

The Impact of Computer Literacy and Computer Anxiety on the Performance in Unified Tertiary Matriculation Examination (UTME) of Candidates in Imo State

Anthony O. EBUBECHUKWU
Department of Physical Science Education
Faculty of Education
Imo State University, Owerri, Nigeria
ebubechukwutony@yahoo.com

Abstract

The study investigated the impact of computer literacy and computer anxiety on the performance of candidates in Post Unified Tertiary Matriculation Examination (UTME). Three research questions and three hypotheses were formulated to guide the study and the hypotheses were tested at 0.05 level of significance. The sample of the study comprised of 640 candidates drawn from a total population of 1563 who participated in the Computer Based Test (CBT). This sample size was drawn through stratified random sampling technique. The responses of the candidates on Computer Literacy Scale, Computer Anxiety Scale and recorded scores of the candidates were used for answering the research questions and testing of the hypotheses. These instruments were adapted and their internal consistency known and their reliability coefficients were 0.72 and 0.95 for CLS and CAS respectively. The researcher employed correlation research design for the study. Mean, Standard Deviation and Pearson (r) regression were used to answer the research questions while t-test was used to test the hypotheses. Results showed that computer literacy correlated well with performance in Post UTME of CBT. It was found that computer literacy negatively correlated with computer anxiety scale. Based on the findings, computer literacy should be encouraged as it reduces the computer anxiety of the candidates who participate in Post UTME in CBT.

Keywords: computer literacy; computer anxiety, performance in UTME and computer based test.

INTRODUCTION

During the last decade, people of the world have experienced some improvement in the area of science and technology. These advances in technology, in particular, have stimulated the development of a complex and easiest way of assessing or testing the testers through the use of computer. The use of computer has had a major impact in the assessment of the students.

Nigeria as a country is not left out in this technology advancement, most important, as it relates to the area of measurement and evaluation. Examination bodies like Joint Admission and matriculation Board (JAMB), Nigerian Universities, etc. use computers to conduct their examinations/tests for selection to university education. Three years ago, JAMB started the use of computer based testing in order to pick her good candidates into Nigerian Universities. These students can be found at their 300 level in Nigerian Universities now. This type of examination

has both positive and negative effects on the validity and reliability of the test (Parshall, Davey & Pashlcy, 2000).

Computers are technologies used in conveying, manipulation and storage of data by electronic means (Ogunsola, 2005). They are equally used to answer questions, grade the answers and record the performance of each candidate accordingly. It is an easiest way of assessing achievement in cognitive skill.

The major concerns of experts in measurement and evaluation have been to minimize the negative effect of CBT in order to yield more valid measurement practices. Anxiety and poor performance have stood out to be such negative effects to be monitored and controlled.

Over the years, research studies have shown enormous advances in computer technology and its impact on educational practices. Several large scale testing are computer-based (Robin, 2000) and many other prominent testing agencies have resorted to the use of computer-based testing while some of them are still contemplating using it. CBT involves the use of computer in order to ascertain the presence or absence of certain psychometric characteristics which are of interest. It is used to ascertain whether learnt materials can be retained and or recalled.

CBT leads to obvious benefits with respect to test administration such as improved security access to interactive item formats and immediate scoring (Wainer & Kiely, 1987). It can lead to more valid assessment practices. It uses standardized test and multiple-choice test items though they have their own criticisms. The critics claim that such assessments often measure test taking skills, rather than the true constructs they are designed to measure (Wainer & Lewis, 1990). The Multiple choice items which are the most popular item formats used in educational tests have been a particular target of this criticism. In fact, some critics argue that multiple – choice items are unable to measure higher level skills such as reasoning, synthesis and evaluation (Darling-Hammond & Lieberman, 1992) and cannot be adequately used in assessing these components of cognitive domain in Mathematics (Ebubechukwu, 2014).

CBT aims at more authentic assessment of knowledge, skill and abilities by introducing new item types that simulate real world performance tasks. Example of this innovative is drag and drop items (Fitzgarald, 1998); problem solving vignettes (Martinez & Bennett, 1992); Sequential problem solving (Drasgow, Olson–Buchanan & Moberg, 1999); and generating examples (Bennett et al., 1999). These new items address problems of construct under Representation associated with traditional paper and pencil test (Parshall, 1999).

With all these benefits associated with computer technology, Nigeria as a country lacks some basic infrastructural facilities that will enable adequate use of it. For example it lacks regular supply of electricity which inhibits adequate utilization of this measurement technology during testing. The tendency of the testees being abandoned half-way at their own risk cannot be ruled out. This however is likely to affect their performance in the test and the anxiety level of the testees.

The relationship between the use of computer and student performance has been reported as something not clear, meanwhile other results showed some contradictions. Kamba (2009) in his study on economic, found that a non-clear consensus concerning the effect of computer on students achievement. This is because students' performance can be explained by a number of factors such as students' characteristics, educational environment and teachers' characteristics. The use of computers may have an impact on these determinants and consequently the outcome of education.

Atimes, different testees use different types of computer system in preparation for the examination/test. Macintosh or windows-based systems could be used when preparing for the

test and the testee may incidentally be given the type which he/she is not very familiar with. This creates apprehension, emotional instability, etc. It takes the testees some time to get acquainted/familiar with the type of computer system given to him/her and by so doing; much of the time allotted for the test has been wasted. This computer-related nervousness has become so widespread and in some cases, acute that it has developed into an imparity commonly known as computer anxiety.

An English Dictionary defines anxiety as an unpleasant state of mental uneasiness, nervousness, apprehension and obsession or concern about some uncertain events. It is a state of restlessness or agitation often accompanied by a distressing sense of oppression. Anxiety has subscales such as apprehension, interpersonal anxiety and physiological arousal. Apprehension is a future- oriented mood or state in which a person attempts to be constantly ready to respond to upcoming negative events. It assesses feeling, nervous, scared and unable to relax (Barlow, Chorpita & Turovski, 1996). Interpersonal anxiety is a subscale that occurs in an interpersonal context such as fears of ridicule, rejection, abandonment and disapproval. This is similar to interpersonal sensitivity which is a feeling of inadequacy and inferiority; mask of discomfort during interpersonal interactions and negative expectations concerning interpersonal behavior with others and others' perceptions (Derogatis, 1994). Psychological arousal assesses stomach discomfort or nausea, sweating or hot flashes, trembling, tingling or numbness, faintness, dizziness or unsteadiness, a choking feeling, shortness of breath, heartbeat pounding or racing, chest pain or tightness (Scott, 2007). Here, computer anxiety means all those unpleasant states caused by inability to manipulate, read and understand computer information/language, which we referred to as computer literacy. Computer anxiety is characterized as an affective response, an emotional fear of potential negative outcomes such as damaging the equipment or looking foolish. Performance on the computer anxiety scale is negatively related with experience with computers (Cohen & Waugh, 1989).

Mawhinney and Sarawat (2016) in their study titled "an empirical study of computer anxiety among college students: differences between academic disciplines" investigated the relationship between computer anxiety levels among business students and their performance in computer courses. They found that among undergraduate business students, computer anxiety has a negative impact on their performance in computer-related courses.

Also, Hong, Othman and Nordin (2005) investigated undergraduates' computer anxiety, computer self-efficacy and reported use of and demographic variables found that undergraduates had moderate computer anxiousness, medium attitudes towards the internet, and high computer self-efficacy and used the internet extensively for education purposes. For them, internet usage decreases the levels of computer anxiety among the undergraduates. Students who demonstrated lower computer anxiousness exhibit positive attitudes towards the internet.

Computer literacy is the ability to use computers and related technology efficiently with a range of skills covering levels, from elementary use of programming and advanced problem solving. It is an understanding of the concepts, terminology and operations that relate to general computer use. It is an essential knowledge needed to function independently with a computer.

There is a belief that a higher level of computer literacy can lead to enhanced student academic performance, increase employment opportunities and perhaps future success on the job (Tanyel, Mitchel & McAhem, 199). Evidence also supports the view that better computer skills should lead to more productive use of the technology, which in turn, should lead to improved academic performance. Richard (2000) examined empirically the correlation between students' level of computer literacy and their performance in an introductory information systems course.

This is to explore the predictive validity of the computer literacy requirement. Results of multiple regression analysis found the predictive power of computer literacy to be task dependent. As expected, if a task requires substantial uses of computers and a specific type of software, students with a higher level of computer literacy as measured by their proficiency in using that specific combination of hard/software achieved significantly better performance.

This study has prompted the researcher to review some theories associated with the topic. Commonest among them is the attribution theory by Saul Mcleod published in 2010. Attribution theory deals with how society perceive the use of information to arrive at causal explanations of events. It examines what information is gathered and how it is combined to form a casual judgment (Fiske & Taylor, 1991). It answers the question, how do we attach meaning to other people's behavior or one own. For example, someone can be angry because he is bad tempered or because something had happened. These are options at which we can interpret one's angriness. This shows a correspondence between motive and behavior. Internal attribution provides information from which we can make predictions about one's behavior.

So far, the researcher has reviewed literature on the benefits of computer based testing. There may be a lot of these benefits but it depends on the literacy level of the testee. This factor seems to affect performance using CBT. Whereby this knowledge is lacking, the testee is bound to perform poorly as it will affect their anxiety level.

Research Questions

The following research questions have been formulated to guide the study:

- What is the coefficient of relationship between scores in computer literacy and performance in Post UTME of candidates in CBT in Imo State?
- What is the coefficient of relationship between scores in computer anxiety scale and performance in Post UTME of candidates in BT Imo State?
- What is the coefficient of relationship between scores in computer literacy and computer anxiety scale of candidates in Post UTME in CBT in Imo State?

Hypothesis

- There is no significant relationship between the scores of candidates in computer literacy and performance in Post UTME using CBT in Imo State.
- There is no significant relationship between scores of candidates in computer anxiety scale and performance in Post UTME using CBT in Imo State.
- There is no significant relationship between scores of candidates in computer literacy and computer anxiety scale in Post UTME using CBT in Imo State.

METHODOLOGY

A correlation research design was adopted for the study. The population of the study comprised of all candidates who sat for 2015/16 Post UTME in Imo State University, Owerri. A sample size of 640 candidates was drawn out of 1563 who participated in the examination through simple random sampling technique. The instruments for data collection were computer literacy scale, computer anxiety scale and record of performance in Post UTME. CAS is a 16 item scale that

measures amount of computer anxiety in each candidate. The internal consistency of these instruments, were estimated using Cronbach Alpha statistics and their reliability coefficients are 0.72 and 0.95 for CLS and CAS, respectively. The purpose of this scale is to ask about ones experiences with computers. It begins with general questions about use of computers (part A) and continues with a task of assigning meanings to computer related symbols and terms (part B). Computer Literacy Scale is a 29 item scale. The researcher employed the services of two specialists in Guidance and Counseling who helped in the administration of the instruments. The candidates were given enough time to respond to all the items in the instruments.

Means, standard deviation and Pearson (r) were used in analyzing and answering the research questions while t-test statistics was used to test the hypotheses. The critical value was determined at 5% level of significance.

RESULTS

Table I: Summary table of the relationship between computer literacy and performance in UTME in CBT.

Group	N	\bar{X}	SD	r_x
CLS	640	62.3	12.56	0.78
Post UTME	640	58.7	11.71	

The reliability coefficient r of the responses of the candidates on computer literacy scale and Post UTME is 0.78. This is an indication that the relationship is positive and high.

Table 2: Summary table of the relationship between computer anxiety and performance in Post UTME in CBT

Group	N	\bar{X}	SD	r_x
CLS	640	60.6	13.17	-0.54
Post UTME	640	58.7	11.71	

From the table above, the reliability coefficient of the responses of candidates on computer anxiety scale and UTME is -0.54. This shows that the relationship between CAS and Post UTME is negative and moderately high.

Table 3: Summary table of the relationship between computer anxiety and computer literary

Group	N	\bar{X}	SD	r
CLS	640	62.3	12.56	-0.49
CAS	640	60.6	13.17	

From the above table, the coefficient of relationship is -0.49 which shows that the relationship is negative and fairly moderate.

Table 4: Summary table of t-test result of relationship between computer literacy and performance in Post UTME

Group	N	\bar{X}	SD	t-test	t-critical	Decision
CLS	640	62.3	12.56	5.39	1.960	Reject Ho
Post UTME	640	58.7	11.71			

From the table above, the mean scores in the response in computer literacy scale and in Post UTME are 62.3 and 58.7 and their standard deviations are 12.56 and 11.71 respectively. The calculated t-test is 5.30 which is greater than the table value. For this reason, we reject the Ho and uphold the alternative which states that there is significant relationship between CLS and Post UTME using CBT.

Table 5: Summary table of t-test result of relationship between computer anxiety and performance in UTME

Group	N	\bar{X}	SD	t-test	t-critical	Decision
CLS	640	60.6	13.17	2.73	1.960	reject Ho
Post UTME	640	58.7	11.71			

From the table 5, the calculated t-test is 2.73 which is greater than the critical value of 1.960. For this reason, the null hypothesis is rejected at 0.05 level of significance while its alternative is upheld. The alternative hypothesis states that there is significant relationship between scores in computer anxiety and performance in Post UTME using CBT.

Table 6: Summary table of t-test result of relationship between computer literacy and computer anxiety

Group	N	\bar{X}	SD	t-test	t-critical	Decision
CLS	640	62.3	12.56	2.36	1.960	Reject Ho
Post UTME	640	60.6	13.17			

From table 6, the calculated value of t-test is 2.36, this value is greater than the table value of t-test. For this reason, the null hypothesis is rejected at 0.05 level of significance while its alternative is upheld. The alternative hypothesis states that there is significant relationship between scores of candidates in computer literacy scale and computer anxiety in Post UTME using CBT in Imo State.

DISCUSSION

The researcher found that the responses of candidates in computer literacy scale and their performance in Post UTME have positive and high correlation coefficient. This is an indication that understanding of the concepts, technology and operations that relate to general computer use is directly related to performance in the Post UTME using CBT. This relationship is significant. The candidates who could not score highly in computer literacy scale performed poorly in Post UTME. This finding is in line with Scott (2007) and Richard (2000) who stated that high score in computer literacy scale yields high performance in CBT though it is not the major factor that affects performance. Other factors may influence performance. The researcher also found that computer anxiety affects performance in Post UTME. The responses of candidates in computer

anxiety scale correlated well with performance in Post UTME. Those candidates with low computer anxiety tend to perform better than their counterparts with high computer anxiety. This finding is in line with Hong, Othman, Nordin (2005). High scores in computer literacy scale yield low score in computer anxiety scale and high performance in Post UTME. The relationship between computer anxiety scale and performance in Post UTME is significant.

CONCLUSION

This study focused on the impact of computer literacy and computer anxiety on the performance of candidates in Post Unified Tertiary Matriculation Examination using CBT in Imo State. The researcher found that computer literacy is directly related with performance in Post UTME and that this relationship is significant. This could be deduced with a reliability coefficient of 0.78 which indeed is high. The research also found out that high scores in computer anxiety scale is in synonymous with low performance in Post UTME. There is a negative relationship though, moderately high which is significant at 0.05 level of significance. The researcher also found that the responses of the candidates in computer literacy scale are inversely (indirectly) related to the responses in computer anxiety scale. The direction of the relationship is negative while a fair relationship which is significant is obtained.

Recommendations

Based on the findings above, the following recommendations are made:

- The users of CBT should ensure that candidates are computer literate as this will reduce their computer anxiety and increase their performance;
- Candidates with severe computer anxiety should be given attention as this effort will increase performance in CBT; and
- Candidates using CBT should be guaranteed of effective (regular) supply of electricity so that they should not work under pressure that electricity might fail them.

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