

**WIRELESS CLOSED-CIRCUIT TELEVISION
FOR COMPUTER LABORATORY**

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Chapter I

INTRODUCTION

Project Context

In industrial plants, CCTV equipment may be used to observe parts of a process from a central control room, for example when the environment is not suitable for humans. CCTV systems may operate continuously or only as required to monitor a particular event. A more advanced form of CCTV, utilizing digital video recorders (DVRs), provides recording for possibly many years, with a variety of quality and performance options and extra features (such as motion detection and email alerts). More recently, decentralized IP cameras, perhaps equipped with megapixel sensors, support recording directly to network-attached storage devices, or internal flash for completely stand-alone operation.

Closed-circuit television (CCTV), also known as video surveillance, this is according to Kumar, et al. (2015) it is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. As mentioned by Dempsey, et al. (2008) it differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint (P2MP), or mesh wired or wireless links. Though almost all video cameras fit this definition, the term is most often applied to those used for surveillance in areas that may need monitoring such as banks, stores, and other areas where security is needed. Though Video telephony is seldom called 'CCTV' one exception is the use of video in distance education, where it is an important tool.



According to Hung, et al.(2005) that surveillance of the public using CCTV is common in many areas around the world. In recent years, the use of body worn video cameras has been introduced as a new form of surveillance, often used in law enforcement, with cameras located on a police officer's chest or head. Video surveillance has generated significant debate about balancing its use with individuals' right to privacy even when in public.

This study would give way for the ISPSC Administration to realize the need of acquiring and establishment of CCTV with IP Camera capability where cameras can be accessed through the Internet even wherever you are in order to monitor activities while administrators and employees of ISPSC are outside the campus. This mechanism is only focused in the Computer Laboratory Room of ISPSC in such way to minimize theft and other unwanted activities inside the computer laboratory.

Purpose and Description

The purpose of this project is to assist in the tracking and monitoring of the various activities of computer laboratory users. With the help of CCTV that can be accessed through the internet, computer laboratory staff members no longer have to closely monitor each and every user within the premises. This eliminates one-one-one overseeing of suspicious activity that can be detected. Wireless Closed-Circuit Television for computer laboratory (ICS) can be used to manage of monitoring facility security, crime, and illegal activities. This study, can help the following:

Laboratory Management. It will be a great help in manage facility and easy monitoring.



Instructors. It will help the instructors in easily trace the student who make illegal activities past activities.

Proponents. The proponents can apply the knowledge and skills They learned. It also enhances their skills, ideas and knowledge on analyze and implementing ideas for the good of the college.

For Future Researchers. The result of this study will serve as their guide and reference in developing related projects.

Objectives of the Project

The main objective of this study is to design and establish a “Wireless Monitoring Facility of Computer Laboratory (ICS)”, the monitoring faculty to provide easier way of management and monitoring of any unwanted activities in the computer laboratory room. Specifically, it sought to answer the following:

1. To Determine the current system in monitoring management in the CCS Computer Laboratory;
2. Design and establish a Wireless Closed-Circuit Television for the ICS Computer Laboratory.
3. To Test the functionality of the Wireless Closed-Circuit Television for the ICS Computer Laboratory.

Scope and Limitation

The proposed installation of wireless CCTV cameras is intended to cover the entire of the computer laboratory. In general, the focus of this study was directed towards the design of a Wireless Monitoring Facility of Laboratory can be used for the monitoring the number of students or



anybody entering and leaving the laboratory room. Looking at the current situation at the laboratory room has no capability to monitor the facility that is why the aim of this project is to establish security cameras through that can be accessed through the internet can be controlled from other location or building allowing the user to observe activity around a facility. With the help of wireless monitoring installed at the computer laboratory of ICS, it can now record activities during the operating hours of the computer laboratory. It is also recommended that video footage beyond the operating hours of the computer laboratory be also recorded to maintain a record of evidence in case of theft or other crime.

This project is limited to the installation of wireless cameras only in the computer laboratory which will not include the whole Santa Maria Campus laboratory rooms. Specifically, this study is delimited for ICS Laboratory use. It is designed to create, access the activity at the Laboratory of the Institute of Computing Studies.



Chapter II

REVIEW OF LITERATURE

According to the Public Area CCTV and Crime Prevention (2014) a systematic review by researchers from Northeastern University and University of Cambridge used meta-analytic techniques to pool the average effect of CCTV on crime across 41 different studies. The results indicated that: a) CCTV caused a significant reduction of crime by on average 16%; b) the largest effects of CCTV were found in car parks, where cameras reduced crime by on average 51%; c) CCTV schemes in other public settings had small and non-statistically significant effects on crime: 7% reduction in city and town centers and 23% reduction in public transport settings. CCTV systems in the United Kingdom accounted for the majority of the decrease; the drop in other areas was insignificant. The studies included in the meta-analysis used quasi-experimental evaluation designs that involve before-and-after measures of crime in experimental and control areas. However, several researchers have pointed to methodological problems associated with this research literature. First, researchers have argued that the British car park studies included in the meta-analysis cannot accurately control for the fact that CCTV was introduced simultaneously with a range of other security-related measures. Some have noted that, in many of the recent studies relative to CCTV, there may be issues with selection bias since the introduction of CCTV was potentially endogenous to previous crime trends. In particular, the estimated effects may be biased if CCTV is introduced in response to crime trends.



It has been argued that problems of selection bias and indigeneity can be addressed by stronger research designs such as randomized controlled trials and natural experiments. A 2017 review published in Journal of Scandinavian Studies in Criminology and Crime Prevention compiles seven studies that use such research designs. The studies included in the review found that CCTV reduced crime by 24-28% in public streets and urban subway stations. It also found that CCTV could decrease unruly behavior in football stadiums and theft in supermarkets/mass merchant stores. However, there was no evidence of CCTV having desirable effects in parking facilities or suburban subway stations. Furthermore, the review indicates that CCTV is more effective in preventing property crimes than in violent crimes. Another question in the effectiveness of CCTV for policing is around uptime of the system; in 2013 City of Philadelphia Auditor found that the \$15M system was operational only 32% of the time. There is still much research to be done to determine the effectiveness of CCTV cameras on crime prevention before any conclusions can be drawn.



Chapter III

METHODOLOGY

According to Wikipedia, The PDCA / PDSA cycle is a continuous loop of planning, doing, checking (or studying), and acting. It provides a simple and effective approach for solving problems and managing change, and it's useful for testing improvement measures on a small scale before updating procedures and working methods.

As mentioned by Deming used the concept of Plan-Do-Study-Act (PDSA). He found that the focus on Check is more about the implementation of a change. Deming's focus was on predicting the results of an improvement effort, studying the actual results, and comparing them to possibly revise the theory. He stressed that the need to develop new knowledge, from learning, is always guided by a theory.

PDCA / PDSA is an iterative, four-stage approach for continually improving processes, products or services, and for resolving problems. It involves systematically testing possible solutions, assessing the results, and implementing the ones that are shown to work.

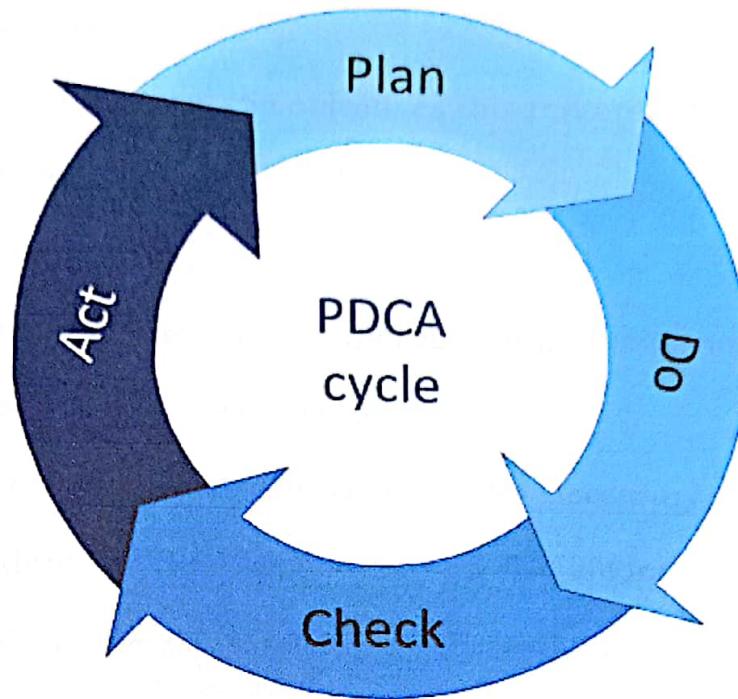


Figure1. PDCA Cycle

Plan. In This Stage the proponents planned to design a “Wireless Monitoring Facility of Computer Laboratory (ICS). Relevant information was gathered through interview, direct observation. The total information needs were arranged and analyzed to come up to the project

Do. Test and review the changes of study. Take an action based on what you have learned in the study steps.

Check. Review and test, analyze the results and identify what you learned. If it did not work start again the plan.

Act. Gathered information, were carefully analyzed during this plan in order to find out how the wireless monitoring (CCTV) operates and how it can process the data through smartphone.



Data Gathering Procedure

To better understand the objectives this research, the following techniques employed:

Instrumentation

The researchers select the appropriate gathering instruments that they planned to use in gathering data.

Interview. This method was utilized to gather necessary information. The interview was done by the proponents and the laboratory in charge. The researchers asked questions regarding the existing “Wireless Monitoring Facility of Computer Laboratory (ICS)

Internet. Researchers used this technique to access different websites in relation to proposed project, internet is a super highway of information and the connections of different nodes which link persons to a variety of pages that provide useful and reliable information.

Observation. It was done to know if when the proposed project be relocated or established.



The Project Schedule

ACTIVITY	JANUARY 2019	FEBRUARY 2019	MARCH 2019	APRIL 2019
Plan				
Do				
Check				
Act				

Table 1. The project Schedule Gantt chart

Table 1 above shows the cycle of the methods and procedures that the researcher applied in this study. The following are:

Plan. When the proponents start making plans for a CCTV monitoring system, we assure that the plans are not crowded.

Do. When the plans were already okay, research do the CCTV installation and work as a team.

Check. They checked if the CCTV are working or not.

Act. After checking all the CCTV IP cameras, cables were used and all materials needed. After that, installing the cameras were done.

**Project Staff and Functions****Table 2. Role Requirements and Responsibility**

Researchers	Designation	Task
Rhonalyn P. Supnet	Project Leader	Lead team report status review and assure quality
Angel Lyca B. Pioquinto Paulo E. Honorato Sherlyn C. Javier Kaye Giselle F. Dela Cruz	Developer	Lead by noting decisions, creating documentation and performing any other operational duty then team needs to stay focused.
Sherlyn C. Javier Kaye Giselle F. Dela Cruz	Documentation	Research writing skills.
Kaye Giselle F. Dela Cruz Sherlyn C. Javier	Analyst	Provides critical data support to the technical team. Routinely performing complete or component analysis. Notifying the entire project team about abnormalities.



The role and responsibility of the members of the team can be seen in table2. The table shows that each member has their different role and responsibility of any action assigned. The leader, who providing giving assignment to his members is according to the skills they have and to help and build a team. Members are grouped to be the project developer, documentation developer and a review team. Furthermore, each of the staff assigned to meet the goals and requirements needed with no specific due are time.



Chapter IV

RESULTS AND DISCUSSION

Requirements Analysis

The researchers encountered students entering inside the Laboratory who are bullying, vandalism and other offenses cases. For this reason, proponents decided to install CCTV to monitor students entering the laboratory. Using this CCTV, monitor all students, faculty members and other intruders entering inside the laboratory. The proponents interviewed the laboratory in-charge in order to gather necessary information which could answer objective no. 1. The researchers asked questions regarding the existing "Wireless Monitoring Facility of Computer Laboratory (ICS), the laboratory in-charge responded that there is no existing wireless monitoring facility in the computer laboratory room.



Design of Product/Process

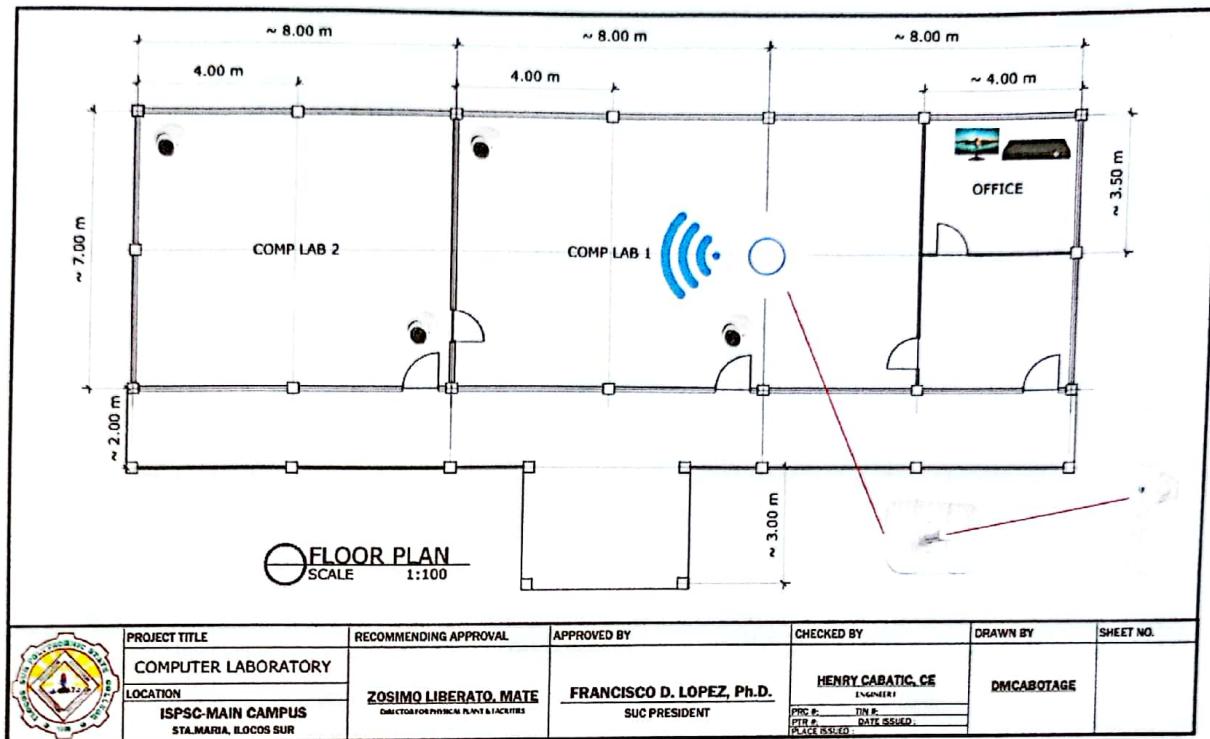


Figure 2. The Network Plan of the CCTV IP Camera for the ISPSC Computer Laboratory

Computer Laboratory

As shown in Figure 2, the proponents designed first a network plan to be utilized for the establishment of the CCTV with IP Camera capability in the computer laboratory of ICS. For computer laboratory 1 with an established IP Camera connected to the CCTV DVR at the right and left corner. The CCTV at the laboratory room recognizes students, faculty and other that enters the room same as through to computer laboratory 2 with an established IP Camera connected to the CCTV DVR. Cameras can be accessed through mobile phone in the address 192.168.x.x. Wireless security cameras are new high performance digital wireless security camera transmission systems. These wireless systems offer exceptional video data transmission using 5.8GHz frequency. They are made for long distance



outdoor use with a direct line of sight between the transmitting and receiving antennas.

The image below is a screenshot from a smart phone having access to the DVR CCTV inside the computer laboratory and shows the whole computer laboratory; the four corners of the Laboratory installed with CCTV IP Cameras. All students entering inside the laboratory can now be monitored.

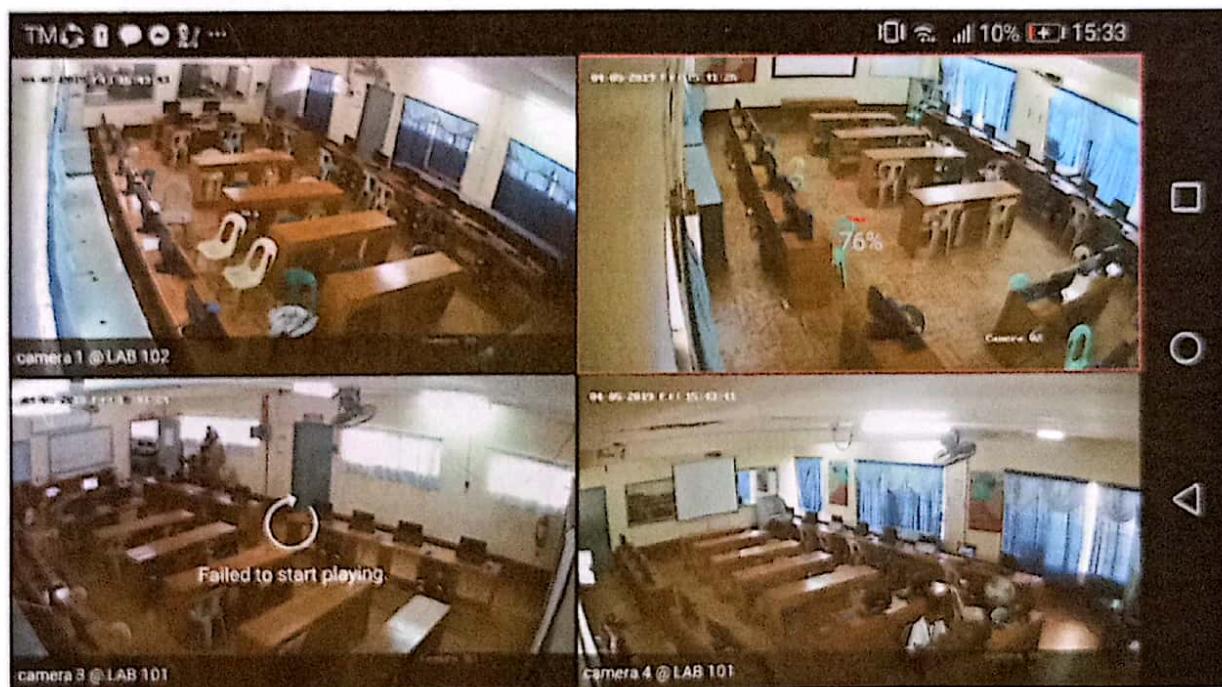


Figure 1. Full Capture of the CCTV Camera

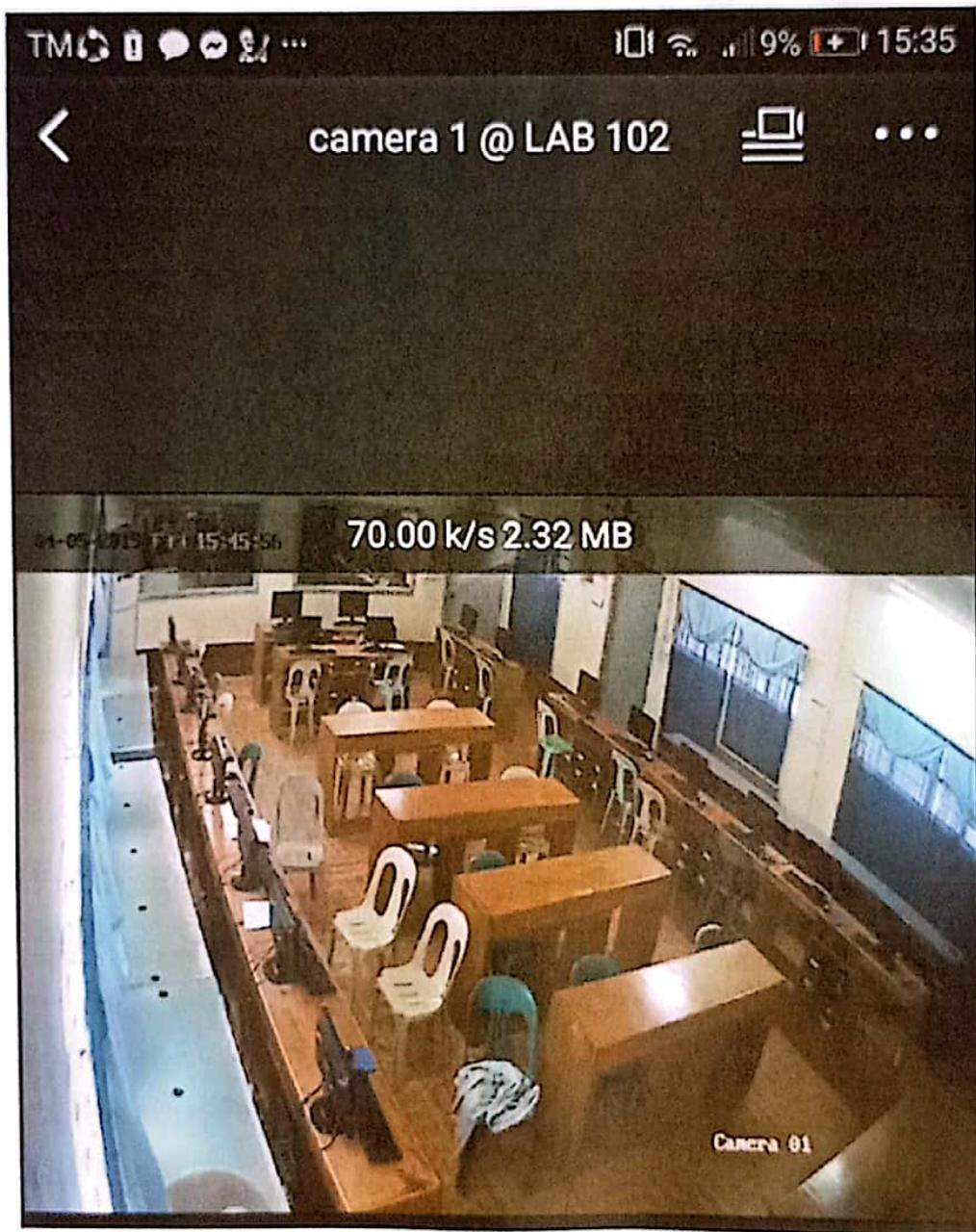


Figure 2. The CCTV Camera at the back corner of the Computer Laboratory

Laboratory

Figure 2 shows the camera capture at the back corner of the computer laboratory 102. It can be noticed that the capture, it is not blurred and shows a good resolution.

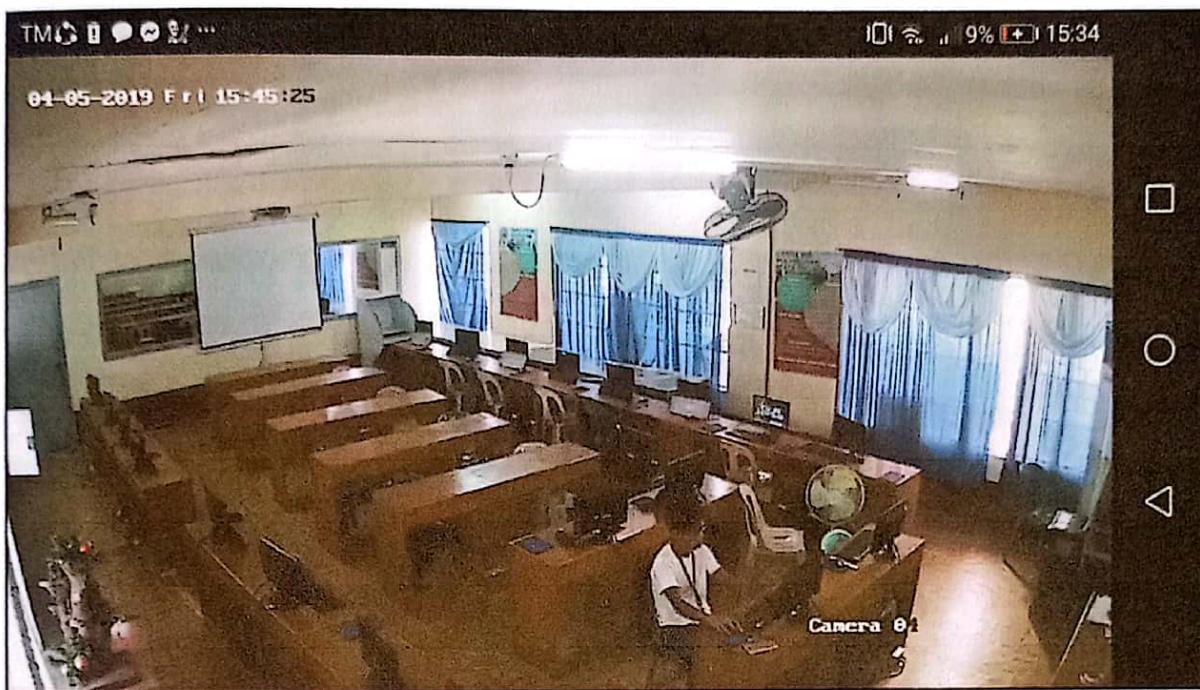


Figure 3. The CCTV Camera at the front corner of the Computer Laboratory

As seen in figure 3 the front view of the CCTV camera at Computer Laboratory 101 presents a clear capture in the said laboratory.



Test Case Results

The last objective is to test the established CCTV camera during the installation part. The CCTV was applied with calibration test to check of the cameras are working well in all camera lens direction from left to right and top to bottom.

Step No.	Test Cases	Test Data	Expected Result	Actual Result	Status
1	Configure DVR and check whether operating system is working or not	DVR on and off	Operating system should be installed correctly	Operating system working good	
2	Install left camera which include data cable setup	Test the camera if working and can capture video	Camera expected to capture video	Camera captured video	



3	Install left camera which include data cable setup	Test the camera if working and can capture video	Camera expected to capture video	Camera captured video	19
4	Test the capability of the CCTV DVR to acquire internet connectivity	Receive internet connectivity status	Expected to have intenet connectivity	CCTV DVR acquired internet connectivity	
5	Test the wireless access to control the CCTV through the use of the internet connectivity	Controlling of the CCTV and viewing/ monitoring/scanning of camera modules of the CCTV	Expected to control the CCTV even not inside the location of the DVR	Controlled the CCTV DVR by the use of smart phone	



Chapter V

SUMMARY, CONCLUSION AND RECOMMENDATION

In summary the main objective of this study is to design and establish a “Closed-Circuit Television of Computer Laboratory (ICS)”, the monitoring faculty to provide easier way of management and monitoring of any unwanted activities in the computer laboratory room. Specifically, it sought to answer the following:

1. To Determine the current system in monitoring management in the CCS Computer Laboratory;
2. Design and establish a Wireless Closed-Circuit Television for the ICS Computer Laboratory.
3. To Test the functionality of the Wireless Closed-Circuit Television for the ICS Computer Laboratory.

Based from the findings of the study, the current system of monitoring management in the computer is by using a logbook to record the users or students who enters and utilizes the computer laboratory room, which was not found accurate. The design of a network plan and the establishment of a Wireless Monitoring Facility of Laboratory with CCTV IP Camera was configured and installed, the calibration of the camera and testing was successful.



Conclusion

1. It has been determined based from the interview to the laboratory in-charge that there is no existing monitoring facility in the computer laboratory room.
2. The designed network layout was used for the installation of the CCTV in the computer laboratory.
3. The test cases showed no errors during the testing of IP cameras.

Recommendation

1. It is recommended that other offices should also have monitoring facility to monitor theft or any unwanted activities.
2. The designed network layout can be adopted for future researchers for future improvements and provision of the installed CCTV in the computer laboratory.
3. A maintenance mechanism should be applied to the established CCTV.

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