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Testwiseness, Digital Accessibility, and Attitudinal Disposition to Computer-Assisted Testing among Undergraduate Students in North-West, Nigeria

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Abstract: The purpose of this study was to determine whether undergraduate students' testwiseness and access to digital devices are key factors critical to enhancing their attitude towards Computer-Assisted Testing (CAT) in some selected Universities in the North-west geo-political zone of Nigeria. It also examined if a significant difference existed in undergraduate students' attitude to CAT in Universities in the North-west Nigeria. These were with a view to improving the CAT results used to certify quality in education by universities in the country. The research design for this study used was descriptive survey in which the sample included an intact class of 5,880 Part I undergraduate students selected from federal and state-owned Universities in the North-west. A self-developed instrument tagged: "Undergraduate's Testwiseness Digital Accessibility and Attitude Inventory (UTDAAI)", was used to collect data, which were analysed through Stepwise Multiple Regression and independent t-test statistics. The results revealed that testwiseness and digital accessibility are not significantly combined to influence undergraduate students' attitude to CAT in Universities in the North-west Nigeria. However, there existed a positive significant relationship between testwiseness and digital accessibility. Further, there was no significant sex difference in undergraduate students' attitudinal disposion to CAT in Universities in the North-west Nigeria. The study concluded that testwiseness was not a most potent predictor of students' attitude to CAT irrespective of their access to digital devices in the University. It was recommended that Universities' Management should invest considerable resources in developing rapid response digital intervention initiatives to support the learning, teaching and assessment transition for undergraduate students in the country.

Keywords: Testwiseness, Digital Accessibility, Attitude, Undergraduate, Computer-Assisted Testing

INTRODUCTION

The significance of any achievement test is to derive examinees' maximum academic performance. In addition to the trait being measured, several factors could influence an examinee's performance on an achievement test especially Computer-Assisted-Testing (CAT). Thus, to ensure accurate test results, one needs to take cognisance of the nuisance variables in order to make appropriate allowances for such factors in interpreting the results (Ibrahim, 2017; Ibrahim, 2020).

Testwiseness (TW), otherwise known as test-taking skills or strategies (Afolabi, 2012), test sophistication, test familiarization (Ibrahim & Yakasai, 2020), test-taking orientation, or test-wisdom (Ibrahim, 2020), is a confounding phenomenon that can hardly be detected in test performance, yet accounts for some differences in test scores. But, for the purposes of the present discussion, the definition proposed by Millman et al., (1965) cited in Ibrahim (2016) will be adopted as the standard, since it is probably the most quoted. These authors defined TW as "a subject's capacity to utilize the characteristics and formats of the test and/or the test-taking situation to receive a high score" (p. 253).

Conceptually, TW is concerned with the skill in test-taking. It is the cognitive trait exhibited

by a test taker to his maximum advantage in any testing condition to improve his test scores. It tends to increase the chances of gaining more marks beyond what knowledge alone could achieve (Afolabi, 2012; Schumacher & Moharan-Martin, 2001; Samacki, 1979). As a definitional addendum, Ibrahim (2016) noted that TW is distinctly different from examinee's knowledge of the items as measured by the test. Likewise, testwise students are believed to have considerable skill at test-taking such that even when they lack the specific knowledge of the questions asked, they are still able to convey ideas that might earn them some points. According to Ibrahim (2017), this implies that they would have undue advantage over others in testing situations, and thus introduce error variance into test scores.

Studies (Ibrahim & Yakasai, 2020; Ibrahim, 2017; Ibrahim, 2016; Afolabi, 2012; and DeMars, 2010) seem generally agreed that TW is a cognitive trait display by test takers, which is not actually based on the knowledge acquired by the test takers over time and could be utilized in testing situation. Rather, TW reveals the examinee's test-taken ability which is deployed in different ways to obtain the maximum scores available in a test, regardless of whether the nature of the content of the tests. In some instances, due to the interrelated nature of learning and test-taking strategies, learning and test-taking strategies could be investigated interactively, hence this study.

It is well known that there exist some examinees with substantial knowledge of a particular subject, yet unable to perform well in the test. Similarly, there are examinees who have no knowledge of the subject matter, but possess the ability to respond advantageously to items containing extraneous clues and, therefore, to obtain credit without knowledge of the subject matter being tested. Thus, any test or item that contains any of the extraneous characteristics may allow examinees to substitute testwiseness for knowledge. The assumption, as Ibrahim (2016) claims, is that success in achievement tests depend on testwiseness and strategic foundations. This means if test takers cannot identify what is expected from them, they cannot reflect their actual academic ability.

Furthermore, several scholars and researchers have given various definitions of CAT (Bartram & Hambleton, 2005; Mills et al., 2002; Wainer et al., 2000), as Computerized Adaptive Testing (CAT), which is a Computer-Based-Test (CBT) that is configured and tailored to suit the examinee's ability level; hence, it is known as "tailored testing". Put differently, CAT is a computer-administered test which consists of many test items administered based on the test taker's responses to the previous item in the test.

Operationally, CAT as a CBT is meant to discriminate between able and not-too-able examinees. Basically then, in CAT, examinees' reactions to previous items determine the next item to be administered to them. For instance, if an examinee gets an item rightly, the item that follows will be a bit difficult than the former. In contrast, if the examinee could not answer the item rightly, the follow up item will be easier. This process continues until the examinee's ability level is assumed. This shows that regardless of ability, students who are test wise can outperform students of equal ability who lack testwiseness in CAT. Hence, since CATs are Multiple-Choice Questions (MCQs), TW is an individual examinee's devised strategy in form of test-taking skill usually employed in the MCQs to gain undue advantage over able examinees in the scores obtained in the test or testing situation (Hosseini et al., 2014).

In this regard, TW is not influenced by the content from which the items are constructed as well as the variable it is supposedly meant to measure (Tavakolia & Samian, 2014). Suffice to say that as test takers' responses to former items is a determinant of subsequent items to be answered subsequently, it could be therefore deducible that test takers may not possess the knowledge to answer correctly most of the items in CAT, but they could depend on their testwiseness and substitute testwiseness for knowledge of the subject matter culminating in a higher performance. As the content of the test is not by any means influenced by examinee's dexterity to deploy testwiseness in testing condition, however, a tendency exist test could be an influential factor. Generally, in CAT, validated items are kept in the question bank, where they are picked whenever the need arises for use (Ibrahim, 2020).

On students' attitudinal disposition to CAT, Boo and Vispoel (2012) compared scores

obtained from computer and paper-and-pencil versions of the Iowa Tests of Educational Development and the examinees' attitudes about these two modes. It was revealed that examinees preferred the CBT to written tests. Also, Mojarrad et al. (2013) investigated paper and pencil reading comprehension assessment to CBT using attitude questionnaire, administered to examinees about their attitudes to computerized testing. The findings showed no significant difference in reading comprehension scores across testing modes as examinees prefer to take the test on computer.

Whereas, access to digital devices have been identified as key factors critical to enhancing examinees' performances in CAT. Ibrahim and Iliyasu (2021) investigated the digital divide in access to CAT in Nigeria, as a result of the COVID-19 pandemic. The sample comprised of sampled 557 undergraduate students in Nigeria Universities. From the survey, a significant relationship between the testwiseness and the digital divide in accessing CAT exists; significant differences in students' access to CAT during the pandemic exists, and significant differences in access to digital tools between students in government universities and their private universities' counterparts exist. Also, there was a statistically significant association between testwiseness and the ability to succeed in CAT during the pandemic. Additionally, students have been experiencing the digital space in a variety of ways and using different platforms, thus showing diversity in their behaviours and experiences. Against this backdrop, this study sought to establish the direction of the pull and push of the relationship between testwiseness, digital accessibility and attitudinal disposition amongst undergraduate students towards CAT in government-owned Universities in the North-west, Nigeria.

The broad objective of this study is to investigate whether undergraduate students' testwiseness, access to digital devices are key factors critical to enhancing their attitude towards Computer-Assisted Testing in some selected Universities in the North-west geo-political zone of Nigeria. To achieve this goal, the specific objectives of this study are to: (1) determine whether significant relationships exist between undergraduate students' testwiseness, digital access and their attitude to Computer-Assisted Testing in the Universities in Northwest Nigeria; (2) examine if a significant sex difference exists in undergraduate students' attitude to Computer-Assisted Testing in Universities in the Northwest Nigeria. Research hypotheses: (1). Testwiseness, digital access will not significantly be combined to influence undergraduate students' attitude to Computer-Assisted Testing in Universities in the Northwest Nigeria; (2) There is no significant sex difference in undergraduate students' attitude to Computer-Assisted Testing in Universities in the Northwest Nigeria.

METHOD

Research Design

The research design for this study used was descriptive survey. A descriptive survey research design collects and uses the data systematically from a give population to describe certain characteristics of that population. Since descriptive survey typically relies on data collected from questionnaires, a sole instrument used for gathering data in this study, which enabled comparisons to be made between and among groups over time, hence its appeal to generalizability and universality of results as well as the degree of confidence which can be placed in the findings of this study (Cohen, et al., 2010).

Also, this study is descriptive in nature as data were collected from participants through questionnaire, which described testwiseness as it affects attitudinal disposition of undergraduate students to CAT regardless of their access to digital devices in Universities. There was no deliberate control of variables in this study as such variables were left untouched as they existed. According to Singh and Upadhya (2008), the descriptive research design typically is used to scan a wide field of issues, populations, programmes in order to measure and describe any generalised features and cannot, therefore, be controlled, engineered or be manipulated by the investigator.

Participants

The participants in the study is made up of all undergraduates in public Universities in North-west states, Nigeria. There are seven (7) states that make up North-west Nigeria namely: Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara. Armed with the sampling frame provided by the Ministry of Education in each of the States in North-west Nigeria, there are a total of 17 government-owned universities (8 Federal Government-owned and 9 State Government-owned Universities) in North-west Nigeria as at the time of this study (State Ministry of Education, 2021). Multi-stage sampling procedure was used in selecting the Part I undergraduates who were participants in this study. The participants were selected using the seven states in the North-west as the first stratum. From each of the states, one Federal-Government-owned and one State Government-owned Universities were selected using simple random method. From both Federal and State-owned Universities selected, stratified sampling technique was used to select 30 Part I undergraduates totaling 420 across the North-west states, using sex and level of educational attainment as strata. The participants were from 7 Federal Government-owned and State Government-owned Universities in each of the states totaled 14 public Universities. 280 male and 140 female participants were selected from each of the randomly selected one Federal-Government-owned and one State Government-owned Universities which made up of 30 Part I participants per University. The reason for doing this was to strike fairness in gender participation and equity as they exist in the Universities in the North-west. Therefore, 420 participants made up of 280 male and 140 female Part I undergraduates were included in the study. Their average age was 18.26 years. Only 330 participants consisting of 207 male and 123 female Part I undergraduates returned the administered questionnaire showing the retrieval rate of 79%.

Noteworthy, Part I undergraduates served as participants in the study owing to the fact that they were considered as newest levelled students as they are quite familiar to CAT, which they took as Universities Matriculation Examinations (UME) in different recognised CAT Centres as organised by Joint Admissions and Matriculation Board (JAMB) throughout the country. Thus, their CAT experience is still fresh in their memories and considered accurately useful to the achievement of the objectives of this study.

Research Instrument

A self-developed instrument tagged: "Undergraduate's Testwiseness Digital Accessibility and Attitude Inventory (UTDAAI)", was used to elicit information about the influence of testwiseness on undergraduate students' attitude to CAT in spite of their digital accessibility. The questionnaire was initially made up of 50-item before it was reduced to 38-item, which contained three sections that were rated on a 5-point Likert-scale ranging from "Most of the time'' to "None of the time'' agreement about the statement.

The questionnaire was of two parts: part one elicited participants' demographic information such as name of the institution, sex, degree in view, CAT experience, location of the institution, type of institution, and a host of others. The second part made up of 38-item with individual items meant to measure variables such as testwiseness, digital accessibility and their influence on the undergraduate students' general attitude to CAT on campuses of the randomly selected Universities used in the study.

Validity and Reliability of the Instrument

The instrument (UTDAAI) validated based on the judgement of experts in Test and Measurement, Educational Psychology, and Sociology of Education respectively before it was subjected to reliability test. To determine the construct validity of "Undergraduate's Testwiseness Digital Accessibility and Attitude Inventory (UTDAAI)", Exploratory Factor Analysis (EFA) was used. Anastasi and Urbinal (2006) referred to factorial validity as the correlation of the test with whatever is common to a group of tests or other indices of behaviour. As a result, there was the need to examine the statistics for each of the items in order to take appropriate decision on items retention/deletion. Table 1 showed the mean and standard deviation for each of the 50 items on UTDAAI.

Table1. Item Mean and Standard Deviation for the 50-Item Version of UTDAAI

Item	Mean	Std. Deviation	N	Item	Mean	Std. Deviation	N
Item 1	1.8200	.84973	50	Item 26	2.0600	.97750	50
Item 2	2.2800	.96975	50	Item 27	2.0600	.97750	50
Item 3	1.5600	.67491	50	Item 28	2.0600	.97750	50
Item 4	2.0600	.68243	50	Item 29	2.2000	.85714	50
Item 5	1.8000	.53452	50	Item 30	2.3000	1.19949	50
Item 6	2.0400	.92494	50	Item 31	2.6400	.87505	50
Item 7	2.1400	1.08816	50	Item 32	2.3800	1.22708	50
Item 8	2.0600	.97750	50	Item 33	2.6600	.93917	50
Item 9	2.4400	1.03332	50	Item 34	2.6400	.72168	50
Item 10	3.4400	.95105	50	Item 35	2.4400	.95105	50
Item 11	2.6600	.79821	50	Item 36	2.6600	1.00224	50
Item 12	2.2000	.85714	50	Item 37	2.4000	.92582	50
Item 13	2.3000	1.19949	50	Item 38	2.5600	.86094	50
Item 14	2.6400	.87505	50	Item 39	2.3800	.98747	50
Item 15	2.3800	1.22708	50	Item 40	2.2800	.94847	50
Item 16	2.8200	1.18992	50	Item 41	2.1600	.73845	50
Item 17	2.9000	1.01519	50	Item 42	2.4200	.75835	50
Item 18	2.9000	1.01519	50	Item 43	2.0400	.72731	50
Item 19	2.9000	1.01519	50	Item 44	2.6600	.93917	50
Item 20	2.5000	1.11117	50	Item 45	1.8600	.63920	50
Item 21	2.5000	1.11117	50	Item 46	1.5400	.50346	50
Item 22	2.5000	1.11117	50	Item 47	2.0200	.76904	50
Item 23	2.9800	1.11557	50	Item 48	2.2800	.96975	50
Item 24	2.9800	1.11557	50	Item 49	1.5600	.67491	50
Item 25	2.9800	1.11557	50	Item 50	2.0600	.68243	50

The item with the highest mean is item 10 (mean = 3.44), followed by items 17, 18, and 19 with mean = 2.9000 respectively. However, item 46 has the lowest mean = 1.54, and the same item has the lowest standard deviation = .50346. While item 32 has the highest standard deviation = 1.22708. This implies that respondents differed mostly on items 46.

An examination of the inter-relationship between the 50 items of UTDAAI showed that the relationship between the items is moderately high and low and some are even negative. The low and negative coefficients on the inter-item correlation matrix showed low relationships in the direction of measurement of the items. This was so because the items are a pool of measuring Testwiseness/Attitude under different topics (factors). The summary of the inter-item correlation is as presented in Table 2.

Table 2. Summary of inter- Item correlations on UTDAAI

Variables	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.362	1.540	3.440	1.900	2.234	.162	50
Item Variances	.892	.253	1.506	1.252	5.940	.104	50

	Intraclass Correlation(a)	95% Confidence Interval		F Test with True Value 0			
	Lower Bound	Upper Bound	Value	df1	df2	Sig	Lower Bound
Single Measures	.036(b)	.020	.365	2.875	49.0	2401	.000
Average Measures	.652(c)	.499	.777	2.875	49.0	2401	.000

The Table 2 shows r-value of 0.365 intraclass correlation for all 50 items at 0.05 level of significance. This is an indication that some items on the UTDAAI were supposed to be deleted. This is so because the same set of respondents (where mortality will be = 0) could not be got again for a readministration, if not, it would have been a case of item review, rewording and editing for second administration. Hence, the decision bothering on item deletion from the 52-item UTDAAI was taken through the use of an approach. This is the use of 'Corrected Item-Total Correlation', which indicates the new coefficient of 'Cronbach's Alpha If Item Deleted' that the UTDAAI would have when such item is removed. The set of items having low 'Corrected Item-Total Correlation of less than 0.2 are those that will increase the Alpha coefficient of the scale when they are deleted.

Table 3. Item-Total Statistics on UTDAAI

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	116.28	118.369	0.244	0.642	Item 26	116.04	120.692	0.291	0.652
Item 2	115.82	114.314	0.403	0.631	Item 27	116.04	120.692	0.291	0.652
Item 3	116.54	123.192	-0.003	0.655	Item 28	116.04	120.692	0.091	0.652
Item 4	116.04	120.121	0.202	0.646	Item 29	115.9	122.949	0.204	0.657
Item 5	116.3	125.806	0.208	0.661	Item 30	115.8	116.449	0.221	0.642
Item 6	116.06	121.119	0.28	0.652	Item 31	115.46	125.07	0.214	0.663
Item 7	115.96	119.713	0.214	0.651	Item 32	115.72	116.042	0.229	0.642
Item 8	116.04	120.692	0.091	0.652	Item 33	115.44	119.966	0.234	0.649
Item 9	115.66	127.045	0.294	0.671	Item 34	115.46	120.049	0.292	0.646
Item 10	114.66	117.617	0.246	0.642	Item 35	115.66	116.841	0.285	0.639
Item 11	115.44	123.476	-0.029	0.657	Item 36	115.44	122.17	0.219	0.656
Item 12	115.9	122.949	-0.004	0.657	Item 37	115.7	117.602	0.256	0.641
Item 13	115.8	116.449	0.221	0.642	Item 38	115.54	123.886	-0.053	0.659
Item 14	115.46	125.07	0.214	0.663	Item 39	115.72	118.859	0.175	0.646
Item 15	115.72	116.042	0.229	0.642	Item 40	115.82	120.273	0.117	0.65
Item 16	115.28	119.389	0.208	0.652	Item 41	115.94	122.017	0.064	0.652
Item 17	115.2	115.265	0.335	0.635	Item 42	115.68	126.875	0.225	0.667
Item 18	115.2	115.265	0.335	0.635	Item 43	116.06	119.853	0.202	0.645
Item 19	115.2	115.265	0.335	0.635	Item 44	115.44	120.129	0.126	0.649
Item 20	115.6	113.633	0.369	0.631	Item 45	116.24	123.778	-0.041	0.656
Item 21	115.6	113.633	0.369	0.631	Item 46	116.56	122.007	0.121	0.65
Item 22	115.6	113.633	0.369	0.631	Item 47	116.08	119.789	0.291	0.646
Item 23	115.12	115.047	0.306	0.636	Item 48	115.82	114.314	0.403	0.631
Item 24	115.12	115.047	0.306	0.636	Item 49	116.54	123.192	0.203	0.655
Item 25	115.12	115.047	0.306	0.636	Item 50	116.04	120.121	0.202	0.646

From Table 3, any item with a 'Corrected Item-Total Correlation' of less than 0.02 was marked as items to be deleted. These set of items are those showing an increase in scale's Cronbach Alpha and mean when they were deleted. This, from Table 3, items 3, 8, 11, 12, 28, 38, 39, 40, 41, 44, 45, and 46 those with the characteristics of improving the scale's (UTDAAI) reliability when deleted from the scale. They were therefore supposed to be deleted. Consequently, the retained items were subjected to reliability analysis using first, Cronbach Alpha, and second, Split-Half reliability. For the Split-Half reliability, both Spearman Brown Split-Half and Guttman Split-Half coefficients were obtained for the scale and for each of the factor. The results of reliability test

presented in Tables 4 and 5 was obtained from the analysis conducted on the retained 38-item version administered on the 30 randomly selected participants after deletion.

Table 4. Mean and Standard Deviation of Retained 38-Item of UTDAAI

Item	Mean	Variance	Std. Deviation	N of Items
Part 1	61.7800	63.522	7.97007	19(a)
Part 2	56.3200	35.406	5.95027	19(b)
Both Parts	118.1000	123.602	11.11765	38

Table 5. Reliability Statistics of UTDAAI

Cronbach's Alpha	Part 1	Value	.764
		N of Items	19(a)
	Part 2	Value	.861
		N of Items	19(b)
	Total N of Items		50
Correlation Between Forms			.760
Spearman-Brown Coefficient	Equal Length		.741
	Unequal Length		.713
Guttman Split-Half Coefficient			.899

**Significant, p<0.05*

From Table 5, Cronbach Alpha reliability of 0.764 was obtained. Further, in order to preclude the possibility of taking wrong inference on the reliability of the GEAT, the data was also subjected to Split-Half reliability analyses. Here, two results were obtained. They are the Spearman Brown Split-Half coefficients and the Guttman Split-Half coefficients. The value of the Spearman Brown Split-Half coefficient for the GEAT is 0.741 (equal length). Also, that of Guttman Split-Half coefficient is 0,899. The two coefficients are high and good enough to declare that GEAT is reliable. According to DeVellies (2011), an Alpha below 0.60-0.65 is undesirable, 0.65-0.70 minimally acceptable, 0.70-0.80 very good respectively, and if much above 0.90 excellent.

Procedure for Data Collection

The instrument was administered to the participants in their various campuses y the researchers with the help of the trained Research Assistants recruited for the purpose of this study. A total of 420 copies of the questionnaire were administered on the selected participants. Out of these, only 330 questionnaires were returned correctly filled consisting of 207 male and 123 female Part I participants showing a retrieval rate of 79% was achieved. Thereafter, a key was developed to code every information received from the questionnaire. Noteworthy, copies of the questionnaire were collected back on the same day after completion.

Data Analysis

Through the use of Statistical Package for Social Sciences (SPSS) version 21.0., the data collected were collated and analysed by calculating first, the mean ($\overline{x}$) scores and standard deviations (SD), before using both Independent t-test and Stepwise Multiple Regression statistical methods to test hypotheses at 0.05 Alpha level of significance.

RESULTS

The computed scores of the undergraduate students' attitude to Computer-Assisted Testing was subjected to mean and standard deviation. Further, the scores were used to categorize students' attitude into positive and negative attitudes with scores that range from minimum through 1-mean

(10-15) as negative while scores from mean through highest (16-21) as positive attitude. The results of the analyses are presented in Table 6.

Table 6. Mean and Standard Deviation of Undergraduate Students' Attitude to Computer-Assisted Testing

N	Mean	Std. Deviation	Minimum	Maximum
330	15.72	3.18	10	21
Attitude to CAT		**Frequency**		**%**
Positive		203		61.5
Negative		127		38.5

From Table 6, the results showed that the majority of the participants (203 out of total 330) representing 61.5% of the undergraduate students exhibited positive attitudinal disposition trait towards CAT, while 127 participants representing 38.5% of undergraduate students manifested negative attitudinal disposition trait towards CAT. Hence, this implies that a preponderant majority of undergraduate students showed a positive attitude to CAT in Universities in the North-west Nigeria.

Research Hypotheses One: This states that testwiseness, digital accessibility will not significantly combine to influence undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-West Nigeria. To answer this research hypothesis, a multiple correlation analysis was initially computed followed by Stepwise Multiple Regression. The multiple correlation analysis was used to determine the nature of relationships that exist between Testwiseness, digital accessibility and undergraduate students' attitude to Computer-Assisted Testing. The result is presented in Table 7.

Table 7. Multiple Correlation Analysis Showing Relationships between Testwiseness, Digital Accessibility and Undergraduate Students' Attitude to Computer-Assisted Testing

Variables	Testwiseness	Digital accessibility	Attitude to Computer-Assisted Testing
Testwiseness	1	0.245*	-0.030
Digital accessibility	0.245*	1	-0.082
Attitude to Computer-Assisted Testing	-0.030	-0.082	1

** Significant, p <0.05*

Table 7 revealed the results of the Multiple Correlation analysis, which showed that there was no significant relationship between testwiseness and undergraduate students' attitude to CAT ($r = -0.030$; $p>0.05$) as well as digital accessibility and attitude to CAT ($r = -0.082$; $p>0.05$). However, a positive significant relationship existed between testwiseness and digital accessibility ($r = 0.245$; $p<0.05$). Further, analysis using Stepwise Multiple Regression with testwiseness and digital accessibility as predictor variables was conducted. This helps to show whether testwiseness or digital accessibility is a more potent predictor of students' attitude to CAT. The results of the analysis are presented in Table 8.

Table 8 indicated the results of the Stepwise Multiple Regression analysis, which showed that testwiseness ($\beta = -0.036$; p-value 0.581>0.05) alone as well as testwiseness ($\beta = -0.014$; p-value 0.835>0.05) and digital accessibility ($\beta = -0.101$; p-value 0.184>0.05) are not statistically significantly combined predictors of undergraduate students' attitude to CAT in Universities in the North-west Nigeria. Also, the value of R^2 (0.007) for the two variables implies that testwiseness and digital accessibility as variables do not have any statistically significant contributory influence on undergraduate students' attitude to CAT in Universities in the North-west Nigeria. As such, the null hypothesis was confirmed, which stated that testwiseness, digital accessibility will not

significantly be combined to influence undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-west Nigeria.

Table 8. Stepwise Regression Analysis Showing Combined Influence of Testwiseness, Digital Accessibility on Undergraduate Students' Attitude to Computer-Assisted Testing

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
R=0.030 R^2=0.001 F-value=0.288		B	Std. Error	Beta		
1	(Constant)	16.548	1.477		11.201	.000
	Testwiseness	-.036	.065	-.031	-.552	.581(ns)
R=0.083 R^2=0.007, F-value=1.134						
2	(Constant)	17.866	1.777		10.053	.000
	Testwiseness	-.014	.067	-.012	-.209	.835(ns)
	Digital accessibility	-.101	.076	-.076	-1.330	.184(ns)

a. Dependent Variable: Attitude to Computer-Assisted Testing

ns = not significant; p> 0.05

Research Hypothesis Two: This states that there is no significant sex difference in undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-west Nigeria. To test this research hypothesis, the computed raw score of the undergraduate students' attitude to CAT was subjected to test of difference using independent t-test with sex of respondents used as grouping variable. The results of the analysis are presented in Table 9.

Table 9. T-test Showing Sex difference in undergraduate students' attitude to Computer-Assisted Testing

	SEX	N	Mean	Std. Deviation	df	t	p-value
Attitude to CAT	MALE	207	15.76	3.185	328	0.253(n	0.800
	FEMALE	123	15.67	3.185			

ns = not significant; p> 0.05

Table 9 showed the results of the t-test, which revealed that there was no significant sex difference (t = 0.253; p >0.05) in the undergraduate students' attitude to CAT. Hence, the null hypothesis was confirmed, which states that there is no significant sex difference in the undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-west Nigeria.

DISCUSSION

The purpose of this study was to investigate whether undergraduate students' testwiseness, access to digital devices are key factors critical to enhancing their attitude towards Computer-Assisted Testing in some selected Universities in the Northwest geo-political zone of Nigeria. Hence, the finding showed that testwiseness, digital accessibility did not significantly combine to influence undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-west Nigeria. However, a there was a positive significant relationship between testwiseness and digital accessibility. Also, there was no significant sex difference in the undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-west Nigeria.

These findings are in consonant with the confirmation of Tavakolia & Samian (2014) and Ibrahim (2020) who alluded that testwiseness is not influenced by the content for which the items are believed to have measured. Perhaps, this could be due to the fact that as test takers' responses to former items is a determinant of subsequent items to be answered subsequently, it could be therefore deducible that test takers may not possess the knowledge to answer correctly most of the items in CAT, but they could depend on their testwiseness and substitute testwiseness for knowledge of the subject matter culminating in a higher performance. While test content has been found not to be a largely determining factor in the use of testwiseness strategies, test method is known to be largely influential factor.

A likely reason for this finding which shows that testwiseness combined with digital accessibility is not a potent predictor of undergraduate students' attitudinal disposition to CAT could be due to the fact that TW is seen as a test contaminant which affects test validity. In other words, as TW involves both the examinees' testing skills and test sophistication, it shows that TW is indeed a nuisance construct, which is not related to test construction or test purpose. A test-wise examinee can be expected to obtain a higher score on an aptitude, achievement, or teacher-made test, than an equally competent examinee who lacks test sophistication. That is, a student who possesses a characteristic labelled as testwiseness could do well on tests even though their level of preparation is less than adequate. This reason as presented here is applicable in most testing situations, regardless of previous exposure (or a lack of it) to either the test-maker, or other tests with a similar purpose. Similarly, this reason does not include rules of thumb to avoid minor mistakes, so that the examinee is not penalized for his or her carelessness. Thus, if examinees wish to maximize their test scores, use of an appropriate TW strategy is a viable means of doing so. This explains why there was a positive significant relationship between testwiseness and digital accessibility as one of the findings in this study.

Another finding in this study indicated that there was no significant sex difference in the undergraduate students' attitude to Computer-Assisted Testing in Universities in the North-west Nigeria. This implies that regardless of gender, both sexes have the same set of attitudinal posture towards CAT. This finding is not surprising as it was consistent with the discovery of Boo and Vispoel (2012) and Mojarrad et al., (2013) studies, which revealed that most of the students prefer to take the test on computer (CAT). Also, this finding confirms Ibrahim and Iliyasu (2021) investigation, which concluded that students have been experiencing the digital space in a variety of ways and using different platforms, thus showing diversity in their behaviours and experiences to CAT.

CONCLUSION

On the basis of the outcome of this study, it was concluded that TW and digital accessibility combined are not statistically significantly potent predictors of undergraduate students' attitudinal disposition to CAT in Universities in the North-west Nigeria. But, there existed a positive significant relationship between TW and digital accessibility. Whereas, gender is not a potent factor in undergraduate students' attitudinal disposition to CAT in Universities in the North-west Nigeria.

RECOMMENDATIONS

The following recommendations were made as follows:

1. CAT should be part of the Junior and Senior Secondary Schools' curriculums in the country in order to ensure efficiency in the development of test taking sills amongst students.
2. TW as a test taking skill could be taught at the University level where proper adoption of the TW cues will reinforce students' acquisition of knowledge.
3. There is no doubt that TW training at higher education will provide students with requisite skills needed for success in their examinations especially during their stay in the University.
4. Whatever CAT type may be adopted in the University, the salient point is that TW training will decrease low test-wise individuals among students.

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