

**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

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APPROVAL SHEET

This Capstone Project entitled “WEB-BASED AUTOMATED INGRESS AND EGRESS SYSTEM FOR BSIS STUDENTS IN COMPUTER LABORATORIES AT SANTA RITA COLLEGE OF PAMPANGA ” proposed and submitted by **Group 5 3A** 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**.

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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 web-based 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

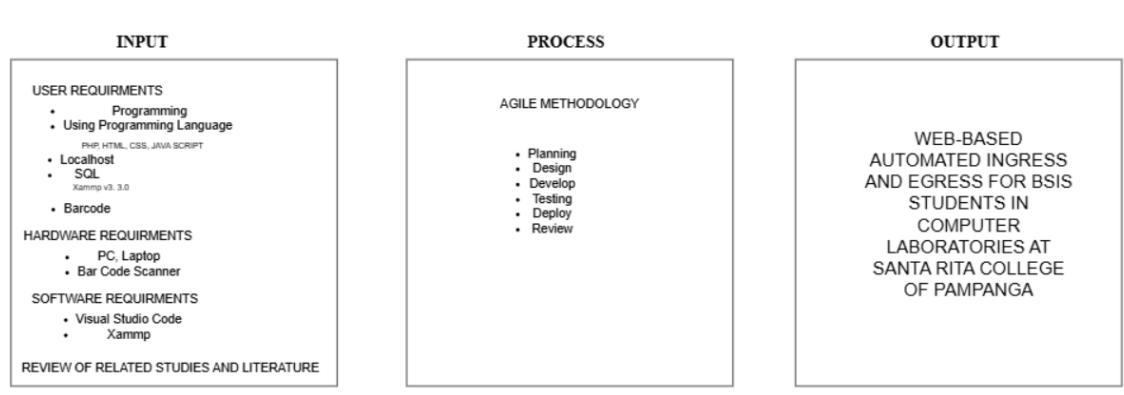


Figure 1: This conceptual framework represents the research project's input, process, and output.:.

It involves gathering required development equipment, software, and expertise.

Both front-end and back-end programming tools, such as Visual Studio Code, are used. The system uses the Agile Methodology to carry out the planning, designing, development, testing, deployment, and review phases. The ultimate result is a website-based automated exit and ingress system that maximizes student attendance control in the computer labs at Santa Rita College. It enhances overall record-keeping and management in a secure, effective, and precise manner.

STATEMENT OF THE PROBLEM

The Santa Rita College Computer Laboratories' present manual attendance monitoring system is unreliable prone to mistakes and unsecure, leaving it open to harm and unwanted access.

SPECIFIC PROBLEM

1. How can the system increase student attendance accuracy, speed, and efficiency?

2. How can instructors and administrators control lab access, improve security, lessen workload and guarantee correct records with real-time attendance monitoring?

3. How can a barcode-based access system increase safety, and make the Computer Laboratory more organized and productive?

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. Flexibility

 - i. Safety

OBJECTIVES OF THE STUDY

This Study aim to develop an automated ingress and egress system that improves student attendance management while guaranteeing efficiency, accuracy and security in Santa Rita College of Pampanga's computer labs A and B.

The following are the study team's precise objectives:

1. Upon entering, students can easily scan their ID with a barcode scanner, which instantly records their attendance for that particular subject and makes it visible on the teacher's dashboard.
2. With the goal to improve security, lessen stress and guarantee correct attendance monitoring, we develop this automated system eliminates the need for teachers to manually check attendance, Administrators can also easily monitor lab access and identify individuals in real time by simply looking and check in to the system.
3. In order to provide a well-organized, effective and well-managed computer lab, teachers assign PC numbers to each student personally and give them along to the administrator, then registers to the system. BSIS pupils also have a unique barcode on their school ID for lab entry and exits.
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 i. Safety

SIGNIFICANCE OF THE STUDY

This Study At Santa Rita College of Pampanga, automated entry and egress system for CCS faculty, students, and administrators greatly improves their access to the computer lab while simplifying attendance tracking for a more effective and well-organized experience.

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

Teachers . The study's benefit to instructors is that it makes tracking attendance easier. Bar codes make it computerized, so instructors won't have to enter attendance in Excel or another program and then update it. This reduces administration, provides accurate records in real time and frees up more time for teaching

Students. It would result in safer and easier access to the labs for the students. Only authorized people will be able to use the facilities for study, which will decrease entry and exit wait times and promote safety and order. Since each access record is linked to a specific user, it will further establish accountability by holding them accountable for the resources available in the labs.

Administrators. A real-time solution to track laboratory activity, which will improve staff and student supervision while guaranteeing facility security and appropriate management. Reports that assess laboratory usage patterns, monitor unwanted access, and ensure equipment and resource responsibility can be generated by the administrators.

SCOPE AND DELIMITATION OF THE STUDY

Real-time student entry and exit are recorded in order to develop this system that does away with manual attendance tracking. By guaranteeing safe access for BSIS Student this system can safeguard lab resources and encourage responsible use. Teachers and administrators can receive real-time information from the system. While administrators can effectively manage lab usage, evaluate trends, and prevent illegal entry or resource misuse, improving overall laboratory management, teachers can focus on teaching instead of spending time checking attendance.

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.

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

4. 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

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

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

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

8. 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.

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

10. Barcode Scanner - is used to quickly and accurately record student entry and exit by scanning their school ID, ensuring real-time attendance tracking and secure access to the computer laboratory.

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

As stated by Bayani et al. (2023) Monitoring System for Class Attendance with the The usage of mobile tethering is centered on creating a mechanism for tracking attendance. for Laguna's National University (NU Laguna). The aim of this research is to automate tracking of attendance at NU Laguna. Apart from tethering technology, the system additionally includes the use of QR code technology. This project highlights the importance of highlighting NU Laguna's reputation as a top university and the advantages of an automated method for monitoring and recording attendance.

According to David (2021) claims that the extensive use and accessibility of QR (Quick Response) Code technology has sparked a number of advancements meant to offer more easier and quicker information access. In the educational realm, this

technology has been employed in systems that provide effective attendance monitoring.

In this research, a technique for tracking attendance based on QR codes that streamlines processes it might be suggested that those involved in using it.

As stated by Acasamoso et al. (2021) Attendance is an essential aspect of Regular attendance increases the likelihood that children will achieve in school and establishing oneself as an important part of the school community. Additionally, it is crucial for keeping track of their attendance and time at school. The research group created a tool. that can monitor and document children' attendance at school for future use is first used in the Polytechnic for goals utilizing the Waterfall Model. Branch of the University of the Philippines in Ragay, Camarines Sur.

FOREIGN

As mentioned by Elaskaria et al. (2021) Monitoring student resources and attendance are two significant issues in the majority of colleges since they constitute a component of the assessment procedure for annual audits of university assets and students. Although there are numerous approaches in the literature to. We decided to employ barcode technology to address the tracking of students and assets because it is inexpensive and simple. to put into practice. We begin our study by providing a historical summary of the earliest instances of the employment of recognizing some of the different forms of barcode technology.

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According to Shaban et al (2021) In educational institutions, maintaining records of students' attendance is a slow, manual procedure that is prone to mistakes and takes a long time. To record student attendance, we have created an application. Students will aim their devices toward a distinct QR Code that is shown on the instructor's projector throughout each class period. The learning-management system will promptly record each student's attendance system.

As stated by OLUWASEGUN (2019) This focuses on using barcodes for course identification and authentication. The system would be able to store student information with barcodes. Attend classes, using the barcode value that is created for scanning as the key identification for each course. The project's objectives will be achieved by creating mobile software apps for Mobile platforms, which will be able to utilize certain hardware elements of users' devices to guarantee the generation and scanning of provided barcodes.

RELEVANCE OF THE DIFFERENT RELATED LITERATURE

LOCAL

According to Valdez et al. (2024) In the Bicol Region, only a few of public and students at private schools can use a radio frequency identities card. Campus of colleges and universities. On campus, this technology is frequently used to track attendance of students, especially during daily arrivals and departures. Additionally, it looks for the individual's identity. approved to enter the university's property by spotting someone trying to campus. The use of radio waves for identification is known as radio frequency identification, or RFID. either people or stuff.

As stated by Velasco (2023) The goal of the study is computer security. labs combined with automated and intelligent attendance tracking. Isabela is where it was designed. State University Cauayan City Campus, particularly at the College's Computer Lab Information and communication technology is studied by the College of Computing. Because the system is web-based, it may be used on any OS platform simply using a web browser to specify the IP address. It serves as a comprehensive user interface for tracking the attendance of its target users and management where it can track classroom admission, teachers' and students' attendance, and computation of absences and lateness

Base on study Ani~ et al. (2020) With the goal to rectify the deficiencies of the current techniques, and in order to reduce the risks, this study outlines the utilization of a web application that employs a motion sensor and ultra-high frequency (UHF) RFID to track the

attendance of students from San Carlos University. There is wireless communication between the web and hardware systems for recording and verifying student attendance. To track attendance in class and reduce unforeseen circumstances, a web application is created for the chairman, instructors, and students. The faculty can also create and modify an arrangement of seats.

According to the analysis Hussien et al. (2024) 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.

FOREIGN

Based on the analysis of Elaskari 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.

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.

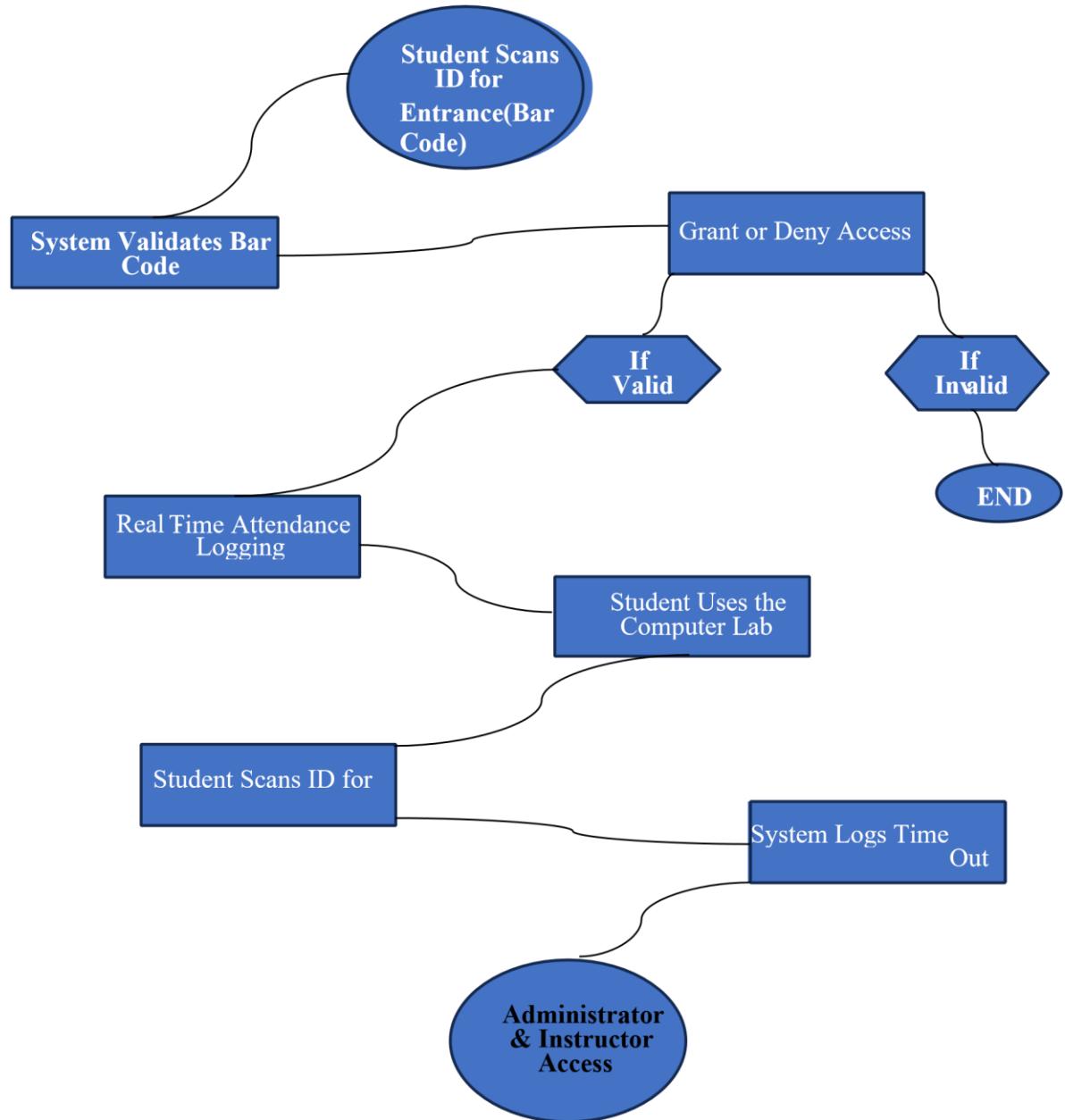
According to the study of [Joseph Bamidele Awotunde](#) et al. (2022). This project presents contactless attendance system passive radio-frequency identification (RFID)based approach. RFID is a technology that uses radio waves to send information from an RFID tag attached to an object to a reader for 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.

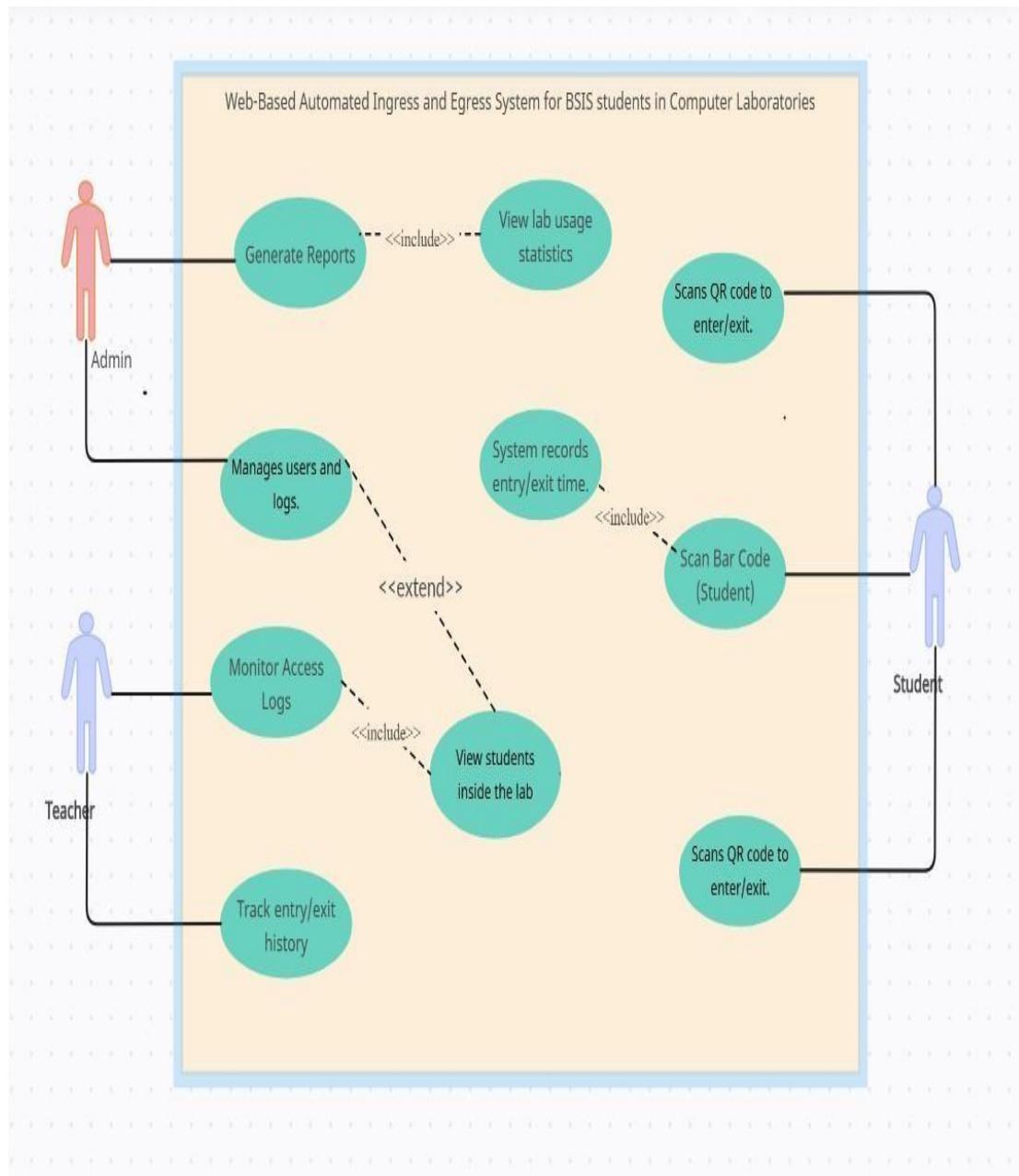
Considering the research of [Kashif Ishaq](#) and [Samra Bibi](#) (2023). The use of Radio Frequency Identification (RFID) technology is ubiquitous in a number of businesses and sectors, including retail sales, smart cities, agriculture, and transportation. Additionally, educational institutions have 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

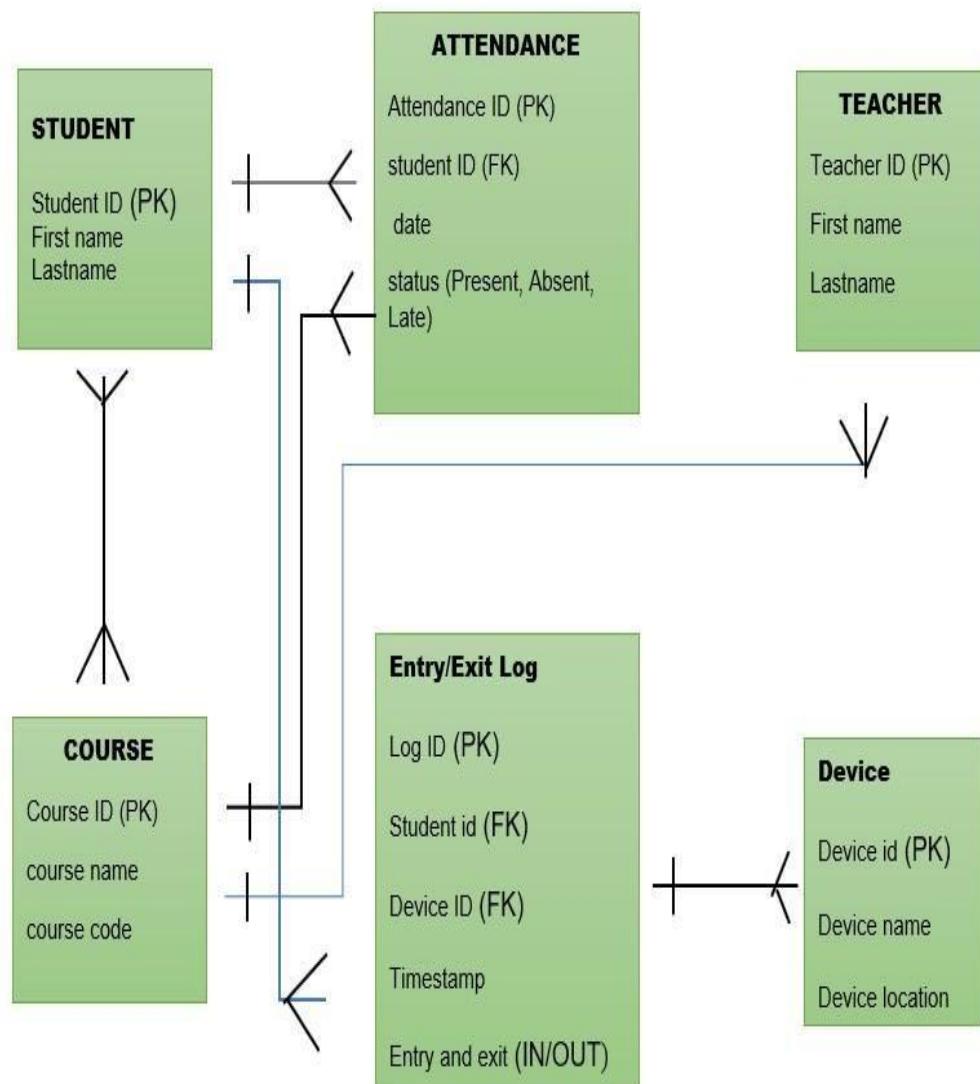
problems connected with the manual process, such as time wasting, proxies, and the possibility of losing the attendance sheet, in contrast to the traditional attendance system, which depends on manual signatures. By creating a system that automatically registers students' attendance by merely flashing 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.

FLOWCHART



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 efficiency 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

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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 programming 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.

Planning- 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.

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 – 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 are from Santa Rita College of Pampanga and engaged in discussions with their 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.

HTML - (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.

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