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A STUDY OF STUDENT DEMOGRAPHIC VARIABLES AS PREDICTORS OF INTENTIONS TO ADOPT COMPUTER-BASED TESTING IN NURSING SCHOOL CLINICAL EXAMINATION

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ABSTRACT

Despite the increasing integration of computer-based testing in nursing education, little is known about how student demographic variables influence their intentions to adopt this technology in clinical examinations. This gap in understanding may hinder effective implementation strategies and reduce student acceptance. Therefore, this study aims to determine whether a combination of nursing students' demographic variables significantly predicts their intention to use computer-based testing (CBT) in clinical examinations; quantify the proportion of variance in students' intentions to use CBT that is explained by their demographic data; and assess the relative contribution of each demographic variable to students' intentions to adopt CBT in clinical examinations. The study adopted a correlation research design with a population comprising all nursing schools in Osun State. The study purposively selected six nursing schools from the population. While the simple random sampling technique was used to select 20 nursing students from each school, totaling 120 respondents. A self-developed instrument was used to elicit data from the students, with an internal reliability of 0.87 obtained using Cronbach's alpha. The data collected were analyzed using multiple regression analysis. The finding showed that the combined demographic variables did not statistically and significantly predict the nursing student's intentions to adopt CBT in their clinical exams. Only 5.6% of the variance in nursing students' intention to use CBT in clinical examinations was explained by the combined demographic variables. However, gender significantly predicted the nursing students' intentions to adopt CBT. It concluded that nursing students' demographic data were not influencing their intentions to use CBT in clinical examinations. The paper outlined the implications for the study.

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1. INTRODUCTION

Clinical examination is a fundamental aspect of nursing practice in Nigeria, reflecting a broader commitment to providing high-quality patient care and ensuring

effective diagnosis and treatment. It encompasses a systematic approach to assessing a patient's health status, encompassing various physical and psychological evaluations. A number of modes have been deployed to assess the performances of these students. These modes include the traditional practical examination (TPE), objective structured clinical examination (OSCE) (Edward & Okanlawon, 2016), and most recently, the use of computer-based testing (CBT). Despite the increasing adoption of CBT in nursing education, little is known about how student demographic variables influence their intentions to adopt technology in clinical examinations. This gap may hinder effective implementation strategies as well as reduce nursing students' intention to accept the technology.

It is important to know that intention is a fundamental component of student experience that could be linked to their inner mental states with external actions. This intention represents the deliberate purpose or aim that guides nursing student choices, behaviors, and interactions with clinical examination through CBT. Far more than a simple mental process, intention is a complicated relationship among consciousness, motivation, decision-making, and meaningful action, which appeared to be influencing technology adoption.

The adoption of computer-based testing for nursing exams in Nigeria is a recent trend, moving away from traditional paper-based methods due to issues like high costs, lack of manpower, and exam misconduct (Ndume et al., 2014). This shift has been made possible by the growing availability of online educational resources (Sadiq & Onianwa, 2011). However, the success of this change depends largely on various factors like students' computer anxiety, technical skills, and attitudes of students towards computer-based assessments, as highlighted by Agah et al. (2016), as well as other demographic variables. To address the current challenges of paper-based testing systems, different strategies have been suggested in a previous study (Abah et al., 2022). Among the suggested solutions, this current study wishes to examine if students' demographic data could influence their intention to adopt CBT in their nursing education.

To this end, this study aims to determine whether a combination of nursing students' demographic variables significantly predicts their intention to use computer-based testing (CBT) in clinical examinations; quantify the proportion of variance in students' intentions to use CBT that is explained by their demographic data; and assess the relative contribution of each demographic variable to students' intentions to adopt CBT in clinical examinations. Likewise, three research questions guided this study. These include: Will a combination of the nursing students' demographic data significantly predict their intention to use CBT in their clinical examination? What is the proportion of the variance accounted for by a linear combination of the nursing students' demographic data? And what is the relative combination of the demographic data to their use of CBT in clinical examinations?

1.1.1. Studies on intentions to use technology related tools

There are different variables that determine students' intentions to adopt or use technologies. Researchers have investigated the influence of some of these factors on students' intentions to adopt technology. For example, in a study conducted by Rahman

et al. (2023), they found that students' attitudes towards ChatGPT significantly predicted ($\beta = 0.83$; $t = 15.289$; $p < 0.001$) their intentions to use ChatGPT. Similarly, a study by Seo and Cho (2022) reported that nursing students' perception ($\beta = .30$) and attitude ($\beta = .38$) significantly influenced their intentions to adopt AI-based healthcare technologies with an adjusted R^2 of 0.318. The authors further argued that AI acceptance attitude correlated positively with the nursing students' intentions to adopt AI ($r = .52$, $p < .001$). In Kang et al.'s (2023) research, perceived value ($\beta = .45$) accounted for 60.2% of the variance in nursing students' intention to adopt chatbots in South Korea. These authors concluded that there existed a high level of intention to utilize chatbots among the nursing students. Furthermore, in addition, Kwak et al. (2022) found that nursing students had a positive attitude toward the use of AI ($\beta = 0.485$, $p = .009$) and facilitating conditions ($\beta = 0.117$, $p = .045$), which predicted their intent to use AI. Labrague et al.'s (2023) study revealed that nursing students' perception positively affected their intention to use AI technology ($\beta = 0.458$, $p < 0.001$). Attitudes towards AI partially mediated the relationship between perceived AI utilization in nursing practice and the intention to adopt AI technology ($\beta = 0.255$). Migdadi et al. (2024) found that gender significantly influences nursing students' intention to use AI ($p < 0.01$). These studies indicated that key factors such as attitude, perception, facilitating conditions, and gender influence students' intentions to adopt technology.

1.2. Concept of Computer Based Testing (CBT)

Computer-based testing (CBT) is a process that involves the use of computer devices to administer and deliver tests. According to Oladapo and Oyedele (2024), computer-based testing is defined as a type of assessment that utilizes digital tools to deliver and administer tests. CBT is an e-learning system that utilizes information communication technology for assessment activities, exams, and recording the responses of examinees (Bello & Abdullah, 2021). Computer-based testing has been used interchangeably in previous research as computer-based tests (Aletan et al., 2022), computer-based assessment (Bello & Abdullah, 2021; Syahbrudin et al., 2025), e-assessment systems (Ndume et al., 2014), electronic exams (Omran et al., 2022; Salem et al., 2023), web assessment systems (Sadiq & Onianwa, 2011), and computerized curricular assistive tools (Schofield, 2023), among others. Some of these scholars have suggested exploring regression analysis, automation, and problem-solving in future research involving CBT (Syahbrudin et al., 2025). On this note, part of the suggestions stands as rationale for the analytical tool employed in this research to explain the impacts of nursing students' demographic variables on intention to use CBT in their exams.

The influence of students' demographic variables on the use of computer-based testing for nursing examinations is significant

Demographical variables for students could include the student's age, gender identities, racial and ethnic groups, socioeconomic status, nationality, location, and household information, among others. Educational research and policy-making often use these variables to understand and address disparities in student outcomes. In this research, there are a range of demographic variables that could influence nursing

students' use of computer-based testing for nursing examinations positively or negatively. For instance, Eusebio et al. (2023) highlighted the positive correlation between educational attainment and a positive attitude toward computer applications in nursing practice. Likewise, Chipps et al. (2022) underscored the relevance of computer literacy skills and positive attitudes toward computerization in healthcare.

In the Nigerian context, Salem et al. (2023) found that female nursing students had higher anxiety levels but more positive attitudes toward online exams. Similarly, Ayamolowo et al. (2023) identified gender and educational qualification as significant factors in the utilization of electronic health records by nurses. Furthermore, Ngozi et al. (2023) highlighted the influence of demographic factors, such as gender and year of study, on student nurses' perception of teaching methods. These studies collectively suggest that demographical factors such as educational background, computer literacy, and gender, as well as year of study, play a significant role in the use of computer-based testing for nursing examinations.

1.3. The influence of computer-based testing on nursing students' clinical examination

The impact of computer-based testing (CBT) on nursing students' clinical examination has been a topic of interest in recent studies. This interest may stem from suggestions made in previous research. Researchers in the nursing field have examined the impact of incorporating computer-based testing into nursing examinations, yielding mixed results. For instance, Schofield (2023) investigated the effectiveness of adopting computerized curricular assistive tools (CCAT) in school curricula to prepare nursing students for the NCLEX-RN examination. The author reported improved preparedness for the NCLEX-RN exam through the use of CCAT. Likewise, Lee and Son (2023) evaluated the use of a virtual reality simulation in improving problem-based learning for neurologic examination among nursing students. The study reported positive outcomes with the Virtual Reality Simulation Problem-Based Learning (VRS-PBL) program, which significantly increased nursing students' academic self-efficacy and neurological examination performance. However, Kolagari et al. (2018) found that CBT did not significantly reduce test anxiety in nursing students, with some even experiencing higher anxiety levels.

In the Nigerian context, the influence of computer-based testing on nursing students' examination performance and anxiety is a complex issue. A previous study has identified computer knowledge as a significant predictor of performance in computer-based testing (Olufemi & Oluwatayo, 2014). In addition, student perception of computer-based testing was regarded as being positive, with a preference for CBT over paper-based testing (Okocha, 2022). These findings collectively suggested that computer-based tools can have a beneficial impact on nursing students' clinical examination.

1.4. Factors influencing nursing students' adoption of computer-based testing (CBT)

Researchers have identified factors that influence nursing students' intentions to use, attitudes towards, and performance in examinations driven by CBT. A study by Cruz-Barrientos et al. (2023) examined the level of knowledge, attitudes, and motivations of nursing undergraduate students at the University of Cadiz. The authors noted that students' knowledge, use, and attitude towards information and communication technologies influence the nursing students' attitudes towards the use of the technology employed. Similarly, the research of Salem et al. (2023) reported a correlation between students' anxiety and attitudes, with first-year students showing more positive attitudes. Likewise, Omran et al. (2022) highlighted the importance of computer skills training, the impact of facilitators, and barriers to students' satisfaction.

In the Nigerian context, the factors found influencing the attitude of nursing students toward the use of computer-based testing (CBT) include anxiety, self-esteem, perceived usefulness, and ease of use, among others. For instance, the study of Mohammed (2021) found that computer anxiety and self-esteem significantly impact students' attitude, with anxiety positively predicting it and self-esteem negatively correlating with it. Ogunlade (2011) identified perceived usefulness, ease of use, and credibility as important factors in students' acceptance of CBT. Ajogwu and Olayanju (2021) further emphasized the role of academic discipline in predicting attitudes toward CBT, while gender was found to be insignificant. Lastly, Ekuri et al. (2019) highlighted the significance of age, gender, school location, parental education, and exposure to computers as predictors of attitude towards CBT.

2. METHOD

This study adopted a correlation research design. This investigation was with the aim of understanding the relationships that existed between the nursing students' demographic variables and their intentions to adopt computer-based testing (CBT) in their clinical examination. It was also to aid decision-making on whether to adopt CBT in nursing education or not.

The target population of the study comprises all nursing students in Osun State. There are nine colleges of nursing in the state. We purposefully selected six schools from this population, taking into account the student population. 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 for this study consisted of 120 nursing students drawn from the population. Six colleges of nursing schools were purposively selected for this study. This was done because of the available number of students enrolled for the program in the schools. In each school, 20 nursing students were selected from 200 levels. We used this set of 200-level students to ensure they experienced both paper-based and computer-based examinations, resulting in a total of 120 respondents.

This study developed a self-designed instrument for data collection. We used the instrument to gather information from the respondents about their intentions to use CBT in nursing examinations in Osun State. We constructed it based on research questions using an amended five-point Likert scale. The questionnaire was structured in 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. 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' attitude toward the intentions to use CBT, while C contains information on the perception of students toward the use of CBT.

Experts scrutinized the data collection instrument to ensure its clarity, relevance, adequacy, and correct attributes. We implemented the suggestions and tested the instrument for reliability. We used 20 respondents from outside the study area for the pilot study to determine the instrument's reliability. The internal consistency and reliability estimate yielded 0.87, indicating that the instrument was fairly reliable and adequate for the study. The tested instrument was administered for data collection.

The tested instrument was administered to nursing students in the selected school of nursing in Osun State after obtaining consent from each of the respondents and relevant authorities. The questionnaire was administered by the researchers in person and collected on the spot. Each respondent was given the opportunity to respond to his/her opinions; collections were done by researchers when the instrument was fully completed. Our goal was to ensure completion of each administered questionnaire.

The data collected were analyzed using regression analysis with the aid of IBM Statistical Package for Social Science (SPSS) version 27. The regression was used to determine the relationship between demographic variables and nursing students' intentions to adopt CBT in clinical exams. The regression analysis was used to test the significance levels of the independent variables at a 0.05 level of significance. The purpose of this study was explained to respondents verbally, and consent was obtained. Respondents were assured of a high level of confidentiality and anonymity of all information that would be obtained.

3. RESULTS AND DISCUSSION

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

Research Question One: Will a combination of the nursing students' demographic data significantly predict their intention to use CBT in their clinical examination?

The nursing student's intention to use CBT in a clinical examination was regressed based on predicting marital status, religion, gender, ethnic background, education background, and age, and the results of the analysis are presented in Table 1. From Table 1, the result indicated that the nursing students' demographic variables (marital status, religion, gender, ethnicity, education background, and age) did not significantly predict the nursing students' intention to use CBT in their clinical examination, $F(6, 113) = 1.114$, $p > 0.05$. Therefore, the combination of the nursing students' marital status,

religion, gender, ethnic, education background, and age variables did not significantly predict their intention to use CBT in their clinical examination.

Table 1. Combined Demographic Variable Effect on Nursing Students Intentions to Adopt CBT

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.763	6	0.127	1.114	0.359[b]
	Residual	12.901	113	0.114		
	Total	13.664	119			

Research Question Two: What is the proportion of the variance accounted for a linear combination of the nursing students' demographic data?

The nursing student's intention to use CBT in clinical examination was regressed, and the results are presented in Table 2. From Table 2, the results revealed that the regression model did not significantly predict the nursing students' intention to use CBT, $F(6, 113) = 1.114$, $p > 0.05$, $R^2 = 0.056$. This indicates that 5.6% of the variance in nursing students' intention to use CBT in clinical examinations was explained by the combined demographic variables of the nursing students in the selected schools.

Table 2. The Variance Accounting for a Linear Combination of the Nursing Students' Demographic Variables in Adoption of CBT

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.236[a]	.056	.006	.33788	.056	1.114	6	113	.359	1.844

Research Question Three: What is the relative combination of demographic data to their use of CBT in clinical examinations?

We used multiple regression analyses to answer the question, and Table 3 presents the results. The results in Table 3 revealed that gender has a significant and positive effect on nursing students' intentions to adopt CBT in clinical examinations ($B=0.154$, $t=2.245$, $p<0.05$). However, age has no significant effect on nursing students' intentions to use CBT in clinical examinations ($B=-0.001$, $t=-0.098$, $p>0.05$). Similarly, religion has no significant effect on nursing students' intentions to use CBT in clinical examinations ($B=-0.013$, $t=-0.339$, $p>0.05$). Furthermore, the result revealed that ethics has no significant effect on nursing students' intentions to use CBT in clinical examinations ($B=0.032$, $t=0.467$, $p>0.05$). Furthermore, educational background has no significant effect on nursing students' intentions to use CBT in clinical examinations ($B=0.027$, $t=0.435$, $p>0.05$). Marital status has no significant effect on nursing students' intentions to use CBT in clinical examinations ($B=0.081$, $t=0.556$, $p>0.05$).

It was concluded that in all the demographic variables used in this study, only nursing student gender was significant and positively predicted their intentions to use CBT in clinical examinations ($B=0.154$, $t=2.245$, $p<0.05$). Age, religion, ethnic background, educational background, and marital status do not statistically significantly predict their intentions to use CBT.

Table 3. Individual Demographic Variable Predicting Nursing Students' Intentions to Adopt CBT

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3.602	.230		15.693	.000	3.147	4.056		
	Gender	.154	.069	.223	2.245	.027	.018	.290	.847	1.180
	Age	-.001	.010	-.013	-.098	.922	-.022	.020	.442	2.264
	Religion	-.013	.038	-.033	-.339	.735	-.088	.062	.888	1.126
	Ethnic	.032	.068	.047	.467	.641	-.103	.167	.827	1.209
	Education background	.027	.062	.053	.435	.664	-.095	.149	.560	1.787
	Marital Status	.081	.145	.079	.556	.579	-.206	.367	.415	2.411

Discussion

The study showed that the combined factors (marital status, religion, gender, ethnicity, education, and age) of the Osun State nursing students did not significantly affect their plans to use CBT in their clinical exams, with results showing $F(6, 113) = 1.114$ and $p > 0.05$. This finding did not align with the results of Ekuri et al. (2019), who discovered that the combined five independent variables (age, gender, school location, parental education, and students' exposure to computers) significantly predicted students' attitudes towards computer-based testing. Likewise, Rahman et al.'s (2023) study found attitude towards ChatGPT as a significant predictor ($\beta = 0.83$; $t = 15.289$; $p < 0.001$) of students' intentions to use ChatGPT. A study that examined the perception and attitude of University of Lagos undergraduate students using CBT for exams discovered that their performance was significantly influenced by their perception of the tool.

The findings in this study also revealed that 5.6% of the variance in nursing students' intention to use CBT in clinical examinations was explained by the independent variables. This means that there are other critical variables that are affecting the nursing students' intentions to adopt CBT in their clinical examinations that were not considered in this study. A study by Seo and Cho (2022) revealed that students' perception ($\beta = .30$) and attitude ($\beta = .38$) significantly influenced nursing students' intentions to adopt AI-based healthcare technologies with an adjusted R^2 of 0.318. This statistic thus means that 31.8% of the variance is explained by independent variables considered in the study. Similarly, Kang et al. (2023) found perceived value ($\beta = .45$) accounting for 60.2% of variance in intention to adopt chatbots in South Korean nursing education. The study concluded that there was a tendency to use chatbots in nursing education.

Our findings in this current study revealed that out of all the demographic variables investigated, only nursing student gender significantly and positively predicted their intentions to use CBT in clinical examinations ($\beta = 0.154$, $t = 2.245$, $p < 0.05$). However, other variables like age, religion, ethnicity, educational background, and marital status could not statistically significantly predict their intentions to use CBT. This then means

that student gender would be key to decisions on nursing students' adoption of CBT for clinical examinations. This also explained that student gender was a predictor of nursing students' intentions to adopt CBT in examination. This result was like the finding in the study of Wynn et al. (2023), which investigated the adoption and nurses' utilization of digital technologies.

The authors found gender, age, and voluntariness to use technology predictors of adoption and utilization of technological tools. Likewise, our finding was in line with Migdadi et al. (2024), who found that gender significantly influences nursing students' intention to use AI ($p < 0.01$). Salem et al. (2023) also found that female nursing students demonstrated positive attitudes toward online exams. In addition, Ayamolowo et al. (2023) identified gender, educational qualification, and access to resources as significant factors in the utilization of electronic health records by nurses. Ngozi et al. (2023) highlighted the influence of gender on student nurses' perception. In contrast, Aletan et al. (2022) found that the gender of students does not significantly affect their views on adopting CBT for exams.

4. CONCLUSION

The study aimed to examine the influence of Osun State nursing students' demographic data on their intentions to adopt computer-based testing (CBT) in their clinical examinations. The paper concluded that the combined demographic variables (marital status, religion, gender, ethnicity, education background, and age) of nursing students in Osun State could not significantly predict their intentions to adopt CBT in their clinical examination. In addition, this study concluded that 5.6% of the variance in nursing students' intention to use CBT in clinical examinations was explained by the demographic data. However, the nursing student's gender significantly and positively predicted their intentions to use CBT in clinical examinations, while other demographic variables did not.

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