

# CYBER-CRIME AND EFFECTIVENESS OF THE USE OF COMPUTER BASED TEST SYSTEM IN NIGERIA COLLEGES OF EDUCATION.

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TERRITORY.

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**ABSTRACT:** The study used a Quasi-experimental design on a population of 200 students drawn from 879 population to investigate the cyber-crime activities among students, and effectiveness of the use of computer-based test system in Nigerian Colleges of education using FCT college of education zuba as case studies. mean score and standard deviation were used for the study while t-test statistic is used to test the research questions and stated hypothesis at 0.05 level of significance. The result of the analysis shows that there is a significant difference in the academic achievement of students when engaged and not engaged in cybercrime, there is no difference in academic performance of both male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime, and that CBT has significant effect on academic outcome Students. It then recommended that the government can work to improve the enforcement of existing laws and increase penalties for cyber criminals to deter them from committing these crimes, that a comprehensive approach that involves investment in cybersecurity infrastructure, training and awareness programs for students and staff, and collaboration between educational institutions and law enforcement agencies to identify and prosecute cybercriminals.

**KEYWORDS:** Cybercrime, Cybercriminal, Computer-Based Test, Examination, Colleges, Education

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## I. INTRODUCTION.

Cybercrime is a growing threat in today's digital age, and its dangers are numerous. Cybercrime is a growing threat in today's digital world, and it can have serious consequences for individuals, businesses, and society as a whole. Some of the dangers of cybercrime include: Financial loss where cybercriminals often target financial institutions and individuals to steal money through fraud, identity theft, or other means. This can result in significant financial losses for victims; Data or Identity theft which involves cybercriminals targeting businesses and individuals to steal sensitive information such as credit card numbers, social security numbers, and other personal information. This information can be used for identity theft, fraud, or other criminal activities. Other forms of cybercrimes are; Malware attacks where software are designed to harm or damage computer systems. Cybercriminals can use malware to gain access to networks and systems, steal data, or disrupt business operations; Cyberstalking and harassment that involves cybercriminals using the internet to stalk, harass, and intimidate individuals. This can lead to emotional distress, anxiety, and even physical harm.

Espionage and terrorism is another Cybercrime that cybercriminals are engaged in espionage or terrorism by hacking into government or corporate systems to steal classified or sensitive information. This can put national security at risk and compromise the safety of individuals. Infrastructure attacks involves cybercriminals targeting critical infrastructure such as power grids, transportation systems, and healthcare networks. This can lead to disruption of services and even cause harm to human life. one other form of cybercrime is the Ransomware attacks where cybercriminals can use ransomware to lock down victims' computer systems and demand payment in exchange for restoring access. These attacks can be highly disruptive and costly, and can even threaten public safety in some cases. Phishing is a type of cybercrime that involves tricking individuals into providing sensitive information, such as passwords or credit card details. Phishing attacks can be particularly effective because they often appear to come from trusted sources. The dangers of cybercrime are significant and can have far-reaching consequences for individuals, businesses, and society as a whole. It is important to take steps to protect yourself and your sensitive data online. Cybercrime can lead to significant financial loss, both for individuals and organizations. Cybercriminals can steal credit card details, personal identification information, and other sensitive financial data, which can then be used to make unauthorized purchases or commit fraud. Cybercriminals can target critical infrastructure, such as power grids and transportation systems, and cause significant damage and disruption. (Adekoya, 2017) This can have a major impact on public safety and national security. Cyberattacks can also damage an individual's or organization's

reputation. This is particularly true in cases where sensitive data, such as personal information or trade secrets, is stolen and made public. Cyberattacks can disrupt business operations, causing downtime and lost productivity. This can lead to financial losses and damage to an organization's reputation. Overall, cybercrime poses a serious threat to individuals, businesses, and society. It is important to take measures to protect yourself and your organization from cyber-attacks. It is important to take steps to protect against cybercrime, such as using strong passwords, keeping software up to date, and avoiding suspicious emails and websites. Within the Nigeria context cybercrime is a growing problem, and the education system is not immune to this threat. There have been several reported cases of cybercrime in the Nigerian education system ranging from hacking into school databases to change grades, to phishing scams targeting students and faculty members. Phishing is a form of online fraud that involves tricking people into giving up their personal information, such as login credentials or credit card numbers. In the education system, phishing scams often target students and faculty members by posing as a legitimate institution or organization, and then asking for personal information. Another common cybercrime in the Nigeria education system is hacking into school databases (Oladitan, 2020). This is often done by students who want to change their grades, but it can also be done by outside hackers who want to steal sensitive information such as student records or financial data.

These cybercrimes can have significant consequences, including loss of sensitive data, financial loss, and damage to the reputation of educational institutions (Kuboni and Ajobo, 2018). One notable incident occurred in 2019, when the website of the Joint Admissions and Matriculation Board (JAMB), which conducts entrance exams for universities in Nigeria, was hacked, and the personal information of over 1.3 million candidates was stolen. This incident raised concerns about the vulnerability of Nigeria's education system to cybercrime. One of the main challenges facing the Nigerian education system in dealing with cybercrime is a lack of awareness and preparedness. Many schools and universities in Nigeria have inadequate cybersecurity measures in place, leaving them vulnerable to cyberattacks. Additionally, students, teachers, and administrators may not be adequately trained in cybersecurity best practices, making them more susceptible to phishing scams and other types of cybercrime. To address these challenges, there is a need for increased awareness and education around cybersecurity in the Nigerian education system. This can include training programs for teachers and administrators, as well as awareness campaigns for students and parents. Additionally, educational institutions should invest in stronger cybersecurity measures, including firewalls, anti-virus software, and regular security audits.

In recent years, the Nigerian government has taken steps to address cyber crimes in the education system. The Cybercrimes (Prohibition, Prevention, Etc.) Act was passed in 2015, which criminalizes a range of cyber activities, including phishing, hacking, and identity theft. However, enforcement of this law has been slow, and cybercrimes in the education system continue to be a problem. One of concern now that is vulnerable to cyber criminality is the Computer-Based Test (CBT) that was recently introduced into the Nigerian education system. CBT is a modern approach to administering examinations using computer technology. In Nigeria, CBT has gained popularity as an innovative and efficient way of conducting examinations. The adoption of CBT in Nigeria's education system has been driven by the need to reduce examination malpractice, improve the quality of education and make the examination process more efficient. CBT has been widely adopted in Nigeria for various examinations, including UTME (Unified Tertiary Matriculation Examination), post-UTME, and recruitment exams by government agencies. The Joint Admissions and Matriculation Board (JAMB) was the first to adopt CBT in Nigeria for the UTME examination in 2013, and the success of this approach has led to its adoption by other examination bodies. CBT is vulnerable to cybersecurity threats such as hacking and data breaches, which can compromise the integrity of exam results. CBT is vulnerable to cybersecurity threats such as hacking and data breaches, which can compromise the integrity of exam results. There are growing concerns in Nigeria about CBT, with various forms of cyber-attacks, including phishing, identity theft, hacking, and online scams. CBT and the education system in Nigeria is not immune to this threat, as cybercriminals can target students and educational institutions to steal sensitive information or cause damage to their networks. However, there is limited recent research work specifically focused on CBT and cybercrime in the Nigerian education system. studies have revealed that cybercrime is a growing concern in the Nigerian education system, and there is a need for increased awareness, education, and training on cyber security best practices to protect against cyber threats. It is important for Nigerian universities and other educational institutions to prioritize cyber security measures and work towards creating a safe and secure online environment for students, staff, and faculty. It is in view of the above that this study is designed to study the effectiveness of CBT system in Nigeria education system more importantly in the colleges of education taking FCT College of Education Zuba as a case study.

**Justification of The Study :** The findings of the study will be of immense benefit to researchers, lecturers, students, curriculum designers, school administrators and education policy makers. The outcome of the study will provide useful information to Lecturers and school administrators on steps to adopt and ways of preventing cybercrimes and in improving student's outcome. Students: The outcome of the study will improve students understanding of CBT and the menace of cybercrimes in the citadels of learning. They will also develop important communication skills that will help to boost their confidence and make them feel relaxed when confronted with CBT. Curriculum designers: The study will help planners to develop procedures and strategies to integrate within the CBT framework into the Nigerian education system properly. It will provide other researchers with some reliable instruments, action procedures, experimental findings as well as references for future research. On final note, the findings of this study is a touch that will serve as pointer to government and policymakers on how to institute policy instrument that will help to curtail the essences of cybercrime in schools and higher institutions, the higher society, Nigerian and the world in general.

**Objectives of the Study**

The general objective of the study is intended to investigate in the impact of cyber-crime on the effectiveness of the use of computer-based test system in Nigeria Colleges of Education using Economics and Business Education Students of FCT College of Education Zuba as case studies.

Specifically, these research objectives will include the following:

- To determine difference in the level of academic outcome of Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.
- To examine the academic outcome of male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.
- To find out the effectiveness of CBT when engaged and not engaged in cybercrime.
- To determine the effect of environmental factors on academic outcome of Economics and Business Education Students when CBT is used to examine them.

**Research Question**

1. What is the level of difference in academic outcome of Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime?
2. What is the level of difference in academic outcome of male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime?
3. What the level of effectiveness of CBT when engaged and not engaged in cybercrime.?
4. Do environmental factors affect academic outcome of Economics and Business Education Students when CBT is used to examine them?

**Hypothesis**

**H<sub>01</sub>:** There is no significant difference in the level of academic outcome of Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.

**H<sub>02</sub>:** There is no significant difference in the level of academic outcome of male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.

**H<sub>03</sub>:** CBT has no significant effect on academic outcome of Economics and Business Education Students of FCT College of Education Zuba whether engaged or not engaged in cybercrime.

**H<sub>04</sub>:** Environmental factors has no significant effect on academic outcome of Economics and Business Education Students when CBT is used to examine them

**II. METHODOLOGY**

Quasi-experimental design is adopted for this study, a pre-test, post-test, as well as non-equivalent group design which involves the use of non-randomized group where the researcher cannot randomly sample and assign subject because intact class were used to administer the treatment.

**Table 1. Format of the Research Design**

<b>Group</b>	<b>Pre-test</b>	<b>T<sub>R</sub></b>	<b>Post-test</b>
EG	O <sub>1</sub>	X	O <sub>2</sub>
CG	O <sub>1</sub>		O <sub>2</sub>

EG --- Experimental Group.                      CG --- Control Group.                      X --- Treatment  
 O<sub>1</sub> --- Pre-test (First observation).                      O<sub>2</sub> – Post-test (Second observation)

The research design will enable the researcher to collect relevant information from the respondents through the use of Economics Achievement Test (EAT).

The population of the study includes all NCE I&II students in all public secondary schools in Department of Economics and Business Education, FCT College of Education, Zuba Abuja. The total number of the population is 879. (Examination and Academic Board, FCT College of Education, Zuba)

Four (4) arms were selected out of the six arms. Fifty (50) students were randomly selected from NCE I and NCE II arms of each Departments, sampling a total of 200 students from the selected Departments. The reason for taking samples from NCE I and II only is that the NCE III students would have been on teaching practice as at the time of conducting the study. Also, the two departments are that both departments has same economics syllabus in the selected courses and, to also create universality of scope as not to restrict findings to department of economics alone.

**Table 2: Distribution of Students from the sampled schools**

Name of Schools	Number of Students		Groups		Total
	Male	Female	EG	CG	
NCE I, Department of Economics	25	25	25	25	50
NCE II, Department of Economics	25	25	25	25	50
NCE I, Department of History	25	25	25	25	50
NCE II, Department of History	25	25	25	25	50
Total	100	100	100	100	200

**Source: Authors’ Computation 2022**

Cluster random sampling, specifically balloting with replacement was used to draw respondents. 50 students (25 males and 25 females) were selected from each of the sample arms using cluster random sampling. “The classes were randomly allotted to experimental and control groups respectively for the research”.

The following are the research instrument used in this study,

- Economics Achievement Test (EAT)
- students not engaged in cybercrime
- students engaged in cybercrime

Economics Achievement Test (EAT) is designed to measure the level of knowledge and proficiency of a student in something that has been learned. The instruments used in this research will be validated by two lecturers’ expert in the department of Economics, University of Abuja, and some lecturers from history department. They will all offer useful advice to enable the researchers elicit the required information and data for the study. A pilot study of the validated instrument will be done outside College of Education Zuba to test the reliability of the instrument. Niger State College of Education, Minna and, Federal College of Education Akwanga will be used for the pilot tests. A test was used at two weeks interval, the result of the test was analysed using Pearson Product Moment Correlation Coefficient statistics. The correlation coefficient will be obtained and used to establish the reliability of the instrument.

The conduct of the main study is as follows for both the first and second semesters. Week One: The researcher visits the departments for introduction, and to take permission to use the departments, samples the classes and students to be involved in the study. A pre-test will then be administered to all the students involved, both the control and experimental group. Week Two -four: Students will be divided into two groups (experimental group and control group), in each school. Introducing cybercrime to the experimental while control group for were not introduced to cybercrime. At the end of the second week, four (4) lessons must have been taught in each class.

Week five and six: Post-test was administered on all the students involved in the study, likewise the last day of the week to determine their retention of the study. Marks obtained from the tests were added together to form the data for the study, and to determine the average. The data needed for this study was gathered using Economics Achievement Test (EAT). The EAT is developed by the researcher using minimum standardized tests of 2010 to 2020 as provided in the NCCE Minimum Standard. The EAT items are developed by the researcher based on the contents of the topics (Theory of demand and Elasticity of Demand).

To analyse the data, mean score and standard deviation were used while t-test statistic was used to test the stated hypothesis at 0.05 level of significance.

**A priori**

It is expected that there should be a wide variation in academic performances of students who engages in cyber-crime and students who does not engages in cybercrime. While the above priori is established, its demonstrative effects and, results are established and stand as bases of generalisation.

**Result**

**Research Question 1:** What is the level of difference in academic outcome of Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime?

**Table 3: Shows the mean achievement score in economics for control and experimental.**

Group	No. of Students	Mean (X)	SD	Mean Difference
Exp.	200	52.7	22.37	13
Control	200	39.7	19.53	

Source: Author’s Computation, 2023

The table below shows the mean achievement score of both the control group and experimental group. Table shows that the mean performance in economics achievement score for the control group (conventional) is 39.7 with a standard deviation of 19.53 while the mean achievement score for experimental group (peer tutoring) is 52.7 with the standard deviation of 22.37. The mean difference of the score is 13 which is very high, this implies that students that engages in cybercrime do excel more in academic achievement than those who does not engages in such act.

**Research Question 2:** What is the level of difference in academic outcome of male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime?

**Table 4: Shows mean score performance of gender engages in cybercrime**

Group	No. of Students	Mean (X)	SD	Mean Difference
Male.	100	64.3	22.17	1
Female	100	63.3	23.09	

Source: Author’s Computation, 2023

The above table shows that the mean performance of gender of students engages in cybercrime, the male students gain the mean score of 64.3 with the standard deviation 22.97 as compare to the female students with the mean score of 63.3 and standard deviation of 23.09, the mean difference of the groups is 1 which is very large low which implies that genders differences does not affect the academic achievement of that students engages in cybercrime.

**Research Question 3:** What the level of effectiveness of CBT when engaged and not engaged in cybercrime?

**Table 5: Shows the difference level of effectiveness of CBT when engaged and not engaged in cybercrime.**

Group	No. of Students	Mean (X)	SD	Mean Difference
Exp.	200	63.5	23.51	23
Control	200	40.5	18.25	

Source: Author’s Computation, 2023

Table 5 shows that the mean the level of effectiveness of CBT with engagement in cybercrime and not engaged in cybercrime. The students who engaged in cybercrime are with a mean score of 63.5 with standard deviation of 23.51, not engaged in cybercrime with the mean score of 40.5 and standard deviation of 18.25, a mean score difference of 23 which implies that engagement in cybercrime improve level of effectiveness of CBT.

**Research Question 4:** Does environmental factors affect academic outcome of Economics and Business Education Students when CBT is used to examine them?

**Table 6:** Shows the mean scores of effect of environmental factors academic outcome of Economics and Business Education Students when CBT is used to examine them

Group	No. of Students	Mean ( X )	SD	Mean Difference
Exp	200	64.6	21.78	26.5
Control	200	38.1	24.03	

Source: Author's Computation, 2023

Table 6 above shows that the mean score of effect of environmental factors academic outcome of Economics and Business Education Students when CBT is used to examine them. The mean score for those engaged in cybercrime is 63.3 with a standard deviation of 23.26 while the mean score of for those not engaged in cybercrime 63.9 with a standard deviation of 23.36. The mean difference for those engaged and not engaged in cybercrime is 0.6 which is very low. This means that environmental factors do really affect academic outcome of Economics and Business Education Students when CBT is used to examine them.

### Test of Hypothesis

$H_{01}$ : There is no significant difference in the level of academic outcome of Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.

**Table 7: T-test result of students when engaged and not engaged in cybercrime.**

Group	No. of Students	Mean ( X )	SD	DF	t-cal	t-crit	Remark
Exp.	200	52.7	22.37	198	4.39	1.96	Reject $H_{01}$
Control	200	39.7					

Source: Author's Computation, 2023

The result was subjected to t-test at 0.05 level of significance. It show that the value of t-cal = 4.39 is greater than the value of t-critical = 1.96. Therefore, this implies that there is a significant difference in the academic achievement of students when engaged and not engaged in cybercrime.

### Hypothesis II

$H_{02}$ : There is no significant difference in the level of academic outcome of male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.

**Table 8: t-test result on level of academic outcome of male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.**

Group	No. of Students	Mean ( X )	SD	Df	t-cal	t-crit	Remark
Male	100	64.3	22.77	98	0.22	1.96	Not Sig. Accept $H_{02}$
Female	100	63.3	23.09				

Source: Author's Computation, 2023

From table 8 above, the calculated value of t = 0.22 is less than the critical value of t = 1.96 at 0.05 level of significance. Therefore, the null hypothesis was accepted. This implies that there is no difference in academic performance of both male and female Economics and Business Education Students of FCT College of Education Zuba when engaged and not engaged in cybercrime.

### Hypothesis III

$H_{03}$ : CBT has no significant effect on academic outcome of Economics and Business Education Students of FCT College of Education Zuba..

**Table 9: T-test result of effect CBT on academic outcome of Economics and Business Education Students of FCT College of Education Zuba.**

Group	No. of Students	Mean ( X )	SD	Df	t-cal	t-crit	Remark
Exp.	200	63.05	23.51	198	7.58	1.96	Sig. Reject H <sub>03</sub>
Control	200	40.5	18.25				

**Source: Field Survey, 2023**

From the table 9 above shows the calculated value of t-cal = 7.58, which is greater than the critical t value of 1.96 at 0.05 level of significance. Therefore, the null hypothesis was rejected. It is then clear that CBT has significant effect on academic outcome of Economics and Business Education Students of FCT College of Education Zuba.

**Hypothesis IV**

H<sub>04</sub>: Environmental factors has no significant effect on academic outcome of Economics and Business Education Students when CBT is used to examine them.

**Table 10. T-test result of effect of Environmental factors on academic outcome of Economics and Business Education Students when CBT is used to examine them.**

Group	No. of Students	Mean(X)	SD	DF	t-cal	t-crit	Remark
Exp.	100	64.6	21.78	198	8.18	1.96	Sig. Reject H <sub>03</sub>
Control	100	38.1	24.03				

**Source: Author’s Computation, 2023**

From table 10 above the calculated value of t = 0.129 is less than the critical value of t =1.96 at 0.05 level of significance. This led to acceptance of the null hypothesis which state that Environmental factors has no significant effect on academic outcome of Economics and Business Education Students when CBT is used to examine them.

**III. DISCUSSION.**

The response to Research Question 2 to test the mean performance of gender of students taught peer tutoring teaching strategy showed that male students gain the mean score of 64.3 with the standard deviation 22.97 as compare to the female students with the mean score of 63.3 and standard deviation of 23.09. The mean difference of the groups is 1 which is very large low. in testing the hypothesis the result exhibited shows the t -calculated value of 0.22 as less than the t-critical value of 1.96 at 0.05 level of significance which implies that genders differences does not affect the academic achievement of students taught with peer tutoring teaching strategy. it means that either involving om not involving in cybercrimes there will be no difference between academic outcome of students based on gender affiliates. this finding is in line with .....

In the research Question 3 result has it that a mean score difference of 23. Likewise, the rejection of the null hypothesis III because the t-calculated value of 7.58 is greater than the t -critical value of 1.96 at 0.05 level of significance stipulates that has significant effect on academic outcome of Students. This means that involvement in cybercrime will significantly affect academic outcome of Students. the finding also confirms the findings of .....

The mean difference of the male and female student of 0.6 which is very low in research question four which while the result of the tested hypothesis IV HAS the calculated t value to be 0.129 which is less than the t-critical value of 1.96 at 0.05 level of significance. This led to acceptance of the null hypothesis IV. By implication, the result that that Environmental factors has no significant effect on academic outcome of Economics and Business Education Students when CBT is used to examine them.

**Summary:** In conclusion, the use of CBT in the Nigerian education system has its benefits and challenges. However, with proper planning and implementation, CBT can improve the efficiency, accuracy, and security of exams, ultimately enhancing the quality of education in Nigeria.

**Recommendation**

1. To prevent cybercrimes in the Nigeria education system, schools and universities can take several steps, such as implementing strong passwords and multi-factor authentication systems, providing training for faculty and students on how to identify and avoid phishing scams, and regularly updating their security systems to prevent hacking and other cyber-attacks.

2. Additionally, the government can work to improve the enforcement of existing laws and increase penalties for cyber criminals to deter them from committing these crimes.
3. Nigeria's education system requires a comprehensive approach that involves investment in cybersecurity infrastructure, training and awareness programs for students and staff, and collaboration between educational institutions and law enforcement agencies to identify and prosecute cybercriminals.
4. Additionally, educational institutions in Nigeria are encouraged to develop and implement cybersecurity policies and educate their students and staff on the best cybersecurity practices.

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#### **AUTHOR'S CONTRIBUTION**

The sole author carried out the sponsored research. Designed the methodology, analysed and interpreted the results and, prepared the manuscript.