Attitude of Undergraduate Students towards Mathematics Computer Based Tests

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Abstract
Mathematics plays a crucial role in this technological age, yet students due to their attitude to mathematics are not performing well in the subject. This study sought to investigate the attitude of undergraduate students towards mathematics computer based tests in Adekunle Ajasin University, Akungba-Akoko,Ondo State. The study adopted a survey design. A sample of 200 undergraduate mathematics Education Students were drawn through simple random sampling Technique. A self-designed questionnaire titled "Undergraduate Attitude Towards Mathematics Based Computer Test Questionnaire" (UATMBCTQ). Data collected were analysed using Chi Square, mean, standard deviation and t-test. Findings revealed that there was positive attitude of undergraduate students towards computer based test in mathematics. Also the attitude of undergraduate students towards computer based testing was significantly positive; hence it was recommended that computer based testing should be employed by universities at all levels to improve undergraduates' performance in mathematics and also enhance their interest in mathematics.
Keywords: Attitude, mathematics, computer-based, tests, students

Introduction
In recent times, technology plays a vital role in people's lives especially in the educational system, where it is used for training, assessment and so on. Employing the use of information and communication technology improves the quality of education and makes policies more effective. Teaching and learning activity is not complete until

when the students are assessed. One major instrument used for assessment is test. Test is a method of assessing certain human behaviours or traits which include attitudes, interest and so on. It is also a systematic way of observing human behaviour, so that at the end of the observation, figures are assigned to results of observations. Assessment is considered as an important part of the teaching and learning process. The use of reliable assessment technique improves the quality of the educational process and enables students to determine whether they have met the required academic goals or not (Alsadoon, 2017, cited in Galle, 2020). Due to the significance of assessment, several methods are used such as Computer Based Test (CBT), Paper and Pencil Test and so on.

The Paper and pencil Test (PPT) has been faulted with numerous problems ranging from shortage of examination materials, impersonation, cheating in examination halls, cases of missing scripts, improper scoring of examinees' responses, delay in computing and processing of result. According to Lim et al (2006), CBT is the form of assessment in which the computer is an integral part of question papers, delivery, response, storage, marking of response or reporting of results from a test. CBT helps the teachers to assess the students' level of achievement faster. CBT is described as a method that would make testing less expensive in the long run, and would produce better assessment of a wide range of students from primary level of education to higher institutions.

Recently, educational assessment bodies such as Joint Admissions and Matriculation Board (JAMB), universities, and so on, changed their assessment method to keep up with latest technological development to computer Based Test (Tella & Bashorun, 2012). Computer Based Test has brought about transformation in learning, pedagogy and curriculum in educational institutions (Jimoh & Salami, cited in Adebola, 2021). According to Adewale and Etuk-Iren (2015), computer based testing has improved on the assessment system. Some of the advantages of CBT, according to them, include increased delivery, administration and scoring efficiency, improved test security, consistency and reliability, faster response rate, measurement of complex forms of knowledge and reasoning, recording a broader knowledge and skills.

Mathematics is an essential requirement by every field of intellectual endeavour and human development. It is described as the language of science and technology, the queen and servant of all school subjects, since it cuts across the school curricula (Ajayi & Ekundayo, 2009). According to Quimbo in Adebola (2021), everyone lives in a world where science and technology have become the integral part of the world culture; hence for any nation to be relevant, it must look into the significance of mathematics in her educational system.

Ilogho (2015) asserted that mathematics has been the impediment to the progress of many students, out of all the subjects in the school curriculum. She further stressed that mathematics records the most woeful and heartrending results in external examinations. This has become a source of worry and concern to all education stakeholders, principal, teachers and parents.

Bandari (2014) opined that many factors contributed to this poor performance in mathematics, one of which is attitude. Attitude plays a vital role in the achievement of mathematics. The relationship between attitude and achievement is based on the concept of the better the attitude a learner has towards a subject, the higher the achievement level in mathematics. Attitude towards mathematics could be explained as either a positive or negative emotional feelings towards mathematics (Zan & Martino, 2007). According to Ogunleye and Akinoso, attitudes may easily change from negative to positive depending on a variety of social factors such as technology if used to support learning. Ursine and Sanchez (2008) stressed that attitude is created and modified by events or things and could be affective, cognitive, and behavioural.

Monterio and Peixoto (2015) in Bandele and Olatunji (2019) identified important factors that contribute to students' attitudes towards learning mathematics. This includes the students themselves, the school, the teachers' beliefs and attitudes and their teaching methods. Teachers can do many things to facilitate the classroom learning and enhance students' engagement level and confidence in learning mathematics. This can be done through various teaching strategies.

Although many researches have been carried out ranging from perception of students and teachers in the utilization and application of computer based testing, some are worried about validity and comprehensiveness of the Computer based testing, Some others are concerned about the degree of variables such as computer familiarity or computer anxiety faced by examinees which affect their performance negatively.

Attitude of students towards any assessment method or process is very important as it will affect the performance either positively and negatively. Gender is a variable shown by researches to have influence on achievement and attitude. According to Ogunleye and Akinoso (2016), attitude is described to be a determinant in the acceptance or rejection of mathematics. Also Akinsola and Olowojaiye (2008) and Mercado (2007) in Ogunleye and Akinoso (2016), found a positive correlation between attitude and the perceived utility of mathematics. Attitude towards mathematics can be affected when technology is used to support learning in this area (Ogunleye & Akinoso, 2016). Hence, attitude is investigated as a variable in this study.

Statement of the problem
Recently, Nigeria has advanced with the global world in using technology known as Computer Based Testing to assess behaviour and cognitive skills due to many advantages it has over Paper and Pencil Testing.

The Paper and pencil (PPT) has been faulted with numerous problems ranging from shortage of examination materials, impersonation, cheating in examination halls, cases of missing scripts, improper scoring of examinees' responses, delay in computing and processing of result. According to Lim et al. (2006), CBT are the form of assessment in which the computer is an integral part of question paper, delivery, response, storage, marking of response or reporting of results from a test. CBT helps to assess the students' level of achievement faster. CBT is described as a method that would make testing less expensive in the long run, and would produce better assessment of the wide range of students from the primary level of education to higher institutions. Now, the question is what is the attitude of undergraduate students towards this Computer Based Testing? Is there any difference in the attitude of undergraduate students towards Computer Based Test based on gender? These and some others questions are the reasons behind this study, which sought to investigate the attitude of undergraduate students towards Mathematics Computer Based Testing.

Research questions
    1. What is the attitude of undergraduate students towards Mathematics Computer Based Test?
    2. Is there any difference in the attitude of undergraduate male and female students towards Mathematics Computer Based Test?

Hypotheses
The following null hypotheses were formulated to guide the study:
    Ho1: The attitude of undergraduate students towards Mathematics Computer Based Testing is not significantly positive.
    Ho2: There is no significant difference in the attitude of undergraduate male and female students towards Mathematics Computer Based Test.

Methodology
The study adopted a survey design. A sample of 200 undergraduate Mathematics Education Students was drawn through simple random sampling technique. A self-designed questionnaire titled Attitude of Undergraduate Students Towards Computer Based Test in Mathematics (AUTCBTMQ) was used. It consists of two sections. Section A consists of demographic data of gender and location of school. Section B(i) consists of 8 questions bordering on the attitude of undergraduate students towards the

use of Computer Based Test in Mathematics, while Section B(ii) consists of 9 items on the perception of undergraduate male and female students on the use of Computer Based Test in Mathematics. The items on the questionnaire were content validated by ICT expert, and expert in mathematics education. Reliability was done using Cronbach Alpha which gives a value of 0.87. 200 questionnaire were administered to the undergraduate mathematics education students. Data collected were analysed using descriptive statistics of frequency counts, percentages, mean and standard deviation while Chi-Square and t-test were used to test the null hypotheses at 0.05 level of significance using Statistical Package for Social Science (SPSS).

Presentation of results

Research question one: What is the attitude of undergraduate students towards Computer Based Test in Mathematics?

Table 1: Descriptive statistics on attitude of undergraduate students towards Computer Based Test in Mathematics

S/N	Item	Always	sometimes	Rarely	Never	Mean	SD
1	I enjoy using computer to do math	104 52%	60 30%	16 8%	20 10%	3.52	1.43
2	Using Computer to solve mathematical problems gives me immediate feedback	100 50%	64 32%	24 12%	12 6%	3.50	1.33
3	Using computer to solve math makes it easier to pick answer	92 46%	68 34%	28 24%	12 6%	3.02	1.31
4	I learn faster using computer	106 53%	60 30%	14 7%	20 10%	3.65	2.22
5	CBT in math saves my time	100 50%	64 32%	12 6%	24 12%	2.86	1.34
6	CBT reduces examination malpractices	104 52%	60 30%	20 10%	16 8%	3.72	0.44
7	I found it difficult to answer CBT in Mathematics	28 14%	48 24%	52 26%	72 36%	0.89	1.23
8	CBT in mathematics does not make me nervous	120 60%	68 34%	12 6%	0 0	2.98	1.36

Table 1 indicates undergraduate students' attitude towards CBT in mathematics. The items showed high percentage responses of students' attitude towards CBT in Mathematics. The statement "I enjoy using computer to do math" had a mean of 3.52 and standard deviation of 1.42. 52% of the respondents chose always, 30% sometimes, 8% rarely and 10% never. Item 2, using computer to solve mathematics problem gives me immediate feedback had a mean of 3.50 and standard deviation of 1.33. 50% of the respondents chose always, 32% sometimes, 12% rarely, 6% never. Item 3, using computer to solve math makes it easier to pick answer (Mean=3.02, SD= 1.31) has 46% respondents choosing always, 34% sometimes, 24% rarely, 6% never. Item 4, I learn faster using computer (Mean=3.65, SD=2.22) had 53% respondents always, 30% sometimes, 7% rarely, 10% never. Item 5 (Mean=2.86, SD =1.34) had 50% respondents for always, 32% sometimes 6% rarely, 12% never. Item 6 (Mean=3.72, SD=0.44), 52% respondents always, 30% sometimes, 10% rarely, 8% never. Item 7, CBT reduces exam malpractice (Mean= 0.89, SD= 1.23), 14% respondents always, 24% sometimes, 26% rarely, 36% never. Item 8, I found it difficult to answer CBT mathematics questions (Mean=2.99, SD= 1.36), 60% always, 34% sometimes, 6% rarely, 0% never.

Ho1: The attitude of undergraduate students towards Computer Based Testing in Mathematics is not significantly positive.

Table 2: Chi-square showing undergraduate students' attitude towards computer based testing in Mathematics

	Item	Always	some times	rarely	never	Total	Chi-square	DF	P	Remarks
1	I enjoyed using computer to do math test	60	104	16	20	200	34.3	3	.000	Sig
2	Using Computer to solve mathematical problems gives me immediate feedback	64	100	24	12	200	41.2	3	.000	Sig
3	I learn faster using computer to solve math problem	92	68	28	12	200	17.9	3	.000	Sig
4	Using computer to do mathematics makes it easier to pick answers	60	106	14	20	200	29.3	3	.000	Sig
5	CBT in mathematics saves my time	64	100	12	24	200	30.4	3	.000	Sig
6	CBT reduces exam malpractices	104	60	20	16	200	32.8	3	.000	Sig
7	I found it difficult to answer CBT in math	28	48	52	72	200	51.9	3	.000	Sig
8	I enjoy fairness and equity during CBTin mathematics	96	88	12	4	200	43.5	3	.000	Sig
9	I don't have enough time to answer questions during CBT in mathematics	68	120	12	0	200	12.2	3	.001	Sig
	Grand Total						293.5	24		

Table 2 showed that the attitude of undergraduate students towards computer based testing in Mathematics is significantly positive. The grand total of the calculated Chi-square was 293.5(χ^2= 293.5) with a degree of freedom of 24. The probability level of each of the items were less than 0.05 (p< 0.05). This implies that hypothesis one which states that the attitude of undergraduate students towards computer based testing in Mathematics is not significantly positive is therefore rejected.

Ho2: There is no significant difference in the attitude of undergraduate male and female students towards Mathematics Computer Based Test.

Table 3: t-test summary showing the difference in the attitude of undergraduate students based on gender

Group	N	Mean	SD	DF	t-cal	t-crit	Decision
Male	75	107.27	20.57				Not
				198	1.053	1.98	significant
Female	125	111.04	21.44				

Table 3 indicated a calculated value of t as 1.053 which is smaller than t-critcal value. This implies that the null hypothesis was not rejected. That is, there is no significant difference in the attitude of undergraduate students towards CBT in mathematics based on gender.

Discussion of the findings
The study investigated undergraduates' attitude towards Mathematics Computer Based Test in Adekunle Ajasin University, Akungba-Akoko. Findings showed that there is positive attitude towards mathematics Computer Based Testing. Out of 200 students, over 150 respondents like using CBT. The test of significance at 0.05 level of significance also affirms the positive attitude of students. Hence the null hypothesis was rejected. This implies that the attitude of undergraduate students towards mathematics CBT is significantly positive. This finding is in line with Bandari (2014) and Sanni and Mohammed (2015) whose studies revealed positive attitude of students towards CBT assessment.

Again, findings from hypothesis 2 showed no significant difference in the attitude of male and female undergraduate students towards Mathematics Computer Based Testing. This implies that gender has no influence on the attitude of undergraduate students towards Mathematics CBT. This result is in agreement with Akinoso (2016) and Durojayi and Emmanuel (2015) who revealed in their studies of gender influence

on student's attitude, that there is no significant difference in the attitude of students towards Mathematics.

Conclusion

Based on the findings, it could be concluded that students preferred CBT assessment to other forms of assessment. There was positive response of undergraduate attitude towards the use of computer for assessment. There is no significant difference in the attitude of male and female undergraduate students but the male students had higher mean than the female students. They all agreed that CBT in Mathematics reduces their test anxiety and improves their performance in Mathematics.

Recommendations

Based on the findings of the study it was recommended that CBT assessment should be used at all levels for students' assessment as it will reduce students' anxiety towards mathematics and improve performance. It also reduces the time for feedback in the test. Again, female students should be encouraged in their attitudes towards computer based testing in Mathematics.

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