Online Journal of Arts, Management and Social Sciences (OJAMSS);
Vol.4 No.1, January 2019, pg. 192 – 201 (ISSN: 2276 – 9013)

COMPUTER ANXIETY AND MATHEMATICS PHOBIA AS PREDICTORS OF POSTGRADUATE STUDENTS ACHIEVEMENT IN EDUCATIONAL STATISTICS IN NIGERIAN UNIVERSITIES

PROF. NNAMDI OBIKEZE (Ph.D)
Department Of Educational Foundations
Chukwuemeka Odumegwu Ojukwu University,
Igbariam
+2348034739218
nnamdiobikeze@gmail.com

&

AMAECHI COMFORT IFEAKOR (Ph.D)
Dept. Of Educational Foundations
Chukwuemeka Odumegwu Ojukwu University,
Igbariam
+2348033382457
Email: ac.ifeakor@coou.edu.ng, aceeifeakor@gmail.com

&

MARY OKWUCHUKWU AKUJIEZE (Ph.D)
Nwafor Orizu College Of Education,
Nsugbe
+2348062522536
akujieze.mary@nocen.edu.ng

&

CHRISTIANA NNEAMAKA ANUJEONYE
Federal College Of Education (Technical)
Asaba, Delta State
+2348035985897
anujeonyechristhy@gmail.com

Abstract
The study investigated computer anxiety and mathematics phobia as predictors of postgraduate students academic achievement in Educational Statistics in universities. Three hypotheses guided the study. The design of the study was correlational. A sample size of 55 Faculty of Education postgraduate students were selected for the study. A total of 25 postgraduate students drawn from Nnamdi Azikiwe University, Awka and 30 postgraduate students from Chukwuemeka Odumegwu Ojukwu University, Igbariam were randomly sampled for the study. Three instruments, Computer Anxiety Rating Scale (CARS), Mathematics Phobia Questionnaire (MPQ) and Academic Achievement of 2015/2016 postgraduate students on Statistical Methods in Educational Research were used for data collection. CARS and MPQ were adopted. The two instruments were validated by experts in Measurement and Evaluation. The reliability coefficient of CARS and MPQ were 0.82 and 0.76 respectively which were determined using Cronbach Alpha technique for internal consistency of the instruments. The instruments were administered to the respondents by the researchers with the help of two trained research assistants. Linear, multiple regression analysis and analysis of variance (ANOVA) associated with regression analysis were used to test the hypotheses at .05 probability level. The results revealed that both computer anxiety and mathematics phobia separately significantly predicted postgraduate students academic achievement in Educational Statistics. Computer anxiety and mathematics phobia jointly significantly predicted postgraduates' academic achievement in Educational Statistics. Based on the findings, it was recommended among others, that postgraduate students should be proficient with the use of computers and mathematical abilities so that they would not be scared at the instance of educational statistics courses.

Keywords: Computer anxiety, Mathematics phobia, Educational Statistics, academic achievement.

Introduction

Educational statistics refer to a set of figures, scores or data used in measurement. Invariably, educational statistics can be said to be a measure or an index used in analysing a set of data or scores in order to bring out the characteristic properties of such data. In this regard, mention is made about mean, median, variance, standard deviation, correlation coefficient, t-test etc. Statistics can also be viewed as a field of discipline, that is, a branch of mathematics that deals with the derivation and study of the mathematical properties of those measures and their applications in the solution of human problems (Osegbo & Ifeakor, 2011). It deals with how data are collected, analysed, interpreted and how conclusions and inferences can be drawn based on analysis of such data.

Literature had shown that the teaching of educational statistics, besides being marginal and incorporated in the mathematical curriculum, is very often dealt in an abstract and formal way (Milito, Pannone & Luchini, 2001). This implied that there is very limited emphasis on the meaning of concepts and even less on the interpretation of the results.

Students need to see mathematics and statistics in a correct perspective, and to distinguish the different features of their logic. Particularly, it is fundamental to enable learners to appreciate the role of statistical reasoning, which allows the students to read and interpret real phenomena with no pretension of giving exact answers, nevertheless helping them to develop a more objective view of reality. Suffice it to say that working with real data reflecting a real life phenomenon favours a better learning of statistical methods and develops students' interests, as they are personally involved in the collection and interpretation of data (Moore, 2001).

It is widely recognized that educational statistics is one of the most important quantitative subjects in a university curriculum. It is also acknowledged that teaching educational statistical courses are challenging because they serve students with varying backgrounds and abilities, many of whom have had negative experiences with statistics and mathematics (Tishkovskaya & Lancaster, 2012). Most critical is the fact that these courses might affect their life-long perceptions of and attitudes towards the values of educational statistics to many students and hence many future employees, employers and citizens. Nonetheless, educational statistics serve very vital importance in the life of both teachers and students. According to Osegbo and Ifeakor (2011), educational statistics serve the following purposes:

1. Educational statistics help teachers with knowledge required in describing results and hence make correct inferences from numerous data which they collect from tests and other personality characteristics.
2. A sound knowledge of educational statistics enables teachers and students to read and intelligently interpret and evaluate literature in the area of education and social sciences such as journals and periodicals.
3. It helps a teacher to analyze and effectively draw conclusions when faced with the responsibility of evaluating a new instructional material or programme.
4. Knowledge of educational statistics can help a teacher who wants to assess the behavioural outcomes of his instructions or who is involved in the development of some instruments to effectively interpret and report the results in journals or periodicals.
5. A teacher who has a sound knowledge of statistics can select appropriate standardized instruments to evaluate instructional outcomes (pg. 201).

With the trend in education sector, information and communication technology (ICT) has gained global acceptance within a short space of time. Most developed and developing countries now see major benefits of using ICT and mastering the basic skills and concepts of ICT as a major part of their academic programme, alongside reading, writing, numeracy and statistical data analysis (Akpan, 2018). Moreso, the acceptance and positive attitude to mathematics would be a good advantage to understand the teaching and learning of educational statistics. Suffice it to say that computer anxiety and mathematics phobia seem to be challenges/hindrances to postgraduates' achievement in Educational Statistics.

Anaekwe (2016) asserted that computer is a highly treasured assert for statistical analysis, with its utility value of speed and accuracy. The popular slogan in computer parlance "garbage in garbage out" serves to remind postgraduate students to be extra-careful and meticulous in data handling and processing because if the computer is inputed

wrongly, it will process the information as inputed and give the result as the output. This automatic operation of the computer, might be the cause of graduates' anxiety.

Literature has revealed that computer literacy level of postgraduate students, lack of computer skills and negative attitude towards the use of computer contribute to computer anxiety (Sam, Abang & Zalmurjjudam, 2005; Akpan, 2016). Students, though may be exposed to knowledge of computers tend to be anxious in using computers to study.

Computer anxiety can be defined as the fear of intending interaction with a computer that is disproportionate to the actual threats presented by the computer. Computer anxiety according to Opara and Egbejule (2016) is the students' fear of computers or the tendency of the students to be uneasy; apprehensive and have phobia towards current or future use of computers. Computer anxiety could lead to students' sweaty palms, dizziness, trouble in assessing programmes in the computer like Statistical Packages in Social Sciences (SPSS) or inability to use computers during educational statistics classes. Computer anxiety, according to Serligman, Walker and Rosenlan (2010) can be seen as an unpleasant state of inner turmoil often accompanied by nervous behaviours such as pacing back and forth.

Another variable discussed in relation to achievement of postgraduate students in educational statistics is mathematics phobia. The knowledge of mathematics helps man to give exact interpretation to his ideas and conclusions. It is the numerical and calculation part of man's life and knowledge. As important as mathematics is in the study of educational statistics, yet students develop mathematics phobia towards the course. Educational statistics deals with computations and formulae in organizing and analysing educational data which rely heavily on simple arithmetic like addition, subtraction, multiplication, division, squares and square roots etc. These can easily be worked out with aid of SPSS.

Mathematics phobia according to Okigbo (2010) is an academic sickness whose virus has not yet been fully diagnosed for an effective treatment in the class. Olaniyan et al in Nwoke and Ugwuegbulam (2016) pointed out that mathematics phobia is regarded as mathematics weakness in students that deals with psychological dimension of learning. Many students have negative attitude towards mathematics which influences their approach to solving problems in educational statistics. This negative attitude results to phobia and subsequently poor performance in educational statistics because educational statistics and mathematics have similar computations.

In a study conducted by Ogunmakin and Osakuade (2014) on the influence of computer anxiety on candidate's performance in computer based test (CBT) in some universities in Nigeria with a sample of 100 candidates, found out that computer anxiety influenced candidates' performance in CBT. In the same vein, Wise, Barnes, Harvey and Plake (2009) investigated the effect of computer anxiety on CBT performance of college students. They found out that computer anxiety appears to play a substantial role in moderating the usefulness of CBT with college students. A study was carried out by Nwoke and Ugwuegbulam (2016) on the causes and solutions of mathematic phobia among secondary school students with 110 mathematic teachers as the sample. They found out that factors that cause mathematics phobia among students are students negative attitude towards mathematics, abstract nature of mathematics and poor mathematic background.

Based on the foregoing, the researchers intend to investigate computer anxiety and mathematics phobia in Educational Statistics in Nigerian universities. In order to achieve the specific objectives of this study, the following null hypotheses were formulated and tested at .05 level of significance to guide the study:

1. Computer anxiety does not significantly predict postgraduate students achievement in Educational Statistics.
2. Mathematics phobia does not significantly predict postgraduate students achievement in Educational Statistics.
3. Computer anxiety and mathematics phobia jointly do not significantly predict postgraduate students achievement in Educational Statistics.

Method

The study adopted a correlational design. The design is ideal and relevant for the study because it investigated how computer anxiety and mathematics phobia predicted postgraduates' achievement in Educational Statistics in universities. The population was 25 postgraduate students in Nnamdi Azikiwe University, Awka and 30 postgraduate students drawn from Chukwuemeka Odumegwu Ojukwu University, Igbariam. A census sampling of 55 postgraduate students formed the sample. The instrument for data collection were Computer Anxiety Rating Scale (CARS) adopted from Lester, Yang and James (2005), Mathematics Phobia Questionnaire (MPQ) adopted from Nwoke and Ugwuegbulam (2016) and academic achievement of 2015/2016 postgraduate students on Statistical Methods in Educational Research from both institutions.

CARS was revalidated and MPQ was validated by two experts in Measurement and Evaluation. The reliability coefficients of CARS and MPQ were computed using Cronbach Alpha to yield a reliability index of 0.82 and 0.76 respectively. The copies of questionnaire were administered to the respondents by the researchers with the help of two trained research assistants, one from NAU and another from COOU. Linear, multiple regression analysis and analysis of variance (ANOVA) associated with regression analysis were used to test the hypotheses at .05 alpha level.

Results

The results were presented in accordance with the hypotheses of the study at .05 alpha level.

Hypothesis One: Computer anxiety does not significantly predict postgraduate students achievement in Educational Statistics.

Table 1: Linear regression analysis of postgraduate students computer anxiety and their achievement in Educational statistics.

R	=	0.143
R squared=	0.020	
Adjusted R^2	=	0.019
Standard error	=	6.21

Analysis of Variance (ANOVA)

Model	**Sum of square**	**df**	**Mean square**	**F-value**	**p-value**
Regression	1347.412	1	1347.412	1.685	.003
Residual	43171.307	54	799.462		
Total	44518.719	55			

Dependent variable: Academic achievement; Predictor (constant); Computer anxiety
Significant level = .05

Table 1 revealed that the linear regression analysis of postgraduate students computer anxiety scores as predictor of their academic achievement in Educational Statistics scores yielded a coefficient of linear regression of 0.143; a linear R square of 0.020 and adjusted R square of 0.019. This implies that computer anxiety had a low predictive power with postgraduate students academic achievement. Based on the R square value of 0.020, it indicates that the predictive power of computer anxiety only explained 2.0% of the variations in postgraduate students achievement in Educational Statistics. The Table also showed that the analysis of variance (ANOVA) for the linear regression produced an F-value of 1.685 which was significant at p-value of .003 which was less than the probability level of .05. Hence the null hypothesis was rejected. This implied that computer anxiety significantly predicted postgraduate students academic achievement in Educational Statistics.

Hypothesis Two: Mathematics phobia does not significantly predict postgraduates' achievement in Educational Statistics

Table 2: Linear regression analysis of postgraduate student mathematics phobia and their achievement in Educational Statistics.

R	=	0.053
R squared=	0.003	
Adjusted R^2	=	0.002
Standard error	=	12.23

Analysis of Variance (ANOVA)

Model	**Sum of square**	**df**	**Mean square**	**F-value**	**p-value**
Regression	7422.317	1	7422.317	15.72	.000
Residual	25496.401	54	472.155		
Total	32918.718	55			

Dependent variable: postgraduate's achievement; Predictor (constant); Mathematics phobia

Significant level = .05

Table 2 revealed that the linear regression analysis of postgraduates' mathematics phobia scores as predictors of their academic achievement scores yielded a coefficient of linear regression of 0.053; a linear R square of 0.003 and adjusted R square of 0.002. This revealed that mathematics phobia had a very low predictive power with postgraduates' academic achievement. Based on the R square value of 0.003, it indicated that predictive power of mathematics phobia only explained 0.3% of the variations in postgraduates' academic achievement. The Table also revealed that the ANOVA for the linear regression produced an F-value of 15.72 which was significant at p-value of .000 which was less than the probability level of .05. Hence the null hypothesis was rejected. This implied that mathematics phobia significantly predicted postgraduate students academic achievement in Educational Statistics.

Hypothesis 3: Computer anxiety and mathematic phobia jointly do not significantly predict postgraduates academic achievement in Educational Statistics.

Table 3: Multiple regression analysis of postgraduates' computer anxiety and mathematics phobia and their achievement in Educational Statistics.

R	=	0.120			
R squared=	0.014				
Adjusted R^2	=	0.010			
Standard error	=	23.86			
		Analysis of Variance (ANOVA)			
Model		**Sum of square**	**df**	**Mean square**	**F-value p-value**
Regression		4484.34	2	2242.170	3.69 .024
Residual	32161.831		53	606.811	
Total		36646.171		55	

Dependent variable: Postgraduate's achievement; Predictor = Computer anxiety and mathematics phobia

Significant level = .05

The result in Table 3 showed the multiple regression analysis of the joint prediction of computer anxiety and mathematics phobia on postgraduates' academic achievement in Educational Statistics. The multiple regression coefficient obtained is 0.120, a multiple R square is 0.014 and adjusted R squares is 0.010. This meant that the two predictor variables jointly had a low relationship with postgraduate students academic achievement in Educational Statistics. Based on the R square value of 0.014, it indicated that the joint prediction of the two predictor variables only explain 1.4% of the variations in postgraduates academic achievement. The Table also revealed that the analysis of variance (ANOVA) for the multiple regression produced an F-value of 3.69 which was significant at p-value of .024 which was also less than .05 probability level is rejected. This implied that computer anxiety and mathematics phobia jointly significantly predicted postgraduate students academic achievement in Educational Statistics.

Discussion of the Findings

The findings revealed that computer anxiety significantly predicted postgraduate students academic achievement. By implication about 98% variation may be influenced by other moderator variables such as postgraduates students' intelligence, age and so on. The findings agreed with the study of Ogunmakin and Osakuade (2014) who found out that computer anxiety significantly predicted candidates performance in CBT. Corroborating with the findings of the study, Wise, et al (2009), affirmed that computer anxiety appears to play a substantial role in moderating the usefulness of CBT with college students.

The findings also revealed that mathematics phobia significantly predicted postgraduate students academic achievement in Educational Statistics. The prediction of

mathematics phobia scores accounted for 0.3% of the variation in postgraduate students academic achievement in Educational Statistics. This finding was in consonance with the findings of Nwoke and Ugwuegbulam (2016) who reported that mathematics phobia affect secondary school students. This is as a result of students negative attitude to mathematics, abstract nature of mathematics and poor mathematic background among others. These students are those who seem to continue to higher level of education. In this context, the researchers found out that mathematics phobia also predicted postgraduate students academic achievement.

Finally, the findings also showed that computer anxiety and mathematics phobia jointly significantly predicted postgraduate students academic achievement in Educational Statistics. This finding supported the finding from the study. There is no research work known to the researchers that studied computer anxiety and mathematics phobia as predictors of postgraduate student academic achievement in Education Statistics, hence the present study.

Conclusion

From the results of the study, the following conclusions were drawn:

- Computer anxiety significantly predicted postgraduate students academic achievement Educational Statistics.
- Mathematics phobia significantly predicted postgraduate students academic achievement in Educational Statistics.
- Computer anxiety and mathematics phobia jointly significantly predicted postgraduate students academic achievement in Educational Statistics.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Lecturers of Educational Statistics should teach so that students would appreciate the role of statistical reasoning, which allows students read and interpret real phenomena with no pretension of giving exact answers.
2. Postgraduate students should understand that though they come from varying backgrounds and abilities, should develop positive attitude towards Educational Statistics.
3. Postgraduate students should be proficient with the use of computers and mathematics abilities so that they would not be scared at the instance of Educational Statistics courses.

REFERENCES

Akpan, I. F. (2016). Computer anxiety, computer self-efficacy and attitude towards computer based on gender and subjects of interest. *Journal of Educational Realities, 1(1), 38-49.*

Akpan, I. F. (2018). Computer anxiety, computer self-efficacy and attitude towards internet among secondary school students in Akwa Ibom State, Nigeria. *American Journal of Educational Research, 6(11), 1455-1459*, Online at http://pubs.sciepub.com/education/6/11/2.

Anaekwe, M. C. (2016). *Basic research methods and statistics in education and social sciences.* Onitsha: Sofie Publicity and Printing Ltd.

Lester, D., Yang, B. & James, S. (2005). *A short computer anxiety scale. Perceptional and Motor Skills, 100, 964 – 968.*

Milito, A. N., Pannone, M. A. & Luchini, S. R. (2001). New strategies for teaching statistics at school. *International Statistics Institute, 53rd Session.*

Moore, D. S. (2001). New pedagogy and new content: The case of statistics (with discussion). *International Statistical Review, 65, 123-137.*

Nwoke, B. I. & Ugwuegbulam, C. N. (2016). Causes and solutions of mathematics phobia among secondary school students. *Research on Humanities and Social Sciences, 6(20), 105 – 109.* ISSN (Paper) 224-5766 ISSN (online) 2225-0484. Retrieved from www.iiste.org.

Ogunmakin, A. B. & Osakuade, J. O. (2014). Computer anxiety and computer knowledge as determinants of candidates' performance in CBT in Nigeria. *British Journal of Education, Society and Behavioural Science, 4(4), 495 – 507.*

Okigbo, E. C. (2010). Comparative effectiveness of mathematical game and instructional analogy as advance organizers on students achievement and interest in mathematics. *Unpublished Doctorial Thesis*, Nnamdi Azikiwe University, Awka. Nigeria.

Opara, I. M. & Egbejule, E. (2016). Computer literacy and computer anxiety as predictors of candidates' performance in UTME computer based test. *ASSEREN Journal of Educational Research and Development (AJERD),* 3, 144 – 151.

Osegbo, I. E. & Ifeakor, A. C. (2011). *Psychological measurement and evaluation in education: Issues and applications.* (Revised Edition). Onitsha: Folmech Printing & Publishing Co. Ltd.

Sam, K. S., Abang, e. A. & Zalmurjjudam, S. N. (2005). Computer self-efficacy, computer anxiety and attitude towards internet: A study among undergraduates in Unimas. *Educational Technology and Society 205 – 219.*

Seligman, M. F., Walker, E. F. & Rosenhan, D. L. (2010). *Abnormal psychology*. (4th Ed.). New York: WW Norton & Company.

Tishkovskaya, S. & Lancaster, G. A. (2012). Statistical education in the 21st century: A review of challenges, teaching innovations and strategies for reform. *Journal of Statistics Education, 20:2, Dol: 10.1080/10691898.2012.11889641.*

Wise, S. L., Barnes, L. B., Harvey, A. L. & Plake, B. S. (2009). Effects of computer anxiety and computer experience on the computer based achievement test performance of college students. *Applied Measurement in education, 2(3), 235 – 241.*