WEB-BASED AUTOMATED INGRESS AND EGRESS SYSTEM FOR BSIS STUDENTS IN COMPUTER LABORATORIES AT SANTA RITA COLLEGE OF PAMPANGA

A Capstone Project

Presented to the

Faculty of the College of Computer Studies

Santa Rita College of Pampanga

In Partial Fulfillment of the

Requirements for the Degree

BACHELOR OF SCIENCE IN INFORMATION SYSTEM

By

Mercado, Roman

Maambong, Cristine

Panoy, Christopher

Popatco, Leonel

March 2025

APPROVAL SHEET

This Capstone Project entitled "A SCHOOL WEBSITE WITH AN ONLINE RESEARCH REPOSITORY AT BECURAN NATIONAL HIGH SCHOOL" proposed and submitted by **Name of the Proponent** in partial fulfillment of the requirements for the degree **BACHELOR OF SCIENCE IN INFORMATION SYSTEM**, has been examined and found in order and is hereby recommended for acceptance and approval for **ORAL EXAMINATION**.

CAPSTONE PROJECT PROPOSAL COMMITTEE

Jonilo C. Mababa, DIT
Chair

Richmon L. Carabeo, DIT
Member

Anthony Rivera, MITc
Member

PANEL OF EXAMINERS

Passed by the PANEL OF EXAMINERS on ORAL EXAMINATION with a grade of _____ on _____.

Jonilo C. Mababa, DIT
Chair

Richmon L. Carabeo, DIT
Member

Anthony Rivera, MITc
Member

Joshua R. Tiongco, MITc
Adviser

Accepted and approved in partial fulfillment of the requirements for the degree **BACHELOR SCIENCE IN INFORMATION SYSTEM.**

Fernand T. Layug

_____Date Dean

TABLE OF CONTENTS

Contents

LIST OF FIGURES

CHAPTER I

INTRODUCTION

BACKGROUND OF THE STUDY

Computer Labs A and B at Santa Rita College of Pampanga have experience issues such as equipment damage and inefficiencies, currently, there are monitoring measures in place, such as CCTV cameras and a monitoring system in the MIS office but these are still not sufficient to fully regulate access and ensure security. Delays as well as openings in the system's security happen because there is no automated system in use. Faculty members have to waste precious time maintaining attendance documents.

To address these challenge, we proposed system aims to implement a webbased automated ingress and egress system with barcode scanning technology. BSIS Students will simply scan their school ID cards which are embedded with unique barcodes at a designated barcode scanner upon entering the computer laboratory. The system will instantly check whether the entry is valid or invalid, the system allowing access to authorized individuals only. Meanwhile, attendance will automatically be noted for the student's subject for the current period, eliminating the need for manual roll calls. Administrators have real-time tracking of student entry and exit via a special dashboard, with complete control over laboratory access and security. Once the class finishes, the students once again scan their IDs when they exit with their departure

being automatically logged in the system. This makes attendance always precise and continuously updated in real time.

By simplifying laboratory entry as well as attendance recording, the system facilitates enhanced security as well as enhanced efficiency but also more orderly, student-based, as well as technologically driven learning.

To develop this barcode-based system the CCS administrator and Faculty workload of instructors will be significantly reduced, allowing them to focus more on teaching and less on clerical tasks. Real-time tracking of student attendance ensures better lab management while eliminating long wait times for students, providing a seamless entry and exit process. Then, digitizing this process fosters a more secure, organized and technology-driven learning environment. Beyond enhancing productivity, implementing this system will foster a cleaner, safer and more effective educational experience. With better attendance tracking and enhanced lab security, administrators, faculty and students will benefit from a well organized and technologically advanced environment. Admin will have a centralized system where in they can control the entry of the laboratories, faculty can give more attention to teaching without the bother of keeping the records manually and the students have a trouble free entry experience. This system keeps our computer laboratories secure at all times blocking unwanted entry and protecting equipment and devices ultimately developing a more disciplined and dependable study area.

CONCEPTUAL FRAMEWORK

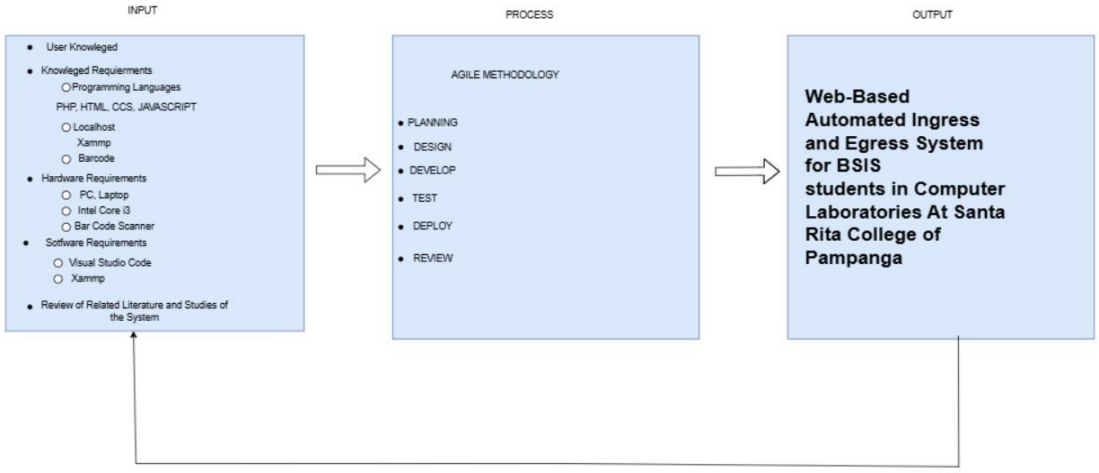


***FIGURE 1: CONCEPTUAL FRAMEWORK OF* WEB-BASED AUTOMATED INGRESS AND EGRESS SYSTEM FOR BSIS STUDENTS IN COMPUTER LABORATORIES AT SANTA RITA COLLEGE OF PAMPANGA**

Figure 1: This conceptual framework represents the research project's input, process, and output:.

Input:

This stage entails compiling the necessary hardware, software, and knowledge. Visual Studio Code for front-end and back-end development are examples of development tools.

Process:

The system development follows an Agile Methodology, consisting of the following phases:

- Planning
- Designing
- Development
- Testing
- Deployment

- Review and Improvement

Output:

A web-based automated ingress and ingress is the end result, giving Santa Rita College an effective and improve management on students' attendance, ensuring security with efficiency at the Computer Laboratories

STATEMENT OF THE PROBLEM

The current manual attendance tracking system in Computer Laboratories of Santa Rita College of Pampanga is inefficient, prone to errors, and lacks security measures.

SPECIFIC PROBLEM

1.How can system improve accuracy, speed, and efficiency in student attendance tracking in Com Lab while reducing administrative workload and enabling real-time monitoring?

2.How can real-time attendance monitoring help teachers and administrators manage lab access, enhance security, reduce workload, and ensure accurate records?

3.How can a barcode-based access system improve security, prevent unauthorized entry, and create a more structured and efficient Com Lab environment?

4. How to evaluate the system based on the ISO 25010 standards with the following criteria?

a. Functional Suitability

b. Performance Efficiency

c. Compatibility

d. Usability
e. Reliability

f. Security

g. Maintainability

h. Portability

OBJECTIVES OF THE STUDY

To design and implement an Automated Ingress and Egress System that would improve management on students' attendance, ensuring security with efficiency at the Computer Laboratories A and B of Santa Rita College of Pampanga.

The following are the study team's precise objectives:

1. Automating the attendance process, this system will eliminate manual errors, provide real-time data updates, and reduce the time spent on administrative tasks.

2. Streamline administrative procedures by automating attendance recording, reducing manual interventions, and enhancing security protocols.

3.The system will automatically authenticate students, reducing the risk of unauthorized entry and ensuring that only those who have legitimate access are allowed to use the facilities, thus improving security and operational efficiency.

4. To evaluate the system based on ISO 25010 with the following criteria:

a. Functional Suitability
b. Performance Efficiency
c. Compatibility
d. Usability
e. Reliability
f. Security
g. Maintainability
h. Portability

SIGNIFICANCE OF THE STUDY

The BSIS students' automated ingress and egress system in the computer laboratories, Santa Rita College of Pampanga, the impact of this work for BSIS students is significant, in that it opens students' access to computer labs and simplifies attendance tracking in a direct manner.

The Result of the Study will be great benefit to the following:

Teachers .The benefit of such a study for instructors is in simplifying attendance tracking, with Bar codes, attendance tracking is computerized, and no longer will instructors have to record attendance in Excel, etc., and then update it, reducing administration, offering real-time correct records, and freeing them to devote

additional time to actual instruction, improving overall efficiency in tracking students' attendance in labs.

Students. It would translate to the students' smoother and safer access to the laboratories. It will reduce the waiting time at entry and exit, allowing only authorized personnel to use the facilities for study, which is safer and orderly. It will further create accountability, since every access record is pegged on specific users; thus, making them responsible for the resources provided in the laboratories.

Administrators. A real-time tool to monitor laboratory usage, hence giving better oversight of the activities of students and staff, ensuring security and proper management of the facilities. The administrators can generate reports that help analyze the pattern of laboratory usage, track unauthorized access, and maintain accountability of equipment and resources.

SCOPE AND DELIMITATION OF THE STUDY

The system can utilize scanning bar codes in students' ID to make real time recording of entry and exit times an automated process. With such a system, attendance can effectively be handled with no manual recording involved. It can restrict access to approved persons only therefore, protecting laboratory assets for safe use. Real-time information dissemination to teachers and administrators regarding laboratory use can be facilitated by the system, allowing them to make timely and informed decisions. Ingress and egress logs can be stored and generated

for audits and accountability and transparency can be guaranteed. Teachers' time taken in tracking attendance can be saved, allowing them to devote more time to instruction. For administrators, it can assist in laboratory administration in that it can allow them to review usage trends and maintain unauthorized persons and misuse resources.

However, the study has certain limitations. The system shall be implemented for the BSIS students who shall only use Computer Laboratories A and B. this study will exclude other departments where there are laboratories serving both BSIS and non BSIS students. Features to be developed by the proposed system shall also be limited to attendance monitoring and access control, with basic reporting only; any deeper feature for tracking behavioral performance is not allowed, and the academic monitoring of the students in the higher levels shall not form part of this system.

DEFINITION OF TERMS

1.Automatic Time In/Out System - A pre-programmed digital system for automatically capturing the exact entry and exit times of persons.

2. SCHOOL ID - serves as the unique identifier for each student and plays a critical role in ensuring secure and efficient access to the computer laboratories.

4.Real-time - functionality in your system are crucial for ensuring accurate, timely, and efficient tracking of student attendance and laboratory access

5.BSIS Student- is at the heart of the Automated Ingress and Egress System. Their connection to the system is vital for security, attendance monitoring, and access control

6. Computer Laboratory- in your system are the physical spaces that are monitored and controlled through the Automated Ingress and Egress System.

7. Ingress and Egress- Ingress refers to the act of entering, while egress refers to the act of exit.

8.Attendance Monitoring- The process of tracking and recording student presence and absence during their access to the computer laboratory, ensuring accurate attendance records.

9. Access control-- A security measure that regulates who can enter or exit the computer laboratory, ensuring only authorized individuals, such as BSIS students, gain access based on their school ID.

10. Dashboard- A web interface that displays attendance records for Teachers and admin

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

INTRODUCTION

This chapter presents the related literature and studies following the specialists thorough a meticulous study. Any relevant studies or publications should be well understood in order to serve as a foundation and guidance for creating the system.

RELEVANCE OF THE DIFFERENT RELATED STUDIES

LOCAL

The main purpose of the study is to develop an IoT-based computer laboratory security solutions. To provide its security and at the same time for the purpose of checking attendance, RFID cards were used that can be done by doubling the security to add code by implementing Secure Multiparty Computation (SMC), which performs simple correlations using card patterns .An RFID-based encryption algorithms is proposed to secure communication between the RFID reader and tags that provides a secure and reliable method of attendance monitoring, reducing the risk of identity and unauthorized access of computer laboratories This process is to increase security and to prevent attendance fraud by students who can use more than one RFID card.

This paper presents the design and implementation of an RFID-based attendance system to increase the accuracy and efficacy of attendance tracking in institutional settings. The old methods of taking attendance, labor-intensive and prone to human error, have been replaced by an automated RFID technology system. Every student is issued an RFID card bearing a unique identification number. When the card comes into proximity to an RFID scanner, the technology updates a central database in realtime to report attendance. The system's main parts are RFID tags and readers, a microprocessor, and a database management system.

Throughout the years, attendance monitoring has widely evolved from manual methods to the integration of technology. Manual attendance monitoring in an institution consumes time, hard to maintain, prone to human error, and leads to misplaced or lost records. Individuals also tend to take advantage of the flaws of the manual method that leads them to commit hoax and forgery. Despite the innovation of different automated systems, biometric recognition systems, RFID technology, and barcodes also have disadvantages. To address the shortcomings of the existing methods and to minimize the contingencies, this paper describes the use of a web application that utilizes an ultra-high frequency (UHF) RFID with a motion sensor to monitor the attendance of students from the University of San Carlos.

FOREIGN

This was achieved through the integration of sub-systems, including the smart attendance system, smart security system, and smart fire alarm system. The smart university system demonstrates a significant impact by effectively addressing challenges faced by students and academics. For the smart attendance system, the integration of RFID technology and ESP microcontroller is introduced to achieve real- time feedback displayed on an OLED screen, providing students with immediate updates on class registration status. Furthermore, the security system is designed to activate a servo motor and issue a buzzer alert upon authorization, ensuring controlled access to designated classrooms or laboratories.

The data encoder converts alphanumeric characters into machine-readable code whereas the machine reader or scanner reads the encoded data and transforms it into an analog electrical signal. Finally, the data decoder converts the electrical signal into digital form and then into an original alphanumeric characters data form. The AIDC technologies have been successfully applied in the manufacturing, retail, and logistics industry [5]. However, their implementation in the education sector is not that common. The authors view this as a great opportunity for the education sector, where these technologies can be applied to automate a wide range of activities, including student attendance and asset tracking.

In this section college rules regarding student attendance system are discussed. As like most of academic intuition, academic semester consist of sixteen weeks, before starting classes, faculty member prepare their attendance file, contains all student list

for both theory and lab. For attendance teacher call students name one by one and mark their attendance in a paper. The students coming after certain minutes (in Jubail Industrial College 3 minutes) are considered late and students coming after five minutes are considered marked as absent. All these steps are done manually. Teachers spend their valuable time for taking attendance and needed to be attentive to observe who is coming late or who is absent.

RELEVANCE OF THE DIFFERENT RELATED LITERATURE

LOCAL

According to Christian Jay H. Valdez et al. (2024). In the Bicol Region, only a few public and private institutions have a radio frequency identification card for students to access institutional campuses. This technology is commonly utilized around campus to track student attendance, particularly at daily entries and exits. It also tries to identify the user authorized to enter the university grounds by detecting a person attempting to access campus. Radio Frequency Identification (RFID) refers to using radio waves to identify individuals or items. There exists a gadget that may remotely extract information from a wireless device or “tag” without the need for physical touch or direct visual access.

According to the study of Rose Mary A. Velasco (2023).The study aims to secure computer laboratories coupled with smart and automated attendance monitoring. It was

designed at Isabela State University Cauayan City Campus, specifically at the Computer Laboratory of the College of Computing Studies Information and Communication Technology. The system is web-based and it can be utilized on any OS platform by specifying the IP Address through a web browser. Its function is a complete user interface for its target user's attendance monitoring and management where it can record teachers' and students' attendance, classroom entry logs, and calculation of tardiness and absences.

Base on study John Dominic Ani˜ non et al. (2020). To address the shortcomings of the existing methods and to minimize the contingencies, this paper describes the use of a web application that utilizes an ultrahigh frequency (UHF) RFID with a motion sensor to monitor the attendance of students from the

University of San Carlos. A Raspberry Pi 3 Model B is used in controlling the input and output, in which it is outputted on an LED. Wireless communication is used between the hardware system and the web system to record and validate students' attendance records. A web application is developed for faculty, students, and chairperson to monitor class attendance and to minimize contingencies. In addition, the

faculty can edit and generate a seating plan.

According to the study of Demir and Karabeyoglu [10], absenteeism is defined as a behavior of students refusing to attend school, lack of interest staying in class, arriving

late, or skipping classes. The causes of absenteeism are classified into three areas: individual, family, and school; where students may feel academically pressured, find classes boring, have health problems, financial problems, poor learning environment, and etc. A study was conducted at the University of San Carlos on the reasons for college student's absences, and most of the reasons were about health and personal matters [7]. Absenteeism is considered to be the beginning of poor academic performance that leads to dropping out of school, however, it does not only affect their performance in an educational institution but also their success and social life [11]. One of the solutions in reducing absenteeism is the improvement in monitoring of attendance. Attendance monitoring on a daily basis improves students' performance by submitting requirements on time, increasing self-confidence, understanding the lessons, and enhancing communication skills to peers and teachers. The method is also a way for counselors and administrators to better understand the problems

Higher education institutions (HEIs) seek ways to help students succeed at school. One way to make them academically successful is to ensure the regular attendance of the faculty at their classes. The importance of the teachers' attendance at class is undeniable. Their attendance motivates students to attend their classes and students' presence in the class signifies a transfer of knowledge from the teacher to the students and vice versa. The Hel's have their own way of monitoring the attendance of their faculty. Some schools use logbooks while some use computer-based systems such as biometrics, Radio Frequency Identification (RFID,) and barcodes. Each of the attendance monitoring systems has its own advantages and disadvantages. For one, the

biometric system is basically used for identification and verification. Such system has three advantages in terms of accountability, efficiency, and profit. However, the system's verification function does not work all the time with all types of biometrics. This study aimed at designing and developing for Capitol University a barcode-based faculty attendance system using the System Development Life Cycle, especially the Waterfall Model, as framework. The development of the system was geared toward the improvement of the school's faculty attendance monitoring, making it efficient in terms of time, recording and coverage.

Based on the analysis of Allen James Gomez et al. (2021). One way to make them academically successful is to ensure the regular attendance of the faculty at their classes. The importance of the teachers' attendance at class is undeniable. Their attendance motivates students to attend their classes and students' presence in the class signifies a transfer of knowledge from the teacher to the students and vice versa.

The Hel's have their own way of monitoring the attendance of their faculty. Some schools use logbooks while some use computer-based systems such as biometrics, Radio Frequency Identification (RFID,) and barcodes. Each of the attendance monitoring systems has its own advantages and disadvantages. For one, the biometric system is basically used for identification and verification. Such system has three advantages in terms of accountability, efficiency, and profit. However, the system's verification function does not work all the time with all types of biometrics. This study aimed at designing and developing for Capitol University a barcode-based faculty attendance system using the System Development Life Cycle, especially the

Waterfall Model, as framework.

According to the study of MLV Nalupa et al. (2022) Increased efficiency and productivity of the school are opportunities that the school administrators have seen in integrating radio-frequency identification (RFID) technology in monitoring attendance. It is observed and proven in many studies that a well monitored school will have better discipline and higher academic performance compared to schools without surveillance [5, 6, 8]. Students avoid disciplinary issues when they know that attendance is tracked and communicated to parents. The intervention of the technology improved the discipline of the students resulting in better grades.

FOREIGN

Based on the analysis of Salah Elaskari a b et al. (2021). Most instructors and staff in a university environment use manual methods of tracking student attendance and college assets. However, these methods have several disadvantages; the major drawbacks of taking attendance manually are errors in data collection and the loss of part of the lecture time. As for asset tracking, the common issues are human errors in data collection, wrong inventory estimation and time wastage during the process. Automated identification and data capturing technologies can help address these issues. This paper investigates the implementation of one such system, the barcode technology, to read and process student attendance data in classroom settings and to track periodic inventory of assets within the college facilities such as devices, equipment, office furniture, classrooms, and laboratories. The paper measures faculty

members and staff response on usability, comfort level, and efficiency for the proposed barcode system.

According to the analysis Hussien, S. H. T et al. (2024) This paper presents the development of an innovative Internet of Things (IoT) based smart system on the university campus. The system was implemented to improve the attendance system while preventing human errors, enhancing safety measures, and improving overall organizational efficiency. This was achieved through the integration of sub-systems, including the smart attendance system, smart security system, and smart fire alarm system. The smart university system demonstrates a significant impact by effectively addressing challenges faced by students and academics. For the smart attendance system, the integration of RFID technology and ESP microcontroller is introduced to achieve real- time feedback displayed on an OLED screen, providing students with immediate updates on class registration status.

As stated by Hajri et al. (2019). This paper is based on the study and the implementation of the pilot project for customized, automated, highly secured class room management system known as fully automated classroom attendance system. In this research paper, the strategies, design, development and implementation of a pilot project for class room attendance management systems is explained in detail. As a pilot project, mobile app is built on Android platform using Xamarin programming. Prototype of proposed system provides high level of authentication by embed- ding

face recognition and biometric verification together with radio frequency identification system (RFID) system.

According to the study of Joseph Bamidele Awotunde et al. (2022). This project presents contactless attendance system passive radio-frequency identification (RFID)-based approach. RFID is a technology that uses radio waves to send information from an RFID tag attached to an object to a reader for the purpose of monitoring and identifying the object. This technology is one of the most widely used in the world; almost every organization uses RFID-based tracking, identification, and other functions on some level. A contactless RFID-based attendance monitoring system is a less cost-effective and efficient automated solution. The proposed system focuses on an RFID-based attendance monitoring system that uses RFID technology in connection with a programmable logic circuit (such as an Arduino) to address the problems that traditional paper and contact-based attendance systems experience.
Each user (student or lecturer) will be given an RFID card.

Considering the research of Kashif Ishaq and Samra Bibi (2023). The use of Radio Frequency Identification (RFID) technology is ubiquitous in a number of businesses and sectors, including retail sales, smart cities, agriculture, and transportation. Additionally, educational institutions have started using RFID to track student attendance, combining this technology with Google Sheets and the Internet of Things (IoT) to build a real-time attendance tracking system. For a thorough examination of

the creation of a student attendance system, this paper includes a systematic literature evaluation of 21 major research published on IoT based attendance systems employing RFID. This RFID-based attendance system enables automation, eliminating several problems connected with the manual process, such as time wasting, proxies, and the possibility of losing the attendance sheet, in contrast to the traditional attendance system, which depends on manual signatures. By creating a system that automatically registers students' attendance by merely flashing their student cards at the RFID reader, all the aforementioned difficulties may be successfully addressed. This automated method guarantees attendance monitoring accuracy and dependability while also saving time.

TECHNOLOGY RELATED TO THE PROJECT

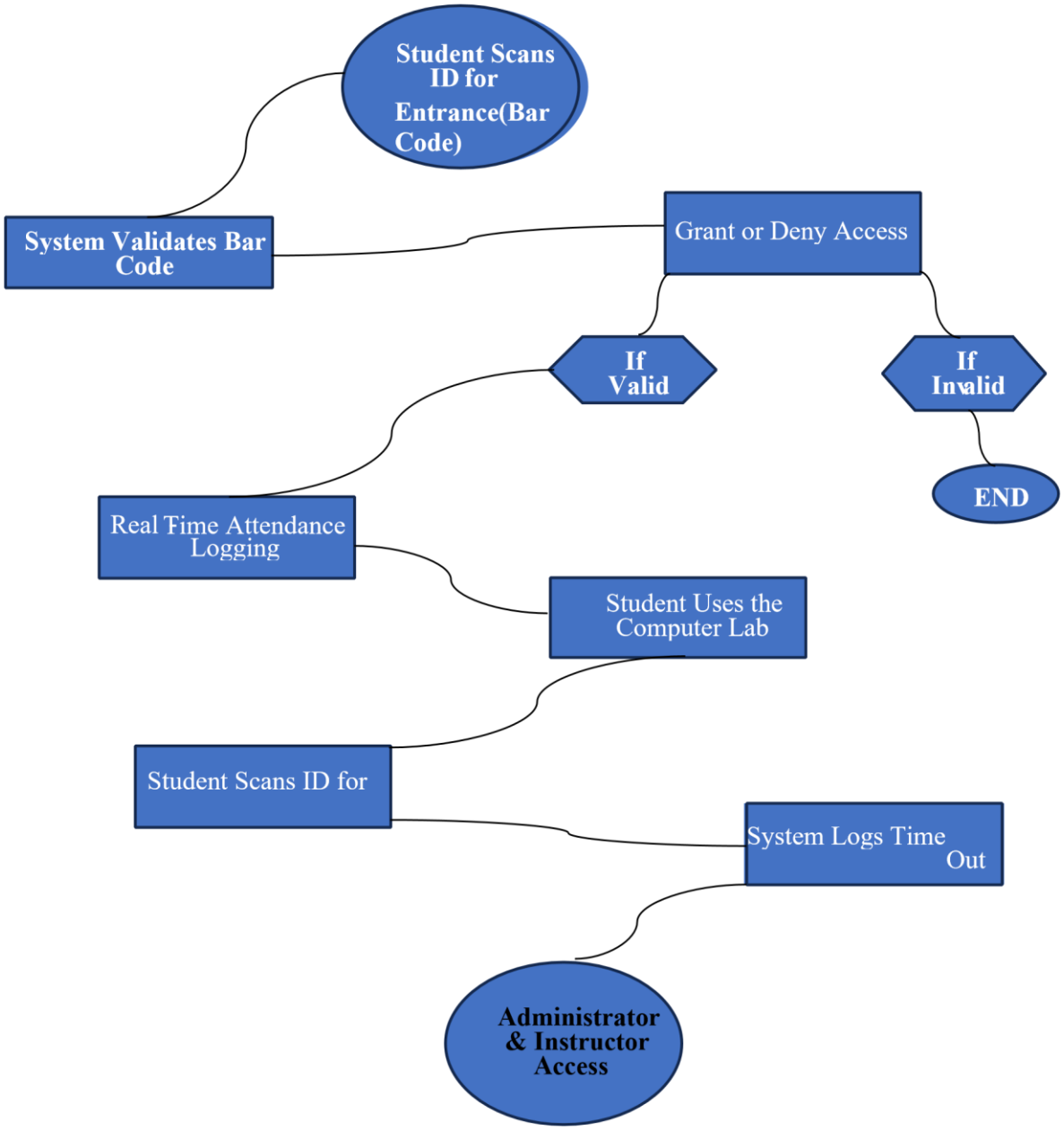
APPDYNAMICS

App dynamics monitoring tool is effective for businesses with numerous applications that rely solely on cloud-based technology. The tool monitors applications in real time and keeps a record of performance information for future reference. It includes a tool for diagnostics that monitors the application's performance and displays user experience data. AppDynamics' services may help businesses make data-driven business decisions.

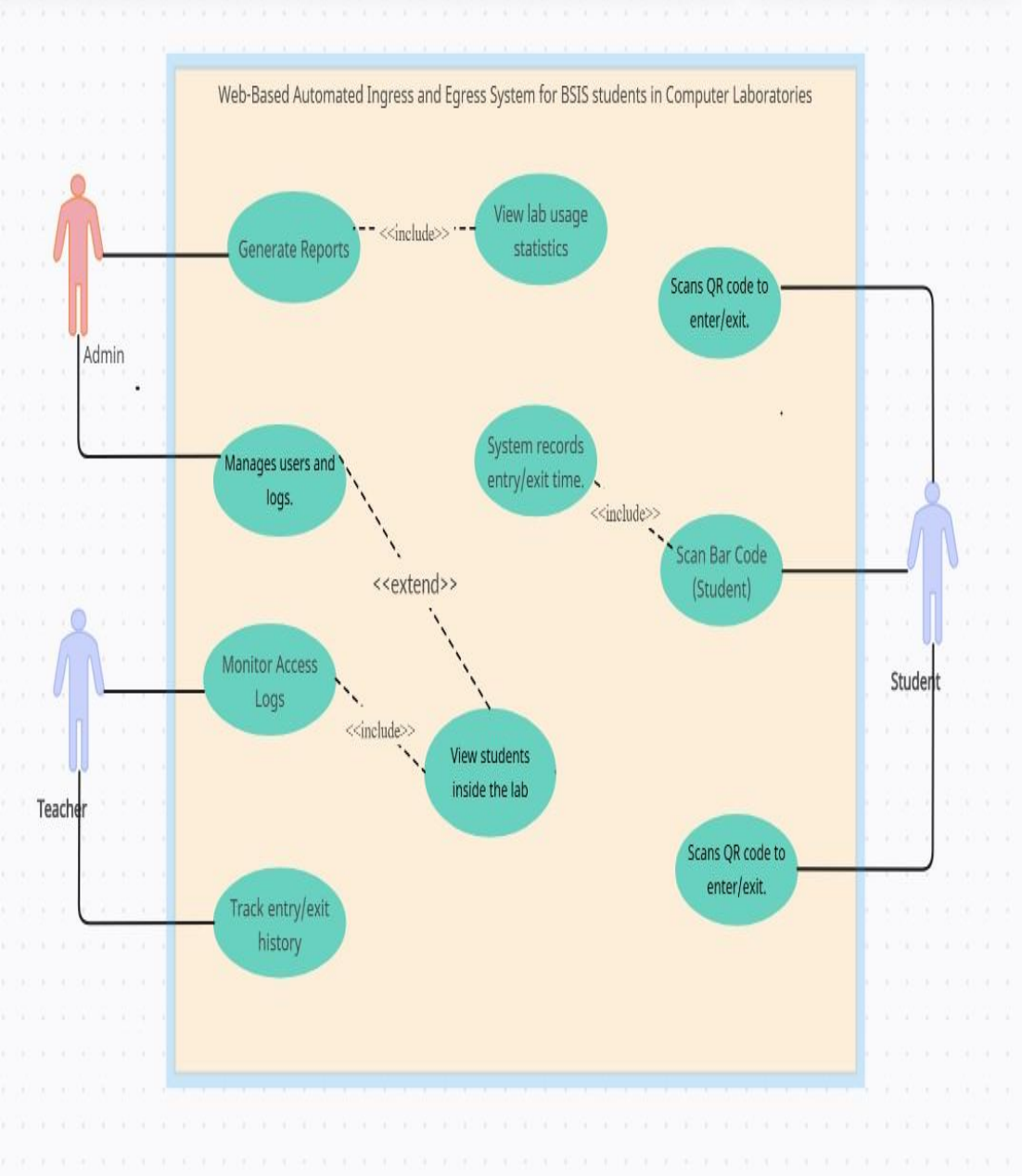
PINGDOM

Pingdom is a server, application, and website performance and availability monitoring solution available globally. This application assists the user in giving customers the greatest online experience possible with all-inclusive monitoring platform. The majority of the organization uses Pingdom since it periodically pings websites to see if they are reachable from the Internet. Pingdom's core functions include: uptime monitoring: checking the global availability of the website. Notifying: notifying when the service under observation is unavailable.

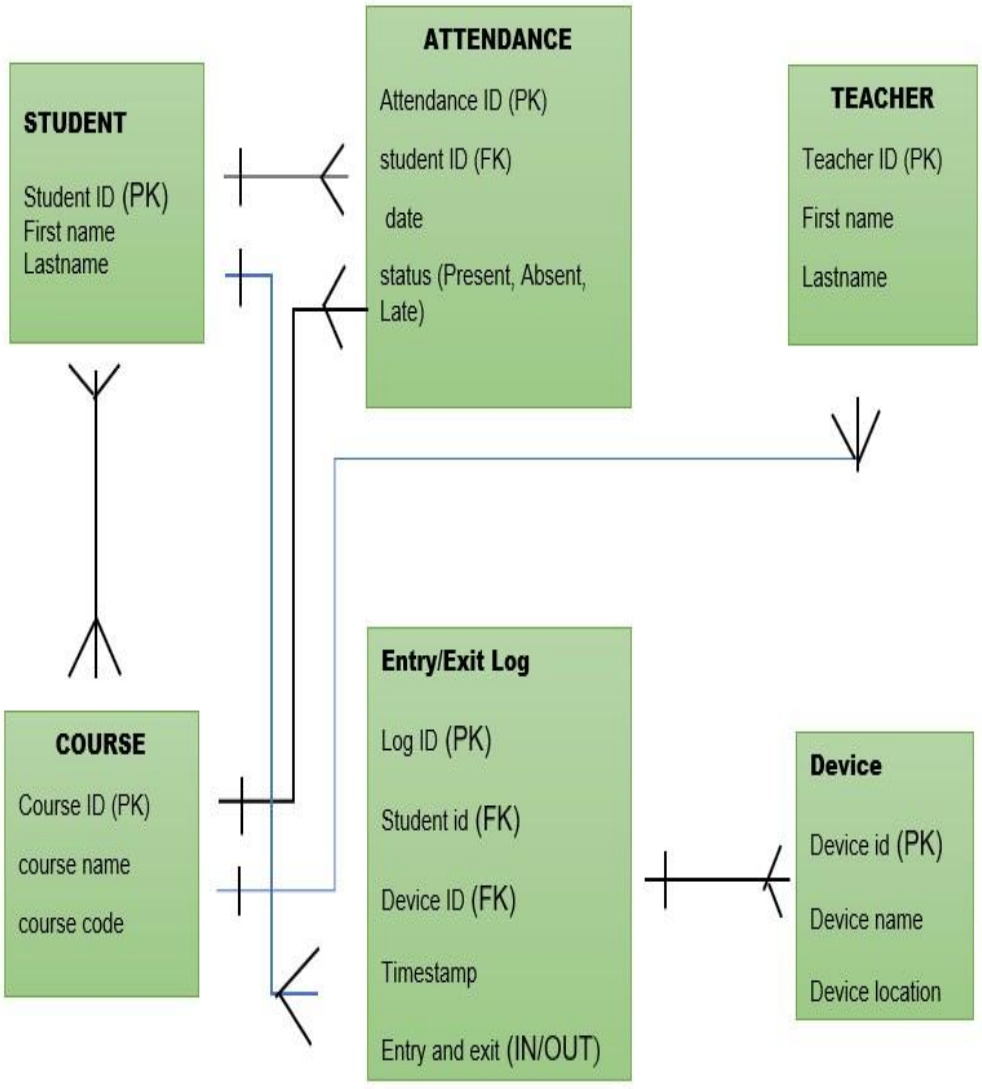
FLOWCHART


Student Scans ID for Entrance(Bar Code)
System Validates Bar Code
Grant or Deny Access
If Valid
If Invalid
END
Real Time Attendance Logging
Student Uses the Computer Lab
Student Scans ID for
System Logs Time Out
Administrator & Instructor Access

USE-CASE DIAGRAM



ENTITY RELATIONSHIP DIAGRAM



CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

This chapter covers the research methods that should be used to collect, analyze, and interpret data. Along with this chapter is the descriptions of the respondents and the equipment used to gather the data.

RESEARCH DESIGN

Collaboration processes were used for both quantitative and qualitative approaches, to improve the system's efficiently and reliability. More, precisely In order to determine the technological feasibility of the web server and mobile application, the researchers evaluated the locale current information processing system.

RESEARCH PARTICIPANTS

The respondent of this study is the MIS administrator, Computers Studies Dean , BSIS Students and Computers Studies Teacher

RESEARCH LOCALE

Santa Rita College of Pampanga is implementing a web-based automated entry and exit system through barcode scanning technology for the accuracy and convenience of recording student entry and exit in the Computer Labs A and B. As of the moment, there is no system installed to automate the process making it challenging to manage student attendance effectively, chosen by the researchers to introduce and deploy the newly developed system, aiming to improve security, monitoring, and overall management of BSIS student access in the computer laboratories.

SOFTWARE DEVELOPMENT METHODOLOGY

*Figure SEQ Figure * ARABIC 2: Rapid Application*

The researchers developed and created the proposed system using a variety of development tools, including some programing language like PHP, JAVASCRIPT, HTML CSS and also MySQL, and other related tools. The System Development Life Cycle, also known as the SDLC, provides as the basis and structure for creating the proposed system. It is the most frequent and classic system development methodology for system analysis and design. This study applied the Agile Model, which combines incremental and iterative process methods.

Concept- Implementation of Agile in Automated Ingress and Egress system allows for adaptability, efficiency, and on-going progress. The system is being developed in increments, first being barcode scan for secure entry and auto marking of attendance followed by other improvements such as live monitoring and security enhancements. User input on a periodic interval by admin, students, and faculty shall drive improvements, ensuring the system is aligned with actual requirements. Agile allows for quick adaptation, quick deployment and trouble-free scaling, making it a secure, efficient and technology enabled lab access system.

Increment Planning - a phased approach to ensure smooth development and continuous improvements. The first increment focuses on barcode scanning for entry and exit automated attendance recording and a basic admin dashboard. Next security enhancements like real time alerts and database optimization are added. The third phase improves user experience with reporting tools, mobile access, and UI/UX enhancements. Finally, the system undergoes full deployment, integrating advanced security features and expanding capabilities. This structured approach ensures a functional, secure and efficient system at every stage.

Design– The Automated Ingress & Egress system is designed for efficiency, security and convenience. The system features a web interface wherein students scan a barcode embedded on their ID for convenient entry and exit. The system features a live admin interface for monitoring of access and attendance. The system stores data of students securely in its back end, performs scan processing and automatically keeps a record of logs. The system features integrated barcode readers for quick authentication, along

with security alerts for unauthorized entry. The streamlined system enhances lab security, makes taking attendance automatic and increases efficiency.

Development & Coding – The system ensuring efficiency and flexibility, designed using web technologies consisting of a secure data base for maintaining students and class attendance. The interface is designed for easy usage, allowing students to scan IDs embedded with a barcode conveniently. The back-end performs scan in real time, validates entry and automatically keeps a record of class attendance. Access control, alerts and other security aspects are imbedded in it for avoiding unauthorized entry. The well organized process of development gives a quick, secure and scalable system for streamlined lab operation.

Testing- Ensures accuracy, security and efficiency well in advance of full release. Unit testing is done for scan of barcode and checks of attendance record, system testing for integration of the database, and user acceptance testing (UAT), wherein users, students and staff provide input on usage. The system is secured against unauthorized access via security testing which gives secure access control. The system is streamlined for timely tracking, error-free taking of roll and hassle-free experience for users, guaranteeing a secure, efficient lab solution.

Release & Deployment- Approach to ensure a smooth transition. The system is first rolled out in a controlled environment allowing faculty and administrators to test its functionality. After successful validation it is gradually deployed for student use, ensuring minimal disruptions. Training sessions and a guide for users **make it easier**

for users to familiarize themselves. Continuous monitoring ensures performance stability with updates and optimizations implemented as needed. This structured deployment guarantees a secure, efficient and fully operational system for managing lab access and attendance.

Review & Feedback - meets end-users needs and functions in an effective way. Faculty, staff and students provide input on usability, accuracy and security which is taken into account for optimization purposes. Performance is tracked using live monitoring and end-user reports which assures uninterrupted operation. Feedback is continuously followed up on and optimized, enhancing functionality and end-user satisfaction. This ongoing evaluation ensures a secure, effective and end-user-friendly system for uninterrupted lab entry and class attendance.

RESPONDENTS OF THE STUDY

The respondent of this study is the MIS administrator, Computers Studies Dean , BSIS Students and Computers Studies Teacher.

THE RESEARCH INSTRUMENT

The research instruments used in the study helped the researchers to collect data, which increased their comprehension of the created system.

Online Research - The researchers utilized research from written journals and studies relevant to the Web-Based Automated Ingress and Egress System with Barcode Scanning Technology at Santa Rita College of Pampanga as basis for implementation. These materials include written research studies and scholarly articles regarding automated attendance systems, barcode technology and control of access. A literature review is the foundation for the creation of a system with enhanced efficiency security and convenience with a convenient and reliable tool for the faculty as well as the students in monitoring ingress and egress in the Computer Labs.

Interview - The researchers visited Santa Rita College of Pampanga and engaged in discussions with the Dean and CCS teachers to gain a thorough understanding of the current student access and attendance monitoring process. These interactions helped

assess existing challenges in managing ingress and egress in Computer Labs A and B while introducing the proposed Web-Based Automated Ingress and Egress System with Barcode Scanning Technology. Insights and feedback from the discussions played a crucial role in refining the system to ensure efficiency, security and ease of use for faculty and students.

Library Method – the researchers used a previous capstone project from Santa Rita College of Pampanga as a reference in documenting the capstone project.

DATA GATHERING PROCEDURES

The data for this study was obtained through online research and interviews. The researchers explored the internet for published papers and publications that could serve as a reference during the system's development. Additionally, the researchers obtained permission from the School administrator to conduct the study by interviewing the selected locals and submitting a formal letter from the Dean of CCS.

SYSTEM DEVELOPMENT TOOLS

The system development tools are the various tools and approaches that the researchers used to develop the proposed system to further evaluate and analyze the needs of the system.

Mockup - is a full-size or scale model of a technology or designing tool that is used in advertising, education, evaluation, and other uses.

Visual Studio Code - is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

H**TML -** (Hypertext Markup Language) code that structures the content of a web page. It allows for the creation and arrangement of sections, paragraphs, and links of the system by using HTML elements such as tags and attributes, which are the core components of a website.

CSS - is a language for formatting webpages. CSS allows to change the appearance and layout of a webpage. can also specify how a website's view changes across multiple screens, such as computers, tablets, and mobile devices.

JAVASCRIPT - a scripting language that enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else. **PHP** - is a free and open-source server-side programming language that may be used to create applications, websites, CRMs, and other things. It is a popular general-purpose programming language that can be embedded into HTML.

Structured Query Language (SQL) - is a programming language for storing and processing information in a relational database. A relational database stores information in tabular form, with rows and columns representing different data attributes and the various relationships between the data values.

Data Base Table – Used to store some data that has a relation to another table, and it is also called a relation. A table that has columns and rows is called an attribute, and rows is a tuple.

Unified Modeling Language (UML) – is a visual modeling language that can help software developers visualize and build new systems. It is not a programming language, but rather a set of rules specifically designed for drawing diagrams.

Data Flow Diagram (DFD) - is a type of diagram chart that depicts how data flows from Var locations to a specific processor in general. In other cases, DFD can show how different organizational departments collaborate; it adds clarity and coherence.

User Flow Diagram – Methodology is used to define or analyze new processes, standardize or redesign current processes, and identify ways to enhance processes through the elimination of unnecessary steps, bottlenecks, and other problems. **UIzard –** This can use as a layout content and functionality. Wireframes are used early in the

development process to establish the basic structure of a page before visual design and content is added and can be used for a mockup system.

REFERENCE

Elaskari, S., Imran, M., Elaskri, A., & Almasoudi, A. (2021). Using barcode to track student attendance and assets in higher education institutions. Procedia Computer Science, 184, 226-233.

Hussien, S. H. T., Farhana, H. A. R. N., Vinukumar, L., Alexander, C. H. C., & Sivakumar, S. (2024, August). Smart campus attendance and security systems: Leveraging IoT for enhanced efficiency. In AIP Conference Proceedings (Vol. 3161, No. 1). AIP Publishing. Al Hajri, E., Hafeez, F., & NV, A. A. (2019).

Fully Automated Classroom Attendance System. Int. J. Interact. Mob. Technol., 13(8), 95-106.

Velasco, R. M. A. (2023). IoT Security Solutions for Students' Laboratory with RFID-based Attendance Authentication. International Journal in Information Technology in Governance, Education and Business, 5(1), 41-50. Valdez, C. J. H.,

Nivales, Y. M., Uy, R. J. R., & Montañez, J. J. F. (2024, November).

TrackID: RFID-Based Student Monitoring System for Accessing Institutional Campus. In 2024 International Conference on Innovation and Intelligence for Informatics, Computing, and Technologies

(3ICT) (pp. 427-434). IEEE. Ani, J. D., Flores, K. K., Otadoy, C. S. K., Rodas, J. P., Tabaco, J. F., Campa.

J. D., & Macapagal, A. J. (2020). Classroom Attendance Monitoring System Using Radio Frequency Identification with Web Application. Research Briefs on Information and Communication Technology Evolution, 6, 108-128.

Gomez, A. J., Grepon, B. G., Liwanen, N. G., & Ranido, C. J. C. (2021). Faculty Attendance Monitoring System: An Improved with Barcode Scanner.

El-Salhi, S. M., Saleh, S. A. N. A. H., & Al-Amro, I. I. (2019). Towards developing an automated attendance management system using barcode reader: Hashemite University as a case study. *International Journal of Business Information Systems*, *31*(1), 69-85.

Ishaq, K., & Bibi, S. (2023). IoT based smart attendance system using RFID: A systematic literature review. *arXiv preprint arXiv:2308.02591*.

Awotunde, J. B., Sur, S. N., Aderinto, M. T., & Gaber, T. (2022, December). RFIDBased Student Identification Card Attendance Monitoring System. In *International Conference on Communication, Devices and Networking* (pp. 31-41). Singapore: Springer Nature Singapore.

Nalupa, M. L. V., Fernandez, J. R. D., Dacay, W. J. C., & Bergado, M. M. FRAUD DETECTION USING ISOLATION FOREST FOR RFID-BASED ATTENDANCE MONITORING SYSTEM.