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Effect of Computer Efficacy Training in the Management of Computer Anxiety among National Open University of Nigeria Freshmen

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Abstract

Computer anxiety has been identified as a prominent drawback to many freshmen in the Open and Distance Learning (ODL) institutions in Nigeria. It is a known fact that inadequate computer skills coupled with computer anxiety are linked to attrition rate and poor academic performance among distance learners who by exigency should utilise computer to bridge the transactional and interactional distance that exist between them, their tutors and other relevant personnel. This study, therefore, determined the effectiveness of Computer Efficacy Training (CET) in the management of computer anxiety among National Open University of Nigeria (NOUN) freshmen in Southwestern Nigeria. The moderating effects of age and gender were examined.

Technology Acceptance Model provided the framework for the study while the pretest-postest control group quasi-experimental design with a 2 x 2 x 2 factorial matrix was adopted. Two study centres of NOUN (Akure and Lagos) were randomly selected from the nine study centres of the university in Southwestern Nigeria. Sixty computer anxious freshmen who met the screening criteria were randomised into CET (30) and Control (30) groups. The interventions lasted eight weeks. The Computer Anxiety Scale Revised (α=0.89) with the norm of 60.0 was utilised for screening. Computer Anxiety Rating Scale (α =0.86) was used to measure the criterion variable. These

were complemented by CET training guides. Analysis of covariance and Multiple Classification Analysis test were utilised for data analysis at a 0.05 level of significance.
There was a significant effect of treatment on the management of computer anxiety of NOUN freshmen. Participants in the CET had the least computer anxiety compared to those in the control groups. There was a significant effect of age on computer anxiety. The older NOUN freshmen significantly benefited more than younger NOUN freshmen. Computer efficacy training was effective in managing computer anxiety of National Open University freshmen in Southwestern Nigeria. Educational, counselling and cyber psychologists should adopt the treatment in the reduction of computer anxiety.

Keywords: Computer efficacy training, Computer anxiety, National Open University of Nigeria

Introduction

Distance education in the 21st century encompasses the use of computer mediated resources in most of its activities globally. Such tasks include course and examination registration, facilitation (online), Tutor/Computer Marked Assignments (Continuous Assessment), counselling, advice and guidance and other learner support services. In such setting, learners are physically separated from their lecturers (facilitators) and other learner support personnel, but the separation is mediated or bridged through Information and Communication Technology. Adequate Computer skills devoid of anxiety are therefore quintessential and germane to the success of distance learners. Studies have shown positive correlation between computer skills and programme completion by distance learners. Conversely, inadequate computer skills and computer anxiety relate positively to attrition rate among distance learners (Ofole, Fawusi & Oduneye, 2012).

Engaging and retaining students in distance learning can be challenging because the students are transactionally and interactionally distanced from teaching, support staff and other learners despite large number of study centres created by open and distance learning (ODL) institution such as NOUN. Computer technology is the engine of the modern civilisation and the driving force of the information age (Ituen, 2009). In today's global and competitive environment, interactive computer technology is becoming a widely accepted tool for multi-facet development in view of the flexible, quality services it offers and the potential to revolutionize the traditional

education system. Open and distance education worldwide is computer driven. Despite this fact, it is not good news that many prospective students of distance learning do experience computer anxiety. And this may frustrate the speed at which they would achieve their educational objectives.

Computer anxiety is a common emotional response to computers characterized by the fear that many adults exhibit. Fear and anxiety toward subject matter are conditions that tend to support negative learner attitudes and repel adult interest (Wlodkowski, 1993). Interaction between humans and computers is complex. Hakkinen (1994) suggests that this interaction may incite a variety of emotional responses, including anxiety. The fear of computers interferes with the communicative nature of human-computer interaction.

Studies have shown the relatedness of computer anxiety and performance effectiveness among students generally and distance learners specifically (Oluwole, 2009; Wang & Newlin, 2002). Computer anxiety stands to have far-reaching negative effects on distance learners because of high level integration of computer-mediated resources involved in such setting. Computer anxiety is a form of disposition that negatively affects the use of computer or effective performance of computer-related tasks by an individual. Computer anxiety is one of the basic factors affecting computer usage. Marcoulides (1989) describes computer anxiety as a prejudice or fear that occurs when a person uses computer technology or when they think about the results of computer usage. It is a set of complex emotional reactions in people interpreting computers as threatening (Raub, 1984). According to Rahner and Simonson (1981), computer anxiety is a mixture of feelings of fear, worry, and hope people experience when they plan to interact with a computer or when they interact with it. Hakkinen (1994), on the other hand, states that the concept of computer anxiety is used to define fears and suspicions of people unfamiliar with computer. Chua, Chen, & Wong, (1999) describe computer anxiety as a fear of computers when there is a probability of using computer or while using it.

Computer efficacy is a specific type of self-efficacy. Computer efficacy is a belief of one's capability to use the computer (Compeau & Higgins, 1995) and participants with little confidence in their ability to use computers might perform more poorly on computer-based tasks (Oluwole, 2008). On the other hand, previous computer experience may lead students to believe computer applications courses are easy. Heightened self-efficacy may cause students to

expend little effort toward learning new computer concepts. On the other hand, Brosnan (1998) argued that better Computer efficacy could increase persistence in studying computing. Medvin, Reed, & Behr (2002) examined the impact of computer experience on computer efficacy, anxiety, and values among teachers. The results indicated that self-efficacy was positively correlated to computer values, and negatively correlated with computer anxiety. Additionally, self-efficacy training was effective in the management of computer anxiety and increasing computer efficacy and values. Computer efficacy training has been identified as a potent intervention that could manage computer anxiety effectively (Rosen, Sear and Weil, 1987, Brosnan & Thorpe, 2006).

Several studies have shown that age is a factor to reckon with in relation to students' computer anxiety. Older and middle aged adults have shown low self-efficacy with respect to use of computers and higher computer anxiety than the younger adults (Dyck & Smither, 1994; Ellis & Allaire, 1999; Czaja, Charness, Fisk, Nair & Rogers, 2006; Oluwole, 2009). Kelley and Charness (1995) also hypothesized the effect of age on computer performance due to age-related deficiencies, thus causing the need for more time to accomplish tasks. Such older behaviour computer users (particularly over the age of 65) have less confidence in their ability to use computers than did younger people and had fewer computer skills. This was seen to be partly due to their inability to adapt and use technology, thus placing them at a disadvantage in terms of their ability to successfully perform computer tasks with ease and devoid of anxiety. Researchers have also discovered that the older adult group of men and women (ages between 60 to 91 years old) have more computer anxiety and lower computer efficacy as compared to the younger group.

The research on gender and computing has often, although not conclusive, reported that males have more experience and use of computers (Brosnan & Lee, 1998). Studies have shown that females have more negative attitudes toward computers (Durndell and Thompson, 1997; Whitely, 1997) and greater computer anxiety (McIlroy, Bunting, Tierney, & Gordon, 2001) than males. Research on Computer efficacy in general also revealed that males on average have better Computer efficacy than females (Torkzadeh & Koufteros, 1994). An examination of computer self-efficacy and computer anxiety of trainee teachers in West Bengel, India by Halder, and Chaudhuri (2011), revealed a significant differences in computer anxiety levels on gender basis. Male trainees had lower computer anxiety than female trainees

Male respondents recorded significantly lower scores of self-anxiety on computer self-anxiety scale than females did. In a more recent study by Sanalan (2016), who investigated computer phobia among preservice education majors in a North-eastern University in Turkey, findings indicated that females have significantly more computer fear than their male counterpart.

It has also been observed that many NOUN students applied into the institution without adequate preparation particularly in the area of ICT which is the pivot on which Open and Distance Education rotates. Many of such learners resume for their studies before discovering their inadequacies. Computer anxiety is evident among many distance learners due to lack of computer skills and computer experience. In Nigeria, studies on the effectiveness of computer efficacy training in managing computer anxiety are scarce most especially as it relates to open distance learners.

In view of this, the purpose of this study was to investigate the effectiveness of computer efficacy training in the management of computer anxiety among NOUN freshmen in southwestern Nigeria. The study also investigated the moderating effects of age and gender on the computer anxiety of the participants (NOUN freshmen). Hence, three null hypotheses were postulated for this study as stated below:

Hypotheses 1: There is no significant effect of treatment in the management of computer anxiety among participants.
Hypothesis 2: There is no significant effect of age in the management computer anxiety among the participants.
Hypothesis 3: There is no significant effect of age in the management computer anxiety among the participants.

Methodology

Research Design

This study was a pre-test, post-test, control group, quasi-experimental design. The factorial matrix consisted of a treatment group (computer efficacy training) and a control group in the rows while the columns had two moderating variables of age (young, old) and gender (male and female).

Population, Sample and Sampling Techniques

The population of the study comprised all fresh students of the National Open University of Nigeria in the South-West geo-political zone of Nigeria.

The simple random sampling technique was used to select two Study Centres of the National Open University of Nigeria in the South-West Nigeria where the study was carried out. In each of the two Study Centres, the Computer Anxiety Scale Revised by Bandalos and Benson (1990) was administered to freshmen across the seven Schools (faculties) in the University to screen for participants with high computer anxiety. Thirty (30) participants were randomly selected from those who scored high in the Computer Anxiety Scale in each of the two selected Study Centres. To qualify for the study, the participants are students of the National Open University of Nigeria (NOUN) in the southwestern geopolitical zone of Nigeria who had attempted one semester examination in their first year of study in the selected Study Centres. And, they have scored below 60 on the Computer Anxiety Scale Revised by Bandalos and Benson (1990).

Instrumentation

Computer Anxiety Scale - Revised

The Computer Anxiety Scale - Revised (CAS-R) was designed in 1990 by Bandalos and Benson. The 23-item survey was designed to measure computer anxiety in participants. It was designed to measure three constructs of computer liking (8 items), computer confidence (9 items), and computer achievement (6 items), as identified by Bandalos and Benson (1990). The authors calculated an estimate of the coefficient alpha reliabilities for the three CAS-R subscales and the total scale at .90, .93, .90 and .96, respectively. This instrument was used to screen for computer-phobic participants. For this study only the total summative score was employed with higher values (60 and above) to indicate lower computer anxiety levels. Scores with low value (below 60) will represent high anxiety levels. The unique nature of the sample compelled the researcher to revalidate the instrument. The internal consistency Cronbach Alpha yielded 0.89 while test-retest reliability showed alpha coefficient of 0.91.

Computer Anxiety Rating Scale (CARS)

The Computer Anxiety Rating Scales (CARS) is a 19 items self-report inventory, designed and validated by Heinssen, Glass and Knight, (1987). The subjects responded on a five-point Likert type scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree). Total scores ranged from 19, indicating a low level of computer anxiety, to 95, which would indicate a high degree of computer anxiety. The instrument has a test re-test reliability of .79. When subjected to revalidation, the instrument

demonstrated high internal consistency with Cronbach alpha of 0.86 and a test-retest reliability coefficient of 0.89.

Procedure

The procedure for treatment was carried out in four stages namely: recruitment, pre-test, treatment and post-test. At the recruitment stage, the Computer Anxiety Scale Revised was used to screen participants. Participants with low score (i.e. below 60) were regarded as computer-anxious. At the pre-test stage, the Computer Anxiety Rating Scale was administered to the participants. Participants in the experimental group were exposed to eight weeks (eight sessions) of treatment (Computer Efficacy Training-CET). Each session lasted for an average of one hour. Participants in the Control group were not exposed to any form of treatment but a seminar on "time management strategies for Open and Distance Learners. The post-test was administered during the last (8^{th}) session of the treatment.

Data Analysis

Analysis of Covariance (ANCOVA) was the major statistical tools that employed in this study. ANCOVA was used to remove initial differences between the participants in the experimental and control groups. The Post-hoc Multiple Classification Analysis was also used to determine the directions of differences and significance identified.

Results and Discussion

To test hypothesis one, ANCOVA was adopted to analyze the post-test scores of participants in the management of computer anxiety among participants using the pre-test scores as covariates to ascertain if the post-experimental differences are statistically significant. The summaries of the analysis are presented in Table 1.

Table 1

Analysis of Covariance (ANCOVA) showing Effects of Computer Anxiety Scores of Participants in the Treatment and control Groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	2005.409[a]	8	250.676	5.604	0	0.468
Intercept	273.066	1	273.066	6.105	0.017	0.107

Source	Type III Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
Prescore	1371.614	1	1371.614	30.665	0	0.375
Trtgroup	1262.09	1	1262.09	28.216	0	0.356
Age	321.37	1	321.37	7.185	0.01	0.123
Gender	0.0289	1	0.289	0.006	0.936	0
tetgroup*age	252.812	1	252.812	5.652	0.021	0
trtgroup *gender	11.551	1	11.551	0.258	0.614	0.005
Age*gender	7.072	1	7.072	0.158	0.693	0.003
tetgroup*age * gender	18.549	1	18.549	0.415	0.522	0.008
Error	2281.175	51	44.729			
Total	80257	60				
Corrected	4286.583	59				

Note. A. R Squared= 468(Adjusted R Squared)

The results presented in Table 1 shows that there is significant effect of treatments in management of computer anxiety ($F_{(1,46)}$= 28.216, $p<0.05$,ñ =0.356). Premised on this, the null hypothesis is rejected. It is therefore concluded that there is significant effect of treatment in the management of computer anxiety among the participants. To further provide information on management of computer anxiety among the two groups (CET and Control) the multiple classification analysis (MCA) is computed and the result is shown in Table 2.

Table 2
Post-Hoc Multiple Classification Analysis

Treatment group	Mean	Std. Error
CET	27.723 [a]	1.805
Control	40.140 [a]	1.365

From the MCA Table, it is evident that the computer efficacy training (CET) group had the least adjusted post-test mean score ($\bar{x}$ = 27.723) and the control group had the high adjusted mean score ($\bar{x}$ = 40.140).

The finding agrees with that of Compeau and Higgins (1995) who discovered a relationship between self-efficacy and learning to use computers and software. This implies that the belief about one's capabilities to use technology successfully were strongly related to decisions about whether and how much to use technology. This finding also corroborates that of Igbaria and Iivari (1995) that self-efficacy was positively correlated with perceived ease of use, perceived usefulness and usage, but negatively correlated with computer anxiety. Zhang and Espinoza (1998) stated that computer-related self-efficacy influences a person's attitudes, perceptions, and beliefs about technology, and this relationship was clearly demonstrated in this study. Furthermore, a study by Czaja, Charness, Fisk, Hertzog, Nair, Rogers, and Sharit (2006) found that Computer efficacy was an important predictor of general use of technology and that people with lower self-efficacy are less likely to use technology in general. This finding also aligns with other studies (Bozionelos, 2001; Webster & Martocchio, 1992; Zhang & Espinoza, 1998) which established the effectiveness of computer efficacy on computer anxiety and computer related behaviours and increased willingness to learn and use computers.

While testing hypothesis two, there is significant effect of age in the management computer anxiety among the participants. To further provide information on computer anxiety management between the two levels (young and old) the MCA was computed and the result indicated that the young students had high adjusted post-test mean score ($\bar{x}$ = 36.94) while the old students had adjusted mean score ($\bar{x}$ = 30.93). The direction of the increasing effect of the interactions in the management of computer anxiety is

Young >old students. The older students benefitted from the treatment more than the young ones.

Table 3
Post-Hoc Multiple Classification Analysis

Age	Mean	Std. Error
16 – 29 years	36.935 [a]	1.127
> 30 years	30.928 [a]	1.906

The finding substantiates that of Dyck and Smither (1994) who found that a significant relationship between age and levels of computer anxiety. The finding also corroborates other studies (Klein, Knupfer, & Crooks, 1993) which revealed that older adults have more interest in learning about computers, greater confidence, and exhibit less computer anxiety than do younger adults. The finding of this study corroborates some studies (Ellis and Allaire, 1999; Czaja et al., 2006; Jay and Willis, 1992; Czaja and Sharit, 1998; Czaja, Charness, Fisk, Nair & Rogers, 2006; Oluwole, 2009 and Campbell, 2004) which indicated differences between older/ middle-aged adults and young adults with respect to use of computers and computer anxiety.

On hypothesis three, the result of the analysis is as presented in Table 1 indicates that there is no significant effect of gender in the management of computer anxiety post-test scores of male and female participants exposed to treatments CET and the control group. It is therefore concluded that there is no significant effect of gender in the management of computer anxiety among participants.

The finding of this study agrees with numerous studies that revealed no significant gender correlation in computer anxiety of managers (Howard and Smith, 1986) and among business professionals (Igbaria and Parasuraman, 1989). The finding was also affirmed by the study of Ray and Minch's (1990) which showed no significant differences between gender and computer anxiety among business professionals. This finding was further corroborated by that of Smith (2001) who examined the relationship between computer anxiety and computer-related tasks performance among college students and found no gender differences in their computer anxiety. Similarly, the finding of this study is in consonant with that of Chao (2001) who found no

significant difference on gender basis and computer anxiety among preservice teachers. In the same vein, Sam, Othman, and Nordin (2005) in a bid to determine if there were differences in men's computer anxiety when compared to women found that gender differences did not exist. The finding was further corroborated by that of Adebowale, Adediwura, and Bada, (2009) and Karsten and Roth (1998) whose studies showed no gender difference in computer anxiety of students. The work of Johnson and Wardlow, (2004), Rosen, Sears, & Weil (1987 and Tuncer, Doğan and Tanas (2013) also found no significant differences in computer anxiety by the effect of gender.

Conclusion and Recommendations

This study investigated the effect of computer efficacy training in the management of computer anxiety among National Open University of Nigeria (NOUN) freshmen in South-western Nigeria. Age and gender were the moderating variables in this study. Freshmen in two study centres selected were screened to identify computer anxious learners. Participants were exposed to training for eight weeks and data were collected, analysed and revealed the findings of this study. On the basis of the findings of this study, the following conclusions were made.

Computer efficacy training was effective in the management of computer anxiety among NOUN freshmen. It is expected that proper application of these intervention programmes should yield similar result in future. Age had significant effect in the management of computer anxiety of NOUN freshmen's anxiety while gender had no significant effect.

The following recommendations are given based on the findings of this study.

1. Computer Efficacy Training (CET) should be incorporated into the orientation programme of fresh students in NOUN anchored by qualified personnel. This kind of training at the inception/resumption of study is very critical as it would equip learners with skills needed to cope in the Open and Distance Learning (ODL) environment.
2. Newly admitted NOUN students should be screened for computer competence and anxiety/attitude to determine their status. The university should make provision for the computer anxious and incompetent ones within weeks of resumption to undergo intervention programme that will enhance their computer skills and reduce phobia.

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