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CLOSED-CIRCUIT TELEVISION TECHNOLOGY FOR PREVENTING EXAMINATION MALPRACTICES

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ABSTRACT

This study examines Closed Circuit Television CCTV systems as part of a series of security infrastructures intended to prevent or detect examination malpractices in tertiary institutions. A structured questionnaire was designed and administered to Admiralty University of Nigeria students. Four research questions with multiple-item constructs were used to obtain the respondents' perceptions. A random online sampling technique was adopted to get the needed information on a five-point Likert scale. A 10-item questionnaire, with other questions on demographics, produced a high-reliability coefficient of 0.941. Exploratory analysis of respondents' perceptions indicated an agreement, with a statistical mean greater than 3, that the presence of CCTV will deter people from being involved in examination malpractices. This study provides statistical evidence that CCTV has great potential to improve the quality of supervision and student conduct during examinations. It is recommended that tertiary institutions should deplore CCTV cameras in examination venues for effective monitoring and to aid post-examination investigations. Future studies may investigate the perceptions of supervisors and management of tertiary institutions concerning CCTV deployment.

Keywords: Examination malpractice; CCTV; Closed Circuit Television; tertiary institution

1. INTRODUCTION

Education can either be formal or informal. Informal learning can take place in several settings, including markets, village squares, community centres, and after-school programs. Informal learning may not strictly be guided by a set curriculum and may arise unintentionally in connection with specific events or as a result of shifting practical needs. On the other hand, formal education takes place in a controlled setting with the specific goal of instructing students. It could be in a classroom setting with several students being taught by qualified/certified teacher(s). At the end of a learning period, the knowledge gained is evaluated and results are given as grades. In formal education, the desire for good grades has been prioritized by students more than actual learning. [1] opined that this may be due to pressure from parents, a decline in reading culture, as well as the availability and abuse of technology.

Examining students gives the trainer feedback on their degree of knowledge acquisition and gauges how well they retain that knowledge. This feedback mechanism is distorted by any wrongdoing or irregularity, which produces a misleading learning consequence. The violation of rules set up to ensure credible feedback is known as examination malpractice. This phenomenon is mostly carried out by examination candidates, who give the trainer feedback on their degree

of knowledge acquisition and their parents or sponsors, schools, parent-teacher associations, examination organizing bodies, and even rules enforcement agents, such as invigilators, policemen, security personnel, and proxy examination writers [2].

This study is focused on the use of CCTV in examination malpractice detection, prevention and post-offence investigation in universities, using Admiralty University of Nigeria (ADUN) as a case study. The university was selected because its students are from across Nigeria. The main limitation encountered is the potential fear of students that the result of this research may be adopted and implemented by the school authority. Some students who refused to fill out the form expressed fears that CCTV would do more harm than good because it would lead to mass failure by students. This could indicate an over-reliance on examination misconduct to pass exams. Another limitation was the passive interest of academic staff in responding to the questionnaire. This may be due to the significant workload on the staff during the survey period. There may also be staff indifference to the approved method of supervising examinations. A future study may investigate the perceptions of staff on the use of CCTV during examinations. However, these limitations did not reduce the quality of the work, because sufficient sample from the students was achieved...

2. THEORETICAL FRAMEWORK

Generally, the principal objective of examination malpractice is to enable its perpetrator(s) to achieve examination success and obtain higher grades without the corresponding knowledge, talent, or ability related to the course of study or program. In the course of this action, the authorities concerned may directly or indirectly cooperate with or allow examination malpractice to take place. Cheating in examinations is now being perceived as a norm partly due to the approach to its prevention and punishment of offenders. This has led to the escalation of examination misconduct in our school system at a scale that would result in unavoidable repercussions in future. There is an urgent need to curtail this ugly trend.

The use of Closed-circuit television (CCTV) to monitor examinations has been proposed [1][3]. This technology provides additional supervision capability by enabling real-time remote monitoring of an examination [4]. While CCTV plays a significant role in providing security intelligence, it has not been extensively adopted for preventing cheating during examinations in Nigerian universities. The apathy to study among young people may have resulted in some students depending on cheating during examinations to pass their courses. This is a serious problem which ranges from lack of self-confidence, lack of knowledge of relevant concepts, and the tendency to be a nuisance to the society in future. Students' awareness of the almost impossible chance of malpractices during examinations, may compel them to study. Thereby, knowledge is gained and self-confidence is improved.

Generally, this study aims to find out the perception of the academic community about the use of CCTV surveillance cameras in preventing examination malpractices. Specifically, the study seeks to ascertain the effectiveness of CCTV technology in preventing/detecting misconduct during examinations. It also provides statistical data on the perceptions of students about the use of CCTV to stop examination malpractices.

Therefore, the following research questions were formulated to guide this study.

Q1: Does the presence of CCTV increase focus and confidence in the examination process?

Q2: Will CCTV improve the invigilator's confidence to act professionally?

Q3: Is CCTV a deterrent against examination malpractice?

Q4: Does CCTV help in exposing examination malpractice?

3. LITERATURE REVIEW

Examination malpractice can be in various forms including impersonation, inscription on paper or parts of the body, copying from one another, bribery and/or intimidation of supervisors [2]. Also, [5] opines that adequate use of surveillance will serve as deterrence from examination malpractices. Studies have recommended ways to reduce examination misconduct, including enactment and implementation of laws, retraining of teachers, effective continuous assessment, as well as using CCTV to monitor examination venues.

3.1 Related works

The study by [1] addressed the pervasive issue

of examination malpractice in Nigeria, highlighting its causes, methods, and potential solutions through e-supervision. They identified factors such as a lack of reading culture, laziness, and overloaded syllabi as contributors to examination malpractice. The research further suggested that improving student reading habits, and teaching methods, and implementing technology like CCTV can help mitigate these issues, emphasizing the need for collective efforts to uphold examination integrity.

Another investigation by [6] revealed that many public tertiary institutions in Rivers State have adopted security measures like CCTV cameras, biometric systems, and signal jamming devices to combat exam cheating among students in advanced studies. The research examined how electronic invigilation could limit examination misconduct among postgraduate students in some public tertiary institutions in Rivers State. Of 400 students selected through multi-stage sampling techniques, 365 were completed and returned for analysis. The survey tool was validated by three experts and achieved a high-reliability score of 0.83 using the Cronbach Alpha Method. The study addressed research questions using mean and standard deviation, while testing formulated hypotheses with the z-test.

To simplify the complex and expensive traditional examination process, [3] proposed a framework for automating traditional invigilation of examination using biometric authentication and 360-degree CCTV surveillance. The method aims to eliminate student malpractices as well as reduce the number of invigilators in examination venues. The proposed system uses a biometric reader for authentication, allowing only registered students to enter the exam hall while an invigilator monitors from a distance through live CCTV feeds and communicates via microphones. The proposed model is reported to be cost-effective, and efficient, and enhances the integrity of an examination process.

An automated cheating detection system was developed by [7] using video surveillance to observe the behaviour of students during examinations. The system considered head movements, eye movements and hand movements to detect examination malpractice. Video input in real-time is captured, analysed, and classified as normal or abnormal behaviours. Misconduct would trigger an alarm to attract the proctor. In [8] a tracking application was developed that could limit misconduct during an online English academic writing examination. It was reported that this method is more cost-effective than traditional proctoring and it reflects the knowledge gained by the student.

A study by [9] have recommended combining artificial intelligence (AI), real-time CCTV coverage, and data analytics for an enhanced monitoring of examinations. Since AI systems can analyse human movements, it makes it suitable to detect unacceptable behaviour within the examination premises.

3.2 Research Gap and Problem Statement

The consequences of allowing examination malpractices to foster is unimaginable. It could lead to the collapse of society and systems. Previous studies made a case for the introduction of CCTV in examination processes in different cities and countries. There is little mention of students' perception concerning having CCTV in examination venues. Also, in a public university such as ADUN – the case study – where the population comprises of students from different parts of the country, it is suitable to understand how this technology will be received.

This study focuses on the perceptions of students in a tertiary institution. It provides statistical data to aid policy makers as evidence of the need for CCTV in monitoring examinations. Specific acts of misconduct such unauthorized movements, using smart devices, and post-examination investigation were all examine.

3.3 Methodology and Research design

This section presents the methods and procedures that were applied in this study. It describes the research design, area of the study, population of study, sample size and sampling technique, and method of data collection. The validation of the instrument, reliability of the instrument, and method of data analysis are also described in this section.

The study made use of a cross-sectional survey research design. Researchers collect detailed descriptions of existing phenomena to use the collected data to justify current conditions and practice or to make better plans for improving phenomena. Surveys are generally done to collect three kinds of information. First, data concerning existing conditions. Secondly, a comparison of the existing status of a situation and the required standard. Finally, data for improving existing conditions.

The cross-sectional survey design enables the researcher to collect his data at a particular point or period from a selected sample. This method was selected because it enabled the researcher to use a sample drawn to represent the various elements of the population under study. The item construct used in this study was derived from published works and interviews with members of the ADUN university community. This was necessary to measure responses that is peculiar to a Nigerian university.

3.4 Population and Sample

Admiralty University of Nigeria (ADUN) is a tertiary institution located in Ibusa town of Delta State, Nigeria. Focus was mainly on students who have been on campus for at least one semester and participated in an examination. As at the time of data collection, the student population from all departments in the school was 652, with male gender at 472 and 180 females.

The sampling technique applied in selecting the sample for the study is simple random sampling. This type of sampling involves a random selection of respondents from a larger sample or population, giving all individuals in the sample an equal chance to be chosen. In simple random sampling, individuals are chosen at random and not more than once to prevent biases that will negatively affect the validity of the result of the experiment. Therefore, an online survey using a Google form questionnaire and the link was shared with both students and staff. Out of 208 responses, 202 from students were accepted and 6 from staff were rejected. The responses from staff were rejected because it was insignificant compared to the number of academic staff in the university. The reason for low staff response may be due to the request for only academic staff who actively participate as examination proctors.

3.5 Method of Data Collection

A self–developed online survey questionnaire was designed with 10 items to measure students' perception of CCTV in preventing examination malpractices. In addition, 5 items were used to obtain the demographics of the students and a declaration of participation in examination malpractice. Notably, the respondents were assured that the instrument would be treated confidentially; hence names or private information was not requested.

The questionnaire was divided into two (2) sections. Section A contained demographic information about the respondent such as their gender, age range, staff/student, academic level, and declaration if they have been involved in examination malpractice. In Section B, a five-point Likert scale, similar to [10], was applied to obtain the respondents' position as regards each item. The five-point Likert scale was used for this study over the "Yes/No" and "four-point" Likert scale because the student is expected to respond to a set of close-ended questions/statements but with support for uncertainty. In this case, a respondent chooses from options such as 'Strongly Agree', 'Agree', 'Undecided/Neutral', 'Disagree', and 'Strongly Disagree'. Scores on this scale ranged from 1 ('Strongly Disagree') to 5 ('Strongly Agree') and the respondents checked the box that best reflected their view on the items stated.

3.6 Validity and Reliability of the Instrument

The validity of an instrument refers to the extent to which the questionnaire measures what it claims to measure [10]. Validity means the extent to which the scores and the conclusions based on these scores can be used for the intended purpose of the questionnaire. In other words, it is the degree to which results obtained from the analysis of the data represent the phenomena under the study. For this research, face validity and content validity of the instruments were carried out by two experts in the field of computer science for validation. Their contributions were considered in restructuring the questionnaire.

The test-retest method was used to ensure the reliability of the instrument. The instrument was trial-tested in the sample with few students, and their responses were collected. After about two months of the administration, the same test items were re-administered to the same group of respondents. Thereafter, the final questionnaire was administered to all students after the semester's examination. Cronbach's Alpha method was used to determine the reliability coefficient of the instrument which was established as 0.941, indicating very high reliability. The generally agreed-upon lower limit for Cronbach's Alpha is 0.7 [11], although it may decrease to 0.6 in exploratory research [11][12]. It was suggested that the score for each construct should be greater than 0.6 for it to be reliable [13]. Thus, a score of 0.6 and above was accepted in this study. The instrument used can, therefore, be said to be suitable for measuring the perception of students accepting CCTV as a technology that could prevent examination malpractices

4. DATA ANALYSIS

The analysis of data from the questionnaire was quantitative. Descriptive statistical method of analysis was employed in this analysis. The research questions were answered and summarized, while each

questionnaire item was analysed with the aid of a frequency percentage and/or charts. To answer the research questions, the decision was based on the instrument scale mean of 50%. Any item with a mean response above 50% was taken as "agreed" while any within 50% and below was considered as "disagreed". The hypotheses were tested at a significant level of 0.05. All analyses were computed using the International Business Machine Statistical Packages for the Social Sciences (IBM SPSS) version 27.

4.1 Demographic Analysis

Out of the 202 respondents, 153 (75.7%) of them were males and 49(24.3%) were females, as shown in Figure 1. This is a reflective estimate of the gender balance in the university as most students in ADUN are males. Hence, the selected sample used in this study is an adequate representation of the global population of ADUN concerning gender.

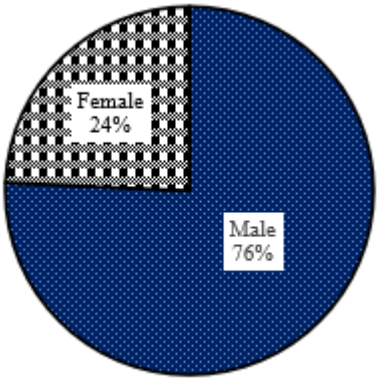

Figure 1: Gender of respondents

The age of the respondents ranged from 18 to 44 years as shown in Table 1. Most of the respondents – 58.9% – were aged between 18 and 29 years, while 37.1% of respondents were less than 18 years. Marginally, 2.5% were above 30 years and 1.5% were between 19 and 29 years. With none of the respondents being above 44 years of age, this indicates that the respondents to this survey are youth in their prime. It is expected that people in this age group are active and may want to consider any means possible to advance their studies/careers. So, their response is very relevant in determining the perceptions of students about the use of CCTV to prevent exam malpractices.

Table 1: Age (in years) of respondents

Age Range	N	%
18 – 29	119	58.9%
less than 18	75	37.1%
30 – 44	5	2.5%
19 – 29	3	1.5%

Frequency analysis of the academic status of respondents showed that 63.9% of the respondents were in the 100 level and 18.8% were in the 300 level, accounting for 82.7% of total respondents. As shown in Table 2, respondents at the 400 and 200 levels were 12.4% and 5.0% respectively. It is worthy of note that at the time of administering this instrument, there was an incremental surge in admission which is responsible for more 100 level respondents. Nevertheless, all participants had witnessed at least one examination in the institution.

Table 2: Academic Level of Respondents

Level	**N**	**%**
100	129	63.9%
300	38	18.8%
400	25	12.4%
200	10	5.0%

4.2 Descriptive Analysis

To analyse the past participation of respondents in examination malpractices, a cross-tabulation method was applied. Figure 2 data visualisation shows that 19.3% of respondents have either assisted or directly gotten involved in examination malpractice. However, 80.7% denied ever been involved in the act. With a clear majority of respondents who have never aided or been involved in examination malpractice, it is expected that an unbiased perception will be expressed about the use of CCTV to prevent examination misconduct.

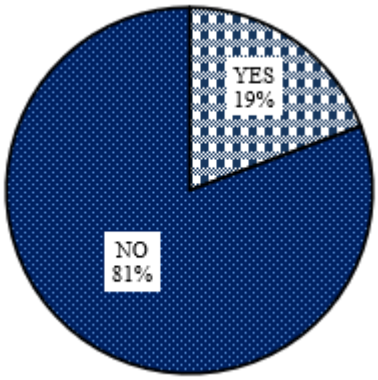

Figure 2: Involvement in examination malpractices

There are four research questions the data will be used to answer. Multiple constructs were used to obtain the perception of respondents about the use of

CCTV to prevent examination malpractices. The statistical mean for each construct is calculated to determine the perception of respondents for that question. Thereafter, the average of all the mean values for the various constructs is used to make decisions if the research questions are answered as "YES" or "NO". For example, from Table 3, Q1 has three constructs with their mean as shown. The decision is "YES" if the average of the three means is greater than 3.00, and "NO" if it is lesser.

Table 3: Answers to research questions

Code	Research Questions	Item Construct	Mean	Decision (Mean Average)
QI	Does the presence of CCTV increase focus and confidence in the examination process?	The presence of CCTV will create awareness that everyone is being watched	3.69	3.45 YES
		The presence of CCTV will prevent distractions from other students during examinations	3.05	
		Students will be afraid to swap seats with others	3.60	
Q2	Will CCTV improve invigilator's confidence to act professionally ?	The presence of CCTV will prevent invigilators from assisting students	3.37	3.48 YES
		It will deter students from assaulting invigilators/supervisors during an examination	3.59	
Q3	Is CCTV a deterrent against examination malpractice?	It will deter students from going into the examination hall with implicating written materials (e.g. *expo*, *bomb* e.t.c.)	3.27	3.22 YES
		It will deter students from smuggling in digital devices such as smartphones and wristwatches	3.32	
		The presence of CCTV will discourage and deter students from talking/whispering during an examination	3.08	
Q4	Does CCTV help in exposing examination malpractice?	CCTV footage/videos will provide evidence during the investigation of an examination malpractice	3.75	3.40 YES
		It will prevent impersonation i.e students paying someone else to write their examination	3.05	

5. DISCUSSION ON THE RESULTS

5.1: Does the presence of CCTV increase focus and confidence in the examination process?

A mean response of 3.69 showed agreement that CCTV would create awareness that the examination is being monitored, thereby increasing the credibility of the process. Similarly, a mean response of 3.05 slightly agrees that distractions will be minimized while students' focus will improve. Also, respondents agreed that movements around the examination hall can make other students lose focus. Unapproved seat changes by students are regarded as misconduct, but a mean response of 3.06 indicates that students will be afraid to commit such offences in the presence of CCTV. Cumulatively, the average of these mean values resulted in 3.45. This indicates an agreement that the presence of CCTV technology when deployed in examination

venues will enhance students' focus and confidence in the examination process.

5.2: Will CCTV improve the invigilator's confidence to act professionally?

There have been reported cases where invigilators assist students in committing examination malpractice, which is unprofessional conduct. A mean of 3.37 implies that respondents believe that the installation of CCTV in examination halls will reduce such incidences. Furthermore, a 3.59 mean implies that some students who threaten supervisors and sometimes assault them will be deterred. Hence, with a mean average of 3.48, it is agreed that CCTV will improve invigilators' confidence to act professionally in an examination venue without fear or favour.

5.3: Is CCTV a deterrent against examination malpractice?

Respondents agree (average mean = 3.22) that the presence of CCTV will serve as a deterrent against those who might want to be involved in examination malpractice. It will deter students from entering the hall with unapproved materials and digital devices to aid them in cheating. When students and proctors are aware of the presence of CCTV in the examination hall, talking/whispering will be curbed.

5.4: Does CCTV help in the detection of examination malpractice?

Sometimes, when examination malpractice is reported, the accused would mostly deny it. There is also the possibility of false accusations. This makes it a challenge to determine if the student committed a punishable offence. This gap can be covered with the presence of CCTV in examination venues. Respondents with a mean of 3.75 affirmed that the recorded CCTV footage would provide reliable evidence to establish malpractice or otherwise. Similarly, a mean response of 3.05 shows that CCTV may prevent impersonation – a situation whereby someone else sits for an examination for another. If the impersonator is not caught at that moment, CCTV footage analysis will help detect the fraud. A cumulative mean average of 3.40 implies that CCTV technology can be deployed to expose examination misconduct.

6. ETHICAL CONSIDERATIONS

Despite the perceptions of students' acceptability, implementations should consider ethical requirements. It is appropriate for the students to be aware of the presence of CCTV and deploy the technology with fairness and equality according to necessity [14][15].

7. CONCLUSION

The discourse so far reveals that the menace of examination malpractices is growing rapidly in tertiary institutions. The use of CCTV technology for monitoring activities in the examination hall is gaining prominence because of its benefits which include providing evidence for investigative reasons and also serving as a deterrence to intending offenders since they are aware that they are being watched.

Based on the findings of this study, it is concluded that the place of CCTV technology in ensuring crime-free examination cannot be overemphasized. This means that the use of CCTV surveillance in place of human invigilation or in addition to human invigilation could go a long way in assisting universities to nib the issue of examination malpractices in the bud. Results from this study suggest that where CCTV technology is adopted during the conduct of examination, students' willingness to cheat will be reduced drastically and confidence in the examination process will be improved.

It is recommended that tertiary institutions should invest in and adopt the use of CCTV technology to monitor their examinations. Future studies may consider automating the use of CCTV systems for remote monitoring examinations. Furthermore, the scope of a similar study could be expanded to cover several universities across Nigeria.

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