

**DEVELOPMENT OF A WEB-BASED AUTOMATED ACCESS CONTROL
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

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APPROVAL SHEET

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To our families, your unwavering support powered us through. To our peers, your encouragement and collaboration mattered more than you know.

And above all, we thank God — the source of our strength, clarity and drive.

The Researchers

ABSTRACT

Researchers have developed a system that will automate and streamline the monitoring of the computer laboratory at Santa Rita College of Pampanga. The system, called the Automated Access control System, recorded in real time every entry and exit of BSIS students in the laboratory, with attendance automatically reflected in the accounts and dashboards of administrators and teachers. The system allows the school to register all BSIS students by year and section, automatically generating a unique barcode for each student to be placed on their ID for scanning. Through this system, administrators and faculty able to easily monitor lab usage and generate detailed attendance reports in PDF or Excel format. By replacing manual logging with a fully automated process, the system ensured accurate records, improved security and enhanced efficiency in managing laboratory access.

Keywords- Automated Access control, Barcode scanning

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CHAPTER 1

INTRODUCTION

BACKGROUND OF THE STUDY

Computer Labs A, B and C 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, the researchers proposed system aims to implement a web-based automated Access control 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

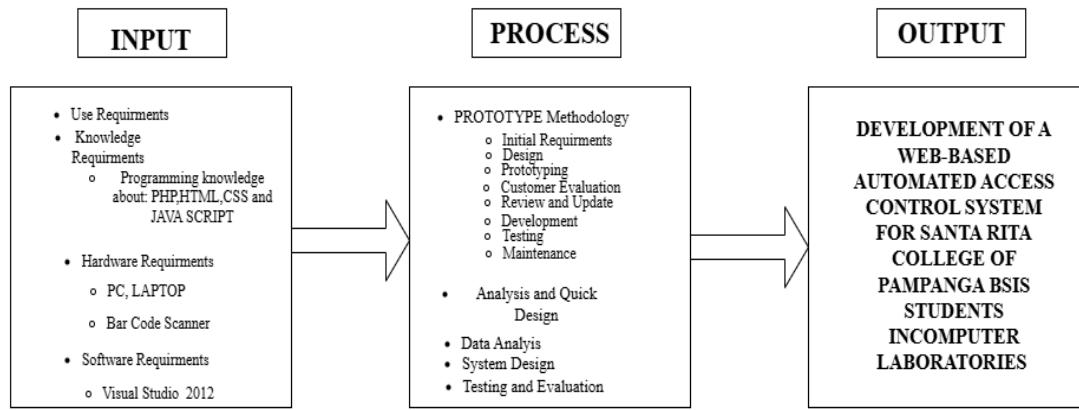
facilitates enhanced security as well as enhanced efficiency but also more orderly, student-based, as well as technologically driven learning.

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 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. A Admin assigns a specific PC barcode to each student to have a better-organized setup and effective monitoring of the use of the PCs. Irregular students will also be given seats at the rear of the laboratory to preserve the uniformity and consistency of the PC setup for regular students. 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 the records of students devices ultimately developing a more disciplined and dependable study area the records of students.

Figure 1

Conceptual framework Development of a Web-Based Automated Ingress and egress system for Santa Rita College BSIS Students in Computer Laboratories



In figure 1, 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 result is a website-based automated entry and exit access control 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 has no attendance monitoring system to know who enters or leaves the laboratories and as a result, many equipment gets damaged without anyone being held accountable.

Problems:

1. How to design and develop Automated Access Control System for Santa Rita College of Pampanga BSIS Students in computer laboratory?
2. How can Administrator and Faculty control lab access, improve security, lessen workload and guarantee correct records with real-time attendance monitoring?
3. What are the benefits of the proposed system?
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

OBJECTIVES OF THE STUDY

This study aim to develop an automated Access control system that improves student attendance management while guaranteeing efficiency, accuracy and security in Santa Rita College of Pampanga's Computer laboratory.

The researchers' specific goals are as follows:

1. Design and develop a barcode-based web system to instantly and accurately log BSIS students' computer lab entry and exit without manual input.
2. By using a real-time, barcode-based attendance system, instructors and administrators can control lab access, enhance security, reduce manual workload and ensure accurate, tamper-proof attendance records.
3. The system saves time, ensures accurate records, boosts security, reduces manual work, and provides real-time attendance tracking.
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

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.

Benefiting the study are the various sectors:

- **Computer Laboratories** - With the proposed system, the computer laboratory of Santa Rita College of Pampanga can maintain a centralized database to efficiently organize and manage of attendance of all BSIS students.
- **Administrator** - A real-time system that tracks laboratory activity, strengthens supervision, secures facilities, and enables administrators to generate reports on usage, access, and equipment accountability.
- **CCS Faculty**– The system streamlines attendance tracking through barcodes, eliminating manual entry and updates. It delivers accurate, real-time records and frees instructors to focus more on teaching.
- **BSIS Students** - the system provides fast and hassle-free entry to the computer laboratory, ensures their attendance is recorded accurately in real time, and eliminates the need for manual logbooks. It also enhances security, prevents unauthorized access, and ensures fair usage of laboratory resources.
- **Researchers** – Researchers prepared their research for Santa Rita College of Pampanga to help their problem in the Computer laboratories.
- **Future Researchers** - Future researchers can use this study as a reference to their study.

SCOPE AND DELIMITATION OF THE STUDY

The system can records student entry and exit in real time as soon as a student scans their ID, eliminating the need for manual attendance tracking. The admin can registered BSIS student in the system and assigned a unique barcode for secure identification. This guarantees safe access, protects laboratory resources, and promotes responsible usage. Teachers and administrators gain instant access to real-time data, teachers can focus fully on teaching without the manual roll calls of checking attendance, while administrators can efficiently monitor lab usage, analyze trends, and prevent unauthorized access or misuse. By automating these processes, the system streamlines operations, strengthens security, and elevates overall laboratory management..

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

The following terminologies are operationally defined to make this study simpler to understand and interpret:

1. **Automatic Time In/Time 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. **Attendance Monitoring**- The process of tracking and recording student presence and absence during their access to the computer laboratory, ensuring accurate attendance records.
7. **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.
8. **Dashboard**- A web interface that displays attendance records for Teachers and admin.

9. **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.
10. **Technology** - The application of scientific knowledge for practical purposes or applications.

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

In this chapter, the researchers conducted research on earlier studies that are relevant to the current study and that the researchers can recommend. Any related research or articles should be included as references in the Automated Access Control System to identify areas for improvement.

RELEVANCE OF THE DIFFERENT RELATED STUDIES

Based on a preliminary study conducted by Pangestika at el. (2024), the use of attendance technology utilizing a barcode scanner at MA Assalafiyyah Mlangi has been in place since 2020. The researchers are interested in examining whether barcode scanner-based attendance is effective in improving student discipline.

As stated by Shakir (2023), Attendance needs to be well recorded to meet the subject requirements and ensure the active participation of students. Appropriate record-keeping is essential for assessing student performance adequately. There were more mistakes in larger classes because recording attendance by hand with a pen and paper was time-consuming and prone to human error. This paper's objective is to investigate the acceptance level for mobile application barcode attendance for the University of Buraimi (UoB) students.

As stated by Acasamoso et al. (2021), attendance is important. Regular attendance increases the likelihood that children will do well in school and defines oneself as an important member of the school community. It also helps them keep track of their attendance and time at school. The research group created a tool. The Polytechnic School

first applied the Waterfall Model to monitor and document children's school attendance for future use.

Attendance systems have been rated as amongst the critical issues that reflect domain achievements, and their performances have contributed better to organizations, industries and universities compared with traditional methods that are time-consuming and inefficient. Different automatic identification technologies have become trends, and extensive research conducted and many applications produced to maximize technology features Ali, N et al. (2022).

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.

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

Based on the findings and conclusions drawn the following are recommended that the Data Center College of the Philippines need to establish a updated and upgraded barcode scanner to have a better performance attendance monitoring in the school. In terms of security of the students the SMS parent notification is recommended for the parental monitoring to avoid absenteeism and parent appearance in the guidance De Guzman et al. (2023)

Based on the analysis of AlSideiri et al. (2022), the main objective of the subject requirements is to mark students' attendance during a class session because this will control the students' attendance. Additionally, it confirms the number of students in the class. Pen and paper were used to manually record attendance in the past. This approach is time-consuming, particularly when there are a lot of students, adds to the teacher's job, and occasionally the data may be prone to errors. Instead of the usual method, which involves the teacher spending time calling students to find out who is present or absent, this application will make it easier to attend to the students during registration.

As stated by Vaishnavi et al. (2022), barcode-based system for recording student attendance. Every student is given a card with a unique barcode on it. Each barcode reflects a student's unique identifier. Students just scan their cards with a barcode scanner, and the system records their attendance according to the dates. Following that, the system saves all of the students' attendance records and creates a defaulter list. It also creates an overall report for the administrator in the form of an excel sheet.

According to Jr., Daniel et al. (2021), the study addressed the security issues in terms of the use of the computer laboratories using the barcode technology in regulating

the entry point of the students and logging in the attendance log. It will only allow student users who were currently enrolled based on the schedule laboratory time and who has an account in mymu server.

As mentioned by Shiral et al. (2020), This project uses a barcode scanner uses Barcode scanner to take the attendance of students entering the lab. Each student's ID card will have a barcode at the back side of it. This barcode contains unique data of the student such as roll number, branch and year. Etc. Student will scan their barcode at the end so that the student can't cheat. The display screen will show the attendance of the particular student after scanning his/her barcode. Teachers and administrator will only have access to the system with their respective login ID's and passwords. General Terms Barcode Scanner, ID card.

TECHNOLOGY RELATED TO THE PROJECT

Edmatix

aieduerp.com

AI Edu's cloud-based Student Information System (SIS) empowers schools and colleges across the Philippines—including Manama, Muharraq, Riffa, and more—to streamline academic and administrative operations. From admissions and attendance to grading, fees, and graduation, our all-in-one ERP automates student and staff management, complaints, library systems, inventories, and more—boosting efficiency and control at every level.

Hash Micro School Management System (Philippines)

www.hashmicro.com

Popular in the Philippines, it offers features like biometric attendance, access logs, and user dashboards—ideal for managing student entry and exit securely.

openSIS

opensis.com

An open-source student information system with features like attendance tracking, secure login, and user role management. It proves the effectiveness of scalable and customizable systems.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

The development of a web-based automated Access control system for BSIS students in the computer laboratories of Santa Rita College of Pampanga is guided by a strong research methodology and design. By applying structured methods such as surveys, case studies, interviews, observations and document analysis, this study ensures data- driven insights that lead to smarter, more secure and more efficient access management. This approach enables informed decisions that directly enhance system performance and support the institution's goal of modernizing lab access and attendance tracking

RESEARCH DESIGN

To develop the web-based automated Access control system, the researchers used the Prototype Methodology. They analyzed the school's current access procedures and engaged with key personnel to gather system requirements. By continuously building and refining prototypes based on user feedback, they ensured the system directly addresses the issues in managing student entry and exit in computer laboratories.

RESEARCH PARTICIPANTS

The participants of this study included two I.T Staff, a College Computer Studies Dean, College Computer Studies faculty, and BSIS students who were involved in the actual process and were the most important beneficiaries of the system. Data analysis software, statistical procedures and formal data gathering protocols were used for correct and relevant results.

RESEARCH LOCALE

Santa Rita College of Pampanga, located on Carlos Mariano Street in San Jose, Sta. Rita, Pampanga, is a private Catholic institution founded in 1945. Committed to accessible quality education, SRC offers programs from elementary to college. The College Department grants degrees in Information Systems, Accounting Technology, Entrepreneurship and Education, while the Senior High School offers both Academic and Technical-Vocational-Livelihood (TVL) tracks. SRC is fully recognized by CHED and DepEd.

Figure 8
Computer Laboratory and Canvas of the Locale

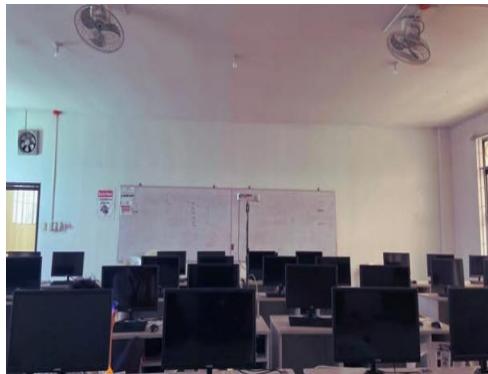


Figure 2 show the Com Lab and Canvas of Santa Rita College.

SOFTWARE DEVELOPMENT METHODOLOGY

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.

Figure 13

Prototype Model Methodology of Development of Web-Based Automated Access control System

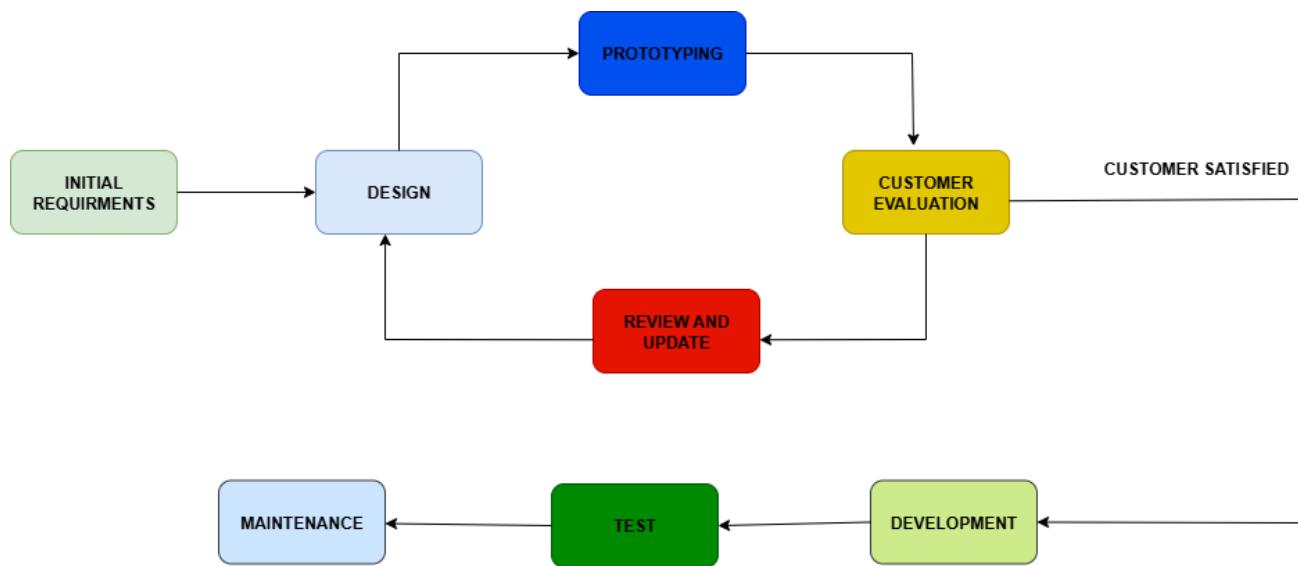


Figure 3 show the Process of Prototype Model Methodology of Development of Web-Based Automated Access control System.

Initial Requirements

The Researchers defines the scope, goals, and timeline. Clear requirements set the foundation and combine our thoughts for the system. This guarantees everyone involved has a common vision of the goals of the project. It also reduces risk by resolving possible problems ahead of time before development starts.

Design

In this phase, the researchers work on to appropriately visualizing the system and choose an interface that is fit, easy to use, efficient. and design diagrams are produced to show the flow and interaction of the system. This process ensures the users' needs are reflected in the layout and functionality while making it clear and usable.

Prototyping

Preliminary version of the system is developed often in the form of a front-end web application. This allows the team to demonstrate the core features and overall flow of the system.

Customer Evaluation

Users test the prototype and provide feedback. The result help the researcher to improve and get the expectations of the users. This stage allows the identification of errors, missing features, and usability issues at an early point.

Review and Update

The researchers reviewed the feedback, then fix and set the system design and features.. Revisions were made to address usability concerns, enhance performance, and strengthen security measures. This iterative process ensured that the system evolved based on actual user needs.

Development

At this point, the system is tuned to incorporate all features and functionalities intended. it makes sure that all the component seamlessly collaborate, paving way for final testing and deployment.

Testing

The system undergoes to ISO 25010 standards for software quality testing the Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, Flexibility, and safety.

Maintenance

After launch, the system is continuously monitored, updated, and optimized. Bugs are fixed promptly, and enhancements are rolled out to keep it effective and reliable and enhancements are rolled out to keep it effective and reliable.

SAMPLE AND SAMPLING PROCEDURES

The College of Computer Studies makes up the sample and sampling for this study. The convenience sampling method was utilized by the researchers to identify the respondents. Non-probability/non-random sampling, in which samples are chosen based on convenience, was used to pick the study's sample.

RESPONDENTS OF THE STUDY

The respondent of this study is the two(2) I.T Staff, one(1) dean , BSIS Students and Computers Studies Faculty. These people were primarily involved in and benefited from the study.

THE RESEARCH INSTRUMENT

The researchers will use the interview method as their research instrument in collecting data.

The researchers will use the interview method as their research instrument in collecting data.

Interview - Based on the research history, interviews are a powerful research tool for obtaining accurate and relevant data. In this study, the researchers conducted interviews with CCS dean, faculty and BSIS students at Santa Rita College of Pampanga to gather firsthand insights and identify key issues concerning the current condition of the computer laboratory.

Observation - The researchers observed, several pieces of equipment are frequently damaged, yet no one is held accountable. Existing monitoring systems, including CCTV and limited MIS oversight, remains insufficient. Before the development,

relevant references were reviewed and key insights were gathered to ensure the system effectively addresses these issues.

DATA GATHERING PROCEDURES

Using interviews, the researchers were able to collect the data required for this study. By asking College of Computer Studies Dean, MIS staff, and faculty about their opinions of the system and some facts regarding the current state of the computer laboratory, the researchers were able to collect data and information from their genuine point of view.

DATA ANALYSIS TOOL

The researchers can used interviews to obtain the information required for this study. To obtain data from the actual viewpoint of the computer Laboratory, the researchers conducted an interview with them in which they inquired about their opinions regarding the system and certain facts regarding the state of Santa Rita College of Pampanga at the time.

Researchers will use the ISO 25010 approach to determine software product standards. The results of the assessment on functional suitability, performance efficiency, compatibility, usability, dependability, security, and maintainability will be analyzed using the Likert scale approach. The findings will be calculated and interpreted using the following formula:

$$\frac{\text{Rating} = (\text{VS}*4) + (\text{S}*3) + (\text{D}*2) + (\text{VD}*1)}{\text{Total Respondents}}$$

Table 1
The Likert Scale Conversion

DESCRIPTION	VALUE	CONVERSION
VS	4	3.26-4.00
S	3	2.51-3.25
D	2	1.76-2.50
VD	1	1.00-1.75

Whereas:

Rating = total result of the evaluation

VS = total number of respondents who answered Very Satisfied

S = total number of respondents who answered Satisfied

D = total number of respondents who answered Dissatisfied

VD = total number of respondents who answered Very Dissatisfied

STATISTICAL TOOLS USED

This section will serve as a guide for the researchers as they choose which statistical tools to employ.

Frequency: This was used to calculate the proportion of respondents who fit the statistical survey criteria for the range of given attributes.

Percentage: This was used to determine the number of respondents.

The formula is:

$$P = \frac{F * 100}{N}$$

Where:

P = Percentage

F = Frequency

N = Total number of populations

Mean: This was utilized to ascertain the general description of the answers provided by the participants for every question on the survey.

The formula is:

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$$

Where:

\bar{x} = Weight Mean

$\sum f_i x_i$ = Sum of Weighted Frequencies

$\sum f_i$ = Sum of Number of respondents

SYSTEM DEVELOPMENT TOOLS

This section shows the different instruments and techniques that researchers employ to build the proposed system. These were employed to enhance the evaluation of the system requirements.

Data Flow Diagram (DFD)

The process of flow and logic was visualized using a data flow diagram. The system data's input and output are also displayed.

Entity relationship Diagram (ERD)

Displayed the connections between the entity sets that were kept in the database. In this context, an entity is a part of the data. The database's logical structure is shown in the ERD.

Database Tables

One of the system's most important components is its database tables. It will function as a storage facility for the system's vital input data and information.

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.

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.

CHAPTER IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

The information acquired by the researchers on how the suggested system addresses the problem statement is presented in this chapter. It encompasses the creation of a student information system. The findings of the system evaluation, which was conducted using ISO 25010 questionnaires to assess the functional suitability, performance efficiency, compatibility, usability, security, maintainability, and portability of the development of a web-based automated Access control system for BSIS students in the computer laboratories of Santa Rita College of Pampanga, are also included in this section.

INITIAL REQUIREMENTS PHASE OF THE SYSTEM

In this phase, the researchers carefully examined end user needs, security standards and system requirements to make sure the suggested solution fits institutional objectives and also, they conduct a survey for BSIS Students for what they need. 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.

Figure 20
Interview and Consultation with the Locale



DESIGN PHASE OF THE SYSTEM

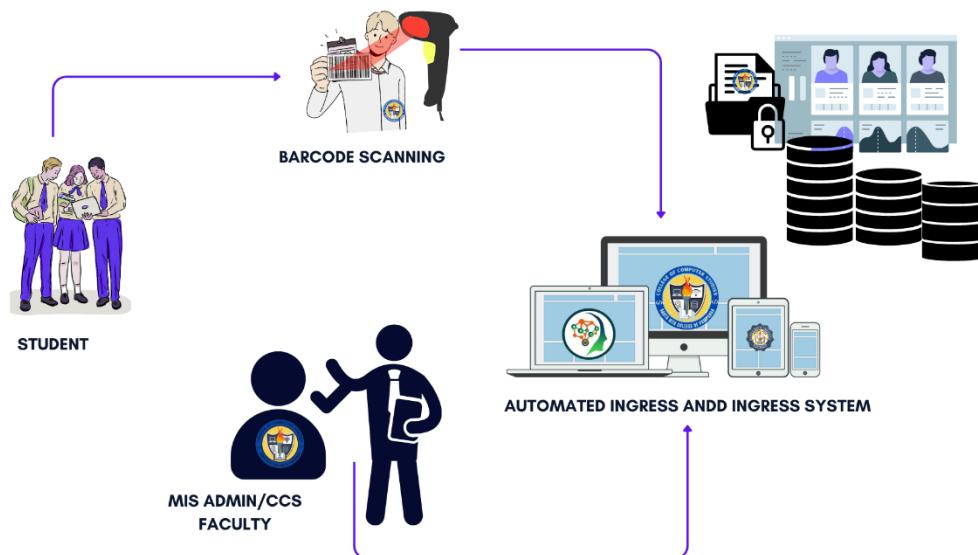
In designing phase, the researchers built the system architecture on the basis of a robust backbone of properly organized code with the use of programming language to make it efficient, scalable and maintainable. Secure database management system is implemented to make storage and retrieval of data easy. The user interface is crafted with intuitive navigation to provide a better experience for the administrators, faculty, and students.

DESIGNING OF THE PROPOSED SYSTEM

BSIS students scan their ID's unique barcode at the laboratory scanner, instantly recording their Time in and Time out in real time. These records are automatically go in the system, accessible to administrators and teachers through their dashboards and are secure against tampering or falsification, ensuring accurate and reliable monitoring.

Figure 5

Overall Process of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



DATABASE TABLES

Figure 6

Database Table of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

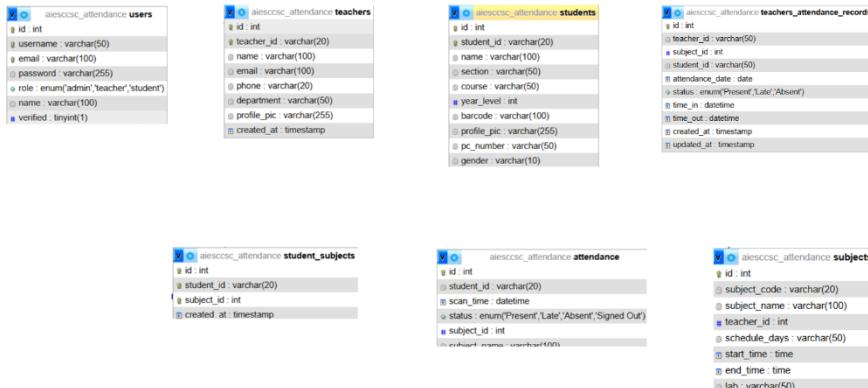


Figure 6 demonstrates the database design as it lays out the database's framework. It determines how connectedly the database tables relate to one another.

ENTITY RELATIONSHIP DIAGRAM (ERD)

Figure 7

Entity Relationship Diagram of Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



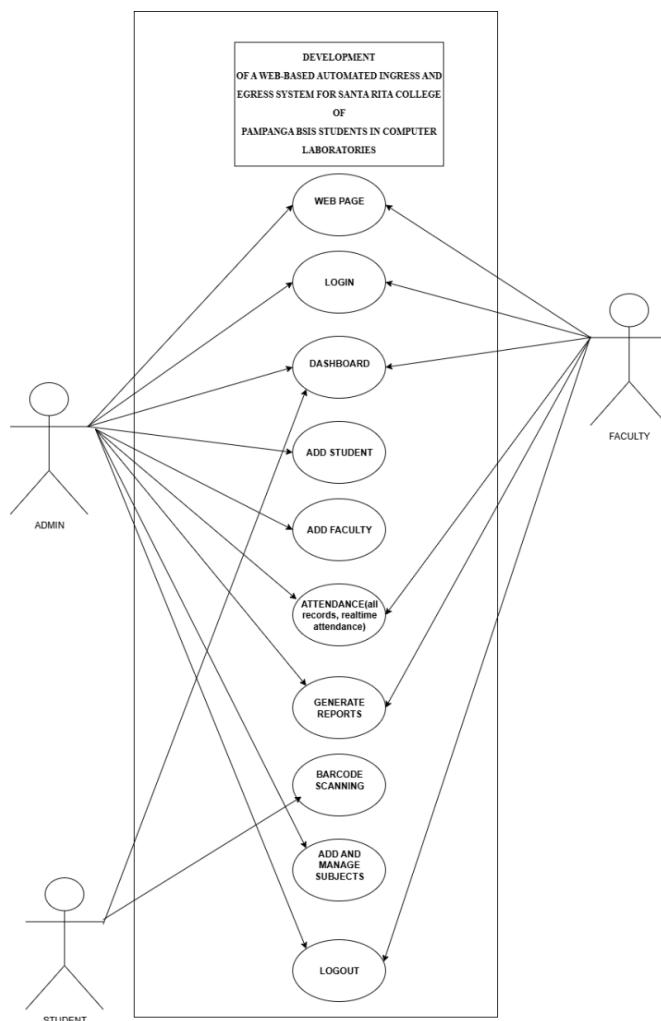
Figure 7 explains the Entity Relationship Diagram of the Development of a Web-Based Automated Ingress and Egress System for Santa Rita College BSIS Students at Computer Laboratory

USE CASE DIAGRAM (UML)

The relationships between the process and the data were defined by the use case diagram. It shows the users with access to the system as well as the features of the system.

Figure 8

Use Case Diagram of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



DATA FLOW DIAGRAM (DFD)

The Data Flow Diagram shows the flow of data and process of the system.

Figure 9

Context Diagram Level 0 of a *Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory*

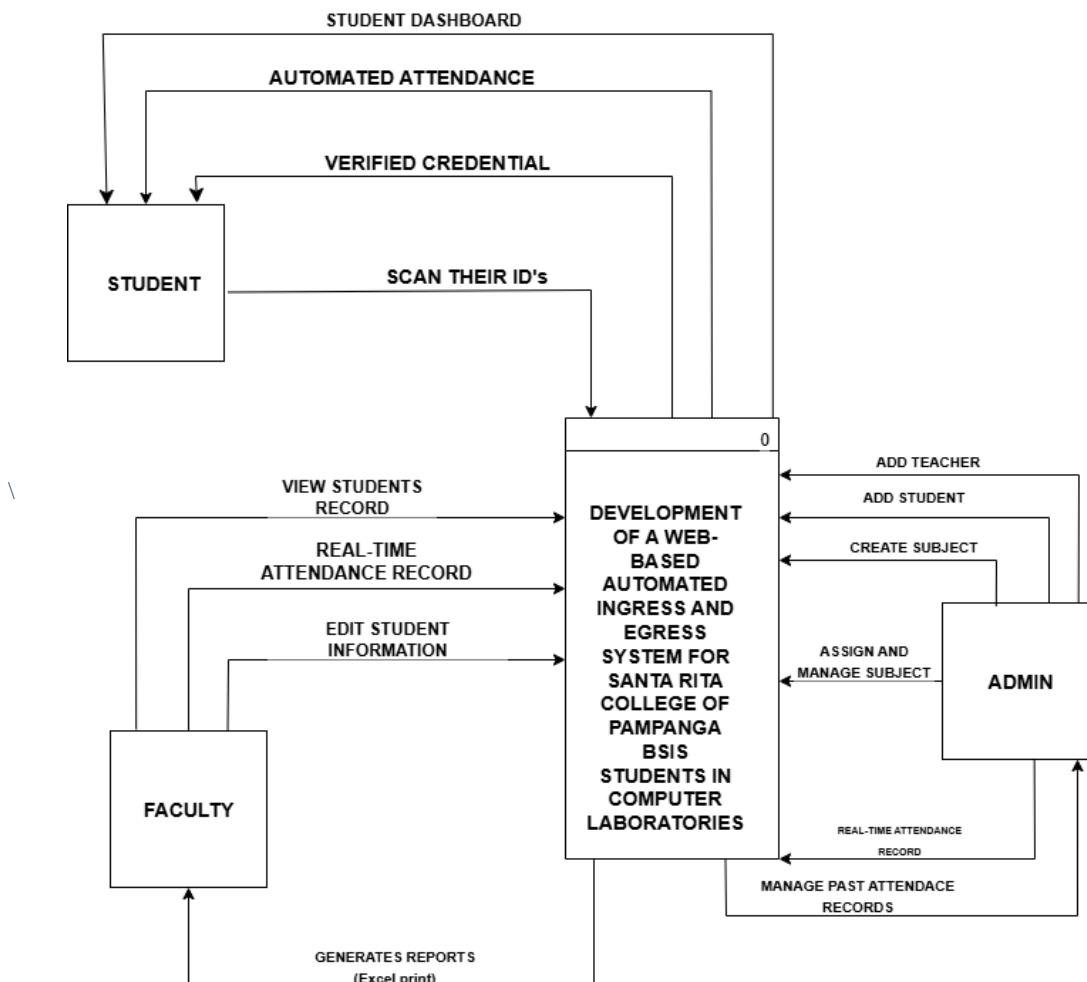


Figure 9 Show the Admin will register the Teachers and Students, and also create the subjects. Their attendance records are real-time, and the Admin also manages the past attendance records. For the Faculty, they can view the students' records and the real-time

attendance records that are recorded under them. The Faculty can also edit their PC number in case the assigned PC is damaged, and they can generate reports into Excel. For the Students, they will simply scan their ID barcode, and once their credentials are verified, their attendance will be automated and they can see on their dashboard if they have been recorded.

Figure 10

Context Diagram Level 1 of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

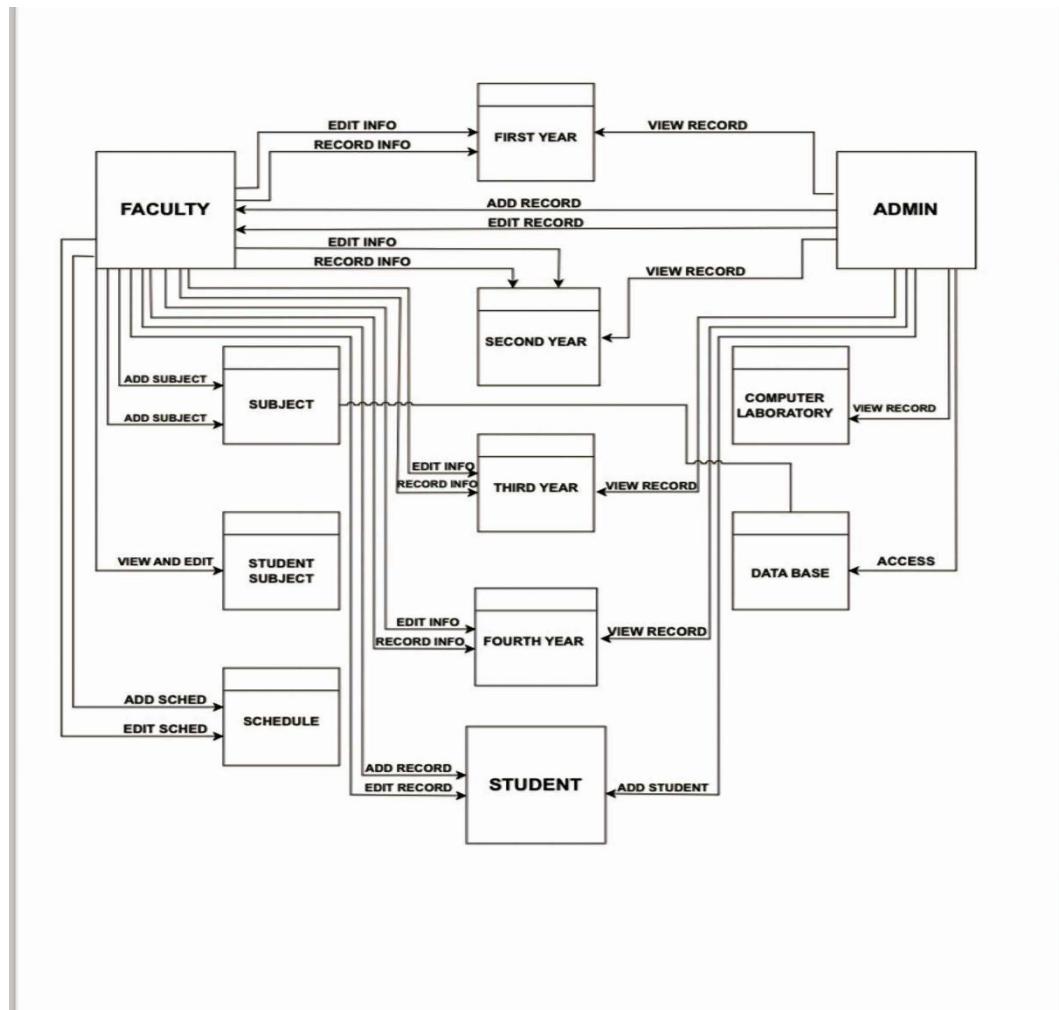


Figure 10, show the admin is responsible for adding and editing records of the faculty, as well as adding and editing records of the students. The admin also edits the information in the subjects and views the records in the computer laboratory. The admin also has access to the database. The faculty is responsible for adding and editing records, and for the students, they also add and edit records. The faculty is also the one who adds and edits information in the schedule. After the faculty edits and records the student data, it will be entered into the database.

PROTOTYPE PHASE OF THE SYSTEM

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.

Figure 11

Prototype Front Page – Index.php of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

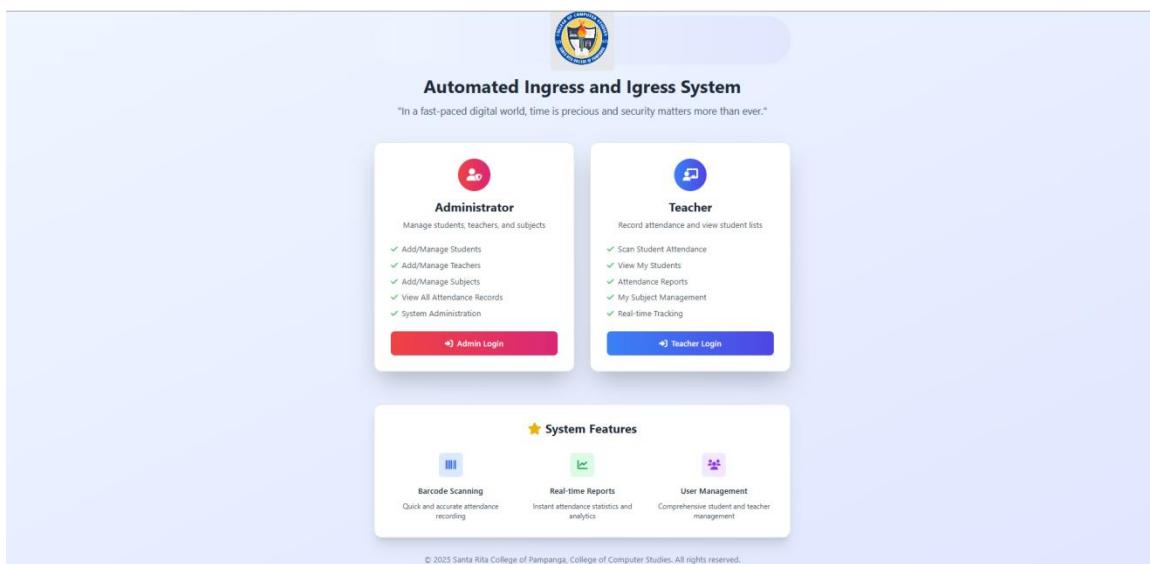


Figure 11 show the the Front Page Automated Ingress and Egress System, The admin and faculty could log in there input the required details. the fields were functional for input collection but lacked full validation and database storage.

Figure12

Prototype Dashboard Page of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

The screenshot shows the Admin Dashboard with the following details:

- Welcome Admin Christopher
- Date: 12:56:41 AM
- Recent Attendance table:

STUDENT ID	NAME	SECTION	YEAR	PC NUMBER	SCAN TIME	STATUS
220002403	Christopher Panoy	A	3	1	2025-07-16 12:48:28 AM	Present
220002404	Leonel Popatco	A	3	7	2025-07-16 12:48:37 AM	Present
220002405	Roman Meracado	A	3	5	2025-07-16 12:48:07 AM	Present
220002403	Christopher Panoy	A	3	1	2025-07-16 12:47:09 AM	Signed Out
220002403	Christopher Panoy	A	3	1	2025-07-16 12:47:05 AM	Present

- Dashboard navigation menu:
 - Dashboard
 - Students
 - Teacher
 - Attendance
 - Scan
 - Add Subject
 - Manage Teachers
 - Assign Subjects
 - Manage Subjects
- Logout button

Figure 12 show the Dashboard Page of the admin, Provides a visual layout of where attendance records and reports will appear.

Figure13

Prototype Add Student Page of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

ID	Name	Section	Year	Gender	Photo	Barcode	PC No.	Actions
13123133131	Abdul Patikol	A	3				78	Profile Edit Delete
220002403	Christopher Panoy	A	3				99	Profile Edit Delete
220002376	Cristine Maambong	A	3				12	Profile Edit Delete
220002405	Leonel Popatco	A	3				7	Profile Edit Delete
220002148	Mark Glen Guevarra	A	3				69	Profile Edit Delete
220002404	Roman Mercado	A	3				100	Profile Edit Delete

Figure 13 Show the add student of the admin is not Accurate, the gender is missing and the UI is not match.

Figure14

Prototype Faculty scan Page of a Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

The screenshot displays two side-by-side panels of a web application.

Left Panel: This panel is titled "Scan student barcodes to record attendance". It contains two main sections: "Select Subject" and "Student Barcode". The "Select Subject" section has a dropdown menu with the placeholder "Choose a subject...". The "Student Barcode" section features a button labeled "Scan barcode here" with a barcode icon.

Right Panel: This panel is titled "View and manage attendance data". It includes a "Quick Actions" section with buttons for "View All Records" and "Generate Reports". Below this is a "Live Attendance Feed" section with a date selector set to "18/08/2025" and a "Filter" button. The main area shows a table of student attendance records:

Student ID	Section	Year	PC Number	Subject	Status
220002403	A	3	5	ESP	Signed Out
220002403	A	3	5	ESP	Present

Figure 14 Show the Faculty Scan of the Faculty is not Accurate, the gender is missing and the UI is not match.

CUSTOMER EVALUTION SYSTEM

The system test with faculty and administrators as participants. Evaluation undergoes to ISO 25010 to ensure quality system standardization. Feedback was gathered to identify issues, improvements and feature enhancements. Key performance measures, including response accuracy and user experience, were analyzed to validate the system's stability and readiness for deployment.

SYSTEM EVALUATION RESULTS OF USER ACCEPTABILITY

Based on the ISO 25010 standards for software quality, the functionality of the system was described based on characteristics namely: completeness, correctness, and appropriateness.

FUNCTIONALITY SUITABILITY

Based on the ISO 25010 standards for software quality, the functionality of the system was described based on characteristics namely: completeness, correctness, and appropriateness.

Table 2
Evaluation of System Functional Suitability

Criteria	4	%	3	%	2	%	1	%	Mean
Completeness	28	59.57	19	47.5	0	0.00	0	0.00	3.59
Correctness	26	55.31	13	27.65	8	17.02	0	0.00	3.38
Appropriateness	15	14.28	32	85.72	0	0.00	0	0.00	3.31
Weighted Mean									3.42

Table 2 shows the system evaluation based on functionality as rated by respondents in this study. Most of the respondents rated the system functionality with a general weight mean of 3.42, Very Satisfied.

PERFORMANCE EFFICIENCY

Table 3
Evaluation of System Performance Efficiency

Criteria	4	%	3	%	2	%	1	%	Mean
Time-Behavior	24	43.86	23	57.14	0	0.00	0	0.00	3.51
Resource Utilization	17	36.17	27	57.44	3	7.5	0	0.00	3.29
Capacity	13	27.65	34	72.34	0	0.00	0	0.00	3.27
Weighted Mean									3.25

Table 3 shows the system evaluation based on performance as rated by respondents in this study. Most of the respondents rated the system performance with a general weight mean of 3.25, Satisfied.

COMPATABILITY

Table 4
Evaluation of System Compatibility

Criteria	4	%	3	%	2	%	1	%	Mean
Co-Existence	25	53.19	22	46.80	0	0.00	0	0.00	3.53
Interoperability	24	51.06	23	48.93	0	0.00	0	0.00	3.51
Weighted Mean									3.52

Table 4 shows the system evaluation based on compatibility as rated by respondents in this study. Most of the respondents rated the system compatibility with a general weight mean of 3.52, Very Satisfied.

USABILITY

Table 5
Evaluation of System Usability

Criteria	4	%	3	%	2	%	1	%	Mean
Appropriateness	27	57.44	17	36.17	3	6.38	0	0.00	3.51
Recognizability	22	46.80	25	53.19	0	0.00	0	0.00	3.46
Learnability	16	34.04	31	65.95	0	0.00	0	0.00	3.34
Operability	14	29.78	33	70.21	0	0.00	0	0.00	3.29
Error Protection	11	23.40	30	63.82	6	12.76	0	0.00	2.97
User Interface	15	31.91	32	68.08	0	0.00	0	0.00	3.31
Aesthetic	24	51.06	23	48.93	0	0.00	0	0.00	3.51
Accessibility	27	57.44	20	42.55	0	0.00	0	0.00	3.57
Weighted Mean									3.37

Table 5 shows the system evaluation based on usability as rated by respondents in this study. Most of the respondents rated the system usability with a general weight mean of 3.37, Very Satisfied.

RELIABILITY

Table 5*Evaluation of System Reliability*

Criteria	4	%	3	%	2	%	1	%	Mean
Maturity	17	36.17	30	63.82	0	0.00	0	0.00	3.36
Availability	15	31.91	32	68.08	0	0.00	0	0.00	3.31
Fault Tolerance	12	25.53	25	53.19	10	21.27	0	0.00	3.04
Recoverability	19	40.42	28	59.57	0	0.00	0	0.00	3.40
Weighted Mean									3.27

Table 5 shows the system evaluation based on reliability as rated by respondents in this study. Most of the respondents rated the system reliability with a general weight mean of 3.27, Very Satisfied.

SECURITY

Table 7*Evaluation of System Security*

Criteria	4	%	3	%	2	%	1	%	Mean
Confidentiality	15	31.91	32	68.08	0	0.00	0	0.00	3.31
Integrity	14	29.78	24	51.06	9	19.14	0	0.00	3.10
Non-Repudiation	26	55.31	13	27.65	8	17.02	0	0.00	3.38
Accountability	15	14.28	32	85.72	0	0.00	0	0.00	3.31
Authenticity	12	25.53	25	53.19	10	21.27	0	0.00	3.04

Weighted Mean	3.22
---------------	------

Table 7 shows the system evaluation based on security as rated by respondents in this study.

Most of the respondents rated the system security with a general weight mean of 3.2.

MAINTABILITY

Table 6

Evaluation of System Maintainability

Criteria	4	%	3	%	2	%	1	%	Mean
Modularity	22	46.80	14	29.78	11	23.40	0	0.00	3.23
Reusability	17	36.17	30	63.82	0	0.00	0	0.00	3.36
Analyzability	13	27.65	24	51.06	10	21.27	0	0.00	3.06
Modifiability	11	23.40	21	44.68	15	31.91	0	0.00	2.91
Testability	15	14.28	32	85.72	0	0.00	0	0.00	3.31
Weighted Mean									3.17

Table 8 shows the system evaluation based on maintainability as rated by respondents in this study. Most of the respondents rated the system maintainability with a general weight mean of 3.17, Satisfied.

FLEXIBILITY

Table 9
Evaluation of System Flexibility

Criteria	4	%	3	%	2	%	1	%	Mean
Scalability	19	40.42	28	59.57	0	0.00	0	0.00	3.40
Instalability	21	44.68	17	36.17	9	19.14	0	0.00	3.25
Replaceability	24	51.06	23	48.93	0	0.00	0	0.00	3.51
Weighted Mean									3.38

Table 8 shows the system evaluation based on maintainability as rated by respondents in this study. Most of the respondents rated the system maintainability with a general weight mean of 3.38, Very Satisfied.

REVIEW AND UPDATE PHASE SYSTEM

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.

LIST OF REVISION MADE

Consisted Template

My adviser in our capstone project prefers templates that are consistent and not moving or changing

Filter Search-

teacher recommended using a filter search to make it easier to find students.

Card Gender

This feature was added to categorize students according to gender, separating male and female.

Student Dashboard

This was added by the adviser so that students can check their attendance immediately after scanning their ID.

Student pending Time in/ Time out-

The Dean of CCS suggest add feature included to address situations where a student scans in after the scheduled class has already ended. In such cases, the student must first scan out from the previous subject before scanning in again to properly log attendance for the next scheduled subject.

Figure 14

Proof of a consultation and gathering feedback to the locale of Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory

Figure 14 show the Proof of Feedback and Consultation.

DEVELOPMENT PHASE OF THE SYSTEM

After the researcher completing the review and update phase, Finally system was developed with all core functionalities fully implemented. The development stage focused on building the complete system, integrating the database, and ensuring that the system was secure and user-friendly.

The system was developed using PHP for backend logic, MySQL for database management, and HTML/CSS/JavaScript for the user interface. Tailwind was used for responsive design to ensure accessibility across devices.

System Features and Functionalities

1. Web Page - The admin and Faculty can see the pictures of our locale and they see the some of features of the system.

2. Login – Only Admin and Faculty can access the Only Admin and Faculty can access the automated access control system for computer laboratory at Santa Rita College.

3. Dashboard – The Admin, Faculty and Student they have their own dashboard. It provides a quick overview of important statistics, such as the total number of students and teachers, attendance records, and who is present today.

4. Add Student – Admin is only can add student into the system, the student well have their own unique barcode after admin created them.

5. Add Faculty – Administrator can create faculty account, quickly register and manage faculty members. It ensures every teacher is assigned correctly and your records stay complete and accurate.

6. Attendance - It stores and manages the full attendance records of all students.

7. **Generates Reports** – Admin and Faculty can generate reports of attendance through print and excel reports and also can print.
8. **Barcode Scanning** – BSIS students can scan their IDs using the barcode scanner installed at the laboratory entrance. After scanned, the attendance is recorded in real time and reflected in both the admin and faculty accounts.
9. **Add and Manage Subject** - The admin has full control of this, including creating, assigning and managing subjects for both faculty and students.
10. **Logout** - Both the admin and faculty can log out once their shift or schedule ends; however, all records remain stored in real time and are tamper-proof.

TESTING PHASE OF THE SYSTEM

The Final system test with faculty, students, and administrators. Evaluation undergoes to ISO 25010 to ensure quality system standardization. Feedback was gathered to identify issues, improvements and feature enhancements. Key performance measures, including response accuracy and user experience, were analyzed to validate the system's stability and readiness for implementation of the system.

Here are some photos showing how the system was tested and experienced by the participants:

Figure 15

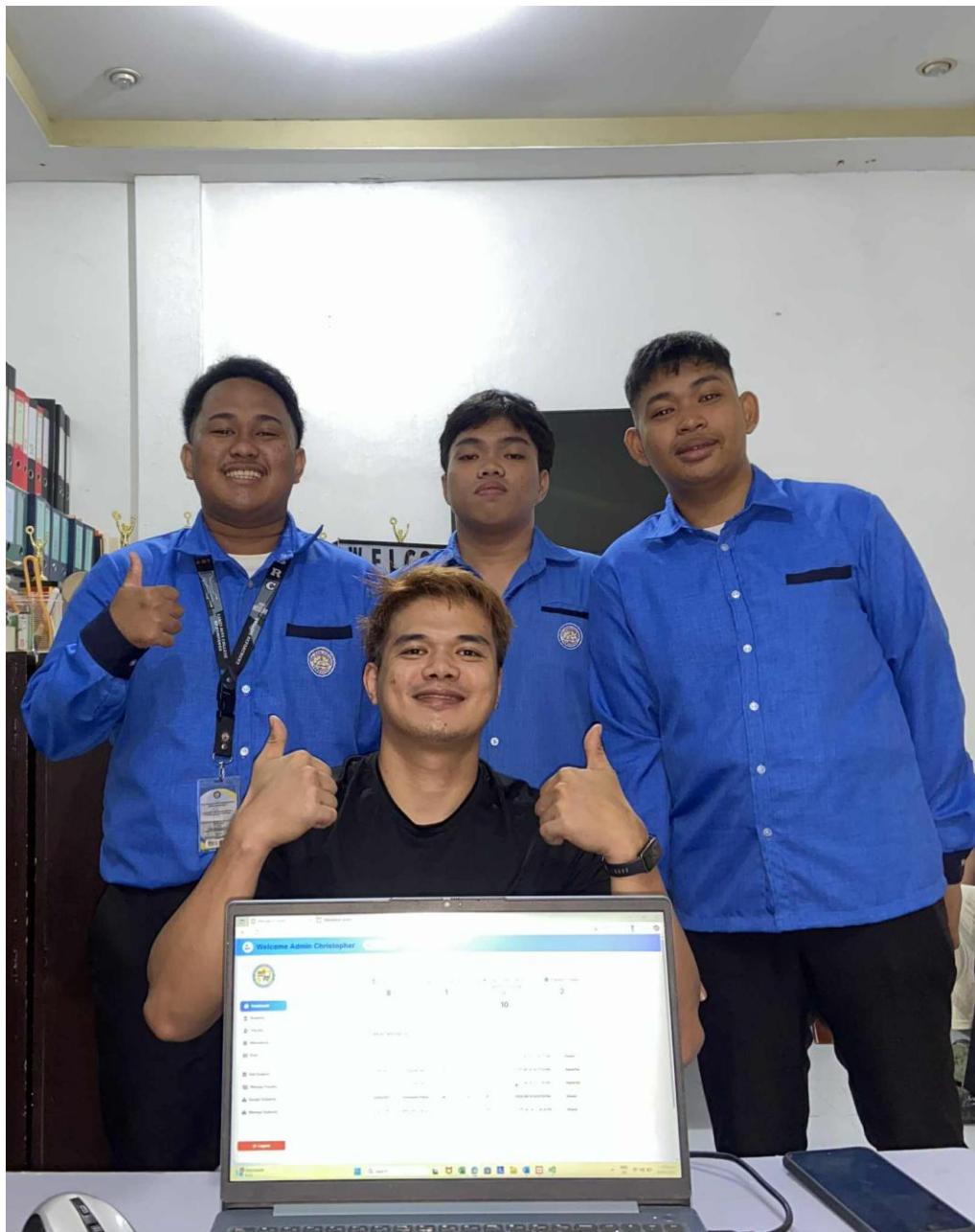
CCS dean Testing The Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



Figure 15, In this figure, the dean is testing the system, offering constructive feedback, and recommending additional features to improve its overall functionality and effectiveness.

Figure 16

CCS Faculty Testing Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



In this figure, one of the CCS faculty members is testing and evaluating the system.

Figure 17

CCS Faculty Testing The Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



In this figure, our adviser is evaluating the system and recommending the most suitable template for its design.

Figure 18

CCS Dean in Automated Access Control System for Santa Rita College BSIS Students at Computer Laboratory



In this figure, our respected dean is conducting the final testing and evaluation of the system.

MAINTENANCE PLAN OF THE SYSTEM

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.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

This study developed a Web-Base Automated Access control System for BSIS students in the computer laboratories on Santa Rita College of Pampanga. The project aimed to monitor who enters and exits the Laboratory, since many computers equipment have been damage without accountability, the system also includes attendance tracking through barcode scanning technology that allows students to log their entry and exit in computer laboratory to check their attendance in real time.

The system also helps administrators and faculty, because they no longer need to rely on manual attendance sheets or logbooks and continue teaching even if someone is late and wants to take attendance. Reports can be generated instantly in PDF or Excel format, reducing paperwork and ensuring reliable monitoring of laboratory access. Student benefit from a faster and easier way to enter the laboratory.

CONCLUSION

The researchers developed a system for Santa Rita College of Pampanga that will help the Faculty and Admin because they will benefit from it because it will make their work easier with the attendance and to know who use the computers and to hold accountable whoever caused the damage in Computer laboratories at Santa Rita College of Pampanga.

RECOMMENDATIONS

During the title defense held in March 2025, the researchers suggested the inclusion of a barcode system for each computer unit. The feature would enable scanning the computer's barcode to display its status, such as whether it requires reformatting or if it has authorized access.

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APPENDIX A

BROCHURE

IS4A C5

CHRISTOPHER M. PANOV
SYSTEM DEVELOPER

LEONEL P. POPATCO
PROJECT MANAGER

RESEARCHERS

ROMAN S. MERCADO
SYSTEM AND PROJECT ANALYST

CRISTINE MAAMBONG
PROJECT ANALYST

SCAN ME!

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

Student Name
ID: 220002403 · BSIS 4
PRESENT
SUBJECT: CAPSTONE2
Scan Time
2:47:32 AM

BACKGROUND

- Automated Ingress & Egress System
- Barcode-Based ID Scanning
- Real-Time Attendance Logging
- Centralized Admin and Faculty Dashboard
- Elimination of Manual Roll Calls

CONCLUSION

This study web-based automated ingress and egress system with barcode scanning will improve security and efficiency in the computer labs at Santa Rita College of Pampanga. It ensures only authorized students can enter, automatically records attendance, and reduces faculty workload.

EVALUATED BY ISO25010

- Functional Suitability
- Performance Efficiency
- Compatibility
- Usability
- Reliability
- Security
- Maintainability
- Flexibility
- Safety

APPENDIX B

POSTER



CURRICULUM VITAE

PANOY, CHRISTOPHER MADEJA

#118 San Basilio, Santa Rita, Pampanga

(+63) 930-997-1418

Christophermadeja7@gmail.com



I am seeking a position with a company where I can apply my experience and education to help the organization meet and exceed its goals.

EDUCATION

TERTIARY / Bachelor of Science in Information Systems

Santa Rita College Santa Rita, Pampanga

[2022-Present]

TECHNICAL SKILLS

System Development and Design

Programming (PHP, JavaScript, HTML, MySQL)

Knowledge in MS Word and Excel for basic document creation, formatting and date entry.

Adaptable and Quick Learner

LANGUAGES

Filipino

English

WORK EXPERIENCE

Working Student at Kambal Store – 2021-Present

I hereby certify that all the information given above is true and correct to the best of my knowledge and belief.

Christopher M. Panoy
Applicant's Signature

CURRICULUM VITAE



MERCADO, ROMAN SANTOS
San Basilio, Sta Rita, Pampanga
(+63) 948-852-1846
Romanmercado521@gmail.com

OBJECTIVE

I am seeking a position with a company where I can apply my experience and education to help the organization meet and exceed its goals.

PERSONAL INFORMATION

Date of Birth: October 21, 2003
Age: 21 years old
Gender: Male
Civil Status: Single
Height: 5'5
Weight: 85 lbs.
Religion: Roman Catholic

EDUCATIONAL BACKGROUND

PRIMARY 2009-2010	San Basilio Elementary School San Basilio, Sta Rita, Pampanga
SECONDARY 2015-2016	Becuran High School Becuran, Sta Rita, Pampanga
SENIOR 2021-2022	Becuran High School Becuran, Sta Rita, Pampanga
TERTIARY 2023-Present Year	Bachelor of Science in Information Systems SANTA RITA COLLEGE OF PAMPANGA San Jose, Sta. Rita, Pampanga

I hereby certify that all the information given above is true and correct to the best of my knowledge and belief.

Roman Mercado
Applicant's Signature

CURRICULUM VITAE
POPATCO LEONEL PACHICO
BALUBAD, PORAC, Pampanga
(+63) 906-932-9185
leonelpopatco16@gmail.com



OBJECTIVE

I am seeking a position with a company where I can apply my experience and education to help the organization meet and exceed its goals.

PERSONAL INFORMATION

Date of Birth: October 30, 2003
Age: 21 years old
Gender: Male
Civil Status:
Single
Height: 5'7
Weight: 85 lbs.
Religion: Roman Catholic

EDUCATIONAL BACKGROUND

PRIMARY 2009-2010	Balubad, Porac, Elementary School Balubad, Porac, Pampanga
SECONDARY 2015-2016	Pulong Santol National High School Pulong Santol, Porac, Pampanga
SENIOR 2021-2022	Pulong Santol National High School Pulong Santol, Porac, Pampanga
TERTIARY 2023-Present Year	Bachelor of Science in Information Systems SANTA RITA COLLEGE OF PAMPANGA San Jose, Sta. Rita, Pampanga

I hereby certify that all the information given above is true and correct to the best of my knowledge and belief.

Leonel Popatco
Applicant's Signature

CURRICULUM VITAE

MAAMBONG, CRISTINE VILLAOS
Sasmuan, Pampanga
(+63) 920-782-7040
cristinemaambong@gmail.com



OBJECTIVE

I am seeking a position with a company where I can apply my experience and education to help the organization meet and exceed its goals.

PERSONAL INFORMATION

Date of Birth: January 09, 2004
Age: 21 years old
Gender: Female
Civil Status:
Single
Height: 5'3
Weight: 80 lbs.
Religion: Roman Catholic

EDUCATIONAL BACKGROUND

PRIMARY 2009-2010	Sto Tomas Elementary School Sto Tomas, Sasmuan, Pampanga
SECONDARY 2015-2016	Sto Tomas, High School Sto Tomas, Sasmuan, Pampanga
SENIOR 2021-2022	Becuran High School Sto Tomas, Sasmuan, Pampanga
TERTIARY 2023-Present Year	Bachelor of Science in Information Systems SANTA RITA COLLEGE OF PAMPANGA San Jose, Sta. Rita, Pampanga

I hereby certify that all the information given above is true and correct to the best of my knowledge and belief.

Cristine Maambong
Applicant's Signature

