selected using 20 nursing students from each school, totaling 120 respondents. One instrument trial tested, yielding a Cronbach's alpha of 0.87, was used for the study. The data collected were analyzed descriptively and correlationally. The results revealed that the nursing students had a positive attitude towards the use of CBT. It further showed that the students demonstrated high perception towards the use of CBT in their exams. There was a significant difference ($p<0.05$) between the average score obtained by the nursing students in CBT and the traditional method. The study concluded that the nursing students had a positive attitude and high perception towards the use of CBT and they preferred the CBT examination to the paper-based test.

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1. INTRODUCTION

The use of computer-based testing in nursing examinations in Nigeria has been a recent development, with a shift from paper-based systems due to challenges such as high costs, manpower shortages, and examination malpractice (Ndume et al., 2014). This transition has been facilitated by the increasing availability of educational resources on the web (Sadiq & Onianwa, 2011). However, students' computer anxiety, operation skills, perception, and attitudes towards computer-based assessment determine the success of this transition (Agah et al., 2016). The design of a single-user-mode computer-based examination system for senior secondary schools identified in

Abah et al. (2022) could serve as a solution to some of the challenges posed by paper-based test systems in nursing exams.

The influence of Computer-Based Tests (CBT) on nursing examinations in Nigeria is a topic that has not been directly addressed in previous research. However, the broader use of Information and Communication Technology (ICT) in healthcare, as highlighted by Nafiu et al. (2024) and Olorunfemi et al. (2024), suggested that the integration of CBT in nursing examinations could potentially enhance the quality and efficiency of the assessment process. This was further supported by the Aluko et al. (2024) study, which emphasized the importance of providing nurses with the skills and knowledge required to effectively use technology in their practice. However, the challenge of poor access to ICT, as noted by Osian et al. (2023), may hinder the successful implementation of CBT in nursing examinations. Therefore, while the potential benefits of CBT in nursing examinations are evident, addressing the issue of students' attitude, perception, and performance in tests became crucial for its successful integration in Osun State nursing schools. Thus, the specific objectives of this study were to determine the attitude and perception of nursing students towards computer-based examination in Osun State. As well as to examine the nursing students' examination performances while using CBT and traditional methods. Two research questions and one hypothesis guided the study, namely, what attitude do nursing students have towards the use of CBT in examination? (ii) What is the perception of nursing students towards the use of CBT in examination? Lastly, the hypothesis formulated was that there is no significant difference in the performance of nursing with computer-based tests (CBT) and traditional approach examinations.

Attitude of nursing students towards use of CBT in examinations

The attitude that one had towards an issue could be a determining factor. Attitude has been referred to as a person's overall outlook or way of thinking and feeling about something. It can be positive, negative, or neutral and can greatly influence a person's behavior and interactions with others. A range of studies have explored nursing students' attitudes towards Computer-Based Tests (CBTs) in examinations. Salem et al. (2023) found that while first-year students generally had a positive attitude towards online exams, anxiety levels were higher among female students and those in higher academic years. Cruz-Barrientos et al. (2023) reported that nursing students generally had a good attitude towards Information and Communication Technologies (ICTs), but their knowledge and use of these technologies were lower in the context of education and learning programs. Tsarfati and Cojocaru (2023) highlighted the importance of understanding the positive impact of technology on the quality of care, which can influence nurses' attitudes towards computer technology. Finally, Ahmed et al. (2024) demonstrated that the application of electronic-based learning, including CBTs, had a positive effect on nursing students' attitudes and evaluation of practical skills. These studies collectively suggest that while nursing students may have positive attitudes towards CBTs, there are factors such as anxiety, knowledge, and understanding of technology's impact on care that can influence these attitudes.

A study by Ahmed et al. (2024) found that nursing students had a positive attitude toward electronic-based learning, which could potentially extend to computer-based tests (CBT). However, Osian et al. (2023) highlighted the challenges of poor access to information, communication, and technology among nursing students, which could impact their attitude toward CBT. Aremu et al. (2024) recommended that there be investment in digital infrastructure to improve the use of electronic devices in education, including CBT. Aluko et al. (2024) point out the value of training nursing students in digital skills, which could also influence their attitude towards CBT. However, Salem et al. (2023) present a more nuanced view, noting that while nursing students may have positive attitudes toward electronic online exams, they also experience anxiety, which can impact their satisfaction with the testing format.

Nursing students' perceptions of using CBT in examinations

A person's perception is another key factor established in literature that determines whether one uses a system or not. Perception is referred to as how one interprets and makes sense of the world around him or her. It involves the process of selecting, organizing, and interpreting information from one's environment in order to create a meaningful understanding of the surroundings. The perception of nursing students towards computer-based testing is influenced by their exposure to and comfort with technology. Alaban et al. (2020) found that limited computer exposure in the curriculum led to a negative view of its potential use in healthcare. However, Reid et al. (2016) reported that a majority of students preferred computer-based testing for multiple-choice question exams. This preference may be related to the students' self-efficacy in using technology, as indicated by Kurt et al. (2020). Ramachandra and Math (2014) further emphasized the need for integrating informatics throughout the nursing curriculum to improve attitudes towards computer use.

The perception of nursing students in Nigeria towards computer-based testing is generally positive, with students perceiving it as useful, easy to use, and credible (Akinwale & Olafare, 2017).

Effect of Computer-Based Examination on Student Performance

Previous studies have explored the use of digital technologies in nursing education. Jones et al. (2024) found that nursing students responded positively to a simulated Electronic Medical Record (EMR) training platform, suggesting that they are familiar with computer-based tests. Similarly, Yelkin et al. (2024) and Kim et al. (2024) both highlighted the benefits of online learning and virtual reality simulations in reducing stress levels and enhancing competence in mental health nursing, respectively. These studies collectively suggest that nursing students are not only familiar with computer-based tests but also respond positively to their use in their education.

The perception of computer-based testing among Nigerian nursing students is mixed, with a preference for paper-based tests in certain subjects (Okocha, 2022). This preference is influenced by academic discipline, with no significant difference between genders (Ajogwu & Olayanju, 2021). However, there is a lack of computer literacy

among nursing students, with a majority not being computer literate (Ajuwon, 2003). This lack of computer literacy may contribute to computer anxiety, which in turn affects students' preparedness for computer-based assessment (Agah et al., 2016).

2. METHOD

This study adopted a descriptive research design of the correlational type. This method was used based on the nature of the data collected and the objectives of the study. The work was done with a view to describing the experience of the research participants and to determine the relationship that existed between the variables. The target population of the study comprises all nursing students in Osun State. There were nine colleges of nursing in the state. Out of this population, six schools were randomly selected based on the students' populations. The colleges of nursing used for the study include Obafemi Awolowo University, Department of Nursing, Ile-Ife; College of Nursing Science, OAUTHC, Ile-Ife; Seven Days Adventist, School of Nursing, Ile-Ife; School of Nursing Osogbo, Osun State; Osun State University, Department of Nursing, Osun State; and Mercy College of Nursing, Iwo, Osun State. The sample size consisted of 120 nursing students in Osun State. Six colleges of nursing schools were purposively selected for this study. This selection was because of the number of students that make up the schools. At each school, 20 nursing students were selected from 200 levels. Our goal was to be sure that the students would have experienced both paper-based and computer-based examinations, totalling 120 respondents.

Figure 1. Descriptive Research Design of the Correlational Type

A self-designed instrument was used for data collection in this study. The instrument was titled Attitude and Perception of Students toward the Use of Computer-Based Tests (CBT) in Nursing Examinations in Osun State (APSCBTNE). APSCBTNE was constructed since research questions on a five-point Likert amended scale. It contained 27 items about the attitude and perception of students toward the use of CBT in nursing

education. The questionnaire has three parts. Part A provides demographic data of the respondents, part B provides information on students' attitudes toward the use of CBT, while C contains information on the perception of students toward the use of CBT. The questionnaire was structured on a five-point Likert scale, coded as follows: "strongly agree" (SA) = 5, "agree" (A) = 4, "undecided" (UN) = 3, "disagree" (D) = 2, and "strongly disagree" (SD) = 1.

The instrument used for data collection underwent face validation. Experts subjected it to rigorous scrutiny to ascertain the clarity, relevance, adequacy, and right attributes. The experts' suggestions were affected, and the instrument was tested for reliability. To determine the reliability of APSCBTNE, 20 respondents who were outside the study area were selected for trial testing. The internal consistency and reliability estimate yielded 0.87, indicating that the instrument was reliable and adequate for the study. The tested instrument was then used for data collection.

The tested instrument was distributed to respondents in all nursing schools in Osun State, having obtained consent from respondents and relevant authorities. The APSCBTNE was administered by the researchers one-on-one to the respondents and collected on the spot. Though the participation was voluntary, we obtained a high percentage return of completed questionnaires.

The data collected were analyzed using mean and standard deviation. The meaning was used to answer the research questions. The five-point rating scale of Strongly Agree (SA), Agree (A), Undecided (UN), Disagree (D), and Strongly Disagree (SD) with values of 5, 4, 3, 2, and 1, respectively, was used in scoring the items. This five-point Likert scale gave a mean of 2.5 when divided by 2. This was taken as the mean decision point. All the items that attained mean scores of ≥ 2.5 were accepted by the respondents, as < 2.5 were accepted as low attitude or perception, 2.6-3.9=moderate attitude or perception, while > 4 implies high attitude or perception.

The purpose of this study was to explain to respondents verbally and the consent was obtained. Respondents were assured of a high level of confidentiality, and they were informed that all information obtained would remain anonymous.

3.   RESULTS AND DISCUSSION
Results

The results of this study are threefold. The details are as follows.

Research Question One: What is the attitude of nursing students towards the use of CBT in their examination?

To respond to the research question above, attitudinal data were collected and subjected to descriptive analysis using frequency count, percentages, mean, and standard deviation. The results were as presented in Table 1.

Table 1. Attitudes of Nursing Students towards Adoption of CBT into Examination

S/N	Items	SA	A	UN	D	SD	x̄	σ	Decision
1.	CBT is a fair and unbiased method of evaluating nursing students' knowledge.	75 (62.5)	45 (37.5)				4.62	0.49	High
2.	I can navigate and use CBT testing software	89 (74.1)	31 (25.8)				4.71	0.45	High
3.	CBT examinations accurately reflect my understanding of nursing concepts	78 (65)	30 (25)	10 (8.3)	02 (1.76)		4.52	0.49	High
4.	CBT examinations are more convenient and time efficient.	85 (70.8)	10 (8.3)	25 (20.8)			4.52	0.81	High
5.	I am comfortable with idea of taking exams in a consistent evaluation of nursing students' performance compared to traditional	96 (80)	24 (20)				4.8	0.40	High
6	CBT exams provide a more standardized and consistent evaluation of nursing students' performance compared to traditional exams	25 (20.8)	35 (29.1)	-	15 (12.5)	45 (37.5)	2.83	1.65	Moderate
7.	I am motivated to study and prepare for CBT exams compared to other types of assessments	62 (51.6)	58 (48.3)				4.51	0.50	High

S/N	Items	SA	A	UN	D	SD	x̄	σ	Decision
8.	CBT exams adequately assess my critical thinking and problem – solving abilities.	72 (64.1)	43 (35.8)				4.64	0.48	High
9.	I am satisfied with the feedback and score reporting process for CBT	110 (91.6)	10 (8.3)				4.92	0.28	High
10.	CBT exams adequately prepare me for real world nursing	53 (44.1)	67 (55.8)				4.43	0.50	High

Following the results in Table 1, the nursing students' attitudes towards utilization of CBT in their examination were determined by using a scale of mean (x̄) scores ranging from 1.0 to 2.5 as negative attitude, 2.6 to 3.5 as moderate positive attitude, and 3.6 to 5.0 as high positive attitude. Based on this scale, out of the 10 items in the table with statements regarding nursing students' attitudes towards the use of computer-based testing (CBT) in their examinations. The results revealed that the mean score ranging between 3.6 and 5.0 was nine, 2.6 to 3.5 was one, while none was recorded against the range of 1.0 to 2.5. Overall, the result showed that nursing students have a high positive attitude towards the use of CBT in their examination. This was because the result indicated high mean scores (above 3.5) for most items responded to by the nursing students.

Research Question Two: What is the level of perception of nursing students towards the use of CBT in examination?

To respond to the research question on nursing students' perception toward the CBT exam, the collected data were subjected to descriptive analysis using frequency count, simple percentage, mean, and standard deviation. The results were presented in Table 2.

Table 2. Perception of Nursing Students towards Utilization of CBT in Examination

S/N	Items	SD	D	UN	A	SA	x̄	σ	Decision
1	I am familiar with CBT testing as an examination format				76 (63.3)	44 (36.6)	4.38	0.4 9	High

S/N	Items	SD	D	UN	A	SA	x̄	σ	Decision
2	I perceive CBT exams to be more challenging or less challenging than traditional paper-based exams				11 (9.1)	109 (90.8)	4.9	0.30	High
3	I am confident in my ability to perform well on CBT exams compared to other types of assessments	15(12.5)	55 (45.8)	-	20 (16.6)	30 (25)	2.98	1.45	Moderate
4	I believe that CBT exams accurately measure the knowledge and skills of a nursing student	31(25.8)	45 (37.5)	9 (7.5)	15 (12.5)	20 (16.6)	2.55	1.40	Moderate
5	I am comfortable with the use of technology during exams, such as computer navigation and inputting responses				80 (66.6)	40 (33.3)	4.43	0.50	High
6	I believe that CBT exams provide a more objective and standardized evaluation of nursing compared to traditional exams	5 (4.17)	20 (16.7)		35 (29.17)	60 (50)	4.06	1.25	High

S/N	Items	SD	D	UN	A	SA	x̄	σ	Decision
7	I perceive that the level of fairness and equity in CBT exams compared to other forms of assessment				50 (41.6)	70 (58.3)	4.58	0.50	High
8	I feel good about the security measures implemented during CBT exams to prevent cheating access to exam content				28 (23.3)	92 (76.6)	4.79	0.41	High
9	I believe that CBT exams adequately reflect the real-world challenges and scenarios that I may encounter as a nurse.	40(33.3)	32 (26.6)	8 (6.6)	30 (25)	10 (8.3)	2.73	1.38	Moderate
10	Overall, I am satisfied with the CBT examination format as a nursing student.			5 (4.17)	55 (45.8)	60 (50)	4.36	0.91	High

In Table 2, the nursing students' perception towards utilization of CBT in their examination was determined using a scale of mean scores ranging from 1.0 to 2.5 as low perception, 2.6 to 3.5 as moderate perception, and 3.6 to 5.0 as high perception. The results therefore reveal that seven items out of 10 had a range of mean between 3.6 and 5.0, three had mean scores between 2.6 and 3.5 but none were between 1.0 and 2.5. It thus implied that the nursing students had high perceptions towards the use of computer-based testing (CBT) in their examinations. This was because most items responded to have a mean value above 3.5, yielding high perception.

Ho 1: There is no significant difference in the performance of nursing students when comparing computer-based tests (CBT) to traditional examination methods

Testing the above hypothesis, the data were subjected to t-test analysis. The results revealed that the nursing student's mean score on the computer-based exam (CBT) was 64.68 ± 12.97, while their traditional-based test score was 60.17 ± 12.83 at t-value = 2.71 and p-value < 0.05 and presented in Table 3.

Table 3. Nursing Students Performance in Examination with Computer-Based Test (CBT) and Traditional Approach

	Mean	Standard Deviation	Standard Error	T-value	P-value
CBT	64.68	12.97	1.12	2.71	0.05*
Traditional	60.17	12.84	1.17		

The results indicated that there existed differences in the mean scores. Besides, since the p-value revealed less than 0.05, this indicated that it was statistically significant. As such, the hypothesis was rejected. The implication of this was that the variation in the mean results between the two examinations indicated that the students' academic ability varied. It thus implied that the students fared better with CBT than with the conventional approach used in their examinations. It could be concluded that there exists a significant difference in the performance of nursing students with computer-based tests (CBT) and the use of paper and pen examinations.

Discussion

This study was set out to examine the influence of attitude and perception of student nurses towards the use of computer-based tests in Osun State. Two research questions guided the study. The finding revealed that the nursing students generally have a positive attitude towards the use of CBT in examination since the mean score was above 3.5. The finding supported that of Israel et al. (2024), who found a majority of University of Nigeria nursing students with a positive perception (74.3%) towards using CBT in examinations. This finding was similar to that of Ahmed et al. (2024), who reported that nursing students had a positive attitude towards electronic-based learning, which could potentially extend to the use of CBT. In similar research conducted by Tella and Bashorun (2012), as well as Ramachandra and Math (2014), they found nursing students demonstrating a positive attitude towards the use of CBT in their exam. And that the students prefer the use of CBT in examinations to traditional paper and pencil tests. However, Salem et al. (2023) present a more nuanced view, noting that while nursing students may have positive attitudes toward electronic online exams, they also experience anxiety, which could impact their satisfaction with the testing format.

The findings of this study further revealed that the nursing students had high perceptions of the use of computer-based testing in their examinations. This was because most items responded to had a mean value above 3.5, yielding high perception. This finding resonated with that by Israel et al. (2024), who found eastern part of Nigeria nursing students having positive perceptions towards the use of CBT for final qualifying examinations. In a similar study, Jones et al. (2024) found nursing students positively

perceived the Electronic Medical Record (EMR) training platform. On the contrary, a study by Shehab et al. (2024) revealed that students of nursing had a low level of perception (56.2%) about blended learning. Also, Ahmed et al. (2021) reported that Egyptian nursing students had a better (53.2%) perception of traditional examination but a moderate perception (41.9%) of distance learning. It could then be implied that factors like ICT literacy level, readiness, attitude, knowledge, and access to resources of the students, among others, might influence nursing students' perception of using CBT in exams.

Finally, our finding revealed that the nursing students performed better in examination with the use of computer-based test (CBT) rather than the usual traditional pen and paper examination. Similar to this finding, Habeeb and Banoo (2019) reported higher performance among nursing students who used CBT for their professional examination. Israel et al. (2024) reported a similar result: the nursing students who participated in their study had a preference for CBT rather than the use of pen and paper examination (2.96±0.96).

4.　CONCLUSION

This study examined nursing students' attitudes, perceptions, and academic performance regarding computer-based testing (CBT) compared to traditional examination methods. The findings offer important information about the viability and acceptance of CBT as an assessment tool in nursing education. The study demonstrated that Osun State nursing students exhibited positive attitudes towards the use of CBT in their exams, indicating a favorable disposition towards technology-enhanced assessment methods. This positive attitude is crucial for the successful implementation and sustainability of CBT in nursing programs in Osun State, as student acceptance plays a vital role in the effectiveness of any educational innovation. Furthermore, the nursing students demonstrated high perceptions of CBT, suggesting that they view this assessment method as credible, fair, and suitable for evaluating their knowledge and competencies.

The statistically significant difference ($p<0.05$) in average scores between CBT and traditional examination methods suggested that the mode of assessment may influence the nursing students' performance. This might potentially be due to factors such as reduced test anxiety, immediate feedback capabilities, enhanced question presentation, or improved testing environment associated with CBT. The superior performance in CBT could also reflect nursing students' comfort with digital technology and their ability to navigate computerized assessment platforms effectively. In conclusion, computer-based testing represents a promising and well-received assessment method in nursing education in Nigeria, with potential benefits for both student performance and institutional efficiency. The positive outcomes observed in this study warrant broader implementation while maintaining attention to quality assurance and the continuous improvement of CBT systems in Nigeria.

The study thus recommended that training nursing students in digital skills is required. Providing nurses with the skills and knowledge required not only accelerates the effective

use of technology in examinations but also in clinical settings. There is a need to invest in digital infrastructure to improve the use of electronic devices in education. The Nursing and Midwifery Council of Nigeria should compel all institutions of nursing (universities, colleges, and post-basic schools) to invest in digital infrastructure in their institution, which would serve not only as one of the criteria for accreditation requirements but also as a source of income to the institution. Access to ICT is needed: Uninterrupted power supply and other accesses should be ensured in all nursing computer laboratories. Integrating informatics into the nursing curriculum will be required: Like medical and surgical courses and clinical postings, computer courses and regular exposure to computers should be emphasized in all institutions of nursing for all nursing students.

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