Computer Anxiety and Computer Self-Efficacy in Computer-Based Tests in Selected Universities in South-West Nigeria

Williams Nwagwu
Africa Regional Centre for Information Science
University of Ibadan, Nigeria
willieezi@yahoo.com

and

Olukunle Adebayo
Documentation, Information and Communication
Centre Council for the Development of Social
Research in Africa (CODESRIA),
Avenue Cheikh Anta Diop CX Canal IV
BP 3304 CP18524
Dakar, Senegal
adebayoolukunle@gmail.com

Abstract

This study was designed to examine the influence of demographic and personality factors on computer anxiety and computer efficacy among first -year students admitted into three universities (CBT) in southwest Nigeria through computer-based test strategies. Using a questionnaire, data was collected from 892 students who were willing to participate in the study. In terms of the demographic characteristics of respondents in the study, the student populations from the three universities are homogenous as Chi Square analysis showed no significant differences among them. Logistics regression analysis shows that computer self-efficacy and computer attitude are considerably high while computer anxiety is relatively low. However, the number of students reporting low self-esteem (33.91%) and low exposure (31.10%) can be considered relatively high. None of the demographic factors predicted computer anxiety but male (â=0.742, p=0.000) and semi-urban residential status (â=-0.542, p=0.001) significantly predicted computer self-efficacy. Also, self-esteem and computer exposure did not predict computer anxiety and high computer self-efficacy, but they did computer self-efficacy. Basically, dealing with computer anxiety and improving self-efficacy of students in respect of CBT will require students being pre-exposed to CBT type of examinations for relatively long periods prior to the examination.

Introduction

Computer-based tests (CBT) are tests or assessments that are administered through stand alone or networked computers, or through other technological devices linked to the Internet (Sorana-Daniela and Lorentz, 2007). CBT has now gained popularity over the traditional paper-and-pencil test (PPT), particularly because of the numerous advantages that it offers such as immediate scoring and reporting of results and reduced costs of test administration. It is also considered fairer, more accurate and comparatively more secured than the PPT technique (Kolen 1999-2000, Pomplun, Frey, Becker 2002).

Many tertiary institutions in Nigeria and examination bodies such as the Joint Admission and Matriculation Board (JAMB) which conducts matriculation examinations into the universities, as well as the West African Examination Council, are now using CBT. Also, many universities now use CBT for post-JAMB screening of students. Personal experiences with the strategy as well as interaction with prospective matriculants who took part in the 2014 JAMB examinations hinted that many students do not feel comfortable with mandatory use of a computer for assessment during their admission and screening processes. On a study on this subject matter, Adebayo, Abdulhamid and Fluck (2014)

compared the e-examination system in Nigeria with that of Australia in order to identify ways of developing more acceptable e-examination system in Nigeria. They justified their study on the observation that poor quality students often gain admission into the universities due to high rate of examination malpractices that obtain in the PPT system, and that these students thereafter become a burden to the university.

Obioma, Junaidu and Ajagun (2013) observed that parents and other stakeholders may be apprehensive that students' performance in automated assessments and examinations will be influenced by individual computer competencies or other systematic differences other than a true expression of knowledge of the subject matter. These authors also identified low level of computer education among students as a threat to the uptake of automated assessment. Generally, many school leavers in Nigeria are not computer literate, neither is computer education available in many of the schools. Abubakar and Adebayo (2014) have observed that migration from PPT to CBT may affect candidates' behaviour, and that it is possible for some testing programs to encounter brief reduction in demand as a result of apprehension about CBT.

The CBT test administrators assume that all participants can use the computer system with the same degree of psychological stability that will not significantly influence their performances. But while some participants are confident and find it relatively easy to use the CBT, some others appear jittery, uneasy and apprehensive using the same system for the same purpose. Factors such as demographic characteristics of the students, personality type, self-esteem, as well as level of exposure to computer technology could explain the way individuals adjust, use and cope with CBT systems. Herman (2005) has shown how these variables interrelate to influence various educational outcomes and behaviours.

Statement of the Problem

Many new users of computers face the challenge of anxiety induced by the computer, and this affects their performance in computer-based examinations. There is understanding that inadequate use of the computer can have adverse effect on the candidates'

performance in CBT (Ogunmakin and Osakuade, 2014). Abubakar and Adebayo (2014), while assessing the prospects, challenges and strategies of deploying CBT, observed that there had been a growing concern about the conduct, authenticity and reliability of examinations, especially during the process of selecting qualified prospective candidates into Nigerian universities. Their study and others on the subject matter did not examine the possible effects of demographic and personality factors, a difference this study is designed to address. For example, students from affluent homes might have prior exposure to the computer compared with the others, and this could be a source of influence adoption of CBTs.

Objectives of the Study

The main objective of the study is to investigate the influence of demographic and personality factors on computer anxiety and computer self-efficacy among computer-based test participants in three universities in south-western Nigeria. Specific objectives are to:

(i)   determine the influence of demographic characteristics on computer anxiety and computer self-efficacy of the participants.

(ii)   determine the influence of personality factors on computer anxiety and computer self-efficacy of the participants.

(iii) determine the influence of psychosocial factors on computer anxiety and computer self-efficacy of the participants.

(iv)   investigate the relationship among the psychosocial, personality and demographic characteristics of the participants.

(v)   compare the computer self-efficacy and computer anxiety levels of the participants.

Statement of Research Hypotheses

H_01:   There is no significant relationship between demographic variables and computer anxiety (CA) among the computer-based test participants.

H_02:   There is no significant relationship between demographic variables and computer self-efficacy (CSE) among the computer-based

H$_0$3: There is no significant relationship between personality variables and computer anxiety (CA) among the computer-based test participants.

H$_0$4: There is no significant relationship between personality variables and computer self-efficacy (CSE) among the computer-based test participants.

H$_0$5: There is no significant relationship between psychosocial variables and computer anxiety (CA) among the computer-based test participants.

H$_0$6: There is no significant relationship between psychosocial variables and the computer self-efficacy (CSE) among the computer-based test participants.

Literature Review and Theoretical Perspectives

This study is based on the body of knowledge on computer anxiety, self-efficacy and social learning perspectives. Self-efficacy and social learning lean significantly on the popular perspectives of Bandura in his series of papers on the subject matter (Bandura 1977, 1978, 1982, 1986a, 1986b, 1988).

Computer Anxiety and Computer Self-Efficacy

Anxiety describes series of disorders that are often associated with nervousness, fear, apprehension, and worrying, among others, and these disorders affect human feeling and behaviour (Allgulander, Jorgensen Wade 2007). Anxiety is frequently used as a construct for personality, learning theory, and psychopathology. Three types of anxiety have been identified: trait, state, and concept-specific. Trait anxiety is a general anxiety that is experienced by a person over the entire range of life experience. People who exhibit trait anxiety are chronically anxious and constantly under tension regardless of their situation. Trait anxiety may be inherited (Howard and Smith, 1986). On its own part, state anxiety is that anxiety that fluctuates over time and arises due to a responsive situation. State anxiety is related to a person's learning background. A person

may have experienced some anxiety in a situation and that anxiety is transferred to a similar situation. Concept-specific anxiety is anxiety that is associated with a specific situation anxiety; it is midway between the trait and state anxieties.

In information systems study, anxiety has been viewed as a personality variable that influences system use (Agarwal and Karahanna, 2000). A number of information science studies are consistent with the view that the relationship between anxiety and behaviour is mediated by personal beliefs (Schlenker and Leary, 1982) and anxiety is incorporated as an antecedent to the beliefs of usefulness and ease of use (e.g., Igbaria, 1993; Venkatesh and Davis, 2000). It is interesting to note that the classical view of anxiety is that it mediates the relationship between beliefs and behaviour (Spielberger, 1972). Thus, anxiety can be viewed as a result of the beliefs an individual has, rather than as an antecedent to them.

Computer Self-Efficacy

Bandura (1986b) has described self-efficacy as one's ability to judge how well he/she can execute a task to achieve a desired goal. It is an individual's belief about his/her ability to successfully execute a behaviour required to produce a desired outcome. Bandura (1986b) also highlighted the difference between component skills and the ability to perform actions. According to him, self-efficacy consists of three dimensions: magnitude, strength and generality. Magnitude is the level of task difficulty an individual believes that he or she can attain; strength is the confidence one has in attaining a particular level of difficulty; while generality is the degree to which the expectation is generalised across situations. One can therefore assert that the concept of self-efficacy is context specific, that is, specific situations influence people's valuing of their capacities to mobilise the motivation, cognitive resources and courses of action needed to meet situational demands (Bandura and Cervone, 1986).

Computer Anxiety and Computer Self-Efficacy

The use of technology sometime has unpleasant side effects, which may include strong, negative emotional states that arise not only during interaction but even

before, when the idea of having to interact with the computer begins (Klein, Moon, Picard (2002). Frustration, confusion, anger, anxiety, and similar emotional states can affect not only the interaction itself, but also productivity, learning, social relationships, and overall well-being (Saade and Kira, 2009).

There are a number of studies explaining what computer anxiety is. Leso and Peck (1992) defined computer anxiety as a feeling of being fearful or apprehensive when using or considering the use of a computer. Computer anxiety is a concept-specific anxiety because it is a feeling that is associated with a person's interaction with computers (Oetting, 1983). Howard and Smith (1986) defined computer anxiety as the tendency of a person to experience a level of uneasiness over his or her impending use of a computer. Evidently, factors such as the context in which an individual was first introduced to the computer (Brosnan, 1998a, 1998b; Rosen and Weil, 1995), past failure and successes with hardware or software, and the current tasks being attempted, including the use of a new computer application (Saadé and Otrakji, 2007), are all determinants of the state and type of anxiety the individual is experiencing. In their study, Saadé and Otrakji (2007) have attempted to predict people who would experience computer anxiety by identifying factors that correlate with its occurrence.

A number of studies have provided evidence supporting a direct relationship between computer anxiety and computer use (Chau, Chen and Wong 1999; Howard and Mendelow 1991; Igbaria, Parasuraman and Baroudi, 1996, Ogunmakin and Osakuade 2014). These research works clearly show that a highly computer anxious individual will be at a significant disadvantage compared to his/her peers who do not have the anxiety. One example of such an environment where this could be experienced is the e-learning and assessment systems offered by many higher institutions.

Factors Influencing Computer Anxiety and Computer Self-Efficacy

Researchers have identified factors that influence computer anxiety and computer self-efficacy in different communities and environments. We provide a description of some of the factors below:
Computer exposure

There is evidence that experienced computer users have higher computer self-efficacy and lower computer anxiety (Thatcher and Perrewe 2002). Also, computer experience has been found to have a negative relationship with an individual's computer anxiety (Beckers and Schmidt 2003). Individuals who have computers at home or have used computers have lower computer anxiety than those who do not (Chu and Spires 1991). Chu and Spires (1991) found that college students who had taken two or more computer courses were less anxious about computers than those who had taken fewer than two courses. Chu and Spires (1991) and Leso and Peck (1992) have also shown that after taking a computer course, students who had previous high computer anxiety experienced a great decrease in their anxiety.

In his own study, Broos (2005) found that computer use and self-perceived computer experience have a positive impact on decreasing computer anxiety. There also exist some studies that reported that individuals' previous computer experience was not associated with their computer anxiety and that experienced users suffered from computer anxiety as much as novice users (Marcoulides, 1988; Rosen, Sears and Weil, 1987). In further support of this finding, Beckers and Schmidt (2003) found that it is not the amount of computer experience that affects people's anxiety but rather that positive experiences reduced the anxiety.

Computer attitude

Attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour. Computer attitude is concerned with the observation that computer-based activities may influence human attitude (Larbi-Apau and Moseley, 2012).

Gender

Many recent studies suggest that there are no significant differences between males and females in respect of computer attitude and efficacy, and that gender difference in computer skill is diminishing (Schumacher and Morahan-Martin, 2001; Nwagwu, 2012). In the same way, there is evidence that computer anxiety significantly influences computer and Internet self-efficacy for both male and female

respondents. User attitude significantly influenced computer and Internet self-efficacy for male respondents. Also, user attitude significantly influenced computer self-efficacy, but not Internet self-efficacy for female respondents. Further studies have found that females are more anxious about computers than males (Broos, 2005; Schottenbauer, Rodriguez, Glass and Arnkoff, 2004).

Socioeconomic background

The socioeconomic background of students also relates with their computer anxiety and self-efficacy. People who are socio-economically privileged have low computer anxiety (Bozionelos 2004). This can be explained by the fact that "individuals who have been raised within higher socioeconomic status families are more likely to have a computer available at home, to attend schools with better computer equipment, and to have teachers with better computer skills" (Bozionelos, 2004).

Methodology

Research Design, Location, Population of Study and Sampling

The study adopts a structured survey design and makes statistical inferences about the population based on a sample. The study covered three universities in the South-West Nigeria, namely: University of Lagos, Federal University of Technology Akure and Babcock University (BU) Ilishan-Remo. These universities were purposively selected. The population of the study comprised first-year students of the selected institutions who have participated in the 2014 CBT screening examinations into the universities. The three universities have an estimated combined population of 13,683 first-year students comprising University of Lagos (6557), FUTA (4139) and BU (2987). The selection of participants for the study was based on availability and willingness of the students to participate in the study. Owing to difficulty in obtaining the sampling frame, we arbitrarily intended to collect data from 1000 respondents, ensuring that males and females are equally represented.

Data Collection Instrument and its Structure

The data collection instrument that guided the study was a structured questionnaire. The questionnaire is structured into 7 sections (A-G): demographics, self-efficacy, computer attitude, computer anxiety, self-esteem, personality type, and computer exposure. All the items in the questionnaire were adapted from related previous empirical studies.

Section A: Demographics: age, sex and residential status.

Section B: Computer self-efficacy scale adapted from the computer attitude scale (CAS) developed and validated by Nickell and Pinto (1986). It used a five-point Likert-type scale type where 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree.

Section C: Computer attitude: a 20-item self-report inventory, rated on a five point Likert type scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree).

Section D: Computer anxiety: a 19 items self-report inventory designed and validated by Heinssen et al. (1987). The subjects responded on a five-point Likert type scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree).

Section E: Self-esteem: was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The scale has ten items measured on a four point scale - from - strongly agree, disagree, agree and strongly disagree.

Section F: Personality type: based on Anjum Khalique Type a Scale (AKTAS, Anjum and Khalique, 1991), consisting of 10 pairs of items measured as in Section F.

Section G: Computer exposure: This study uses a peer-reviewed computer experience measure developed by the authors. The instrument measures the level of familiarity the respondent has with the computer in completing tasks.

The questionnaire was handed to respondents who were willing to participate in the study during

January and February 2015 in their classrooms, and collected back at dates agreed with the respondents. At UNILAG, FUTA and BABCOCK, 377, 365 and 353 were distributed and 309 (82%), 274 (75%) and 309 (88%) were returned respectively.

To plan for the analysis, we wanted to establish whether the three universities from which we collected data were homogenous in terms of the variables under study, namely computer anxiety, self-efficacy, computer attitude and computer exposure, as well as demographic characteristics. To achieve this, we ran a Chi Square analysis and found: computer anxiety = (N=892, X^2=0.002, p=0.999), computer self-efficacy (N=892, X^2=2.056, p=0.358), computer attitude (N=892, X^2=3.009, p=0.209) and computer exposure (X^2=42.12, p=0.0905), faculty (N=892, X^2=0.2333, p=0.189), age (N=892, X^2=0.5192, p=0.0941) and residential status (N=892, X^2=0.1102, p=0.0570). We infer therefore that the three populations were largely homogenous, as there was no difference among the universities in respect of the variables under study.

Computer self-efficacy, computer anxiety, attitude and exposure were recoded into three categories of low, undecided and high; while self-esteem and personality were re-coded in to two categories of the low and high categories. Binary logistic regression was used to examine how demographic and personality characteristics of the respondents relate to their computer anxiety and self-efficacy in CBT.

Findings

Socio-Demographic Characteristics of Respondents

Table 1 shows that respondents aged 16 years and below constituted 5.5% of the respondents while those between 17 and 19 constituted 66.9%. About one-fifth of the respondents (20.2%) were aged between 20 and 22. Respondents within the age bracket 23-25 years constituted 4.9% while those aged 26 years and above constituted the least number of respondents, 2.5%. The mean age of the students is 18.22 years.

Table 1: Socio-demographic characteristics of respondents

	Frequency	Percentage
Age (years, N=892)		
16 and below	49	5.5
17-19	597	66.9
20-22	180	20.2
23-25	44	4.9
26 and above	22	2.5
Sex (N=892)		
Male	455	51.0
Female	437	49.0
Residential Status (N=892)		
Rural	25	2.8
Semi Urban	221	24.8
Urban	646	72.4

Table 2: Computer self-efficacy, computer anxiety, and computer exposure and computer attitude

Factor	Low	Undecided	High
Computer self-efficacy	10.22%	29.26%	60.52%
Computer anxiety	59.08%	11.75%	29.17%
Computer exposure	31.10%	11.88%	58.02%
Computer attitude	17.63%	11.78%	52.60%

Of the respondents, (29.17% reported high computer anxiety whereas 59.08% were reported to have low computer anxiety. The results in respect of computer attitude were similar to that of self-efficacy, with 17.63% reporting low computer attitude while 52.60% had high computer attitude. The number of those reporting low computer exposure (31.10%) is much higher than those with low computer attitude just as those that reported high exposure (58.02%)

to computer is also higher than those in the same category for computer attitude.

In respect of self-esteem, 33.91% of the students reported having low self-esteem while 66.90% had high self-esteem. Also, 43.82% reported falling into personality type A category while 56.18% were of personality type B. These results conform in pattern but in varied degrees of magnitude with those of Herman (2005) and Achin *et al* (2015).

Table 3: Means, standard deviations and inter-correlation coefficients of the variables

	Computer anxiety	Computer self-efficacy	Personality	Self esteem	Computer attitude	Computer exposure
Mean	3.46	4.01	1.41	2.79	3.44	3.56
SD	1.06	2.23	0.47	0.80	1.89	1.53
Cronbach Alpha	0.72	0.65	0.69	0.72	0.73	0.68
Computer anxiety	1					
Computer self-efficacy	0.482	1				
Personality	0.650	0.622	1			
Self esteem	-0.352	0.643	0.602	1		
Computer attitude	-0.306	0.711	0.599	0.801	1	
Computer exposure	-0.271	0.652	0.519	0.649	0.677	1

The relationship between computer self-efficacy and computer anxiety is considerably low (r=0.482). Achim and Al-Kassim (2015) obtained the same type of result in their study that collected data from military ranked officers. The relationship with personality is however somewhat high (r=0.650), a result consistent with Herman (2005). Self-esteem (r=-352) and computer attitude (-0.306)

respectively have low relationship with computer anxiety, but the relationship between computer anxiety and computer exposure is much lower (r=-0.276). Computer self-efficacy relates positively and relatively highly with personality (r=0.622), self-esteem (r=0.643), and computer attitude (r=0.711) and computer exposure (r=0.652). Personality, on its own part, relates positively with self-esteem

(r=0.602), computer attitude (r=0.599) and computer exposure (r=0.519) while self-esteem also has high and positive correlation with computer attitude (r=0.801) and computer exposure (r=0.649). Computer attitude and computer exposure have a relative high correlation (r=0.677).

The Result of the Hypotheses Testing

Hypothesis 1: There is no significant relationship between demographic characteristics of the respondents and computer anxiety

Table 4 shows the result of the binary logistic regression analysis of the relationship between demographic variables and computer anxiety. The table shows that sex does not significantly explain computer anxiety among the respondents.

Table 4: Binary logistic regression analysis of demographic factors and computer anxiety

	Computer anxiety				
	B	S.E.β	Wald χ^2	Sig. (p)	e^{β}
Sex	0.117	0.223	0.275	0.600	1.124
Age (Ref =>26 years)					
16 years and below	1.461	1.119	1.705	0.192	4.310
17-19 years	1.084	1.050	1.066	0.302	2.957
20-22years	1.110	1.062	1.092	0.296	3.034
23-25years	1.054	1.134	0.864	0.353	2.868
Residential status (Ref=Urban)					
Rural	0.365	0.647	0.318	0.573	1.441
Semi-Urban	0.301	0.246	1.499	0.221	1.351

Across the age groups $\leq$ 16 to 25 years, there is also no significant relationship between age and computer anxiety, although it could be noted that the odds ratio was higher for those respondents who are 16 years and below than for the other categories of respondents. Interestingly also, there is no significant difference in computer anxiety between students whose dwelling type is rural and urban.

Hypothesis 2: There is no significant relationship between demographic variables and the computer self-efficacy of the computer-based test participants.

The result in table 5 shows that sex (β=0.742, p=0.000) and semi urban residential status β=-0.542, p=0.001) significantly predict computer self-efficacy.

Table 5: Binary logistic regression of demographic factors and computer self-efficacy
Demographic factors   Computer

Demograhic Factors	Computer self-efficacy				
	B	S.E.β	Wald χ²	Sig. (p)	eβ
Sex: (Ref cat = female) Male	0.742	0.143	26.989	0.000	2.101
Age (Cate ≥ 26 years) 16 years and below 17-19 years 20-22 years 23-25 years	0.666 0.551 0.298 0.787	0.539 0.457 0.469 0.112	1.526 1.454 0.404 2.864	0.217 0.228 0.525 0.146	1.946 1.735 1.347 2.197
Residential status: (Ref cat=Urban) Rural Semi-Urban	-0.467 -0.052	0.428 0.163	0.318 1.499	0.573 0.221	0.627 0.582

The age of the respondents did not predict their computer self-efficacy.

Hypothesis 3: There is no significant relationship between personality variables and computer anxiety of the computer-based test participants.

From the result in table 6, it is shown that high self-esteem (β=-1.243, p=0.000) significantly influences computer anxiety, while Type A personality type does not have a significant influence on test participants' computer anxiety (β=0.102, p=0.657), controlling for Type B.

Table 6: Binary logistic regression of personality and computer anxiety

Personality Factors	Computer anxiety				
	B	S.E.β	Wald χ²	Sig.	eβ
Personality type: (Ref Cat=Type B) Personality Type A	0.102	0.230	0.197	0.657	1.108
Self-esteem: (Ref Cat=Low Self-Esteem) High Self-Esteem	1.243	0.223	31.029	0.000	3.465

Hypothesis 4: There is no significant relationship between personality and computer self-efficacy of the computer-based test participants.

The result in table 7 reveals that high self-esteem (β=-0.457, p=0.004) significantly influences computer self-efficacy, while personality type A does not have a significant influence (β=-0.099, p=0.475).

Table 7: Binary logistic regression of personality factors and computer self-efficacy

Personality Factors	Computer self-efficacy				
	B	S.E.β	Wald χ^2	P	$e^β$
Personality type: (Ref Cat=Type B) Personality Type A	-0.099	0.139	0.510	0.475	0.906
Self-esteem: (Ref Cat=Low Self-Esteem) High self-esteem	0.457	0.160	8.155	0.004	1.579

Hypothesis 5: There is no significant relationship between psychosocial variables and the computer anxiety of the computer-based test participants

The result in table 8 reveals that good computer attitude ($β=1.063$, $p=0.001$) significantly influences computer anxiety, while high computer exposure does not have a significant influence on their computer anxiety ($β=-0.134$, $p=0.807$).

Table 8: Binary Logistic Regression of psychosocial factors and computer anxiety

Personality Factors	Computer anxiety				
	B	S.E.β	Wald χ^2	Sig.	$e^β$
Computer exposure: (Ref Cat=low computer exposure) High computer exposure	-0.134	0.548	0.060	0.807	0.875
Computer attitude: (Ref Cat=poor attitude) Good attitude	1.063	0.318	11.131	0.001	2.894

Hypothesis 6: There is no significant relationship between psychosocial variables and computer self-efficacy of the computer-based test participants.

Based on the results from table 9, computer exposure did not significantly explain computer self-efficacy.

Table 9: Binary Logistic Regression of psychosocial factors and computer self-efficacy

Personality Factors	Computer Self-Efficacy				
	B	S.E.β	Wald χ^2	Sig.	$e^β$
Computer exposure: Ref Cat=Low Computer Exposure High computer exposure	0.413	0.350	1.389	0.239	1.511
Computer attitude: Ref Cat=poor attitude Good Attitude	0.037	0.151	0.059	0.008	1.037

Discussion of Findings

This study was designed to investigate computer anxiety and computer self-efficacy among computer-based matriculants in three universities in South-West, Nigeria in 2014. On a five-point Likert scale, computer anxiety, computer efficacy, computer attitude and computer exposure are all considerably high, but self-esteem is very low (on a four-point scale).

As would have been expected, computer self-efficacy and computer attitude are considerably high while computer anxiety is relatively low. However, the number of students reporting low self-esteem (33.91%) and low exposure (31.10%) can be considered relatively high. Besides the result on self-esteem and computer exposure, many studies involving these variables have been conducted in many different communities, and the results vary in magnitude according to the circumstances such as subject and respondents under study. For example, the studies of Herman (2005), Achim and Al-Kassim (2015) had produced similar results; but Herman studied loneliness and depression, while Achim et *al* studied military officers. In respect of CBT, it should be recognised that even if the computer itself no more causes anxiety among the students, examination situations would always raise some anxiety among students. Some studies, for instance, Vella, Caputi and Jayasuria (2003), decomposed computer anxiety into their various elements and examined these elements, an approach that could probably reveal why the number of students reporting low anxiety is not as low as would be expected.

The demographic factors in the study, namely age, sex and residential status, did not predict computer anxiety. Unlike the observations of Miura (1987), Jorde-Bloom (1988), Carlson and Grabowski (1992) which underpinned differences in computer access and use by gender, the result of this study supports recent observations that this gap is closing (Schumacher and Morahan-Martin 2001, Nwagwu 2012).

Participants in the study are generally relatively young – with an average age of 18 years; they fall in the category of people born at the expansion of information technologies often dated around the 1990. The inability of residential status to predict computer anxiety could be explained by the fact that information technologies in their various forms have penetrated the urban and the rural populace alike. For example, mobile services cover many rural communities in the areas of study, and this is a global development. By implication, therefore, children in the rural areas have sufficient knowledge and access to the computer and related devices to relieve them of computer anxiety when they are confronted with CBT.

The result is different with respect to the relationship between demographic factors and self-efficacy - males explained self-efficacy, when female was controlled for. It is inferred here that although females reported not to be anxious in respect of computer anxiety, they may not be as efficacious as the males in respect of efficacy in the use of computers. This result supports the earlier one by Schottenbauer, Rodriguez, Glass and Arnkoff (2004). When we controlled for urban, semi urban predicted computer efficacy, but rural did not. Hence, while the rural youth might not suffer anxiety in respect of use of the computers, they are definitely less efficacious in the use of the computers than those who dwell in the semi urban areas. Observations in related studies also uphold our finding (Bozionelos, 2004; Aikens and Barbarin, 2010).

The result in respect of personality and computer anxiety shows that there is no significant relationship between personality type and computer anxiety. Computers appear to be becoming personality-friendly, capable of meeting people's needs, irrespective of their type of personality. However, the result in this study shows that it is only those people that have high self-esteem that use the computer without any anxiety, and this is irrespective of their personality type (Sam, Othman and Nordin 2005).

Personality and self-efficacy repeat the previous result - personality type does not predict self-efficacy, but self-esteem does. Computers are becoming ubiquitous and their presence and use for various purposes are not personality type sensitive. But self-esteem remains a very important attribute required to exploit the absence of the influence of personality type, a result supported by Cooper-Gaiter (2015).

Psychosocial factors represented by computer exposure and computer attitude present another interesting result in respect of computer anxiety and computer self-efficacy. Students' level of computer exposure, whether high or low, does not explain

computer anxiety. How do we understand this result? Many devices such as the mobile phones that mimic the characteristics of the computer exist, and their use for most purposes that the computer can serve may diminish the anxiety of using a computer. Also, there may be several other factors that could explain computer anxiety other than students being exposed to the computer. Several people could use the computer without any anxiety outside the examination hall, but the same people could be struck by computer anxiety under examination condition.

Furthermore, some researchers have reported that individuals' previous computer experience was not associated with their computer anxiety and that experienced users have also been found to suffer from computer anxiety as much as novice users (Rosen, Sears and Weil 1987; Marcoulides, 1988). Despite the seeming non-existence of anxiety among the students on account of computer exposure, individual attitude remains an important explanation. In several studies about human behaviour, attitude is a significant explanatory variable (Venkaesh and Davis, 2000). In the same way, students whose attitude to the computer is good will encounter no anxiety in using the computers. This result in respect of computer anxiety is exactly the same in respect of self-efficacy – good attitude to the computer will result to higher self-efficacy in the use of computers (Saade and Kira, 2009).

Conclusion and Recommendations

The demographic variables did not explain computer anxiety, but residence type and sex of respondents explained computer self-efficacy. Basically, almost everyone is in one way or the other exposed to either computers or computer-like devices but not everyone is adept in its use. The variables that guided this study did not provide explanations for the 29% of respondents who reported high computer anxiety. But for all the respondents, high self-esteem, high computer exposure and good computer attitude explained both computer anxiety and computer self-efficacy.

Basically, dealing with computer anxiety and improving self-efficacy of students in respect of CBT will require students being pre-exposed to CBT type of examinations for relatively long periods prior to the examination. What obtains in many universities

in Nigeria at present is the pre-JAMB test, which holds a few to the real JAMB examination, an approach that will not reduce the anxiety faced by students who are not very adept in using computers. Furthermore, exposure of students to CBTs in schools should be part of the assessment criteria for enlisting students to take part in CBT-based examinations. In respect of research and theory, it may be necessary to expand the scope of psychological theories and variables that guided the study in order to increase the chances of explaining higher computer anxiety among some students. Resort to other than psychological variables and theories such as sociotechnical systems, among others, may be very useful. Finally, this study was constrained by the use of non-random sampling technique to use binary statistical method in the analysis of the data, thus compelling psychological variables to be viewed as discrete observations.

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Williams Nwagwu, a graduate of the University of Ibadan holds Ph.D degree in Information Science. He is Senior Leecturer at the Africa Regional Centre for Information Science of the University of Ibadan Nigeria. He is a Visiting Professor in the Department of Information Science of the University of South Africa, and currently on leave of absence at Documentation, Information and Communication Department of the Council for the Development of Social Science Research in Africa based in Dakar, Senegal. He is the Head of Programme
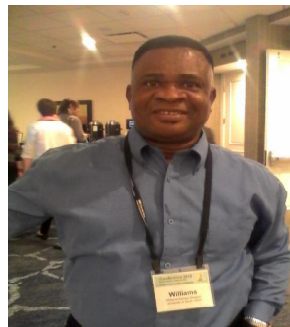
Adebayo Olukunle is budding scholar with interest in technology use in education. He just concluded his master's degree under the supervision of the first author.