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ASSESSMENT OF STUDENTS' PREFERENCE BETWEEN COMPUTER-BASED TEST AND PAPER-PENCIL TEST IN DELTA STATE UNIVERSITY, ABRAKA, NIGERIA

Igabari, Queen E.

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Abstract

Computer based testing is gaining wider patronage in internal examinations of Nigerian Universities. While this has attracted a lot of research attention, not much empirical studies have been done to find out learners' preference. Therefore, this study assessed students' level of preference between computer-based test (CBT) and paper-pencil test (PPT), and investigated the influence of gender on such preference. Study design non-experimental of survey research type. The population consists of 5,100 year-two undergraduates of Delta State University, Abraka, for the 2021/2022 academic session. Simple random sampling technique was used to select 220 students as sample for the study. A questionnaire called CBT-PPT-PREF was used to collect data. Facial and content validation of instrument was done by experts in measurement and evaluation. Test-retest was carried out on an independent group of 25 students different from those of the study in order to estimate the reliability of the instrument which yielded 0.86. Two research questions and three hypotheses were articulated to direct the research. Data collected were analysed using frequency count and t-test. Findings show that the overall proportion that approved of CBT was 76.4 %, while the overall proportion that approved of PPT was 52.3 %, that difference in the level of students' preference between CBT and PPT was significant at $p<0.013$, and that gender did not affect level of preference for any mode of assessment. The study concluded that CBT was an innovative mode of assessment that should be promoted and encouraged at all levels of education.

Keywords: Computer based test, Paper–pencil test, Students' preference, Gender, Undergraduates.

Introduction

Education at all levels has been considerably enhanced due to innovations brought into the educational system from time to time. These innovations require efficient and measurable modes of assessment to evaluate the outcome of every learning process. Before now, assessment of students were mostly based on paper-pencil or biro test in all spheres of education until recently when new modes of assessment were introduced into the education system. A prominent one among them is computer-based test (CBT). Computer-based tests are examination systems where students are required to answer questions via computer medium, and perhaps without using pencil, biro or paper. This mode of assessment is executed through the use of electronic devices. Computer-based testing is a recent novelty for assessing students in Nigerian educational system, including the Universities, where it is used in conducting examinations for large undergraduate courses. Delta State University is a typical example of a higher institution where computer based testing is gaining popularity in assessment of students.

Computer based tests emerged as an innovative approach to assessment of students because change is dynamic and it is the only permanent thing in life. It brought in the use of technology into assessment procedures in educational system. Danladi and Dodo (2019), claimed that computer-based test involved the engagement of interconnected system of computers. According to Olumorin,

Fakomogbon, Olawale and Olatare (2013), CBT has the features to simplify a very time consuming task, ease scoring process and to aid in monitoring progress. It can also be deployed to evaluate the learners' lower-order and higher-order mental ability with more complex application software. Computer - based testing have been adapted and adopted by many higher institutions and it has earned some level of popularity as a method to test and assess very large number of learners by well-known examination bodies like Joint Admissions and Matriculation Board (JAMB). Furthermore, Olumorin et al (2013) observed that the wide acceptance of computer based testing came stemmed from Post – Unified Tertiary Matriculation Examinations (Post-UTME) and other aptitude tests for placement into universities and other tertiary institutions in Nigeria. Delta State University has adopted computer-based testing as one of the means for assessing undergraduates. Many activities are involved in computer-based tests and they include administration of questions, scoring of answers, analyzing students' performance and publication of results of students' performance.

Bennett (2015) argued that computer-based tests implied modern approach to answering examination questions by replacing the ink and pencil format. Furthermore, computer-based test (CBT) involves adapting system hardware and software by examiners to manage the examination process. It allows a candidate to seat beside a computer monitor, logs in to gain access, supplies answers to questions, submits and ends exam using the keyboard or mouse. Olutola, Olatoye and Olatoye (2021) identified the advantages of CBT over PPT to include time saving, easy administration, ease and promptness of marking and scoring, enhanced integrity of the examination process, immediate documentation and availability of feedback for decision making. CBT reduces leakages, examination malpractices while covering a wide range of course syllabus.

Delta State University has adopted the CBT mode of assessment for first year undergraduates of the institution, while the higher level students still use the paper-pencil test to write. Paper-pencil test involves setting of questions and allowing students to write either with pencil, pen or biro to answer the questions. It has been the traditional method of assessing students before recent innovations of using technology to administer examinations. According to Olutola et al (2021) that all universities in Nigeria are in transition from the traditional paper-pencil mode to the innovative computer-based mode. Virtually all universities in Nigeria now employ CBT mode to conduct placement tests for admission into undergraduate programmes (Osadebe & Esegbue, 2018, Olumorin et al, 2013).

In a study on students' perception and acceptance of computer-based test, Okocha, Eyiolorunshe and Owolabi (2017) agreed that many universities in Nigeria have accommodated the new mode of using computer-based test to assess students. However, sustaining the acceptance largely depends on the students who are major players in the issue. The study reported that about 95 % of respondents preferred CBT mode of tests and assessment, and that about half of respondents prefer CBT for all courses. Presently, use of CBT has not been absolute, but limited to some specific courses. It was further concluded that preference for paper-based test were high in courses like physics and chemistry. It was observed that about 43% of students did not favour CBT in physics, while about 38% rejected the idea of CBT in chemistry. These two were relatively higher than what was observed for other courses.

Tella and Bashorun (2012) was another study that focused on the attitude of students towards computer-based test (CBT) and paper-pencil test (PPT) among undergraduate from seven faculties of University of Ilorin. The work reported a general positive response on attitude of students to CBT, with about 50% of both male and female students showing preference for each. Also, the work of Osadebe and Esegbue (2018) reported that both male and female learners performed better with CBT than their respective peers did with PPT. Alkadi and Madini (2019) reported that some studies have been carried out on the relevance of CBT and PPT modes for tests on language studies, and the effect on performance of candidates. The study reported that paper-based testees had more

challenges than those who took computer-based test, and that the test centred on sentence-level difficulties and lexico-grammatical ability. The study reported that 73 female undergraduates in Saudi Arabia who took the PBT committed a higher number of sentence-level mistakes than their CBT counterparts. It was then concluded that languages students make less mistakes with CBT than with PBT.

In addition, Prisacari and Danielson (2019) reported that CBT offers a memorable testing experience in contrast to paper-based mode of testing (PBT). Also multimedia can easily be included in CBT with other stimulating experiences that captures the attention of learners. Osadebe and Esegbue (2018) were also of the view that computer based test could be used to enhance a more impactful learning by testing for knowledge, understanding and a range of skills. The study asserts that computer technologies could offer powerful tools to tackle emerging challenges like design and implementation of non-conventional assessment methods, and may additionally, aid in developing a broader repository of knowledge and skills of cognition. Osadebe and Esegbue (2018) did a comparative evaluation of learners' performance in JAMB chemistry test with CBT and with PPT mode in Delta State University. The study reported that the difference between performance with CBT and with PPT was statistically significant, and that students performed better in JAMB Chemistry with CBT than with PPT mode.

Many authorities, such as Olutola et al (2021) and Prisacari and Danielson (2019), agree that computer-based tests has substantial advantages over paper-pencil test. However, Danladi and Dodo (2019) observed rightly that there are a lot of challenges facing computer-based test. One of them is inadequate Information Communication and Technology (ICT) infrastructures. Obioma, Junaidu and Ajagun (2013) discovered that available ICT infrastructures were non-functional due to old age, capacity overload, poor maintenance, and security issues. In addition, poor level of internet facilities in rural areas makes it imperative for learners to travel distances for access to such facilities. Bulus. Aremu and Ikpi (2019) investigated the attitude of students towards PPT and CBT modes of tests in Niger State. The study reported challenges concerning integrity of the process of CBT to include quality of ICT infrastructure, adequacy of number of systems, cybercrimes, poor ICT skills for both learners and instructors and epileptic public power supply. The research cautioned that Nigeria cannot afford to stay back in the face global advances in web technology.

Garas and Mostafa (2018) investigated the influence of gender towards preference for paper-pencil test and computer-based test. It was shown that gender had no effect on students' paper-based and computer-based scores. Additionally, it was observed that male learners have similar preference with female learners on both computer based and paper-pencil modes of assessment. Similarly, Owonwami, Filgona and Adepoju (2018) investigated how gender affects CBT in comparison with conventional mode of assessing learners' achievement in developmental psychology, in Yola, Nigeria. The study returned a verdict that gender had no influence on learners' achievement, whether with CBT or PPT, implying that students' gender could not be factored into learners' achievement in developmental psychology using CBT or PPT. The study concluded that both CBT and PPT mode of assessment are not gender-biased.

For most undergraduates in Nigerian Universities, choosing between Paper-Pencil mode (PPT) and Computer-based mode (CBT) has become an issue. This stems from the fact that many undergraduates are new to taking examinations via the use of computers, arising from the fact that many of them had no prior access to computers in their secondary schools, as reported by Bulus et al (2019). They were quite used to writing examinations with paper, pencil, pen and biro. Many feel at home with paper-pencil or pen-test because of familiarity, while others are not computer literate enough, especially those from rural schools, making them to dread computer-based tests. Another challenge reported by Bulus et al (2019) was that many teachers were not computer literate, and they did not possess the skills necessary for effective function with the computer. The attitude of some invigilators during examination can discourage students when it comes to computer based test. Some invigilators are

barely knowledgeable in computer operations. All these put together, may affect the attitude of students towards CBT examinations. However, according to Bulus et al (2019), stakeholders have also considered the low cost of administration, savings in time, reduced pressure on both instructors and students, as well as significant reduction in cases of examination malpractice as important reasons for embracing CBT.

Based on the foregoing, it is evident that not much empirical studies have been done to actually ascertain the learners' preference between computer based and paper pencil modes of assessment, because the learner is a critical stakeholder in the process. This study is therefore intended to fill this gap by a planned study on the learners preference and why. This is to ensure that learners are properly on board in the transition from PPT to CBT mode of examination.

Research Questions

The research questions to pilot this study are:

1. What is the level of learners' preference for computer-based test and paper-pencil mode of assessment in Delta State University?
2. What is the preference of male and female students for a mode of assessment in Delta State University?

Hypotheses

The null hypotheses for this study, formulated and tested at 0.05 alpha level, are:

Ho1: There is no significant difference in the level of students' preference between computer-based mode and paper-pencil mode of assessment in Delta State University.

Ho2: There is no significant difference in level of preference for computer-based mode of assessment between male and female students.

Ho3: There is no significant difference in level of preference for paper-pencil mode of assessment between male and female students.

Methodology

Non-experimental design of survey research type was adopted. The population consists of 5,100 year-two undergraduates of Delta State University, Abraka, for the 2021/2022 academic session. Simple random sampling technique was used to select 220 students as sample for the study. A questionnaire called CBT-PPT-PREF was used to collect data. The questionnaire had three sections. Section A was made up of the demographic details such as gender, level of study, academic session and discipline of the respondents. Sections B and C contained items pertaining to students' preference for CBT and PPT, respectively as modes of assessment, and had provision for responses on a four-point Likert scale options, arranged in order of strongly agree(with 4 points), agree(with 3 points), disagree(with 2 points) and strongly disagree(with 1 point point). Facial and content validation of the instrument was done by specialists in measurement and evaluation. Test-retest was carried out on an independent group of 25 students different from those of the study in order to estimate the reliability of the instrument which yielded 0.86. This was an indication that the questionnaire was good and reliable for the study. Data collected were analyzed using frequency count and percentages for the research questions and t-test for the hypotheses. SPSS version 26 and MS-Excel 2016 packages were employed as computational aids.

Results

Data analyses and results are presented as follows:

Research Question 1: What is the level of learners' preference for computer-based test and paper-pencil mode of assessment in Delta State University?

Table 1a: Level of Preference for Computer-Based Mode of Assessment

SN	Item	Number Agreed	% Agreed	Number Disagreed	% Disagreed
1	CBT is the best way of writing GST examination	174	79.1 %	46	20.9 %
2	CBT help students to get use to computer	191	86.8 %	29	13.2 %
3	CBT enable students to learn more about computer	185	84.1 %	35	15.9 %
4	CBT help to prevent exam malpractice	181	82.3 %	39	17.7 %
5	I prefer CBT in my GST examination because there is enough time to answer the questions	166	75.5 %	54	24.5 %
6	CBT encourages the release of results in a very short while	152	69.1 %	68	30.9 %
7	CBT enable questions to be draw from all topic taught	177	80.5 %	43	19.5 %
8	I like CBT exam than PPT in all my examination	159	72.3 %	61	27.7 %
9	I don't like CBT in my exam because the time is too short to answer the questions	144	65.5 %	76	34.5 %
10	I like CBT because there is no scoring bias	162	73.6 %	58	26.4 %
11	I don't like CBT examination because of network problems	160	72.7 %	60	27.3 %
	Overall Frequency	**168**	**76.4 %**	**52**	**23.6 %**

Table 1a shows the level to which the 220 respondents agreed or disagreed with the basic principles of CBT in Delta State University, Abraka. Out of the 11 items raised about the use of CBT, nine of them had an approval rating of more than 70 %, while the remaining two have rating that is at least 65 %. The overall proportion that approved of CBT stood at 76.4 %, while 23.6 % seem to disagree with its operations. The implication of this result is that the level of preference for CBT as a mode of examination is very high.

Table 1b: Level of Preference for Paper-Pencil Mode of Assessment

SN	Item	No Agreed	% Agreed	No Disagreed	% Disagreed
1	Paper-pencil examination enable me to express my knowledge in examination	138	62.7 %	82	37.3 %
2	I like PPT because it gives me opportunity to demonstrate my writing skill	103	46.8 %	117	53.2 %
3	I like PPT because it discourages too many questions	125	56.8 %	95	43.2 %
4	I prefer paper-pencil test to CBT because I am not use to computer	98	44.5 %	122	55.5 %
5	I prefer paper-pencil test because more time is given to it	111	50.5 %	109	49.5 %
6	PPT is more detailed	89	40.5 %	131	59.5 %
7	PPT identify the content which has been mastered by students	135	61.4 %	85	38.6 %
8	Teacher knows through the PPT the areas where the students have difficulties	186	84.5 %	34	15.5 %
9	PPT determine how effective teaching is	75	34.1 %	145	65.9 %
10	PPT provide the teacher with needed information to improve teaching	119	54.1 %	101	45.9 %
11	PPT make me to be more fulfilled	81	36.8 %	139	63.2 %
	Overall Frequency	**115**	**52.3 %**	**105**	**47.7 %**

Table 1b shows the extent to which the 220 respondents agreed or disagreed with the basic principles of PPT in Delta State University, Abraka. Out of the 11 items raised about the use of PPT, one of them had an approval rating of above 70 %, two have ratings that is between 60 % and 70 %, three are between 50 % and 60 %, while five of them are rating below 50 %. The overall proportion that approved of PPT stood at 52.3 %, while 47.7 % seem to disagree with its operations. The implication of this result is that the level of preference for PPT as a mode of examination is barely above average. In conclusion therefore, it is very obvious from Tables 1a and 1b that the level of preference for CBT is much higher than the level of preference for PPT in Delta State University, Abraka.

Research Question 2: What is the preference of male and female students for a mode of assessment in Delta State University?

Table 2a: Gender Level of Preference for Computer Based Test

	Number Agreed		% Agreed		Number Disagreed		% Disagreed	
Item No	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
1	84	90	78.5%	79.6%	23	23	21.5%	20.4%
2	92	99	86.0%	87.6%	15	14	14.0%	12.4%
3	93	92	86.9%	81.4%	14	21	13.1%	18.6%
4	85	96	79.4%	85.0%	22	17	20.6%	15.0%
5	83	83	77.6%	73.4%	24	30	22.4%	26.6%
6	72	80	67.3%	70.8%	35	33	32.7%	29.2%
7	80	97	74.8%	85.8%	27	16	25.2%	14.2%
8	80	79	74.8%	69.9%	27	34	25.2%	30.1%
9	71	73	66.4%	64.6%	36	40	33.6%	35.4%
10	83	79	77.6%	69.9%	24	34	22.4%	30.1%
11	78	82	72.9%	72.6%	29	31	27.1%	27.4%
Overall	**82**	**86**	**76.5%**	**76.4%**	**25**	**27**	**23.5%**	**23.6%**

A careful look at the entries of Table 2a shows that the level of preference for CBT by male students is 76.5 % while the level for female students is 76.4 %. The similarity of preference level for male and female students is clearly obvious from the respective percentages of agreement on each item. Therefore, one can conclude that gender does not affect a student's level of preference for CBT mode of assessment.

Table 2b: Gender Level of Preference for Paper-Pencil Test

	Number Agreed		% Agreed		Number Disagreed		% Disagreed	
Item No	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
1	70	68	65.4%	60.2%	37	45	34.6%	39.8%
2	49	54	45.8%	47.8%	58	59	54.2%	52.2%
3	61	64	57.0%	56.6%	46	49	43.0%	43.4%
4	49	49	45.8%	43.4%	58	64	54.2%	56.6%
5	51	60	47.7%	53.1%	56	53	52.3%	46.9%
6	47	42	43.9%	37.2%	60	71	56.1%	62.8%
7	61	74	57.0%	65.5%	46	39	43.0%	34.5%
8	89	97	83.2%	85.8%	18	16	16.8%	14.2%
9	34	41	31.9%	36.3%	73	72	68.2%	63.7%
10	64	55	59.8%	48.7%	43	58	40.2%	51.3%
11	39	42	36.4%	37.2%	68	71	63.6%	62.8%
Overall	**56**	**59**	**52.2%**	**52.0%**	**51**	**54**	**47.8%**	**48.0%**

From Table 4, the mean level of preference for PPT by male learners is 52.2 %, while the level for female learners is 52.0 %. The similarity of preference levels for male and female students is clearly obvious from the respective percentages of agreement and disagreement on each item. The closeness of the mean percentage for agreed and disagreed respondents, for both sexes shows no definitive preference for paper pencil mode of assessment. Therefore, one can also conclude that gender does not affect a student's level of preference for PPT mode of assessment.

Hence, whether it is CBT or PPT, results in Tables 2a and 2b indicates that gender does not influence a student's level of preference for a mode of assessment.

Hypotheses

Ho1: There is no significant difference in the level of students' preference between computer-based mode and paper-pencil mode of assessment in Delta State University.

Table 3: t-test for difference in students' level of preference between CBT and PPT

Test mode	N	Proportion	SD	Df	p-value	Decision
CBT	220	0.764	6.30	218	0.013	Rejected
PPT	220	0.523	7.41			

Alpha level = 0.05

From Table 3, the p-value of 0.013 was obtained from the analysis. To test this hypothesis at 0.05 alpha level, observe that p-value is 0.013 and it is less than 0.05 alpha level. Thus, we reject this hypothesis. Therefore we conclude that, on the basis of data available, the difference in the level of preference between CBT and PPT is significant.

Ho2: There is no significant difference in level of preference for computer-based mode of assessment between male and female students.

Table 4: t-test for difference in level of preference for CBT between male and female students

Gender	N	Proportion	SD	Df	p-value	Decision
Male	107	0.765	4.39	218	0.190	Accepted
Female	113	0.764	4.51			

Alpha level = 0.05

Table 4 is the t-test for difference in level of preference for CBT between male and female students. The p-value for the test is 0.190, which is greater than 0.05 alpha level. This implies that the difference in level of preference for CBT between male and the female students is not significant. Thus, the null hypothesis is accepted.

Ho3: There is no significant difference in level of preference for paper-pencil mode of assessment between male and female students.

Table 5: t-test for difference in level of preference for PPT between male and female students

Gender	N	Proportion	SD	Df	p-value	Decision
Male	107	0.522	5.17	218	0.176	Accepted
Female	113	0.520	5.31			

Alpha level = 0.05

Table 5 shows the t-test for difference in level of preference for CBT between male and female students. The p-value for the test is 0.176, which is greater than the 0.05 alpha level. This implies that the difference in level of preference for PPT between male and female students is not significant. Hence, the null hypothesis is similarly accepted. From Tables 4 and 5, therefore, we conclude that on the basis of data before us, a student's gender does not affect the student's level of preference for any mode of assessment.

Discussion of Findings

From analyses of data, the major findings of this research are as that the overall proportion that approved of CBT stood at 76.4 %, while the overall proportion that approved of PPT stood at 52.3 %, that the difference in the level of students' preference between CBT and PPT is significant, and that a student's gender does not affect the student's level of preference for any mode of assessment.

This study was an assessment of students' preference between computer-based test (CBT) and paper-pencil test (PPT) as modes of assessment within Delta State University, Abraka. The findings generally show that preference for CBT is on the increase, while that of PPT is on a decline. In spite of the fact that there are some challenges inherent with CBT, the acceptance is becoming wider, perhaps, because it is a global trend and the benefits are attractive and numerous. Some of the benefits of CBT include the fact that complex task can be resolved within a short time, is less expensive, provides immediate documentation and availability of quick feedback for making decision which is not so with PPT. The students prefer CBT to PPT because of innovation through the use of computer technology, like the use of phones for information online.

The first finding that there is higher preference for CBT agrees with the work of Okocha et al (2017), and Osadebe and Esegbue (2018) on the growing acceptance being accorded to CBT in Nigerian universities. The inference from the first hypothesis reveals indicates a significant difference in level of students' preference for CBT as opposed to PPT. The reason could be as a result of the fact that CBT is gradually being recognized and accorded serious attention as a global phenomenon. The findings from the second research question and the second hypothesis that a student's gender does not affect the student's level of preference for any mode of assessment, is in tandem with the work of Owonwami et al (2018) which concluded that both CBT and PPT modes of assessment were not gender-biased. It also aligns with Garas and Mostafa (2018) who concluded that the difference between students' paper-based and computer-based scores with respect to gender was not statistically significant. This implies that students' gender could not be factored into policies on mode of assessment. This research confirms that both modes of assessment are not sensitive to the gender of a student.

Conclusion

This study has investigated students' preference between computer-based tests and paper-pencil tests. Generally, findings indicated that higher proportion of students showed more inclination or preference for computer-based tests when compared with paper-pencil tests in Delta State University, and that whether it is CBT or PPT, gender does not influence a student's level of preference for a mode of assessment. This study has also established that there is significant difference in the level of preference between CBT and PPT, and that a student's level of preference for any mode of assessment has nothing to do with gender.

Recommendations

In line with the findings of this study, we recommend that, for better impact of CBT mode of assessment:

1. Universities and other tertiary institutions should strengthen and enhance the CBT mode of assessment in line with the present trend.
2. Efforts should be accelerated by school proprietors towards introducing practical computer applications in secondary schools especially in rural area in preparation for tertiary institutions.
3. Proper orientation should be organized for fresh intakes into the university system

before exposing them to CBT mode of assessment.

4. Opportunities should be created for learners at all levels to familiarize themselves with the processes of computer- based-testing long before official assessment.

5. Computer-based-test, being an innovative mode of assessment, should be promoted and encouraged at all levels of education.

References

Alkadi, S. Z, & Madini, A. A (2019). EFL learners' lexico-grammatical competence in paper-based vs computer-based in genre writing. *SSRN Electronic Journal* https://doi.or/10.2139/SSrn.3431758.

Bennett, R. E (2015). The changing nature of educational assessment. *Review of Research in Education*. *39*(1): 370 - 407.

Bulus, G. B., Aremu, O.D. & Ikpi, E.E., (2019). An investigation of senior secondary schools students attitude towards paper-pencil and computer-based test in Niger State. *International Journal of Scientific Research and Engineering Development. 2*: ISSN: 2581-7175.www.Ijsred.com.

Danladi, H. & Dodo, A. K. (2019). An assessment of the challenges and prospects of computer-based test (CBT) in Joint Admissions and matriculation Board (Jamb). *International Journal of Humanities and social science (SSRG-IJHSS). 6*: ISSN: 2394-2703.

Garas, F. & Mostafa, D. (2018). The use of computer-based testing method for the conduct of examinations at the University of Ilorin. *International Journal of Learning & Development*. *2*(3): 28-31.

Obioma, G., Junaidu, I. & Ajagun, G. (2013). The automation of educational assessment in Nigeria: challenges and implications for pre-service teacher in education. *A paper presented at the 39th Annual Conference of International Association for Educational Assessment* (IAEA) Tel-Aviv, Israel, Oct. 20-25. Retrieved from http://www.19e9.intro/paper_5bc19d0.

Okocha, F., Eyiolorunshe, T. E. & Owolabi, S. (2017). Students' perception and acceptance of computer-based testing: A case study of Landmark University students. *Journal of Digital Innovations & Contemporary Research in Science, Engineering & Technology*. *5*(1): 25 - 32.

Olumorin, C. O. Fakomogbon, M. A., Fasai, Y. A, Olawale C. O, & Olafare F. O. (2013) Computer-based tests: a system of assessing academic performance in University of Ilorin, *Nigeria. American Academic & scholarly research Journal. 5*(2): 110 - 116.

Olutola, A. T., Olatoye, O. O, & Olatoye, R. A (2021). Undergraduates' attitude towards, computer-based tests as an assessment mode for general studies. *Journal of Applied Research in Education, 7*(1).www.unilagjare.net.

Osadebe, P. U., & Esegbue, T. O, (2018). Evaluation of students' academic performance in JAMB chemistry test under the computer–based testing and paper pencil media in Delta State University. *International Journal of Advanced Research. 6*(5): 415-426.

Owonwami, I. T; Filgona, J. & Adepoju, O. A (2018). Gender effect of computer-based testing and traditional mode of testing on students' achievement in developmental psychology: A case study of Modibbo Adama University of Technology, Adamawa State, Nigeria. *International Journal of Research*. *5*(19): e-ISSN: 2348-68-48, p-ISSN: 2343-795x.

Prisacari, A. A, & Danielson, J. (2019). Computer-based versus paper-based testing: investigating testing mode with cognitive lead and scratch paper use. *Computers in Human Behaviour*. *77*: 1 - 10.

Tella, A. & Bashorun, M. T. (2012). Attitude of undergraduate students towards computer-based tests (CBT): A case study of University of Ilorin, Nigeria. *International Journal of ICT Education*. *8*(2): 33 – 45.