

# ASSESSMENT OF COMPUTER LITERACY SKILLS AND COMPUTER BASED TESTING ANXIETY OF SECONDARY SCHOOL STUDENTS IN ADAMAWA AND TARABA STATES, NIGERIA.

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## ABSTRACT

The introduction of Computer Based Testing (CBT) in 2013 by Joint Admissions and Matriculation Board (JAMB) and plans by the West African Examinations Council (WAEC)/ National Examinations Council (NECO) to introduce CBT in Senior School Certificate Examinations (SSCE) necessitated this study. The study adopted a correlation design to assess Senior Secondary School (SSS) students' Computer Literacy Skills (CLS) and their perceived level of anxiety when confronted with CBT. Two validated questionnaires; "Computer Basic Literacy Competence Questionnaire" (CBLCQ) and "Computer Based Assessment Anxiety Questionnaire" (CBAAQ) were administered to 1595 final year senior secondary school students in 106 randomly selected senior secondary schools in Adamawa and Taraba states. The questionnaires yielded Cronbach Alpha reliability coefficients of 0.72 and 0.81 respectively. Four research questions and four hypotheses guided the study. Mean and standard deviation were used to answer the research questions. The t-test and Pearson Product Moment Correlation Coefficient were used to test the hypotheses. Results revealed that students have low competence in basic computer literacy skills and high level of anxiety towards CBT. There was also a weak positive relationship between computer competence and computer anxiety. It was recommended among others that schools be provided with computers, human and material resources and tutorials on computer applications.

**Keywords:** Computer Literacy, Computer Based Testing, Computer Anxiety, Secondary School Students.

## INTRODUCTION

The introduction of a new Secondary School Education Curriculum (SSEC) by the Federal Government of Nigeria in 2011 made computer education a compulsory subject to secondary school students. Graduates of the new SSEC were expected to possess relevant information and communication technology skills and become well prepared to live and contribute meaningfully in a globalised computer society. The expectation is that computer education would make the students computer literate in line with the computer revolution permeating the globe.

Computer is the most important innovation of the 20<sup>th</sup> century and has dramatically and irrevocably changed the way we live. The educational sector is not left out of the computer revolution spreading every facet of human existence. The importance of computer education to students cannot be over-emphasised especially now that the world has been reduced to a global village by technology. According to Josiah, Pam, and Okooboh (2003) the use of

computer plays important role in all tiers of education and Computer Based Testing (CBT) is increasingly being used for assessment of students' knowledge in many examinations (Fadeyi, Desalu, Ameen and Adeboye, 2010).

Technology today offers many new opportunities for innovation in educational assessment through rich new assessment tasks and potentially powerful scoring, reporting and real-time feedback mechanisms (Scalise and Gifford, 2006). Mulvany (2011) observed that CBT has emerged as one of the recent "innovative" approaches to assessments, and examination bodies are moving from paper and pencil standardized testing to the electronic format in order to eliminate materials and provide more timely feedback, cheaper and speedier test delivery. Computer based testing vastly expands testing possibilities beyond the limitations of traditional paper-and-pencil tests.

Computer literacy is the ability to use computers to perform a variety of tasks and is becoming fundamental to the learning process (Osuji, 2010). Computer literacy is being able to handle a wide range of varying computer applications for various purposes. Albirini (2004) considers computer literacy as educators' belief about their computer knowledge and skills. Mason and McMarrow (2006) suggested that there are two distinct components to computer literacy: awareness and competence. Awareness requires a person to have understanding of how computers impact their day to day life as well as the larger society while competence is the ability to handle various computer operations.

Nigerian students must soon be computer literate to acquire higher education as the Joint Admissions and Matriculation Board (JAMB), which examines students for higher education in Nigeria partially introduced CBT in 2013 with a planned full implementation in 2015. Similarly, the West African Examinations Council (WAEC) and National Examinations Council (NECO) are also planning for CBT (NGscholars, 2013). This has generated apprehensions and anxieties on students' ability to participate in CBT bearing in mind the low computer proficiency of the students (Arenyeka, July 2013).

Computer anxiety has been defined as a fear of computers when using one, or fearing the possibility of using a computer (Chua, Chen and Wong 1999). Olatoye (2011) defined computer anxiety as the fear of impending interaction with a computer that is disproportionate to the actual threat presented by the computer. Those who are computer anxious may experience fear of the unknown, feeling of frustration and possible embarrassment, failure and disappointment. Students' reaction and anxieties to computer may effect on test scores (McVay, 2002). Studies on computer anxiety is necessary as research reports have shown that computer anxiety makes users to avoid computers and computer anxiety is a phobic condition that is amenable to change (Olatoye, 2011).

### **Statement of the Problem**

The use of computer has become an important component of education as it plays significant role in all tiers of education (Fadeyi, *et.al.*, 2010). In 1988, the Nigerian government enacted a policy on computer education. The plan was to establish pilot schools and diffuse computer education innovation first to all secondary schools, and then to primary schools.

Unfortunately, the project did not take off beyond the distribution and installation of personal computers (Adomi and Kpangban, 2010). To further institutionalized computer education in Nigeria, the Federal Government in 2011 introduced a new Secondary School Education Curriculum (SSEC) where computer education was made a compulsory subject to all secondary school in Nigeria. Computer education before 2011 was a pre-vocational elective at the junior secondary school and a vocational elective at the senior secondary school level. How have these efforts of government enhanced computer literacy of students and prepared them for CBT?

Computer education in Nigeria is bedeviled by many problems such as availability and accessibility of computers to classrooms, teacher quality and teaching method, learning environment and learner characteristics (Akuoma, 2012). Other problems include erratic power supply, poor maintenance of computers, low computer literacy of teachers and students and high class population (Josiah *et al.* 2003). Despite these shortcomings, JAMB has introduced CBT, WAEC and NECO are also planning to introduce same in their examinations. What are secondary school students perceived level of Computer Literacy Skills (CLS) and CBT anxiety?

### **Purpose of the Study**

The purpose of the study was to determine secondary school students' CLS and their level of anxiety when confronted with a CBT. Specifically, the study determined the level of Adamawa and Taraba states secondary school students':

1. CLS;
2. CLS based on location;
3. CLS based on gender;
4. level of anxiety to CBT.

### **Research Questions**

The following questions were posed to guide the study:

1. What is the level of CLS of secondary school students in Adamawa and Taraba states?
2. What is the level of CLS of Urban and rural secondary school students in Adamawa and Taraba states?
3. What is the level of CLS of male and female secondary school students in Adamawa and Taraba states?
4. What is the perceived level of computer anxiety of secondary school students to CBT in Adamawa and Taraba states?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between Adamawa and Taraba states secondary school students' competence in CLS.
2. There is no significant difference between Urban and rural secondary school students' competence in CLS in Adamawa and Taraba states.
3. There is no significant difference between male and female secondary school students' competence in CLS in Adamawa and Taraba states.
4. There is no significant relationship between secondary school students' level of competence in CLS and their level of anxiety to CBT.

## **METHODOLOGY**

The study adopted a correlation design to assess the relationship between senior secondary school students' CLS and their perceived level of anxiety when confronted with CBT. The population of the study consisted of all senior secondary school students in Adamawa and Taraba states. Simple random sampling was used to select a sample of 1595 senior secondary

3 students from 106 senior secondary schools in the two states. Senior secondary 3 students were selected because they were in their final year and have gone through the computer education curriculum. Secondly, these students will be faced with CBT by JAMB though they have the option of going for the paper and pencil version of the examination. Two researchers' structured questionnaires were developed and validated by three experts were used to gather data; The questionnaires were "Computer Basic Literacy Competence Questionnaire" (CBLCQ) and "Computer Based Assessment Anxiety Questionnaire" (CBAAQ). CBLCQ was an 81-itemed questionnaire that determined students' computer literacy skills on seven applications: Word Processing, Graphics, Multimedia, Internet, Email, Spreadsheet and Database while CBAAQ was a 17-itemed questionnaire that determined students perceived level of anxiety to CBT. The response mode for CBLCQ was a five rating scale of Very High Level (5), High Level (4), Moderate Level (3), Low Level (2) and Very Low Level (1). While the response mode for CBAAQ was Very High anxiety (5), High anxiety (4), Moderate Anxiety (3), Low Anxiety (2) and Very Low Anxiety (1). CBLCQ and CBAAQ were pilot tested on 50 students in a school not selected for the study and yielded Cronbach Alpha reliability coefficients of 0.72 and 0.81 respectively which determined the internal consistency of the questionnaires. The instruments were administered in Adamawa and Taraba states by the researchers and 5 other research assistants. Adamawa and Taraba states are found in the north eastern part of Nigeria. The states were formally named Gongola state before the split.

The Upper and lower limits of the 5-point scale used to answer the four research questions were:

4.50 – 5.49	Very High Competence/Very High Anxiety
3.50 – 4.49	High Competence/High Anxiety
2.50 – 3.49	Moderate Competence/Moderate Anxiety
1.50 – 2.49	Low Competence/Low Anxiety
0.50 – 1.49	Very Low Competence/Very Low Anxiety

The t-test statistics was used to test hypotheses 1, 2 and 3 while Pearson Product Moment Correlation Coefficient was used to test hypothesis 4.

## RESULTS

Data was analysed and results presented according to research questions and hypotheses.

**Research Question one:** What is the level of CLS of secondary school students in Adamawa and Taraba states?

**Table 1: Level of secondary school students' CLS in Adamawa and Taraba states**

LITERACY SKILL	LOCATION	N	MEAN	SD	REMARK
COMPETENCE IN WORD PROCESSING	ADAMWA STATE	1013	2.77	0.93	Moderate Competence
	TARABA STATE	582	1.97	0.99	Low Competence
COMPETENCE IN GRAPHICS	ADAMWA STATE	1013	2.72	1.56	Moderate Competence
	TARABA STATE	582	1.80	0.95	Low Competence
COMPETENCE IN MULTIMEDIA	ADAMWA STATE	1013	2.78	1.14	Moderate Competence
	TARABA STATE	582	1.83	1.03	Low Competence
COMPETENCE IN INTERNET	ADAMWA STATE	1013	2.68	1.07	Moderate Competence
	TARABA STATE	582	2.00	1.09	Low Competence

COMPETENCE IN EMAIL	ADAMWA STATE	1013	2.67	1.05	Moderate Competence
	TARABA STATE	582	1.91	1.05	Low Competence
COMPETENCE IN SPREADSHEET	ADAMWA STATE	1013	2.52	0.97	Moderate Competence
	TARABA STATE	582	1.81	0.96	Low Competence
COMPETENCE IN DATABASE	ADAMWA STATE	1013	2.73	1.29	Moderate Competence
	TARABA STATE	582	1.77	0.97	Low Competence
<b>GRAND MEAN IN COMPUTER LITERACY</b>	ADAMWA STATE	1013	2.70	0.85	Moderate Competence
	TARABA STATE	582	1.87	0.91	Low Competence

Results in **table 1** show that Adamawa state secondary school students have moderate CLS (2.70) while Taraba state has low CLS (1.87).

**Research Question Two:** What is the level of CLS of Urban and rural secondary school students in Adamawa and Taraba states?

**Table 2: Level of urban and rural secondary school students' CLS in Adamawa and Taraba states**

LITERACY SKILL	LOCATION	N	MEAN	SD	REMARK
COMPETENCE IN WORD PROCESSING	URBAN	812	2.64	1.02	Moderate Competence
	RURAL	783	2.32	1.01	Low Competence
COMPETENCE IN GRAPHICS	URBAN	812	2.54	1.73	Moderate Competence
	RURAL	783	2.23	1.04	Low Competence
PROFICIENCY IN MULTIMEDIA	URBAN	812	2.60	1.21	Moderate Competence
	RURAL	783	2.25	1.15	Low Competence
COMPETENCE IN INTERNET	URBAN	812	2.62	1.17	Moderate Competence
	RURAL	783	2.24	1.05	Low Competence
COMPETENCE IN EMAIL	URBAN	812	2.59	1.11	Moderate Competence
	RURAL	783	2.19	1.08	Low Competence
COMPETENCE IN SPREADSHEET	URBAN	812	2.39	1.05	Low Competence
	RURAL	783	2.12	0.98	Low Competence
COMPETENCE IN DATABASE	URBAN	812	2.57	1.31	Moderate Competence
	RURAL	783	2.18	1.19	Low Competence
<b>GRAND MEAN IN COMPUTER LITERACY</b>	URBAN	812	2.56	0.96	Moderate Competence
	RURAL	783	2.22	0.92	Low Competence

Results in **table 2** show that urban secondary school students have moderate CLS (2.56) while rural secondary school students have low CLS (2.22).

**Research Question Three:** What is the level of CLS of male and female secondary school students in Adamawa and Taraba states?

**Table 3: Level of Male and Female secondary school students' CLS in Adamawa and Taraba States**

LITERACY SKILL	GENDER	N	MEAN	SD	REMARK
COMPETENCE IN WORD PROCESSING	MALE	933	2.52	1.03	Moderate Competence
	FEMALE	662	2.43	1.02	Low Competence

COMPETENCE IN GRAPHICS	MALE	933	2.46	1.66	Low Competence
	FEMALE	662	2.28	1.06	Low Competence
COMPETENCE IN MULTIMEDIA	MALE	933	2.47	1.18	Low Competence
	FEMALE	662	2.37	1.21	Low Competence
COMPETENCE IN INTERNET	MALE	933	2.50	1.14	Moderate Competence
	FEMALE	662	2.34	1.10	Low Competence
COMPETENCE IN EMAIL	MALE	933	2.45	1.11	Low Competence
	FEMALE	662	2.31	1.11	Low Competence
COMPETENCE IN SPREADSHEET	MALE	933	2.29	1.03	Low Competence
	FEMALE	662	2.22	1.02	Low Competence
COMPETENCE IN DATABASE	MALE	933	2.41	1.28	Low Competence
	FEMALE	662	2.34	1.24	Low Competence
GRAND MEAN IN COMPUTER LITERACY	MALE	933	2.44	0.98	Low Competence
	FEMALE	662	2.33	0.92	Low Competence

Results in **table 3** show that male and female secondary school students have low level of CLS (2.44 and 2.33) respectively.

**Research Question Four:** What is the perceived level of computer anxiety of secondary school students to CBT in Adamawa and Taraba states?

**Table 4: Perceived level of computer anxiety of secondary school students to CBT in Adamawa and Taraba states**

	STATE	N	MEAN	SD	REMARK
COMPUTER ANXIETY	ADAMAWA	1013	4.09	0.87	High Anxiety
	TARABA	582	4.06	0.87	High Anxiety

**Table 4** shows that Adamawa and Taraba states secondary school students have high anxiety towards CBT with means of 4.09 and 4.06 respectively.

### Hypotheses Testing

**Hypothesis One:** There is no significant difference between Adamawa and Taraba states secondary school students' competence in CLS.

**Table 5: t-test analysis of difference in Level of CLS between secondary school students in Adamawa and Taraba states**

STATE	N	MEAN	SD	df	t	P-value	REMARK
ADAMAWA	1013	2.70	0.85	1593	17.91	0.00	Reject Ho
TARABA	582	1.87	0.91				

**Table 5** shows that there is no significant difference in CLS of Adamawa and Taraba states students with t-calculated of 17.91, df=1593, and a p-value of 0.00. Since the p-value is smaller than alpha=0.05, we reject the null hypothesis.

**Hypothesis Two:** There is no significant difference between urban and rural secondary school students' competence in CLS in Adamawa and Taraba states.

**Table 6: t-test analysis of difference of Level of CLS between Urban and Rural secondary school students in Adamawa and Taraba states**

LOCATION	N	MEAN	SD	df	t	P-value	REMARK
URBAN	812	2.56	0.96	1593	7.25	0.00	Reject Ho
RURAL	783	2.22	0.92				

**Table 6** shows that there is no significant difference in CLS of urban and rural secondary school students in Adamawa and Taraba states with t-calculated of 7.25, df = 1593, and p-value of 0.00. Since the p-value is smaller than alpha = 0.05, we reject the null hypothesis.

**Hypothesis Three:** There is no significant difference between male and female secondary school students' competence in CLS in Adamawa and Taraba states.

**Table 7: t-test analysis of difference in level of CLS between Male and Female secondary school students in Adamawa and Taraba states**

GENDER	N	MEAN	SD	df	t	P-value	REMARK
MALE	933	2.44	0.98	1593	2.39	0.01	Reject Ho
FEMALE	622	2.33	0.92				

**Table 7** shows that there is no significant difference in CLS of male and female secondary school students in Adamawa and Taraba states with t-calculated of 2.39, df = 1593, and a p-value of 0.01. Since the p-value is smaller than alpha = 0.05, we reject the null hypothesis.

**Hypothesis Four:** There is no significant relationship between secondary school students' level of competence in CLS and their level of anxiety to CBT.

**Table 8: Relationship between level of CLS and anxiety to CBT of secondary school students of Adamawa and Taraba states**

GENDER	N	MEAN	SD	r	P-value	REMARK
COMPUTER ANXIETY	1595	4.08	0.87	0.02	0.42	Weak Positive Relationship
COMPUTER LITERACY	1695	2.39	0.95			

**Table 8** indicates a weak positive relationship ( $r = 0.02$ ,  $p=0.42$ ) between students' level of CLS and their level of CBT anxiety. The square of the correlation coefficient is  $r^2 = 0.0004$ , which means that 0.04% of the variance in the level of students' level of computer anxiety is explained by students' level of CLS.

## DISCUSSION

The study was designed to assess Adamawa and Taraba states secondary school students'

level of CLS and their perceived level of anxiety to CBT. The findings of the study are hereby discussed.

The study found that Adamawa state students had moderate level of CLS as compared to Taraba state that had low level of CLS. This is consistent with Adeagbo (2012) who reported low computer literacy among Nigerian students. The difference in the level of computer literacy between the two states could be attributed to the more investment and supervision of computer education in Adamawa state.

The study showed that urban schools have moderate CLS as compared to the low CLS in the rural areas. This may not be unconnected with the robust computer activities in urban areas than in rural areas.

The study also revealed a low CLS based on gender.

Results obtained from the study revealed a high anxiety to CBT by the students in Adamawa and Taraba States. This corroborated the studies of Lawal (2009) and Umoren (2009) who found that self efficacy could be used to predict computer anxiety.

The study also found no significant difference in CLS of secondary school students in Adamawa and Taraba states base on gender, location and state. However, there was a weak positive relationship between the students' level of CLS and their level of anxiety to CBT.

## **CONCLUSION**

Secondary school students' low level of CLS would deny them the ability to function effectively in the CBT currently being advocated in Nigeria. Similarly, low CLS of students could cause anxiety and poor performance in CBT.

## **RECOMMENDATIONS**

The following recommendations are made towards improving students CLS and reducing their anxiety to CBT.

1. Government should make computers available and accessible to students to enable them learn and practice computer skills.
2. Adequate and qualified computer education teachers should be engaged to teach students.
3. Teachers should be encouraged to integrate computer in their teaching.
4. Some forms of CBT should be introduced in schools' assessment systems in order to acquaint students with the rubrics of CBT.
5. Examination bodies should provide tutorial packages on their examinations to schools for students to practice before the actual examination.
6. Rural schools should not be discriminated against in the provision of computer infrastructures.

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