Republic of the Philippines
CAVITE STATE UNIVERSITY
City Campus
SHIV, Molino VI, City of Bacoor
(046) 476 – 5029

cvsubacoor@cvsu.edu.ph

QueuePoint: Implementation of Web-based Digital Queueing System for Campus Registrar Transactions for Cavite State University Bacoor Campus

COSC 70 : Software Engineering

Clarissa O. Rostrollo

Members:

Clarisse Jane T. Petilla

Elisar R. Pamotongan

Emmanuel P. Sumalo

Kurt David Martinez

Immanuel Isaac B. Ponteras

Mary Joyce I. Habana

Mary Strelline R. Magdamit

Neil O. Hampac

Nemelyn O. Baldo

Von Zymon Raphael B. Patagnan

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Republic of the Philippines
CAVITE STATE UNIVERSITY
City Campus
SHIV, Molino VI, City of Bacoor
(046) 476 – 5029

cvsubacoor@cvsu.edu.ph

CHAPTER I
INTRODUCTION

Standing in long lines has become a regular cause of annoyance in the fast-paced society of today. The Cavite State University - Bacoor Campus Registrar's office is no exception, as it handles a large volume of transactions daily. This emphasizes how urgently effective solutions that can lower wait times and enhance general consumer experiences are needed.

Particularly in the educational field, recent technological developments seek to simplify numerous aspects of daily living. One of the technologies-based solutions schools are using more and more to improve their operations is queue tracking management system. Designed to efficiently handle lineups, this technology has proven indispensable in sectors such education that lean on services.

Systems of queue tracking management assist in simplifying the flow of customers, faculty, and students in educational environments. Although traditional queuing systems sometimes result in inefficiencies and high wait times, these modern inventions digitize the queuing process and offer real-time wait times and service statuses. These solutions help to improve the whole experience for all those engaged by more efficient organization of the flow of people, therefore facilitating the operations of schools.

This thesis aims to implement a web - based queue management systems in educational environments and their effect on enhancing the school experience, therefore solving the problems presented by traditional queuing systems.

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1.1 Background of the Study

The growing need for the best and quality for processing of transactions has been the problem of the people on how are they gonna make it more accessible and how are they gonna avoid long lines and many hours of waiting. Just like other school The Registrar's Office of Cavite State University - Bacoor Campus also manages many daily transactions, which sometimes lead to bad quality service, congestion, and long waiting times which takes most of time and energy of the student and school staff and registrar. Particularly during peak registration times, including enrollment, release of student grades and many more traditional queuing systems are starting to be one of the causes of students and school staff losing time for other activities due to long waiting, stress and even hunger leading to rushing to do other things.

Furthermore, according to studies by Wavetec and the American Educational Research Association (AERA) it show that over 56% of university students suffer from prolonged waiting periods, losing energy for other activity due to inconveniency , therefore compromising their academic and personal output. Considering these problem causing by the traditional queuing, the web - based digital queue management system becomes a sensible way to increase student experience and service efficiency.

This study proposes the implementation of a web-based queueing system to streamline student transactions by allowing remote queue registration and real-time updates. Moreover, Research has shown that universities implementing Queue Management Systems (QMS), such as Greenville Technical College and the University of Central Florida, have significantly reduced congestion while improving service efficiency. By leveraging technology to optimize resource allocation and improve communication between students and administrative personnel, this system aims to enhance overall institutional operations. Through this initiative, Cavite State University - Bacoor Campus can foster a more organized, efficient, and student-centered service environment, aligning with broader efforts to integrate digital solutions in academic administration.

1.2 Statement of the Problem

The current manual queuing system at the Cavite State University - Bacoor Campus Registrar's Office causes long waiting times, congestion, and inconvenience for students and staff. With the increasing number of students, the inefficiency of the traditional queueing method leads to delays and frustration.

This study aims to develop a web-based digital queueing system to improve transaction flow and reduce waiting time. Specifically, it seeks to answer the following questions:

1. How does the current queuing system affect students and staff in terms of time, efficiency, and convenience?
2. How can a web-based digital queueing system help in managing registrar transactions more effectively?
3. What are the challenges in implementing a digital queueing system, and how can they be addressed?
4. How effective is the proposed system in reducing wait times and improving the overall queuing experience?

By addressing these questions, the study aims to provide a solution that enhances service efficiency and convenience for students and the registrar's office.

1.3 Objectives of the Study

This study focuses on creating a web-based queuing system to improve how people line up at Cavite State University - Bacoor Campus. The main goals of this project are to make the queuing process faster, more organized, and easier for everyone involved.

1. To develop an intuitive queuing system that minimizes waiting periods, thereby reducing congestion and the length of wait lines.
2. To incorporate online registration capabilities into the queuing system, providing users with real-time updates.
3. To implement a visual display feature that continuously shows each student's current position in the queue, ensuring transparency and enhanced communication.

1.4 Significance of the Study

This study about setting up a web-based digital queuing system at Cavite State University - Bacoor Campus is helpful for several groups:

The Students - It will make it easier and faster for students to process their transactions at the Registrar's office by reducing long lines and wait times. Students can also plan their time better while waiting.

The Campus Registrar - The system will help the Registrar's office handle transactions more efficiently, cut down waiting times, and improve its work management.

To the School Administrator - This study will give the school helpful administrator information about how digital queuing systems improve service and

student satisfaction. It can also help decide if similar systems should be used in other parts of the school.

The University - Implementing this system will create a more organized and productive environment for both students and staff. It will also improve the university's image as a modern and student-friendly place, attracting more students and stakeholders.

1.5 Scope and Limitation

This study focuses on the development and implementation of a web-based digital queueing system exclusively for the Registrar's Office at Cavite State University - Bacoor Campus. It targets specific student transactions such as enrollment, document requests, and student record inquiries. The system is designed to enable online registration of queue numbers, offer real-time status tracking, and deliver notifications when a student's turn arrives. By streamlining the queuing process and reducing crowding, the proposed system aims to enhance overall service efficiency and create a more organized and user-friendly experience for both students and administrative staff.

However, the scope of this study is limited to registrar transactions only and does not extend to other university offices or services. As the system requires internet access for full functionality, students without reliable connectivity may still be forced to register manually. Additionally, while the system is expected to reduce waiting times and improve process management, it may not completely eliminate delays inherent in high-volume transaction settings. The ultimate success of the digital queueing system will also depend on the willingness of both students and staff to adopt and consistently use the new technology, which may present challenges during the initial implementation phase.

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cvsubacoor@cvsu.edu.ph

Definition of Terms

Campus Registrar's Office - the administrative department responsible for managing student records, enrollment, and other academic transactions within the university.

Campus Registrar Transaction - the processes and services provided by the Registrar's Office within the university campus.

Cavite State University – Bacoor Campus - a branch campus of Cavite State University located in Bacoor, Cavite.

Congestion - overcrowding, severe traffic or clogging.

Digital Queueing System - is a software-based solution that replaces traditional paper tickets and physical lines with a streamlined digital process.

Dynamic queuing - a system that automatically creates and populates queues based on certain conditions.

Queue - line of people waiting, a sequence of messages, or a data structure

Traditional Queuing - is when people physically wait in lines to be served.

Transaction Management - is the process of handling transactions within a system, involving tasks such as ensuring data integrity, consistency, and reliability during interactions with databases or other components.

Web-based System - are applications or systems that run on web browsers. It can run on any platform as long as you have a browser and an internet connection.

CHAPTER II
METHODOLOGY

This chapter presents the requirements for developing the system. Essential materials used by the researchers are explained and discussed in this chapter, including the research design and methods needed in the developing the system.

Materials

The researchers utilized the specific hardware and software specifications as the instruments in the making of the study. The hardware specification includes the use of an HP Victus Gaming Laptop 15-fa0xxx, equipped with an 12th Gen Intel(R) Core (TM) i5-12500H, 2500 Mhz, 12 Core(s), 16 Logical Processor(s) and 8GB of installed RAM.

The software specification involves the effective use of Windows 11 Home edition, version OS build 21H2.

2.1 Research Design

This study used developmental research as the research design since the only goal of the researchers is to develop, design and evaluate a Web-Based Digital Queueing System for campus registrar transactions. Developmental research is known for being frequently used in terms of solving an existing institutional problem through developing technologies, innovating, and making practical solutions.

In this research, the developmental design centered on making effective solutions about the inconvenience and struggles of the current manual system of the campus registrar's office. The study focuses on identifying user requirements, designing the structure of the system and its user interface, implementing appropriate solutions, and evaluating its performance with a test environment. This approach

ensures that the system created is designed for its application and aims at fulfilling the needs of the actual users and for the institution.

2.2 Procedures

Rapid Application Development (RAD) methodology refers to a flexible way to create and deploy software applications quickly. This method is effectively designed to adapt to changes and new inputs like features and functions, updates, and many more. It emphasizes quick prototyping and iterative development to deliver software in a shorter time frame.

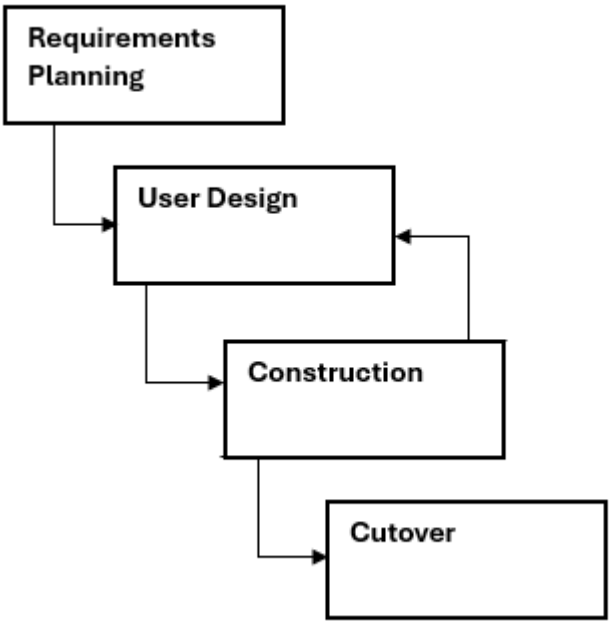

Figure 1. Rapid Application Development Approach

The Web-based Digital Queuing System was designed with Rapid Application Development (RAD), as depicted in the figure above. In designing the system's functions, the paradigm provided a step-by-step approach that was followed.

Requirements Planning

The initial phase of the Rapid Application Development Methodology is the requirement-planning stage. During this development phase, the researchers proceed to identify problems related to the manual queueing process of the campus registrar's office. Some informal interviews are conducted to understand the existing workflows and determine essential requirements regarding their process. The purpose is to determine the applicable solution for the challenges faced by the people who are engaging in campus registrar's office transactions. In this phase, the researchers secured what hardware and software specifications needed in order to build the final output. Additionally, the researchers gathers and carefully examines data that is crucial for development of the system, this also involves preparing a list of needed features such as queue tracking and queue management logic based on FIFO (First-In, First-Out), CRUD database (Create, Read, Update, Delete), responsive user interface, real-time ticket generation and an exclusive admin dashboard.

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User Design

The second phase is the user design phase, which outlines and conceptualizes the approach for building the system. During this phase, Data Flow Diagrams (DFDs) are developed to visualize the movement of the data within the system. Specifically the context diagram, a high-level overview which shows the system as a single process interacting with external entities and Level 1 diagrams which provides more specific detail on the internal processes within the system. (Refer to the diagram below).

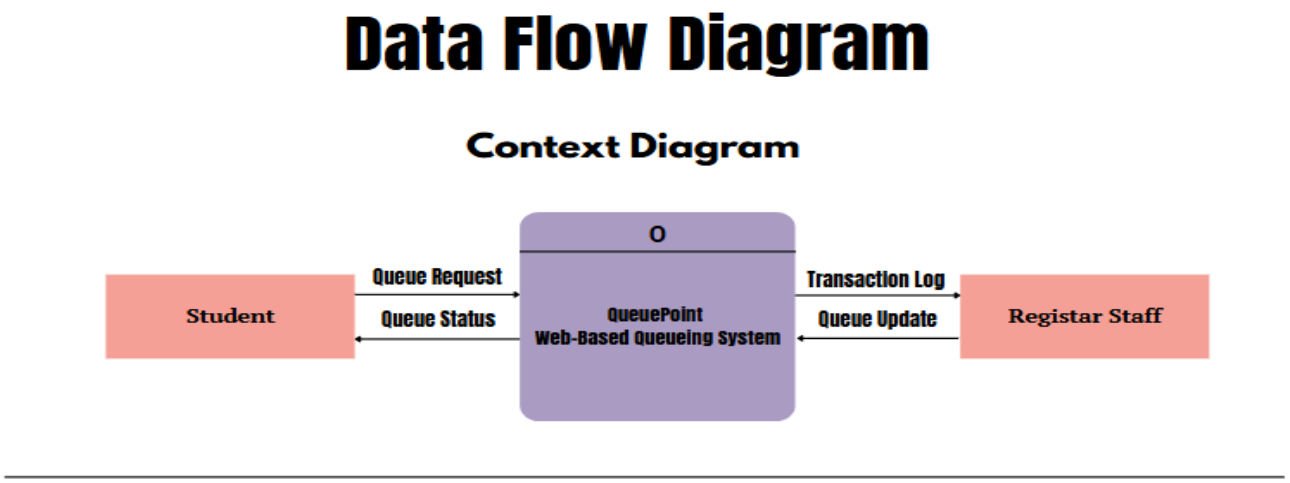

Figure 2. Context Diagram

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Level 1 Diagram

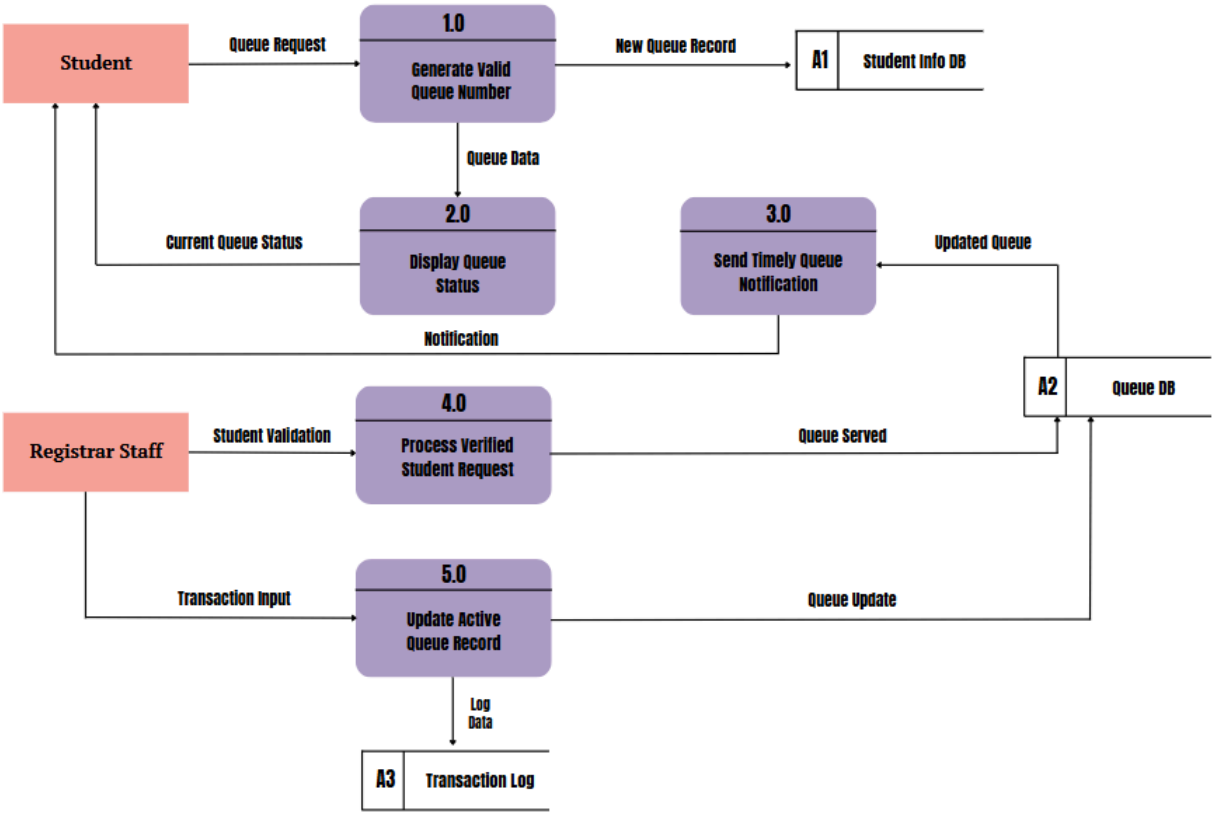

Figure 3. Level 1 Data Flow Diagram

Construction

The third phase is called construction. In this phase, it focuses on the actual creation and the development of the system.The researchers utilized various programming languages in implementing the frontend development and backend development. Building the code for the Web-based Digital Queuing System is the focal point of this process. This is the longest phase in the development process since it goes through a lot of coding and testing. The developer members and researcher members collaborated and completed all the required tasks and features in order to make it to the final output.

Cutover

The fourth and last phase is the cutover. The system goes through a test-environment. In this phase, the system is evaluated to test its performance. Testing the finished system is essential in order to implement it into a fully functional system.

During this process, the researchers carefully tested, examined, and assessed the responsiveness, effectiveness, features if it is working without delay, page load speeds, and the overall reliability of its queue management process of the system. In this phase, feedback and evaluation results are valued so that the system can be upgraded, added some new features and can make updates.

2.3 Tools and Technologies

In terms of the development tools and technologies used, the researchers worked with several programming languages for the website development. Specifically, they utilize HTML 5 ,CSS 3, and Javascript 1.5 languages as the programming language for the front end development while PHP (Hypertext Preprocessor) is used as server-side scripting along with the use of SQL (Structured Query Language) as the programming language for the backend development using MySQL software. The development environment consisted of Visual Studio Code as the integrated development environment (IDE), and XAMPP was used to initiate a local server. Database operations were managed using phpMyAdmin.

In making creative visuals and designs for data-flow diagrams, they utilized Lucidchart and Canva; these web applications assisted the researchers in creating visual-appealing and well structured diagrams during the user designing phase.

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CHAPTER III
SUMMARY, CONCLUSION AND RECOMMENDATION

3.1 Development Output

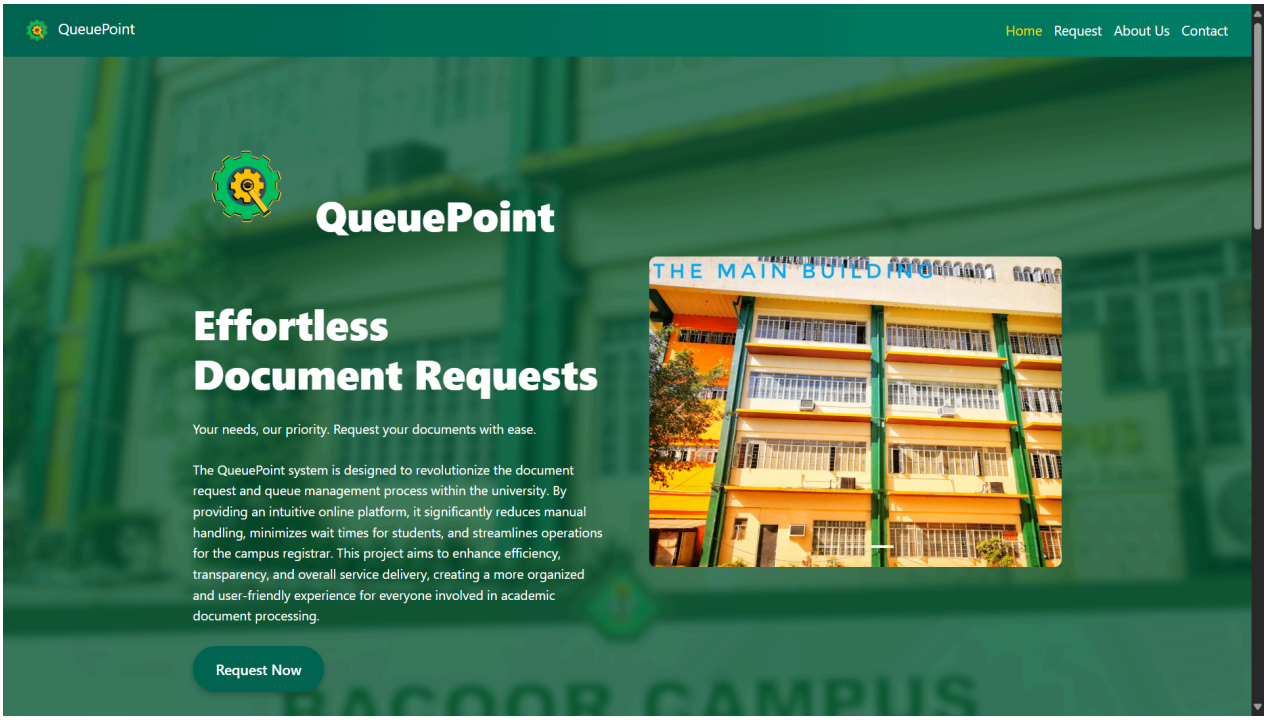

Figure 4. QueuePoint: - Landing Page/Home Page(part 1)

- Clearly stating its goal to simplify document requests and queue management at Cavite State University - Bacoor Campus, this landing page for QueuePoint invites visitors to start the process with an easily available call-to-action button.

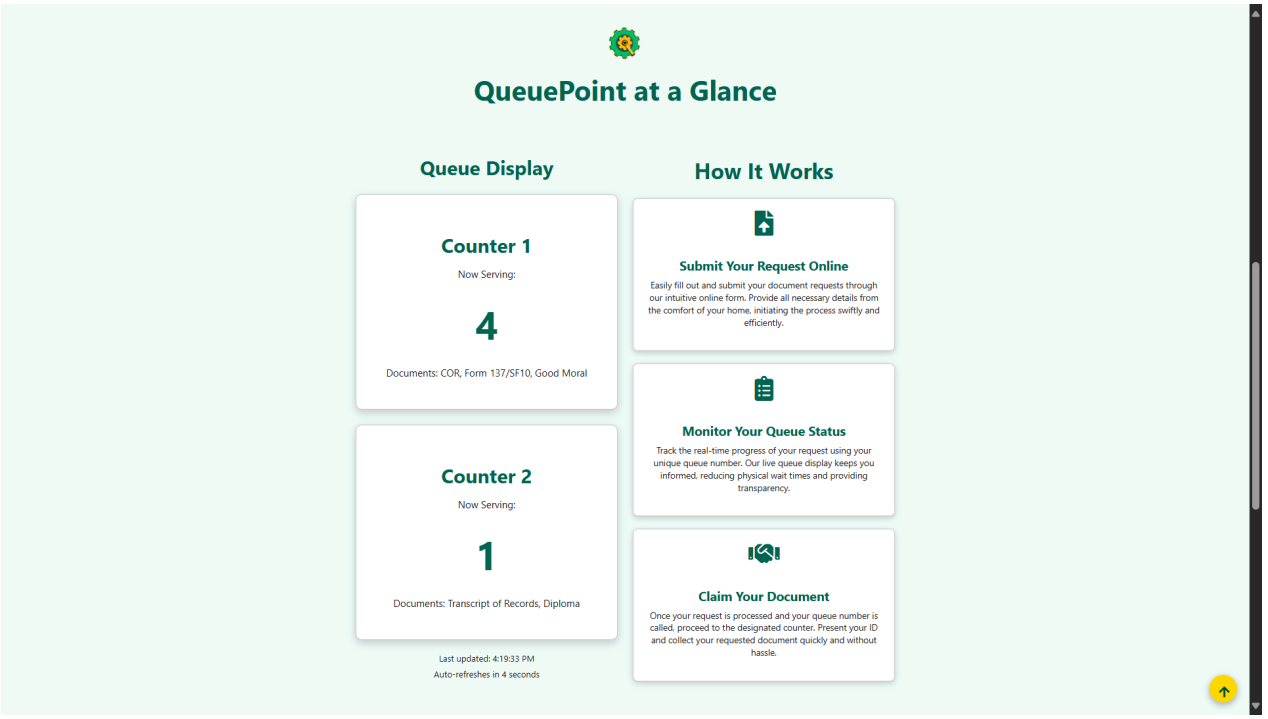

Figure 5. QueuePoint: - Landing Page/Home Page(part 2)

- Real-time queue status on this landing page helps visitors effectively navigate requesting and claiming documentation.

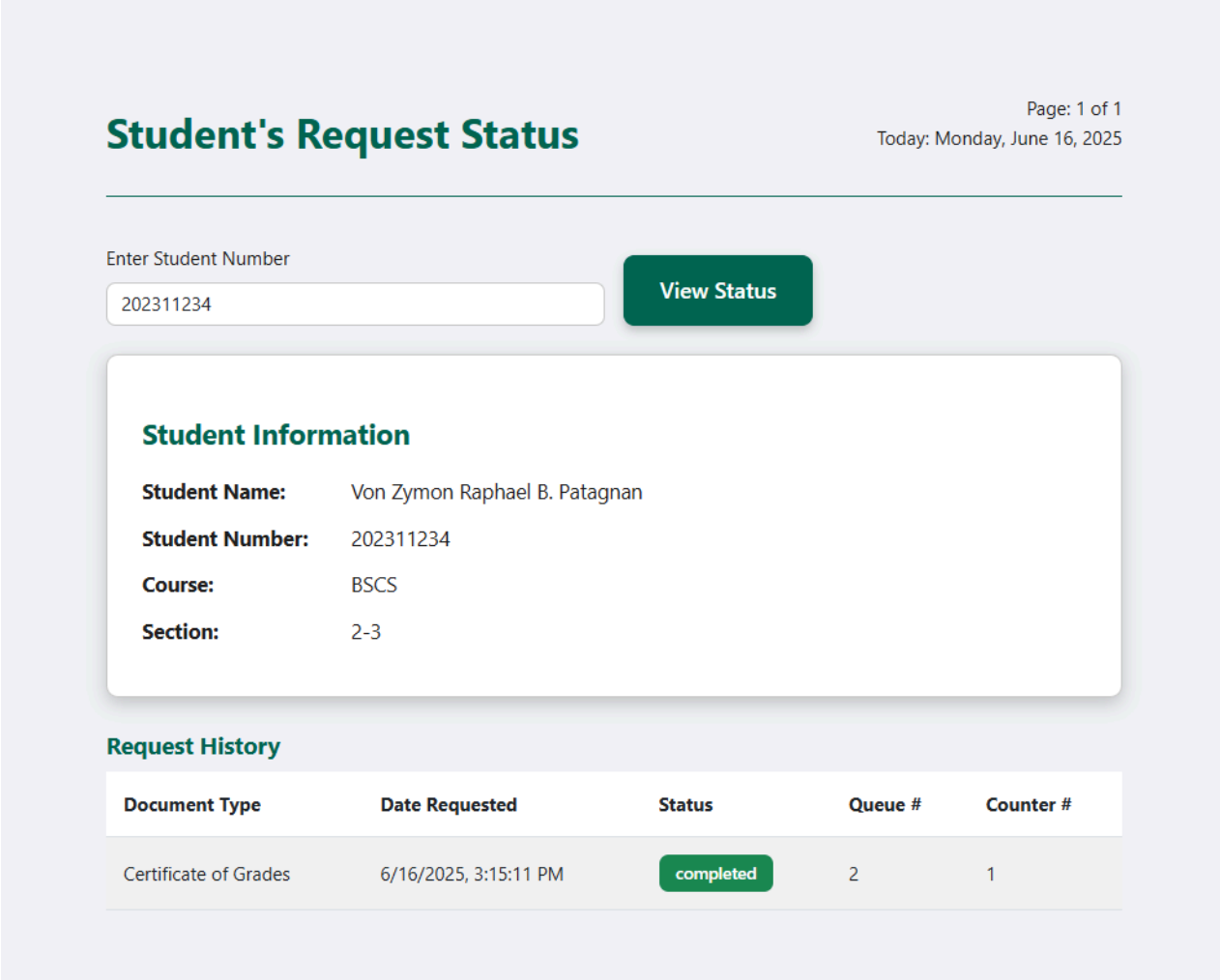

Figure 6. QueuePoint: - Landing Page/Home Page(part 3)

- This page lets students quickly check their request status and history by entering their student number.

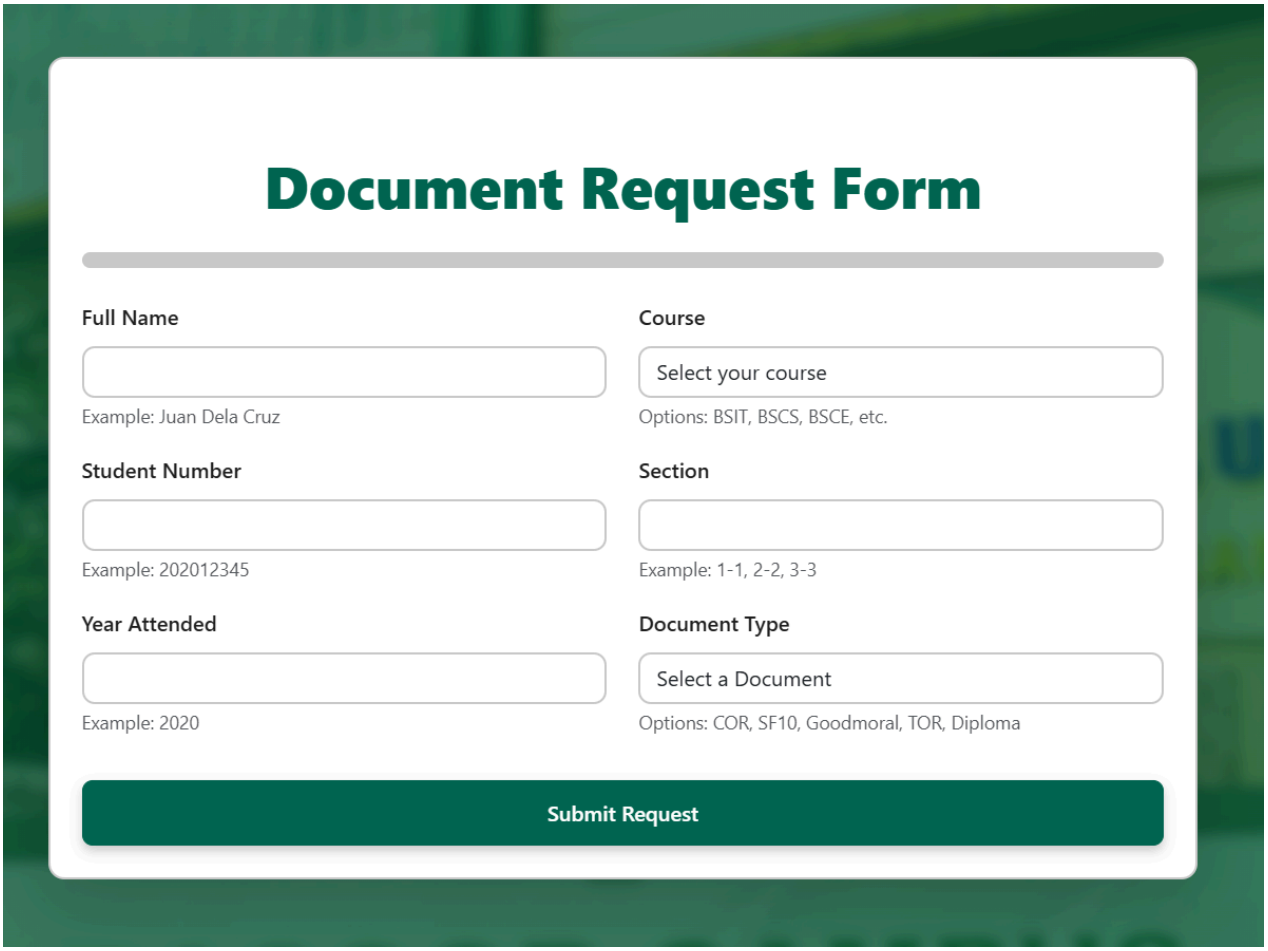

Figure 7. QueuePoint: - Request Page

- This page allows students to submit a request for official documents by filling out their details.

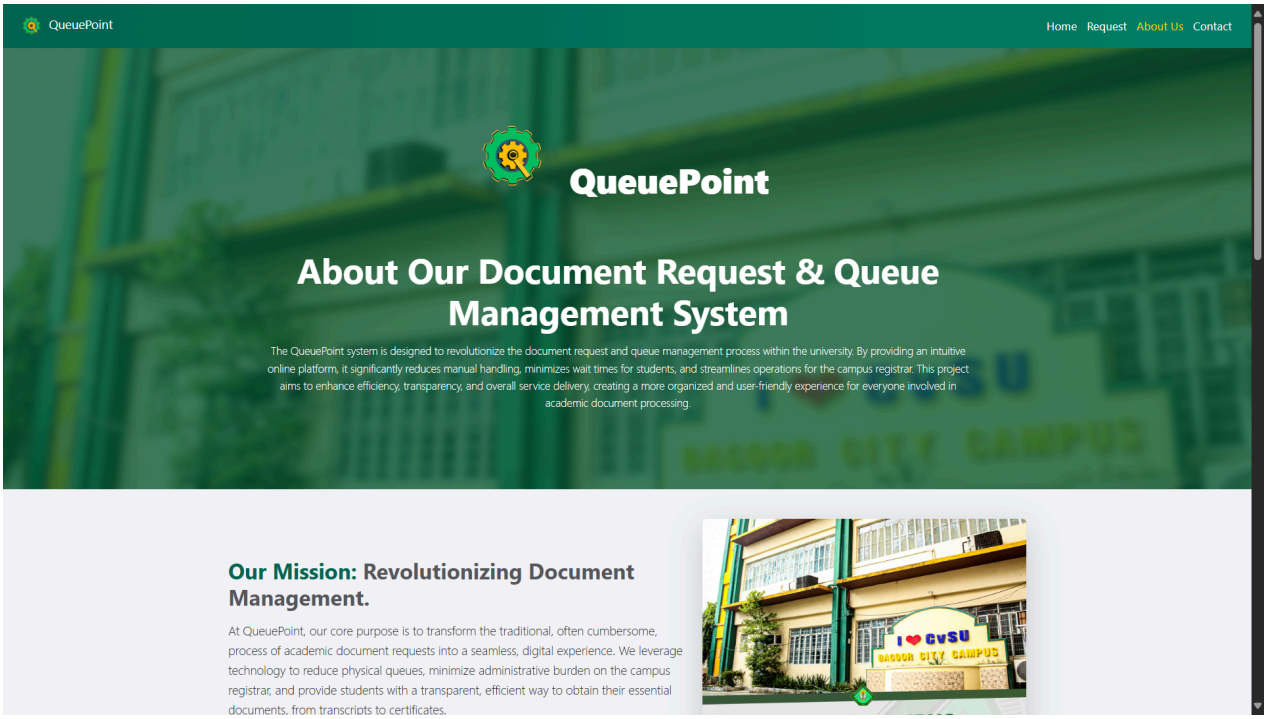

Figure 8. QueuePoint: - About Us Page (part 1)

- This page introduces QueuePoint's purpose and mission to improve document requests and queue management at the university.

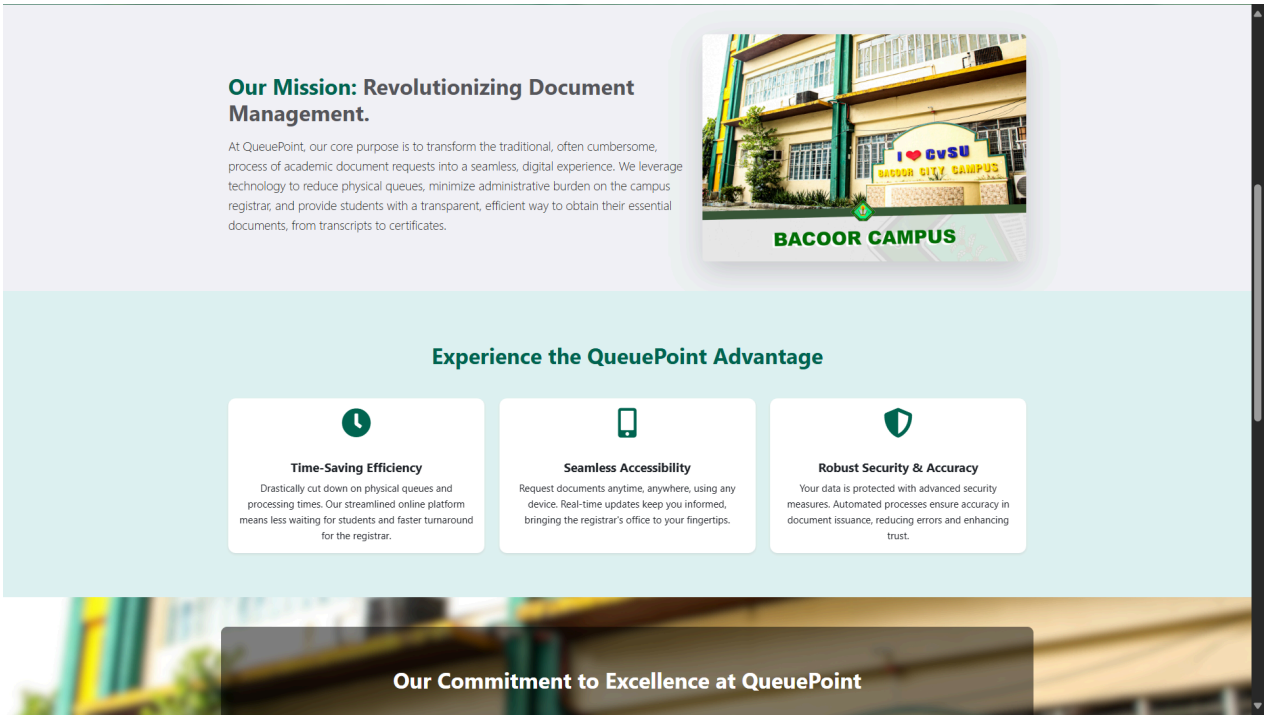

Figure 9. QueuePoint: - About Us Page (part 2)

- This section highlights QueuePoint's mission and key advantages, emphasizing efficient, accessible, and secure document management for students.

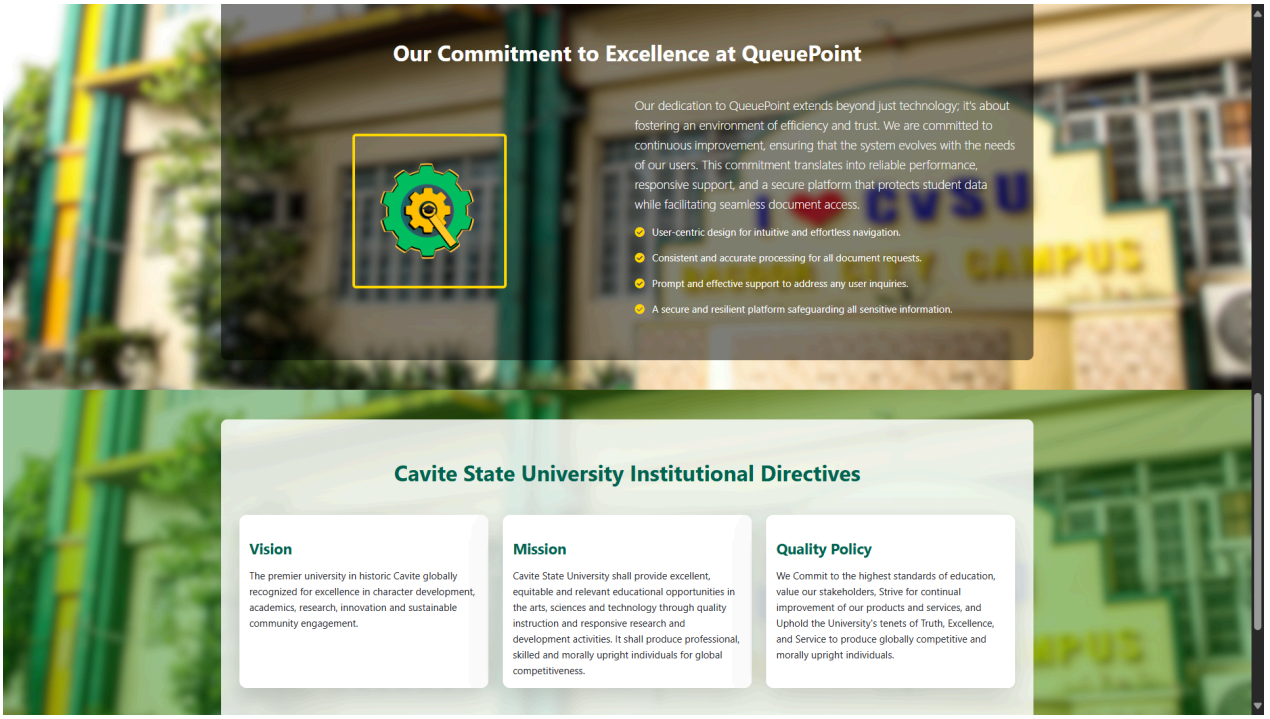

Figure 10. QueuePoint: - About Us Page (part 3)

- This section emphasizes QueuePoint's commitment to excellence and aligns its goals with the university's vision, mission, and quality policy.

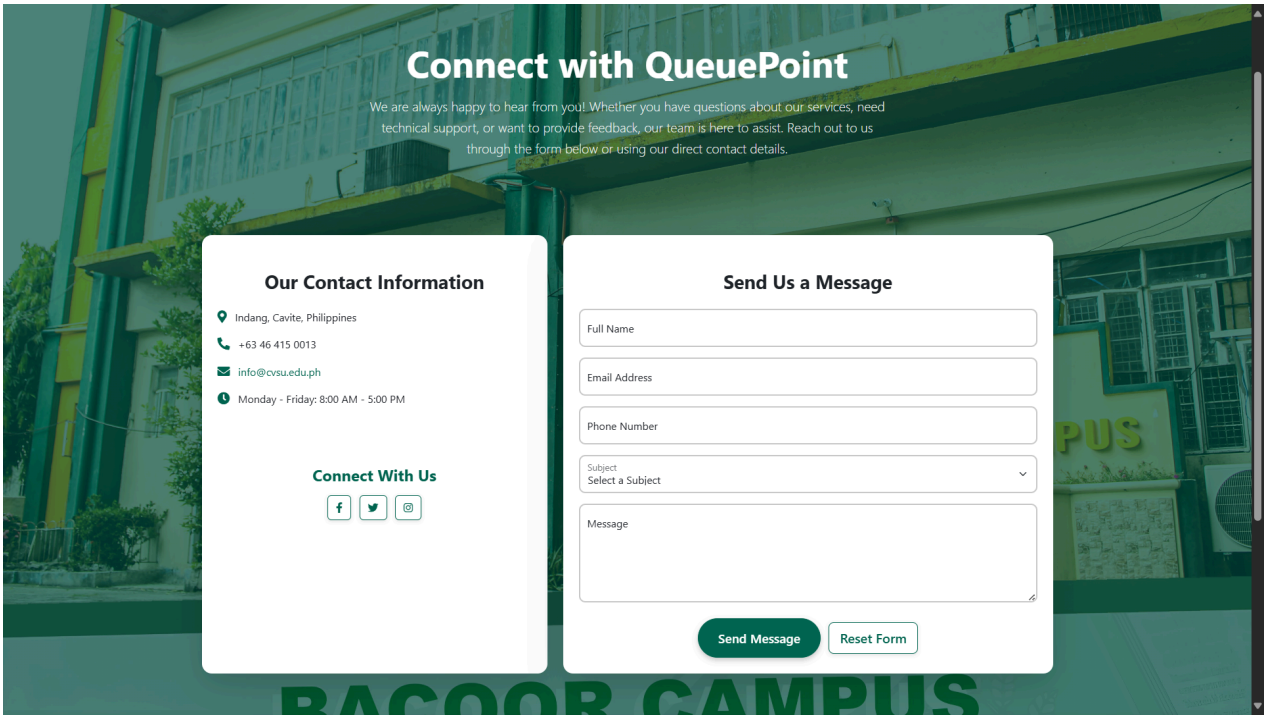

Figure 11. QueuePoint: - Contact Page

- This contact page provides users with multiple ways to reach QueuePoint for inquiries, support, or feedback.

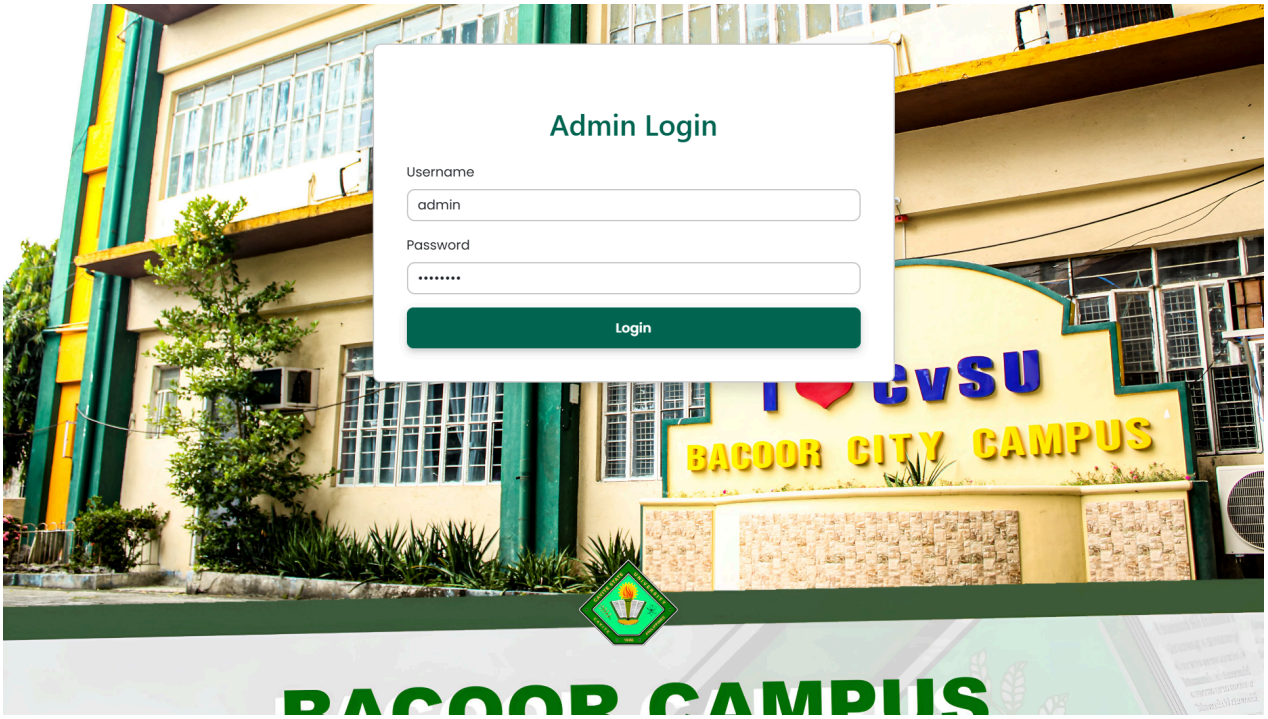

Figure 12. QueuePoint: - Admin Login Page

- This page allows administrators to securely log in and manage the QueuePoint system.

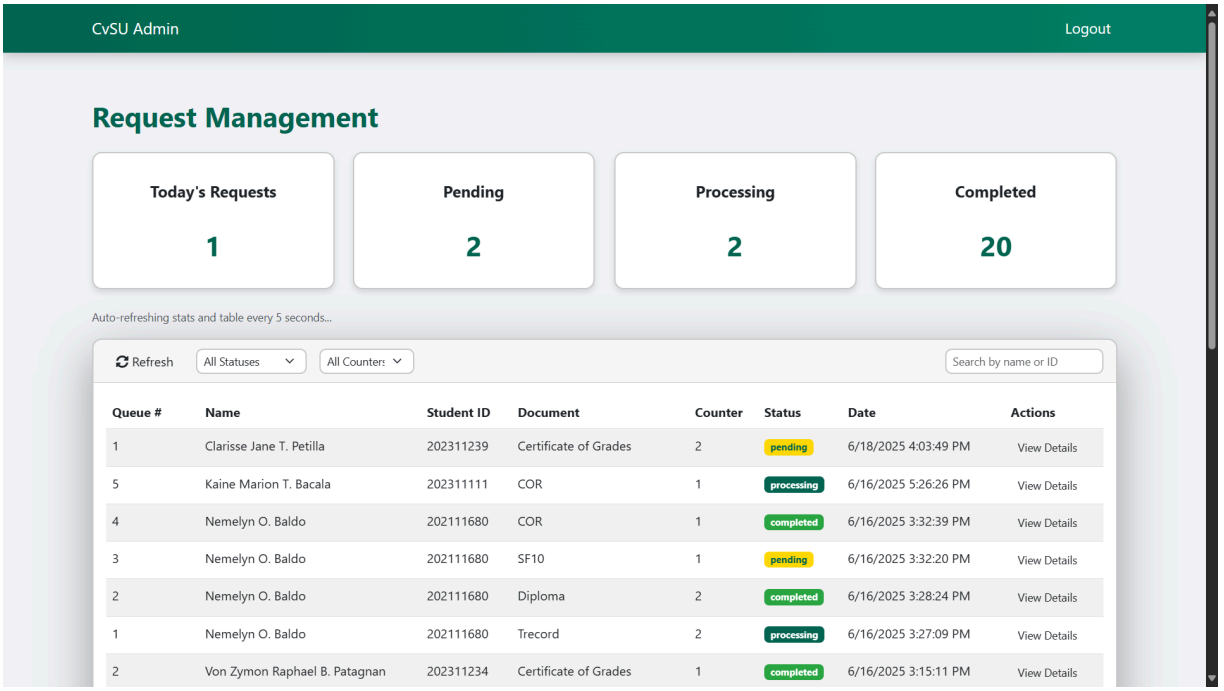

Figure 13. QueuePoint: - Admin Dashboard Page

- This page is the section where the admin monitors all the transactions and information being received.

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cvsubacoor@cvsu.edu.ph

SUMMARY

This study presents QueuePoint, a web-based digital queuing system designed to streamline and modernize registrar transactions at Cavite State University's Bacoor Campus. This study addresses the inefficiencies of traditional, manual queuing procedures, including long wait times, crowding, and a lack of real-time service updates. By developing QueuePoint, the system encourages transparency and ease of use by enabling students to remotely check their queue status, secure their queue numbers online. The research follows the systems development life cycle (SDLC) to ensure systematic platform planning, design, development, testing, and deployment.

QueuePoint is essential to moving the university's administrative services closer to a complete digital transformation by enhancing service delivery and easing physical traffic in registrar offices. By reducing in-person lines, automating repetitive tasks, and offering real-time updates and notifications, it not only improves operational efficiency but also cultivates a more structured, student-centered environment. This change is in line with the university's overarching objective of implementing cutting-edge technologies to provide staff and students with faster, more dependable, and more accessible services.

CONCLUSION

In conclusion, the implementation of Web-based Digital Queueing System for Campus Registrar Transactions Cavite State University Bacoor Campus successfully showed the effectiveness of the system in resolving the inconvenience and congestion during the traditional queueing process. The system that researchers created has become a practical modern solution that essentially improves the engaging experience of the users or the students with the campus registrar by offering its features such as real-time queue tracking, smooth-running transaction processing, user-friendly interface and is suitable for handling continuous loads of transactions.

Furthermore, the researchers followed the Rapid Application Development (RAD) approach which guided them for effective development with the iterative design, continuous testing and quick speed of prototyping. This process ensures that the system provides the needs of the actual users and includes prompt updates. Generally, the system achieves its objectives and goals of improving the queue management and enhancements on the service of the campus registrar's office. It serves as a future prototype ready for implementation and development for future use.

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RECOMMENDATION

In order to maximize the advantages of digital queue management, Cavite State University - Bacoor Campus is advised to totally embrace and include the QueuePoint system into its registrar operations. The university should give staff members as well as students ongoing training and orientation to guarantee smooth implementation and efficient use. It should also regularly evaluate and get comments to pinpoint areas needing development and handle any technical or operational issues. Moreover, additional features such as email notifications or SMS. appointment scheduling, and mobile application integration could be implemented to enhance its accessibility and convenience for users. The system's application could be expanded to other campus assigned sections such as cashiering, accounting or guidance offices and can be recommended to create a more complex and campus-wide digital queuing system operations. Ensuring student data security is essential: The university must implement strict data privacy regulations, utilise secure authentication methods, and restrict data access only to authorised individuals. Systematic security audits must be performed to safeguard student data and uphold confidence in the system.

Maintaining the efficacy of the system will also depend on creating a specialized support team for maintenance and troubleshooting, raising system feature awareness, and strict data privacy policies enforced. While actively promoting user involvement and cooperation with stakeholders will ensure the system remains responsive to the changing needs of the university community, expanding QueuePoint's coverage to other university offices and planning for future scalability will help to further institutional efficiency and service quality.

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