DEVELOPMENT OF A WEB-BASED AUTOMATED INGRESS AND EGRESS

SYSTEM FOR SANTA RITA COLLEGE OF PAMPANGA BSIS STUDENTS IN

COMPUTER LABORATORIES

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

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APPROVAL SHEET

This Capstone Project entitled " Development of a Web-Based Automated Ingress and Egress for Santa Rita College of Pampanga BSIS Students in Computer Laboratory" proposed and submitted by **Cristine Maambong, Roman Mercado, Christopher Panoy and Leonel Popatco** 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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Table of Contents

LIST OF TABLES

LIST OF FIGURES

<div align="center">

CHAPTER I

INTRODUCTION

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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 F~RAMEWORK~ ~OF~ Development of a Web-Based Automated Ingress and egress system for Santa Rita College BSIS Students in Computer Laboratories

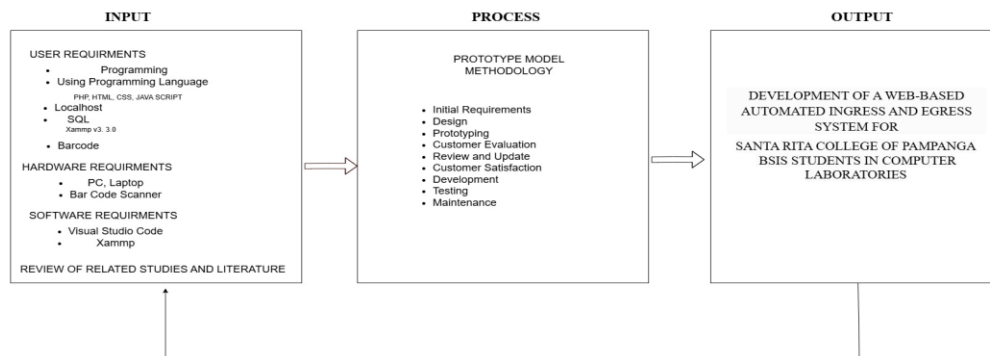| INPUT	PROCESS	OUTPUT
USER REQUIRMENTS • Programming • Using Programming Language PHP, HTML, CSS, JAVA SCRIPT • Localhost • SQL Xammp v3. 3.0 • Barcode HARDWARE REQUIRMENTS • PC, Laptop • Bar Code Scanner SOFTWARE REQUIRMENTS • Visual Studio Code • Xammp REVIEW OF RELATED STUDIES AND LITERATURE	PROTOTYPE MODEL METHODOLOGY • Initial Requirements • Design • Prototyping • Customer Evaluation • Review and Update • Customer Satisfaction • Development • Testing • Maintenance	DEVELOPMENT OF A WEB-BASED AUTOMATED INGRESS AND EGRESS SYSTEM FOR SANTA RITA COLLEGE OF PAMPANGA BSIS STUDENTS IN COMPUTER LABORATORIES

Figure 1: Conceptual Framework of the Study

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 Prototype Model Methodology to carry out the initial requirements , design, prototyping, customer evaluation, review and update, customer satisfaction, development, testing and maintenance. 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. Flexibilty

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 a 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.

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 of 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 of 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) in his paper, 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.

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CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

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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 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.
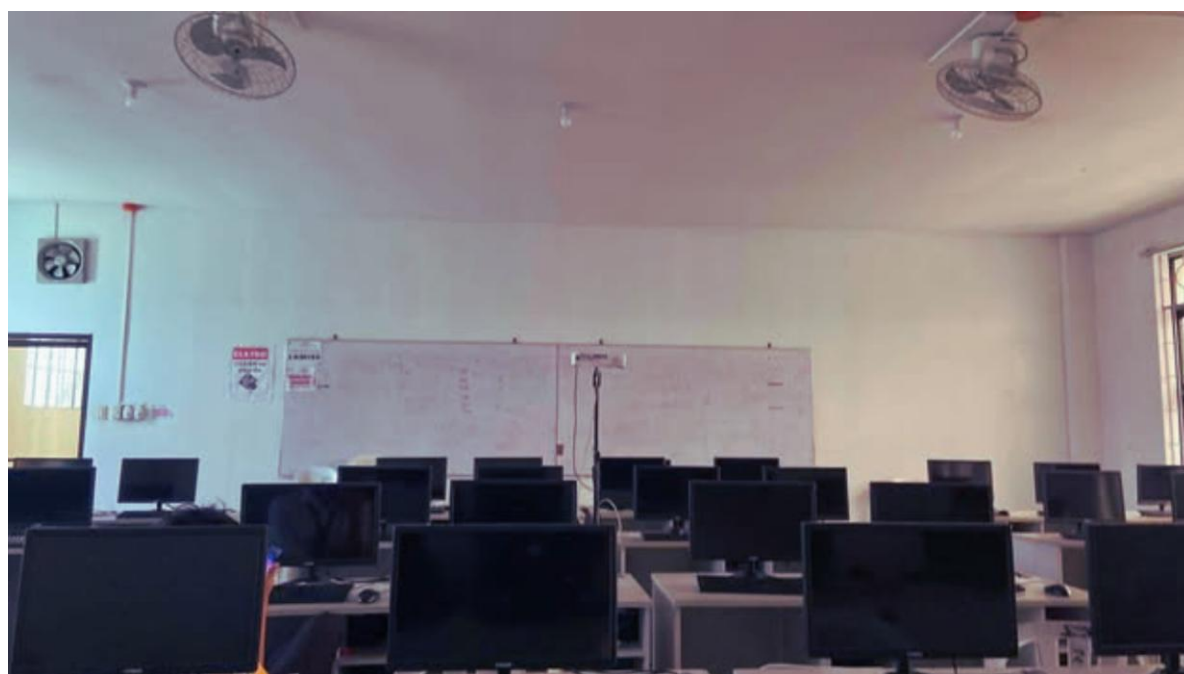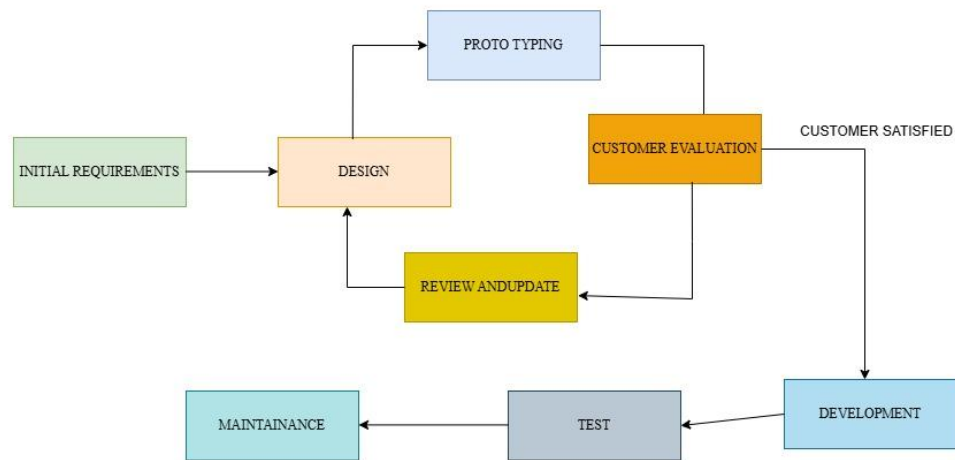
SOFTWARE DEVELOPMENT METHODOLOGY

Figure 2 Prototype Model Methodology of Development of Web-Based Automated Ingress and Egress System

Figure 2: Shows how the researchers developed and created the proposed system using a variety of development tools, including programming languages such as PHP, JavaScript, HTML, CSS, and MySQL, along with other related technologies. The Prototype Model serves as the foundation and structure for developing the proposed system. This methodology focuses on iterative development, where a working prototype is built, evaluated, and refined based on continuous user feedback to ensure the system aligns with end-user requirements.

Initial Requirements

In this phase, the researchers carefully examined end user needs, security standards and system requirements to make sure the suggested solution fits institutional objectives. It includes consultations with faculty , administrators and also Dean of CCS to determine key features and security protocols. A project scope is outlined in its entirety, including functionality, access control and expected outcomes.

Design

In designing phase, the researchers built the system architecture on the basis of a robust backbone of properly organized code with the use of programming language to make it efficient, scalable and maintainable. Secure database management system is implemented to make storage and retrieval of data easy. The user interface is crafted with intuitive navigation to provide a better experience for the administrators, faculty, and students. A smooth barcode scanning facility is incorporated to make operations faster, while security features like access authentication, role-based permissions, and data encryption are incorporated to protect sensitive data. The general layout and workflow are designed with ease of use in mind to ensure effortless interaction with all the system features.

Prototype

The Researcher's first implementation of the system is created highlighting its fundamental features such as the use of barcodes to control access and track real-time attendances. This is used as a proof of concept to enable stakeholders to engage with and

evaluate the usability of the system. It is used as a basis to make iterative improvements based on initial testing and feedback.

Customer Evaluation

Faculty, students and administrators participate in a controlled system testing where they check efficiency, security and usability in a real time. Their feedback is collected to identify potential issues, the areas of improvement and additional features needed for optimization. Performance measures such as response accuracy and user experience are analyzed to ensure reliability.

Review and Update

Based on the feedback the system is thoroughly reviewed to determine weaknesses, security issues and areas of improvement in usability. Required updates are implemented, ranging from streamlining interface components to optimizing the performance of the system and the security features. Through this cyclical process, the system is made to adapt to institutional needs and beyond the expectations of the users.

Development

The system is complete with the final features in place, such as the robust database, secure access control and real-time attendance tracking. Performance optimizations are put in place to guarantee that the user experience runs smoothly and efficiently, free from

technical issues and processing lag. To guarantee adherence to the intended specifications and security measures the finished product is put through a rigorous testing process.

Testing

Prior to deployment through assessment is carried out to confirm the system accuracy, security and stability. To identify potential threat and vulnerabilities, validate data consistency and ensure functionality across scenarios both automated and human testing are carried out. Then stress testing is carried out to confirm dependability and assess performance under high loads.

Maintenance

Regular improvements and updates to the system are implemented to enhance performance, security and the users' experience. Regular checks ensure trouble-free performance while patches and troubleshooting fix newly encountered issues. Future developments and extensions are planned to adapt to shifting institutional needs and technological advances.

RESPONDENTS OF THE STUDY

  The respondent of this study is the two(2) MIS administrator, one(1) dean , BSIS Students and Computers Studies Teacher.

Respondents	Number of Respondent
MIS Administrator	2
Dean	1
Faculty	5
Students	300
Total	**306**

Table 1: Respondents of the Study

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

It 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(Cascading Style Sheets)

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 (Hypertext Preprocessor)

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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