

---

# UNDERGRADUATE STUDENTS' PERCEPTION ON USAGE OF COMPUTER-BASED TEST FOR LEARNING ASSESSMENT IN ILORIN, NIGERIA

<sup>1</sup>Mayowa Olurotimi Ogunjimi, <sup>2</sup>Victoria Iyabo Aremu

<sup>1</sup>University of Ilorin, Nigeria' <sup>2</sup>Lagos State University of Education, Ijanikin, Nigeria

<sup>1</sup>[ogunjimi.mo@unilorin.edu.ng](mailto:ogunjimi.mo@unilorin.edu.ng); <sup>2</sup>[vicaremu@gmail.com](mailto:vicaremu@gmail.com)

---

## ABSTRACT

*The study investigated the undergraduate students' perception on the use of computer-based tests for learning assessment in Ilorin, Nigeria. A descriptive survey research design was adopted for the study. The target population were all undergraduate students from three universities in Ilorin, Kwara State, Nigeria. A multistage-stage sampling technique was employed to select 600 respondents as the sample size. At first stage, purposive sampling technique was used in selecting three universities. Afterwards, simple random sampling technique by ballot was used to select 200 students from each of the three universities.*

*A researcher self-constructed questionnaire titled: "Undergraduate Perception on the Use of Computer-Based Test for Learning Assessment" with a four-point Likert Scale was used to obtain the data for the study. The instrument was validated by experts' judgment and the Cronbach Alpha reliability estimate yielded 0.83. Data collected was analysed using descriptive statistics, t-tests and Analysis of Variance (ANOVA).*

*The result shows a positive perception of undergraduate students on the use of computer-based tests for learning assessment and that their perception does not differ significantly irrespective of institutional type, students' academic level and gender. It was recommended that computer-based test should be integrated into all examinations in Nigerian Universities irrespective of the level and gender of the students that are involved.*

**Keywords:** Technology advancement, Undergraduate Students, Computer-Based Test, Assessment, Paper and Pencil Test.

## INTRODUCTION

Many facets of life have been influenced by the progressive advancement in technology. The present century has equally been marked by significant improvements in different aspects of man's life including farming, transportation, economy, communication, and education through technology advancement. In particular, the application of technology in the field of education is not novel. It is not contentious that the application of modern technological devices

enhances teaching and learning such that both run concurrently without hindrance; even more, assessments are being conducted via electronic means in this era of technology. In support of this, Daramola (2017) opined that technology has remodelled the method of assessment in the past few years, whereas Computer-Based Assessment (CBA) has gained popularity as an assessment modality.

Assessment is a variety of tasks by which teachers collect information regarding the performance and achievement of their students. Yambi and Yambi (2018) describe assessment as a means of gathering and interpreting information about students' level of learning goals attainment. It is used to identify the weaknesses and strengths in individual students so that educators can provide suitable academic support, educational programming or social services for such students. Undoubtedly, assessment is vitally important in higher education because it stimulates learners' attitudes and behaviors toward learning. It gave them the necessary opportunity, a feedback on their strengths and weaknesses, and it offers the insights on the areas they might improve on in future (Clay, 2019).

Accordingly, assessment has long been recognized as maintaining a central position in students' learning (Croft, et al., 2001). In any educational system, assessment ascertains the extent to which educational learning outcomes are achieved and also the extent to which students have mastered a subject matter (Adedoyin, 2016).

In higher institutions of learning, assessment of students is a fundamental phenomenon and it is also a continuous process geared towards promoting and understanding students' learning outcomes. It is related to series of measures used to determine a complex attribute of an individual or group of individuals. This involves gathering and interpreting information about students' level of attainment of learning goals.

In the present 21<sup>st</sup> century, a paradigm shift in assessment is being witnessed as students can be tested or assessed both inside and outside the classroom. Technology offers benefits such as creating and displaying works online through Social media, YouTube, and Digital portfolios. Additionally, many university classes are encouraging and even requiring students' contribution on online platforms and forums. Regardless of the format of assessment, technology is becoming a critical part of learning and is widely used for assessment purposes. With the current prevalence of remote learning and growing interest in e-assessment, most teachers have come to understand the benefits of technology for assessment. However, what is not yet widely celebrated is that technology-enabled assessment can be used for more than just tracking results and discipline knowledge. By combining data with learning analytics, technology also offers great promise in helping pupils learn through assessment.

Across the globe, educational institutions are migrating towards the application of technology in testing students' knowledge while computer-based test is a modern approach being used for testing and assessment (Olumorin et al., 2013). According to Daramola (2018), a system of interconnected computer networks that uses the Standard Internet Protocol Suite (SIPS) to serve their users in taking examination is termed as computer-based examination. Conole and Warburton (2005) advanced that Computer-Based Test (CBT) entails the use of computers for assessing students' learning. Computer-based test is a form of assessment in which computer is an integral part of questions delivery, response storage, marking of response or reporting of result from a test or exercise. It is a method of administering tests in which assessment are electronically provided and responses are also recorded in the same way.

Contrary to the paper and pencil-based tests, CBT is more efficient and highly beneficial. This view is supported by Daramola (2018) who maintained that computer-based assessment has some practical and economic benefits which include its usefulness in testing large students' cohort with the facility of automated marking of responses. Also, Peter et al. (2004) stated that computer-based assessments can be more easily designed to meet the needs of special population, including students with disabilities and those from diverse linguistic backgrounds. Again, Mulvaney (2011) pointed out that electronic delivery of test items is also less expensive than printing and mailing large quantities of testing materials.

Similarly, Siddiquah and Salim (2017) maintained that computer-based tests have several security advantages over the paper-and-pencil tests. In respect of the foregoing, explanation offered was that instead of keeping test papers at school sites for days before the time of test administration, it can be sent over the internet at the last minute thereby preventing the possibility of questions being exposed prior to the test.

Due to this paradigm shift in educational assessment, computer and related technologies have become assistive tools in revamping the designing and implementation of assessments methods that go beyond the conventional practices and its challenges. Jimoh et al. (2012) stated that an increase in student numbers, ever-escalating work commitments for academic staff and the advancement of internet technology, have necessitated the use of computer assisted assessment in many higher institutions of learning. Of note, the rapid advancement of Information and Communication Technology (ICT) in teaching and learning has facilitated the shift away from the traditional method of assessment (paper-pencil-based) to the computer-based system of examination. Nonetheless, the paradigm shift in the mode of assessment does not necessarily mean that the CBTs are intrinsically better than paper-and-pencil based tests (Jimoh, Shittu, & Kawu, 2012). As advances in technology continue to change the lives of instructors and students in the academic circle, researchers in the field of education have investigated the perception of students and lecturers on the use of CBT, while their findings

revealed some dichotomies in the views of the two parties about computer-based test. For instance, in a survey of university teachers' perception about computer-based and paper-based examination, Jamil et al. (2012) reported that university lecturers maintained a positive attitude towards computer based examinations, yet they preferred the paper-based option in some situations. Though computer-based assessment has been the fastest way of assessing students due to the increasing population of undergraduate students in the Nigerian varsities, but most often, it focuses on lower cognitive skills such as recalling information that requires students to give correct or incorrect responses that can be graded effectively and efficiently.

Computer provides powerful tools to meet the new challenges of examining and assessing the undergraduate students beyond conventional practices. CBT mode of examination provides opportunities to measure complex form of knowledge and reasoning that are not possible to assess via the traditional methods. One of the major problems confronting the use of CBT mode of examination among undergraduate students in Ilorin, Nigeria especially after the post Covid-19 era has been traced to poor power supply, inadequate ICT infrastructure, technical problems, improper utilization of computer system and factors related to getting suitable software, poor standardized based assessment development mode as challenges to the success of e-examination (Wordu, Olutimilehin & Kelechi, 2020).

Moreover, the online assessment may not be effective for evaluating creativity, problem solving ability, critical thinking reflection or authentic learning in which some studies had been extensively researched (Oye, Salleh & Iahad, 2011; Croft et al., 2001 & Anolu & Ofeimu, 2019). Therefore, because of dichotomies in the views concerning the use of CBT, the present study examined undergraduate students' perception on usability of computer based test for learning assessment in Ilorin, Nigeria.

#### RESEARCH QUESTION AND HYPOTHESES

The following research question was raised to guide the study:

- i. What is the undergraduate students' perception on the use of computer-based test for learning assessment in Ilorin, Nigeria?

#### RESEARCH HYPOTHESES

The following null hypotheses were formulated to guide the study:

- H<sub>01</sub>:** There is no significant difference in the perception of undergraduate students on using CBT for learning assessment based on institution types;
- H<sub>02</sub>:** There is no significant difference in the perception of undergraduate students on the use of CBT for learning assessment on the basis of academic level.
- H<sub>03</sub>:** There is no significant difference in the perception of undergraduate students on the use of CBT for learning assessment on the basis of gender.

## METHODOLOGY

The study adopted the descriptive survey type of research design. The target population of the study consists of all undergraduate students from the federal, state, and private universities situated in Ilorin, Nigeria. A multistage sampling technique was employed to select 600 students as sample size for the study. At first stage, purposive sampling technique was used in selecting three universities (one federal, one state and one private owned university), Afterwards, simple random sampling technique was used to select 200 students from each university, and at third stage simple random sampling technique by ballot was used to select fifty students from each academic level.

A self-constructed questionnaire was used as instrument to elicit information from the respondents. The questionnaire was titled "Undergraduate Students' Perception on the Use of Computer-Based Test for Learning Assessment". The research instrument was divided into two sections. The first section elicits information on the demographic data of the respondents, while the second section consists of twenty (20) items on the perception towards the use of Computer-Based Test for Learning Assessment which had four point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). Content validity of the instrument was carried out by two experts in the field of Educational Test and Measurement and Computer Education while the reliability of the instrument was established using the test-retest reliability method which yielded a value of 0.86 and hence, adjudged to be reliable.

The data collected were analyzed using descriptive statistics (frequency, percentage, mean and standard deviation) to provide answer to the research question while the research hypotheses were tested with t-test and Analysis of Variance (ANOVA) at 0.05 alpha level.

## RESULTS AND DISCUSSION

In order to answer the research question, the mean response of students to each items on the questionnaire that addressed the undergraduate students' perception on the use of computer-based test for learning assessment were computed. In order to get the mean response to each item, the average of the total points was computed to be 2.50. Any item with the mean value below 2.50 is negative, while item with mean value greater than 2.50 is positive.

**Table 1: Summary of Descriptive statistics on Undergraduate Students' Perception on the Use of Computer-Based Test for Learning Assessments.**

S/N	Items	Mean	SD	Rank	Remarks
1.	is more credible for learning assessment.	3.23	0.71	1st	Positive
2.	gears students to read intensively on all the topics of a given course	3.21	0.72	3rd	Positive
3.	aids adequate assessment of course contents taught	3.21	0.86	3rd	Positive
4.	saves the workload on the part of the examiner when recording scores	3.23	0.77	1st	Positive

5.	is effective because many students are tested with the different set of questions	2.80	1.01	19th	Positive
6.	rules out the possibility of favouritism in marking	3.06	0.86	6th	Positive
7.	covers the defects of students who do not have good expression	2.97	0.93	9th	Positive
8.	crosses out the use of high-handed or script marking scheme	2.84	0.86	17th	Positive
9.	limits the expression of students' understanding of concepts	2.94	0.86	12th	Positive
10.	CBT scores do not reflect a real picture of students' knowledge	2.96	0.96	11th	Positive
11.	tests the cognitive aspect of student's learning	2.89	0.95	15th	Positive
12.	allows students to evaluate themselves before results are released	2.89	0.87	15th	Positive
13.	prevents entry errors like a mix up of students' scores/grade	2.93	0.93	14th	Positive
14.	adequate time is usually allotted for computer-based tests	3.01	0.87	7th	Positive
15.	should not be used singly for learning assessment	2.97	0.87	9th	Positive
16.	should be used for assessing learning in some general courses only	2.94	0.91	12th	Positive
17.	should not be limited to objective test items only	2.83	0.99	18th	Positive

18.	should be designed with adequate timing	3.00	0.84	8th	Positive
19.	should be used to improve the quality of learning assessment	3.21	1.07	3rd	Positive
20.	assess every aspect of student's knowledge	2.79	0.89	20th	Positive

Table 1 above revealed the undergraduate students' perception of the use of computer-based test for learning assessment in Kwara state. This is evident as the mean value of all the items in the table above indicate values greater than 2.50. It shows that undergraduate students had positive perception on the use of computer-based test for learning assessment in tertiary institution. It was revealed that computer-based assessment was perceived as more credible for learning assessment and saves the workload on the part of the examiner when recording scores which had the highest mean, and was perceived as assessing every aspect of student's knowledge which had the lowest mean. Above all, the mean value of all the items are greater than 2.50 which indicate that the perception of the undergraduate students on the use of computer-based test for learning assessment is positive.

In order to test this research hypotheses, the response to all the items were summed together and the data collected were subjected to Analysis of Variance (ANOVA) for research hypotheses one and two while t-test analysis was used to test research hypothesis three. The result of the analysis is presented in the tables below.



**H01:** There is no significant difference in the perception of undergraduate students on using CBT for learning assessment based on institution types.

**Table 2: Summary of One-way ANOVA on undergraduate students' perception on the use of CBT based on institutional type.**

	Sum of Squares	df	Mean Square	F	Sig.	Remark
Between Groups	56.790	2	28.395	1.061	.347	*Not Significant
Within Groups	15978.195	597	26.764			
Total	16034.985	599				

**Sig. 0.347 > 0.05**

From table 2 above, the result shows that F-value of 1.061 at 599 degree of freedom (df) is not significant at 0.05 alpha level ( $p > 0.05$ ). Hence, the null hypothesis which state that there is no significant difference in the perception of undergraduate students on using CBT for learning assessment based on institution types is retained. It means that the undergraduate students from federal, state and private institutions do not differ in their perception on the use of computer-based test for learning assessment.

**H02:** There is no significant difference in the perception of undergraduate students on the use of CBT for learning assessment on the basis of academic level.

**Table 3: Summary of One-way ANOVA on undergraduate students' perception on the use of CBT based on academic level.**

	Sum of Squares	df	Mean Square	F	Sig.	Remark
Between Groups	61.338	3	20.446	0.763	.515	*Not Significant
Within Groups	15973.647	596	26.801			
Total	16034.985	599				

**Sig. 0.515 > 0.05**

From table 3 above, the result shows that the F value 0.763 at 599 degree of freedom is not significant at 0.05 alpha level ( $p > 0.05$ ). Therefore, the null hypothesis which state that there is no significant difference in the perception of undergraduate students on the use of CBT for learning assessment based on academic level is retained.

This revealed that undergraduate students at different academic levels do not differ significantly in their perception on the use of CBT for learning assessment.

**H03:** There is no significant difference in the perception of undergraduate students on the use of CBT for learning assessment on the basis of gender.

**Table 4: Summary of One-way ANOVA on undergraduate students' perception on the use of CBT based on gender.**

Gender	N	Mean	SD	df	t-value	Sig.	Decision
Male	321	49.51	5.236	598	.288	.592	*Not significant
Female	279	50.55	5.053				

**Sig. 0.592 > 0.05**

From table 4 above, the result indicated that the t value of .288 at 598 degree of freedom is not significant at 0.05 alpha level ( $p > 0.05$ ). Therefore, the null hypothesis stated above is retained since the significant value of 0.592 is greater than 0.05 of alpha level. This reveals that perception of undergraduate students on the use of computer-based tests for learning assessment in tertiary institutions is not determined by gender.

The findings from this study revealed that the perception of the undergraduate students on the use of computer-based test for learning assessment is positive. This indicate that undergraduate students in Ilorin, Nigeria perceive the use of CBT for learning assessment positively. The possible reason behind this finding may be due to the facts that CBT is more credible for learning assessment and that it rules out the possibility of favouritism in the scoring of students' response. Also, CBT examination reduce the stress and anxiety that comes along with writing of exams using paper and pencil and that marking is more accurate. This corroborate findings of Oladimeji and Mwuese (2018). who reported that majority of the respondents prefer writing all examination in CBT because computers is more accurate and had less

human error in the process of scoring and that the potential for immediate feedback with CBT helps the students to learn better.

Moreover, it was revealed from the study that there is no significant difference in the perception of undergraduate students on the use of computer-based test for learning assessment based on institutional type. This indicates that undergraduate students from Federal, State and Private institutions do not differ significantly in their perceptions on the use of CBT for learning assessment respectively. This corroborate submission of Bala (2018) that the culminating benefit of CBT lies in its ability to curtail examination malpractice and hence various learning institution used it. This is in line with the study of Ebimgbo, Igwe and Okafor (2021) which revealed that the ability of CBT in enhancing administrative convenience through time saving, and prevention of frequent occurrence of missing exam scripts of students, promotes exam security which allows institution across the globe to migrate toward the use of CBT to test students' knowledge.

In addition, the finding of this study revealed that there is no significant difference in the perception of undergraduate students on the use computer-based test for learning assessment based on the academic level of the students. This implied that the undergraduate students at all levels perceived the use computer-based test for learning assessment the same way. This support the findings of Kies, Williams and Freund (2006) who found out that all students become very well acquainted with the computerized format long before taking



examinations through the use of on-line practice examinations and on-line grade reporting. Thus, giving both male and female a level of comfort and familiarity with the on-line format long before an on-line examination is administered. Also, Owonwami, Filgona and Adepoju (2018) found out that students at different levels are more comfortable with taking CBT examinations than paper-pencil based one. Moreso, Aletan et al. (2022) reported that no significant difference exists in undergraduates' views towards the use of CBT for examinations regarding stream of study and programme of study. In addition, Heerwegh, De Wit, & Verhoeven, (2016). stated that access to ICT is crucial for students at all level to participate in the society on equal terms.

Furthermore, the finding of this study shows that there is no significant difference in the perception of undergraduate students on the use of computer-based test for learning assessment based on gender. This means that there is no gender differences in the undergraduates' view towards the use of computer-based test for learning assessment. This finding corroborate the finding of Jimoh et al. (2012) who reported that gender does not affect students' perception of CBT, and as such, CBT can be considered a valid and acceptable testing mode. The finding also coincides with Khoshisma and Toroujeni (2017) who observed no significant gender differences among the students on the post achievement tests and perception of CBT scales favouring the experimental group. It was stated that the use of CBT for learning assessment is perceived the same way by the male students and their female

counterparts. Students' gender could not be factored in their achievement in developmental psychology using CBT and traditional assessments. This further showed that CBT is gender-friendly.

## CONCLUSION

The study ascertains the perception of undergraduate students on the use of computer-based test for learning assessment. CBT was introduced in various universities in Nigeria as a result of some limitations associated with the paper and pencil test. The findings of this study revealed that undergraduate students had positive perception on the use of CBT for learning assessment because it has aided in conducting examinations that involve a large number of students and has helped to reduce the experience of missing scripts, examination malpractices, and despicable experiences by the students.

The findings also revealed that it provides students with opportunities to write exams with ease and have feedback immediately after the test. It a modern approach of assessment because marking is more accurate and stress free. It was also revealed that CBT is user friendly irrespective of institutional type, students' academic level and gender. Hence, CBT is credible for learning assessment in the universities.

## RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

- i. Computer-based test should be integrated in all examinations in Nigerian Universities irrespective of the level and gender of the students that are involved. By this, some of the irregularities such as missing and untimely publishing of results, favouritism, etc. will be curtailed.
- ii. Computer-based test should be developed in a way that it would assess every aspect of student's knowledge and that the software developed for examination should be updated regularly in order to cater for possible challenges.
- iii. Information and Communication Technology (ICT) infrastructures should also be maintained regularly to cater for adequate functioning of the facilities during the examinations.
- iv. Regular seminars, workshops and training on the use of computer is very paramount prior to the examinations to facilitate improved digital competency and skills among students and staff on usage and maintenance of CBT software.

## REFERENCES

1. Adedoyin, O. O. (2016). Concepts on assessment practices in institutions of higher education as perceived by BA ISAGO undergraduate students. *Asian Journal of Social Science Studies*, 1(2), 24 - 36. <http://dx.doi.org/10.20849/ajsss.v1i2.51>
2. Aletan, M. S., Falade, E. O., Erundu, N. C. & Ogunsola, R. (2022). Undergraduates' Views and Attitudes towards the use of Computer-Based Tests for Examination at the University of Lagos, Nigeria. *International Journal of Advanced Research in Social Sciences, Environmental Studies & Technology*, 7(1), 62 – 74.
3. Anolu, C. O., & Ofeimu, J. (2019). Lecturers' perception of the usefulness of computer-based examination in tertiary institutions in Edo state, Nigeria. *European Journal of Educational and Development Psychology*, 17(1), 16 - 29.
4. Bala, M. M. (2018). Computer based test (CBT): A veritable tool for checking examination malpractice in unified tertiary matriculation examination (UTME). *International Journal of Educational Benchmark (IJEB)*, 10(2), 68 - 73
5. Clay, H. B. (2019). Learners' perceptions of assessment strategies in higher education. *Journal of Education and e-Learning Research*, 6(2), 76-81. <https://doi.org/10.20448/journal.509.2019.62.76.81>
6. Conole, G., & Warburton, B., (2005). A review of computer-assisted assessment. *Research in Learning Technology*, 13(1), 17 – 31. <https://doi.org/10.3402/rlt.v13i1.10970>
7. Croft, A., Danson, M., Dawson, B., & Ward, J. (2001). Experiences of using computer-assisted assessment in engineering mathematics. *Computers & Education*, 27(1), 53–66.
8. Daramola, F. O. (2017). Impact of computer based test in Nigeria tertiary institutions: A theoretical view. *International Journal for Innovative Technology Integration in Education*, 1(1), 109 – 116.

9. Ebimngbo, S. O., Igwe, N. J. & Okafor, A. E. (2021). Perceived effectiveness of computer-based test examination mode for large classes among undergraduates of Nigerian universities: Implications for social work. *Journal of Social Work in Developing Societies*, 3 (1), 62 – 77
10. Ekeke, J. H. (2013). Conceptual frame work of teachers' competence in relation to students' achievement. *International journal of networks and systems*. 2(3), 15- 20.
11. Fagbola, T. M., Adigun, A. A., Oke, A. O., (2016). Computer-based test (CBT) system for univesity academic enterprises examination. *Interntional journal of Scientific &technology research volume, Issue 8*.
12. Greaud, V. A., & Green, B. F. (1986). Equivalence of conventional and computer presentation of speed tests. *Applied Psychological Measurement*, 10(1), 23–34. <https://doi.org/10.1177/014662168601000102>
13. Haigh, M. (2010). Why use computer-based assessment in education? A literature review. *Research Matters*, Issue 10. Available at <http://www.cambridgeassessment.org.uk/research-matters/>
14. Heerwegh, D. & De Wit, K. & Verhoeven, Jef. (2016). Exploring the Self-Reported ICT Skill Levels of Undergraduate Science Students. *Journal of Information Technology Education Research*, 15, 19 - 47.
15. Hensley, K, K. (2015). Examining the effects of paper-based and computer-based mode of assessment on mathematics curriculum based measurement. <http://cambrigeassess ment.org.uk/reasearch-matter/>
16. Jamil, M., Tariq, R., & Shami, P.A. (2012). Computer-Based vs Paper-Based Examinations: Perceptions of University Teachers. *Turkish Online Journal of Educational Technology*, 11, 371-381.
17. Jimoh, R. G., Shittu, A. K., & Kawu, Y. K. (2012). Students' perception of computer based test (CBT) for examining undergraduate chemistry courses. *Journal of Emerging Trends in Computing and Information Sciences*, 3(2), 125-134.
18. Kies, S.M., Williams, B.D. & Freund, G.G. (2006). Gender plays no role in student ability to perform on computer-based examinations. *BMC Medical Education*, 6(57), 1 - 6 <https://doi.org/10.1186/1472-6920-6-57>
19. Khoshsima, H., & Hashemi Toroujeni, S. M. (2017). Computer-Based Testing: Score Equivalence and Testing Administration Mode Preference in a Comparative Evaluation Study. *International Journal of Emerging Technologies in Learning (iJET)*, 12(10), 35–55. <https://doi.org/10.3991/ijet.v12i10.6875>
20. Morkhtaria, L. (2015). The uses of portfolio as an assessment tool. *International Journal of Scientific & Technology Research*, 4(7), 170 – 172.
21. Mulvaney, J. R. (2011). Computer-based assessment and the effects it has on middle school aged students. Unpublished Thesis, University of Winsconsin-Stout.
22. Okocha, F., Eyiolorunshe, T. T., & Owolabi, S. (2017). Student 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.
23. Oladimeji, O. F. & Mwuese, B. C. H. (2018). Computer based test: Panacea to undergraduate students' performance in Olabisi Onabanjo University, Ogun State, Nigeria. *Educational Research*, 9 (3), 50-57. <http://dx.doi.org/10.14303/er.2018.219>.
24. Olafare, F. O., & Boor, C. M. H. (2018). Computer based test: Panacea to undergraduate students' performance in Olabisi Onabanjo University, Ogun state, Nigeria. *International Research Journals*, 9(3), 50 - 57.
25. Olumorin, C. O., Fakomogbon M. A., Fasasi Y. A., Olawale C. O., & Olafare F. O (2013). Computer-based test: A system of assessing academic performance in University of Ilorin, Ilorin, Nigeria. *America academic & scholarly research journal* 5 (2)
26. 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), 1051 – 1059.
27. Oye, N. D., Salleh, M., & Iahad, N. A. (2011). Challenges of e-learning in Nigerian university education based on the experience of developed countries. *International Journal of Managing Information Technology*, 3(2), 39 – 48.
28. Peter, C., Bill I. & David S. (2004). Using computers for assessment in medicine. *British Medical Journal*, 329(7466):606-609.
29. Siddiquah, A., & Salim, Z. (2017). The ICT Facilities, Skills, Usage, and the Problems Faced by the Students of Higher Education. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(8), 4987-4994.  
<https://doi.org/10.12973/eurasia.2017.00977a>
30. Wordu, H., Olutimilehin, A., & Kelechi, F. (2020). Computer-Based Assessment: Application, Prospects and Challenges in Nigeria. *International Journal of Education and Evaluation*, 6(1), 1-5
31. Yambi, T. D. A. C., & Yambi, C. (2018). *Assessment and evaluation in education*. University Federal do Rio de Janeiro, Brazil.