# COMPUTER ANXIETY, OPERATION SKILLS AND ATTITUDE AS CORRELATES OF STUDENTS PREPAREDNESS FOR COMPUTER BASED ASSESSMENT.

**By**

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**Abstract**

*This study set out to determine the relationship between computer anxiety, operation skills, students' attitude towards the use of computer and students' preparedness for computer based assessment. The study adopted correlational research design. The population of the study comprised all the students who registered and wrote Joint Admissions and Matriculations Board (JAMB) examination in the University of Nigeria, Nsukka centre for the year 2015. A sample of 400 students was used for the study. The instrument used for data collection was a 40 items 4-point Likert-scale questionnaire developed by the researchers. Three experts in measurement and evaluation in the University of Nigeria, Nsukka validated the instrument. Cronbach's alph method was used to determine the internal consistency of the items and the overall reliability coefficient of the instrument was 0.85. The researchers used direct delivery method in the administration and retrieval of the questionnaire from the respondents. Data collected was analyzed, and the Pearson Product Moment Correlation Coefficient was used to answer the research questions while Regression Analysis was used to test the null hypotheses at 0.05 level of significance. The result of the study showed that computer anxiety, operation skill and attitude are good predictors of students' preparedness for computer-based-assessment.*
**Key word:** Computer Anxiety, Operation Skill, Attitude, Computer-based-Assessment.

**INTRODUCTION**

The predominant mode of assessing students' learning in most countries and Nigeria in particular, is the traditional paper-and-pencil assessment method. In this method, students' cognitive abilities are assessed using paper-and-pencil tests. When a large number of examinees are involved in this method of assessment, serious limitations are imposed on the effectiveness of the method. Aliyu and Francis (2014) noted that presently, the traditional method of assessment in Nigeria is characterized by different forms of examination malpractice such as bringing in unauthorized materials into the examination hall, writing on currency notes and identity cards, copying from other candidates' answer scripts, substitution of answer scripts and change of examination scores or grades. Others malpractices include, impersonation, leakage of questions to students before the examination, collusion with supervisors and school authorities to cheat, body writing or tattoo in which students, especially females, write on hidden parts of their bodies.

Other disadvantages of paper-and-pencil assessment include cost of conduct of the examination on the part of the examination bodies including allowances for invigilators, coordinators, markers, collators and other allied staff; subjective scoring and plausible manipulation of results; late release of results and missing grades. Davey (2011) noted that a wide assortment of options are now available for using a computer to present information, facilitate interaction, and collect responses in ways not possible with traditional text-based items. This is the basis of e-examination, which could be used to assess cognitive and practical abilities.

The use of technology in educational assessment is relatively new in Nigeria. The achievements of Joint Admissions and Matriculations Board (JAMB) in the automation of public examinations, which began with on-line checking of candidates' examination centres, and later e-registration of candidates for the Unified Tertiary Matriculation Examinations (UTME), e-marking of the UTME and release of students examination results in a record breaking-time of one week; to actual conduct of e-examinations in designated centers is proof of the invaluable role of technology in tackling the numerous challenges of assessing students' learning outcomes in Nigeria (Obioma, Junaidu and Ajagun, 2013).

Educators who advocate technology integration in the learning process believe it will improve learning and better prepare students to effectively participate in the 21st century workplace (Butzin, 2000; Hopson, Simms, & Knezek, 2002; Reiser, 2001). Indeed, teaching - learning process in recent years has been facilitated by the combined use of a variety of technological, instructional, and pedagogical approaches (Bonk & King, 1998; Marina, 2001).

In integrating computers in assessment process, researchers have opined that positive attitudes towards computers, students' operation skills and lower computer anxiety levels could be important factors in helping students to pass the examinations. Computer anxiety has been defined as a fear of computers when using one, or fearing the possibility of using a computer (Chua, Chen, & Wong, 1999). It is different from negative attitudes toward computers that entail beliefs and feelings about computers rather than one's emotional reaction towards using computers (Heinssen, Glass, & Knight, 1987).

Computer anxiety manifests as response, emotional fear of potential negative outcomes such as damaging the equipment or looking foolish, because of inability to perform a given task that involves the use of computers. (Kanfer & Heggestad, 1997). Experiential evidence indicates that many adults, including first-year University students, have some sort of computer-related phobia. Computer anxiety to some extent may be determined by the operation skill of the students. Students with high operation skills may have low computer anxiety as compared to students with little or no operation skills.

Computer operation skill entails the ability of the operator or the student to operate a computer with proficiency (Kinzie, Delcourt and Powers, 1994). It is also an operator's knowledge of the system and the ability to utilize such knowledge to keep the system running, recover from full or partial failures, or save jobs in progress without resorting to full restart and/or data restoration procedures. The operator's alertness, speed, and accuracy of judgment in determining what should or should not be done are crucial requirements for ascertaining the computer operation skill acquired by an operator or a student.

Delivery of tests in recent time has been by the use of computer. Ogilvie, Trusk, and Blue (1999) observed that one area where computers are rapidly impacting training at all levels is their use in assessments, especially those involving multiple-choice exams. Although students' attitudes to computerized testing are generally positive, this new testing environment has raised concerns such as effects of computer anxiety and attitudes, sufficiency of resources, and reliability as compared to paper-and-pencil multiple-choice tests (Clariana and Wallace, 2002).

At the basic education level in Nigerian Education system, computer education has become compulsory. All private and public schools are expected to embrace this curriculum innovation. Currently, one of the best ways of wooing parents to register their wards in any institution is the conviction that computer education is available in the school. It follows that early exposure of the student in the use of computers is a sure way of making them not only to acquire knowledge in the use of the computers, but also to help them overcome the apathy associated with seeing computer as a monster, especially when confronted with the problem of writing tests with it. The recent introduction of the use computer as the only option in writing Unified Tertiary and Matriculation Examination in Nigeria is real boost in recreating awareness in the knowledge and use of computers for assessment purposes. Therefore, students and teachers must be competent in the use of computer for assessment purposes, and must have low computer anxiety, good operation skill and positive attitude towards computer.

Humans constantly busy themselves with thinking, feeling or other activities, which define their attitudes. Attitude is nothing but a point of view one holds for other people, situations, event, object, places, phenomena, or beings. It is essentially like an evaluative statement that is either positive or negative, which depends on the degree of liking or otherwise for the matter under consideration. Attitude reflects how one thinks, feels and behaves in a given situation. Attitude is a central part of human identity. Everyday people love, hate, like, dislike, favour, oppose, agree, disagree, argue, persuade etc. All these are

evaluative responses to an object. Hence attitudes can be defined as "a summary evaluation of an object of thought" (Bohner & Wänke, 2002). They are inclinations and predispositions that guide an individual's behaviour and persuading to an action that can be evaluated as either positive or negative. Attitudes develop and change with time.

Woodrow (1991) asserted that students' attitudes toward computers were critical issues in computer courses and computer-based curricula. Monitoring the user's attitudes towards computers should be a continuous process, if the computer is to be used as a teaching and learning tool and for assessment purposes. There is therefore, the need to carry out studies towards mediating computer anxieties on perceived ease of use of the computer in computer-based tests. This study suspects that performance in a test of participants with higher computer anxiety might be poorer than those with little or no computer anxiety.

The questions then are: how prepared are the candidates in writing computer based assessment? How competent are the candidates in operating computer and what is their attitude towards the use of computer? If the candidates are not competent in writing the computer based assessment and have negative attitude towards computer, what effect would it have on their anxiety level when writing, and the test outcome?

Therefore, this study focuses on three variables: computer anxieties, operational skill and attitude, as correlates of students' preparedness for computer based assessment. It is assumed that these three variables impact on individuals' use of computers and level of performance on computer-based tasks, especially examination.

**Purpose of the study**

The main purpose of this study is to investigate how computer anxiety, operation skill and attitude correlate with students' preparedness for computer-based assessment. Specially, the study aims to find:

i. the relationship between computer anxiety and students preparedness for computer based assessment;

ii. the relationship between computer operation skills and students preparedness for computer based assessment;

iii. the relationship between students' attitude towards computer and students' preparedness for computer based assessment;

iv. the inter-relationship between computer anxiety, operation skills, attitude and students preparedness for computer based assessment.

**Research Questions**

i. What is the relationship between computer anxiety and students' preparedness for computer based assessment?

ii. What is the relationship between computer operation skills and students' preparedness for computer based assessment?

iii. What is the relationship between students' attitude towards computer and students' preparedness for computer based assessment?

iv. What is the inter-relationship between computer anxiety, operation skills, attitude and students' preparedness for computer based assessment?

**Hypotheses**

i. There is no significant relationship between computer anxiety and students preparedness for computer based assessment.

ii. There is no significant relationship between computer operation skills and students preparedness for computer based assessment.

iii. There is no significant relationship between students' attitude towards computer and students' preparedness for computer based assessment.

iv. computer anxiety, operation skills and attitude do no significantly predict students' preparedness for computer based assessment.

**Methods**

The study adopted correlational research design to determine the relationship between computer anxiety, operation skill, attitude and students' preparedness for computer based assessment. The population of the study comprised all the students who registered and wrote JAMB examination in University of Nigeria, Nsukka centre for the year 2015. A sample of 400 students was used for the study. The instrument used for data collection was a questionnaire developed by the researchers comprising of 40 items. The questionnaire was divided into four clusters – A, B, C and D. Cluster A sought information on students' computer anxiety, cluster B elicited information on students' operation skill, cluster C was on students' attitude towards computer and cluster D was on students' preparedness to take computer-based examination. The questionnaire was modeled on a four (4) point rating scale with response options of  Strongly Agree (SA); Agree (A); Disagree (D) and Strongly Disagree (SD) with numerical values of 4,3 2, and 1 points assigned to each of the responses respectively. Three experts in measurement and evaluation, University of Nigeria, Nsukka, validated the instrument. The questionnaire was trial tested on 100 level students who wrote JAMB in 2014 in order to measure the internal consistency of the items. Reliability coefficients of 0.87, 0.80, 0.79 and 0.84 were obtained for clusters A to D respectively, and the overall reliability of 0.85 was obtained for the instrument. The researchers used direct delivery method in the administration and retrieval of the questionnaire from the respondents. Data collected was analyzed using Pearson Product Moment Correlation Coefficient to answer research questions while Regression Analysis was used to test the null hypotheses at 0.05 level of significance. Correlation coefficients of 0.80 and above were regarded as high relationship; 0.30 to 0.79 were regarded as moderate relationship, 0.01 to .29 were regarded as low relationship and a correlation

coefficient of 0.00 was regarded as no relationship, (Dowine and Heath, 1974 as cited Nworgu, 2006).

**RESULTS**

**Research Question 1:** What is the relationship between computer anxiety and students' preparedness for computer based assessment?

**(TABLE 1)**

To answer this research question, the scores from the responses of the respondents on students' computer anxiety were correlated with students' preparedness for computer-based assessment. The result in Table 1 showed that the correlation coefficient obtained was 0.68. This means that, there exist a medium direct positive relationship between students' computer anxiety and their preparedness for computer based assessment. Table 1 also shows that, the coefficient of determination ($R^2$) associated with the correlation coefficient of 0.68 was 0.47. This coefficient of determination ($R^2$) indicates that, 47% of students' compute anxiety accounted for their preparedness for computer-based assessment. This is an indication that 53% of students' preparedness for computer-based assessment is attributed to other factors not studied.

**Research Question 2:** What is the relationship between computer operation skill and students' preparedness for computer-based assessment?

**(TABLE 2)**

To answer this research question, the scores from the responses of the respondents on computer operation skill were correlated with students' preparedness for computer based assessment. The result in Table 2 showed that the correlation coefficient obtained was 0.77. This means that, there exist a medium direct positive relationship between computer operation skill and students' preparedness for computer based assessment. Result also shows that, the coefficient of determination ($R^2$) associated with the correlation coefficient of 0.77 was 0.59. This coefficient of determination ($R^2$) indicates that, 59% of students' compute operation skill accounted for their preparedness for computer based assessment.

**Research Question 3:** What is the relationship between students' attitude towards computer and students' preparedness for computer-based assessment?

**(TABLE 3)**

To answer this research question, the scores from the responses of the respondents on students' attitude towards computer were correlated with students' preparedness for computer-based assessment. The result in Table 3 showed that the correlation coefficient obtained was 0.82. This means that, there exist a high positive relationship between students' attitude towards computer and their preparedness for computer-based assessment. Result also shows that, the coefficient of determination ($R^2$) associated with the correlation coefficient of 0.82 was 0.67. This coefficient of determination ($R^2$) indicates that, 67% of students' attitude towards computer accounted for their preparedness for computer-based assessment.

**Research Question 4:** What is the inter-relationship between computer anxiety, operation skills, attitude and students' preparedness for computer-based assessment?

**(TABLE 4)**

Result in table 6 seeks to find how much of the overall variance of students' preparedness for computer-based assessment is explained by the predictor variables. Results in Table 4 showed that the relationship of the predictor variables and the criterion variable was 0.89 and the coefficient of determination (R Square) was 0.79, this means that the model as a whole explained 79% of the total variance of students' preparedness for computer-based assessment. This also means that 79% of students' preparedness for computer-based assessment is accounted for by the predictor variables.

**Hypothesis 1: There is no significant relationship between computer anxiety and students' preparedness for computer-based assessment.**

**(TABLE 5)**

In order to test hypothesis 1 ($H_{O1}$), regression analysis was used. The result in Table 5 shows that an F-ratio of 346.81 with associated exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance set as benchmark for testing the hypothesis and it was found to be significant. The null hypothesis was therefore, rejected and inference drawn was that, there was significant relationship between computer anxiety and students' preparedness for computer-based assessment.

**Hypothesis 2: There is no significant relationship between computer operation skill and students' preparedness for computer-based assessment.**

**(TABLE 6)**

In order to test hypothesis 2 (H$_{O2}$), regression analysis was used. The result in Table 6 shows that an F-ratio of 572.78 with associated exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance set as benchmark for testing the hypothesis and it was found to be significant. The null hypothesis was therefore, rejected and inference drawn was that, there was significant relationship between computer operation skill and students' preparedness for computer-based assessment.

**Hypothesis 3: There is no significant relationship between students' attitude towards computer and students' preparedness for computer-based assessment.**

**(TABLE 7)**

In order to test hypothesis 3 (H$_{O3}$), regression analysis was used. The result in Table 7 shows that an F-ratio of 804.06 with associated exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance set as benchmark for testing the hypothesis and it was found to be significant. The null hypothesis was therefore, rejected and inference drawn was that, there was significant relationship between students' attitude towards computer and students' preparedness for computer-based assessment.

**Hypothesis 4: Computer anxiety, operation skills and attitude do no significantly predict students' preparedness for computer-based assessment.**

**(TABLE 8)**

In order to test hypothesis 4 (H$_{O4}$), multiple regression analysis was used. The result in Table 8 shows that an F-ratio of 542.45 with associated exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance set as benchmark for testing the hypothesis and it was found to be significant. The null hypothesis was therefore, rejected and inference drawn was that, computer anxiety, operation skills and students' attitude towards computer significantly predict students' preparedness for computer-based assessment.

**Discussion**

The finding of the study as presented in table 1 showed that there is a relationship between computer anxiety and students' preparedness for computer-based assessment. Computer anxiety has been defined as a fear of computers when using one, or fearing the possibility of using a computer. The finding of the study somewhat agrees with the works of Kanfer & Heggestad (1997), which showed that the performance of participants with higher computer anxiety might be poorer than those with little or no computer anxiety. Experiential evidence shows that as many as fifty percent of adults, including first-year University students, have some sort of computer-related phobia, which in most cases influence or affect their readiness to take computer-based test. This report

demonstrates that the use of computers still has some unpleasant side effects despite the Internet boom in the past decade. Past research shows that computer anxiety influences how users perceive ease of use of an information system. The result of test of hypothesis one also support the finding in table 1 ($H0_1$) that there is a significant relationship between computer anxiety and students preparedness for computer- based assessment.

Result of research question 2 showed that students' operation skills can predict their preparedness for computer-based assessment. Kinzie, Delcourt and Powers, (1994) stated that operation skill is an operator's knowledge of the system and the ability to utilize such knowledge to keep the system running or recover from full or partial failures. This means that the operation skill of the students which in most cases leads to self-efficacy is a significant predictor of students' preparedness for computer-based assessment. The result of test of hypothesis two ($H0_2$) also showed that there is a significant relationship between computer operation skill and students' preparedness for computer based assessment.

Result in table 3 showed that there is a high positive relationship between students' attitude towards computer and their preparedness for computer-based assessment. Result showed that about 67% of students' attitude towards computer accounted for their preparedness for computer based assessment. The result of test of hypothesis three ($H0_3$) also showed that there is a significant relationship between students' attitude towards computer and their preparedness for computer based assessment. The finding of this study is in agreement with Woodrow (1991) assertion that students' attitudes toward computers were critical issues in computer courses and computer-based curricula. Monitoring the user's attitudes toward computers should be a continuous process if the computer is to be used as a teaching and learning tool and for assessment purposes.

The result of research question 4 showed the inter-relationship between computer anxiety, operation skills, attitude and students' preparedness for computer-based assessment. Results showed that the relationship of the predictor variables and the criterion variable was 0.89 and the coefficient of determination (R Square) was 0.79, this means that the model as a whole explained 79% of the total variance of students' preparedness for computer-based assessment. This also means that 79% of students' preparedness for computer-based assessment is accounted for by the predictor variables. This is in agreement with the result of test of hypothesis four ($H0_4$) that computer anxiety, operation skills and students' attitude towards computer are significant predictors of students' preparedness for computer based assessment.

**Conclusion**

Based on the findings, this study concludes as follows: There was a positive and direct relationship between computer anxiety, operation skills, attitude and students' preparedness for computer-based assessment; Computer anxiety, operation skills and students' attitude towards computer are significant predictors of students' preparedness for computer based assessment.

**Recommendations**

Based on the findings of the study, the following recommendations are made.

1. Students preparing for any examination that involves the use of computers or any electronic gadgets should be encourage to reduce their anxiety towards the use of such equipment. This will enhance or improve their performance in such examination.
2. Students should also be encouraged to improve on their computer operation skills.
3. Students should be encouraged to have positive attitudes towards the use of computer. This will help to prepare them for any computer-based assessment or examination.

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**List of Tables**

**Table 1**: Pearson's Product Moment Correlation Analysis of students' computer anxiety and their preparedness for computer based assessment.

| Variable | $\bar{x}$ | SD | N | r | $R^2$ |
|---|---|---|---|---|---|
| Students' Computer anxiety | 25.13 | 3.86 | 400 | 0.68 | 0.47 |
| Preparedness for CBA | 26.38 | 4.88 | | | |

$\alpha = 0.05$, $R^2$ = coefficient of determination

**Table 2**: Pearson's Product Moment Correlation Analysis of computer operation skill and students preparedness for computer based assessment.

| Variable | $\bar{x}$ | SD | N | r | $R^2$ |
|---|---|---|---|---|---|
| Computer operation skill | 26.00 | 4.30 | 400 | 0.77 | 0.59 |
| Preparedness for CBA | 26.88 | 4.88 | | | |

$\alpha = 0.05$, $R^2$ = coefficient of determination

**Table 3**: Pearson's Product Moment Correlation Analysis of students' attitude towards computer and their preparedness for computer based assessment.

| Variable | $\bar{x}$ | SD | N | r | $R^2$ |
|---|---|---|---|---|---|
| Attitude Towards Computer | 24.66 | 4.65 | 400 | 0.82 | 0.67 |
| Preparedness for CBA | 26.88 | 4.88 | | | |

$\alpha = 0.05$, $R^2$ = coefficient of determination

**Table 4**: A model summary of the inter-relationship between computer anxiety, operation skills, attitude and students' preparedness for computer based assessment

| Model | R | R Square | Adjusted R Square |
|-------|------|----------|-------------------|
| 1 | 0.89 | 0.79 | 0.78 |

Predictors: computer anxiety, operation skill and attitude.

**Table 5:** Regression Analysis of computer anxiety and students' preparedness for computer based assessment

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|-------|----------------|-----|-------------|---------|------|
| Regression | 4432.277 | 1 | 4432.277 | 346.814 | 0.00 |
| Residual | 5086.433 | 398 | 12.780 | | |
| Total | 9518.710 | 399 | | | |

$\alpha = 0.05$

**Table 6:** Regression Analysis of computer operation skill and students' preparedness for computer based assessment

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|-------|----------------|-----|-------------|--------|------|
| Regression | 5616.239 | 1 | 5616.239 | 572.78 | 0.00 |
| Residual | 3902.471 | 398 | 9.805 | | |
| Total | 9518.710 | 399 | | | |

$\alpha = 0.05$

**Table 7:** Regression Analysis of students' attitude towards computer and students' preparedness for computer based assessment

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 6367.072 | 1 | 6367.072 | 804.056 | 0.00 |
| Residual | 3151.638 | 398 | 7.919 | | |
| Total | 9518.710 | 399 | | | |

α = 0.05

**Table 8:** Regression Analysis of students' attitude towards computer and students' preparedness for computer based assessment

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 7655.755 | 3 | 2551.918 | 542.450 | 0.00 |
| Residual | 1862.955 | 396 | 4.704 | | |
| Total | 9518.710 | 399 | | | |

α = 0.05