PROGRESSPATH: A STUDENT PERFORMANCE TRACKING SYSTEM WITH OUTCOME-BASED EDUCATION STANDARDS

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PROGRESSPATH: A STUDENT PERFORMANCE TRACKING SYSTEM WITH OUTCOME-BASED EDUCATION STANDARDS

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by

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APPROVAL SHEET

In partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSIT)**, this **UNDERGRADUATE CAPSTONE PROJECT** entitled:

PROGRESSPATH: A STUDENT PERFORMANCE TRACKING SYSTEM WITH OUTCOME-BASED EDUCATION STANDARDS

has been prepared and submitted by CHRISTIAN JAY F. DIMAS, JULIAH JANE B. GEALON, and XANDER JAVE P. JAMIO, who are recommended for the corresponding ORAL EXAMINATION.

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EXECUTIVE SUMMARY

PROGRESSPATH: A STUDENT PERFORMANCE TRACKING SYSTEM WITH OUTCOME-BASED EDUCATION STANDARDS

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The capstone project aims to develop Progress Path, a web-based Outcome-Based Management System designed to help manage courses, share learning materials, and track student progress. This application addresses the challenges when it comes to monitoring, recording, and evaluating student performance, providing a centralized, digitalized, and efficient platform that will align with the outcome based education standard for students, faculty members, and admins. By leveraging PHP, MySQL, HTML, CSS, JavaScript, and Laragon, the project seeks to enhance the process of performance evaluation and will become more efficient and transparent for better decision making and improved learning outcomes..

To achieve these goals, the study focuses on the following objectives:

(1) Designing and developing the application with features like managing student profiles, tracking course enrollment, checking academic performance, and giving different access based on user roles to ensure data handling more organized and easy to use;

(2) Evaluating usability through surveys and performance tests, assessing on how easy it is to navigate, how well it works, and how accessible it is; and

(3) analyzing application logs to gain insights into how users use the system, how well it performs, and to find any errors.

The results of the study indicate that the application successfully improved the efficiency of tracking and managing student progress and received positive usability ratings. Usability tests revealed that users found the system intuitive, easy to navigate, and effective in completing required tasks, with only minor issues related to navigation clarity. Log analysis provided insights into user behavior and system performance, showing frequent use of progress monitoring features and occasional slowdowns during report loading. These findings highlight that the application met its objectives and positively enhanced the overall user experience.

Based on these results, future directions for this project include enhancing system performance, improving user interface clarity, and adding more advanced progress analytics features. Further research and development may focus on integrating automated alerts, and improving system scalability to ensure long-term effectiveness, better user engagement, and sustainable support for academic progress monitoring.

In conclusion, this study demonstrates the effectiveness of web-based information systems in student progress monitoring and academic management, contributing to improved efficiency, usability, and data-driven decision-making in educational institutions.. The insights gained from this research can serve as a foundation for further improvements, making ProgressPath a valuable tool for Students, Faculty Members, and Administrators.

Keywords: Outcome-Based Education, Program Outcome, Web-based application, Student Performance Tracking

TABLE OF CONTENTS

PAGE

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

[note: Please coordinate for the applicable appendices]

CHAPTER I

INTRODUCTION

This capstone project introduces the ProgressPath: A Student Performance Tracking System with Outcome-Based Education Standards. It is a web-based management system that helps the school to monitor, record, and evaluate student performance. It will provide a centralized, digitalized, and efficient platform that will align with the outcome based education standard. The traditional methods require more paperworks, and are prone to human error, but this system will solve the problem by providing a centralized web-based platform where teachers will be able to track student progress to ensure proper alignment with the outcome-based education standard.

Technology continues to evolve, transforming industries and improving various aspects of daily life. In the field of education, digital solutions have become essential in addressing challenges related to inefficient academic processes, manual record-keeping, and data accuracy. However, many existing systems struggle with paper-based procedures, limited accessibility, and being prone to human error, making it necessary to develop innovative solutions.

This capstone project aims to bridge this gap by introducing a web-based academic management system that enhances usability, automation, and centralized data management. The project aims to provide a centralized, digital, and efficient platform for managing student records and monitoring academic performance solutions for students, faculty members, and school administrators.

Project Context

The rapid growth of web technologies has made it possible for schools and universities to improve how they manage academic records and student performance. However, many institutions still rely on manual processes or partially digital systems, which often lead to problems such as data inconsistencies, lost records, and slow performance evaluation. A review of higher education research highlights that fragmented and unintegrated systems make it difficult to monitor learning outcomes, track student progress, and align assessments with program goals [1]. Studies of web-based admission systems in Tanzania found that without a centralized platform, schools experienced delays of several weeks in processing applications and faced repeated errors due to scattered information [2].

Moving to web-based systems allows institutions to store data in one secure location, provide role-based access, and enable real-time monitoring. However, many commercial platforms lack support for outcome-based education features, such as alignment of assessments with learning outcomes and structured student progress tracking [3]. To address these gaps, ProgressPath was developed as a web-based outcome-based education system for student performance tracking, learning outcome monitoring, and secure academic record management, helping make academic processes more accurate, efficient, and transparent.

The rapid advancement of technology has transformed the field of education, yet many organizations still face challenges related to inefficient academic management systems, manual record-keeping, and the lack of centralized tools for monitoring student performance and learning outcomes. Research indicates that the lack of centralized and

automated academic systems makes it difficult to efficiently track student performance and manage academic records [4]. In educational institutions, processes remain that academic tasks are still handled using separate systems or paperwork, which makes processes slow and increases the chance of mistakes [5], resulting in delays in accessing academic information, inconsistent evaluation of student outcomes, and challenges in supporting effective decision-making and learner-centered assessment practices [6].

For instance, academic records are often stored across multiple systems or in paper files, requiring faculty members to manually compile and verify student data. This problem often leads to delays, data inconsistencies, and increased workload, making it difficult for students, faculty members, and administrators to effectively manage academic records, monitor student performance, and make timely academic decisions. Studies have shown that fragmented data systems, excessive paperwork, and inefficient record-keeping are major barriers to effective academic management [7].

Despite the proven benefits of outcome-based education (OBE) in enhancing student engagement, curriculum alignment, and learning outcomes, challenges remain in effectively managing and monitoring these processes in higher education. Apriana and Andalia highlighted that while OBE approaches can increase student awareness and improve learning outcomes in specific courses, the management of student progress and performance tracking often relies on manual or fragmented systems, which limits scalability and real-time monitoring [8]. Similarly, Santos and Clemente-Faustino's synthesis of qualitative studies revealed that institutions frequently struggle with inconsistencies in implementing OBE practices, fragmented assessment records, and insufficient integration of technology to support outcome-based processes [9]. Hossain further emphasized that although internal quality assurance mechanisms can strengthen

teaching quality and curriculum innovation, the lack of centralized, digital systems hampers the efficient tracking of learning outcomes and performance evaluation [10].

These studies indicate a clear gap. While OBE improves learning and teaching practices, there is a need for integrated, technology-supported systems that allow real-time monitoring, centralized record management, and structured assessment tracking. Addressing this gap forms the rationale for developing ProgressPath, a web-based outcome-based education system designed to streamline academic monitoring, enhance transparency, and support data-driven decision-making in higher education.

Purpose and Description

This capstone project aims to address the difficulty of efficiently managing and monitoring academic records and student performance by developing an outcome-based academic management system that provides centralized record management, academic performance tracking, and role-based access for students, faculty members, and school administrators. The system is designed to enhance automation, data accuracy, and user experience by reducing manual academic processes and supporting structured assessment and record management [11] using modern web technologies such as PHP, MySQL, HTML, CSS, JavaScript, and Laragon [12]. Unlike existing solutions, the application developed for this study integrates centralized performance tracking, structured assessment mapping, and organized academic data management [13] to offer a more systematic and transparent academic management approach [6] in education.

By implementing this project, the study aims to contribute to more efficient academic processes and enhanced assessment practices through the use of digital technologies [14],

paving the way for future system enhancements such as advanced analytics, expanded reporting tools, and broader institutional adoption [15].

Objectives of the Study

The objective of this capstone project is to develop an Outcome-Based Management System that aims to monitor, record, and evaluate student performance, providing a centralized, digitalized, and efficient platform that will align with the outcome-based education standard.. Specifically, this study seeks to accomplish the following:

- Design and develop the application with features such as student profile management, course enrollment tracking, academic performance monitoring, and role-based access control, ensuring efficient, accurate, and organized management of student records.
- Evaluate usability using survey-based user feedback and system performance testing, measuring ease of navigation, responsiveness, functionality, and user satisfaction.
- Analyze application logs to assess user interactions, system performance, error occurrences, and usage patterns, in order to identify areas for improvement and optimize the user experience.

Significance of the Study

The study also aims to benefit multiple stakeholders, including:

- **Student** - The system helps students by giving them an easy way to see their grades, subjects, and learning progress. They don’t need to wait for updates or ask their teachers all the time. This makes it easier for them to know how well they are doing in school.

- **Faculty** - Teachers can use the *ProgressPath* to manage their classes, upload lessons, and check how students are doing. It saves time because they don't have to write reports or grades by hand. Everything is in one place, which helps them focus more on teaching.
- **School Administrator -** School staff or administrators can use the *ProgressPath* to see all student records and teacher activities. This makes it easier to check if the school is meeting its goals and to fix problems quickly. It also keeps school data organized and safe.
- **Educational Institutions -** The system helps schools and colleges by making academic work faster, more organized, and better for both students and teachers. It also helps the school keep track of how well students are learning based on the goals of each course.
- **Future Researchers**: This study can help future students or developers who want to build similar systems. It gives ideas and examples for creating better tools in education using technology.

This capstone project is expected to benefit various stakeholders by addressing the challenges of managing and monitoring academic performance efficiently through a centralized outcome-based management system. For students, faculty members, and administrators, the project provides real-time access to academic records, streamlined course and grade management, and easy progress monitoring, leading to improved decision-making, reduced errors, and enhanced academic performance. Meanwhile, organizations and businesses can benefit from the system to organize student data securely, simplify reporting, and ensure compliance with academic standards [16].

From an academic perspective, this study contributes to the growing body of research on educational technology and academic management systems, serving as a foundation for future enhancements and innovations. Future researchers may build upon this work to explore advanced learning analytics, integration with mobile platforms, and automated predictive performance monitoring [17].

Scope and Limitations

The scope of this study focuses on the design, development, and evaluation of an outcome-based management system intended for students, faculty members, and admins of the College of Computing and Information Sciences. The system will include student profile management, course enrollment tracking, academic performance monitoring, and role-based access control, which aim to address the lack of centralized academic records, manual processes, and difficulties in tracking and analyzing student performance efficiently.

The study will involve students, faculty members, and administrators, who will participate in usability testing, surveys, and system evaluation to assess the effectiveness, usability, and accuracy of the system.

The project will be conducted in Cor Jesu College, covering a period from June 2025 to May 2026, which includes design, development, testing, result dissemination, and publication.

Despite the scope defined, this study has several limitations:

1. **Technological Constraints:** The system will be developed using PHP, MySql, HTML, CSS, JavaScript, and Laragon, which may limit compatibility with different platforms and does not support offline access.
2. **Sample Size and Respondents:** The study will involve 50 participants, which may not fully represent the target population.
3. **Usability Testing:** The evaluation will be conducted within a controlled environment within Cor Jesu College, Inc. specifically in the computer laboratories. This setup provides a stable setting for observing participants' interaction with the system
4. **Data Collection Methods:** The study will utilize surveys and questionnaires with the use of google forms to conduct the collection of data, which may be subjective or limited in scope.
5. **Requires Internet Connectivity:** The system is web-based and does not work without an internet connection, which may be difficult in areas with weak or no internet connectivity.

Definition of Terms

1. **Continuous Quality Improvement** - refers to an ongoing process of systematically evaluating and improving processes, services, or systems to enhance efficiency, effectiveness, and outcomes [18]. In this capstone, CQI is applied to the student progress tracking system by continuously assessing the platform’s features, user feedback, and academic monitoring processes to ensure that the system consistently meets the needs of students, faculty, and administrators while improving performance and usability over time.

2. **Outcome-Based Education** - refers to an educational approach that focuses on defining specific learning outcomes that students are expected to achieve [19]. In this capstone, OBE is applied to structure the student progress tracking system so that academic performance, skill mastery, and learning milestones are clearly defined, monitored, and evaluated, ensuring that both students and faculty can measure progress against concrete outcomes.
3. **Outcome Evaluation** - refers to the systematic process of assessing the extent to which students achieve the intended learning outcomes, providing evidence of learning effectiveness and areas for improvement [20]. In this capstone, outcome evaluation is applied to the student progress tracking system to measure and analyze students' academic performance and skill mastery, ensuring that the platform accurately reflects learning achievements and supports data-driven decisions for improving educational outcomes.
4. **Program Outcome** - refer to the specific knowledge, skills, and competencies that students are expected to achieve by the end of an academic program, which serve as measurable indicators of learning effectiveness [21]. In this capstone, program outcomes are used to guide the design of the student progress tracking system, ensuring that the platform effectively monitors and evaluates students' achievement of defined academic objectives, skill mastery, and overall program competencies.
5. **Student Performance Tracking** - refers to the systematic monitoring and recording of students' academic achievements, progress, and learning outcomes to inform educational decisions and interventions [22]. In this capstone, student performance tracking is applied within the web-based system to continuously

monitor students' grades, skills, and progress, enabling faculty members and administrators to identify learning gaps, provide timely support, and ensure that students meet their academic goals.

6. **Web-Based Application** - refers to a software application that is accessed and operated through a web browser over the Internet, allowing users to interact with its features without installing software locally [23]. In this capstone, the web-based application is used to provide a centralized platform for managing student records, tracking academic performance, and monitoring progress, enabling students, faculty, and administrators to access and update information anytime and anywhere.

CHAPTER II

REVIEW OF RELATED LITERATURE AND SYSTEMS

This chapter presents a thematic review of literature and related systems relevant to this study. It examines academic research, industry studies, and existing technologies that align with the study's objectives. The discussion follows a thematic structure, where each section integrates both literature and system analysis to establish the foundation for the proposed system.

Outcome-Based Education Management in Digital Age

Research indicates that education institutions are implementing the "Outcome-Based Education" (OBE) concept. It is considered as a huge innovation to improve education. A student-centered teaching approach that emphasizes using outcomes for evaluating student success is outcome-based education (OBE). Knowledge, abilities, and attitudes are examples of outcomes [24]. Prior work highlights the challenge of manually mapping course outcomes to program goals, which often leads to inconsistent reporting and poor transparency [25]. These studies suggest that using automated systems to manage learning outcomes enhances efficiency and accuracy in academic planning and delivery [26]. "Outcome-Based Education" OBE promotes personalization and flexibility in learning, with a focus on measurable objectives which connect learners' expectations with outcomes. OBE is constantly subject to challenging improvement. Since it started, it has improved student engagement and efforts to match

learning to real-world, practical situations, giving students the information and abilities they need for future career aspirations and general success in life [27].

Existing applications, such as Moodle, integrate learning management technologies and learning analytics tools to enhance course delivery, activity tracking, and monitoring of student participation [28]. Moodle supports outcome-based education by allowing instructors to manage learning materials, assessments, and student activities within a centralized platform. In addition, activity logs and usage data collected by Moodle can be analyzed to understand student learning behavior and academic performance patterns [29].

However, limitations in outcome-based evaluation, scalability, and integrated academic performance visualization remain unaddressed. Studies have shown that Moodle faces challenges when handling large-scale academic projects and complex outcome tracking, particularly in institutions with high user volumes and diverse academic requirements [30]. Moreover, the alignment of learning activities with clearly defined learning outcomes is often manual and fragmented, making it difficult to evaluate program-level achievements effectively [31]. The proposed system, PathProgress, aims to improve these limitations by integrating automated outcome-based management features, centralized dashboards, and structured evaluation tools to support more efficient and accurate academic monitoring.

Enhancing Faculty and Student Engagement Through Academic Portals

Studies show that faculty support and active academic portals lead to higher student engagement and better online learning performance, but they often lack comprehensive integration of self-regulation and emotional support systems [32]. These

approaches are commonly limited by static content delivery, lack of personalized feedback, and weak faculty-student collaboration. Research findings suggest that using integrated academic portals and learning analytics can improve engagement, self-regulation, and performance in digital classrooms [33].

Existing applications, such as Socrative and Clicker systems, integrate mobile-based and cloud-based interaction technologies to enhance classroom participation and provide instant feedback [34]. These platforms support interactive quizzes, polls, and discussions, allowing instructors to assess understanding and adapt teaching strategies on the spot [35].

However, these platforms often remain limited by disjointed communication channels, lack of deep outcome-tracking analytics, and no unified dashboard for both students and faculty. The proposed PathProgress addresses these limitations by combining learning analytics and progress visualizations in a single, user-friendly portal. This enhancement allows both students and faculty to stay connected, share timely feedback, and track academic outcomes together, supporting a more engaging and collaborative learning environment [36], [37].

The Role of Outcome-Based Education Systems in Modern Education

Findings in outcome-based education (OBE) and educational management systems indicate that existing OBE frameworks provide a clear structure for aligning learning outcomes, teaching activities, and assessments, which helps improve student learning quality [38]. However, these frameworks lack strong technological support for continuous outcome tracking, automated assessment, and centralized monitoring, making implementation difficult in many institutions [39], [40]. Many schools still depend on

manual documentation and isolated systems, which reduces efficiency and consistency in outcome evaluation [41].

Advances in learning management systems and digital education technologies suggest improvements in academic management, student engagement, and outcome-based monitoring [42], [43]. Modern LMS platforms support flexible learning, online assessments, and communication tools that improve teaching and learning processes. However, these systems often focus more on content delivery than on program-level outcome assessment and long-term academic performance analysis, limiting their effectiveness for full OBE implementation [44].

Systems like Moodle apply web-based learning management techniques to support course management, online assessments, and basic student progress tracking, achieving improved accessibility and learning efficiency [45]. These features help institutions manage teaching activities more effectively. However, limited support for outcome dashboards, integrated outcome evaluation, and academic decision support remains unaddressed. The proposed system will refine outcome monitoring, analytics, and reporting features to enhance accurate performance evaluation and informed academic decision-making across the institution [40].

The review of related literature and systems has provided valuable insights into outcome-based education and digital academic management in higher education. Several studies have demonstrated that OBE improves student learning outcomes, academic behavior, and skill development when properly implemented [46], [47]. However, research also highlights challenges such as lack of system integration, difficulty in

measuring outcomes consistently, and limited technological support, which directly relate to the focus of this capstone project [48], [49].

Existing systems such as Moodle and Blackboard have implemented online course management, assessment tools, feedback mechanisms, and communication features, improving teaching efficiency and access to learning resources [45], [50]. Despite these advancements, these systems exhibit weaknesses in outcome-based analytics, centralized outcome tracking, and program-level evaluation, making them less effective in institution-wide outcome-based academic management.

Implementation of Outcome-Based Management Systems in Educational Institutions

Academic Management Systems are digital platforms designed to support the organization, tracking, and improvement of educational processes within institutions. These systems cover various operations such as enrollment management, grading, scheduling, and curriculum oversight. Studies show that AMS significantly improves institutional efficiency, transparency, and academic quality when properly implemented [51], [52], [53].

However, many schools still face challenges in implementing these systems effectively. Some systems lack integration across departments, leading to data redundancy and inefficiencies. In certain schools, records are managed manually or through standalone software with no synchronization, resulting in inconsistencies and limited access to real-time information [54], [55], [56]. Additionally, the absence of user-role management often exposes sensitive academic records to unauthorized access.

To address these issues, recent research recommends the use of smart technologies such as fuzzy logic algorithms and Internet of Things (IoT) tools to automate and secure school operations. Liu (2021) introduced an intelligent administration system that groups students and tracks academic progress using fuzzy clustering, improving data accuracy and reporting [57]. Li (2021) proposed a smart campus system that uses IoT to manage resources, monitor infrastructure, and track student activity in real time [58]. These technologies help reduce manual workload and increase data reliability.

Meanwhile, schools like those studied by Idroes et al. (2024) and Ilham & Yuniarti (2022) successfully implemented web-based systems tailored to their needs. These systems featured centralized databases, academic dashboards, and automated reporting, which helped streamline workflows and improve educational quality [59], [60]. Similarly, Wong-Fajardo et al. (n.d.) demonstrated that combining Learning Management Systems (LMS) with academic databases creates a more connected and responsive academic environment [61].

Despite these improvements, many AMS platforms still struggle with scalability and customization, particularly in areas such as research tracking, outcome-based education, and project-based learning. In some cases, traditional platforms do not support complex workflows needed for higher-level academic operations.

CHAPTER III

TECHNICAL BACKGROUND

This chapter presents the technical foundation of the proposed system. It discusses the key technologies used in the development, including their functionalities, advantages, and relevance to the system. Each section provides a discussion of relevant technologies, followed by a workflow narrative that explains its processes and interactions within the system.

PHP (Hypertext Preprocessor)

PHP is a server-side scripting language used for developing dynamic and interactive web applications. It is widely used for handling backend logic such as user authentication, data processing, and database transactions. In this system, PHP manages all business logic including login validation, role-based access control, task management, student submissions, grading, messaging, and program outcome computations. PHP is suitable for this system because it is easy to integrate with databases, supports session management, and allows fast development of secure web-based applications. It also works efficiently with the Apache server provided by the local development environment.

The workflow of PHP in the system follows these steps:

1. The user sends a request by submitting a form or clicking a button in the browser.

2. The request is processed by a PHP script on the server.

3. PHP validates the user session and checks the user role.

4. PHP communicates with the database to retrieve or store data.

5. The processed result is sent back to the browser as HTML or JSON.

6. The user interface is updated based on the returned data.

MySQL Database Management System

MySQL is a relational database management system used to store and organize system data. It holds records such as user profiles, programs, courses, classes, tasks, submissions, grades, messages, and notifications. Relationships between tables support tracking of academic activities and outcome-based education data. MySQL is reliable, fast, and suitable for structured academic records. It supports complex queries needed for generating reports such as student performance per Program Outcome.

The workflow of MySQL in the system follows these steps:

1. PHP sends SQL queries to the database server.

2. The database processes the query such as SELECT, INSERT, UPDATE, or DELETE (soft delete).

3. Data is retrieved or modified based on the request.

4. The database returns results to the PHP application.

5. PHP processes the result and sends formatted output to the user interface.

HTML, CSS, and JavaScript

HTML is used to structure the content of the system such as forms, tables, and modals. CSS is used to design the layout and visual appearance including cards, buttons, and responsive design. JavaScript is used to provide interactivity such as opening modals, form validation, and dynamic updates without reloading the page. These technologies allow the system to be user-friendly and responsive across different screen sizes.

The workflow of HTML, CSS, and JavaScript in the system follows these steps:

1. The browser loads the page structure using HTML.

2. CSS styles are applied to format the interface.

3. JavaScript listens for user actions such as clicks or form submissions.

4. JavaScript sends requests to the server using AJAX when needed.

5. Returned data is displayed dynamically without refreshing the page.

AJAX (Asynchronous JavaScript and XML)

AJAX allows the system to communicate with the server in the background without reloading the entire page. It is used in features such as loading student submissions, sending messages, submitting tasks, and updating grades. AJAX improves system performance and user experience by making interactions faster and smoother.

The workflow of AJAX in the system follows these steps:

1. The user performs an action such as clicking submit or view.

2. JavaScript sends an asynchronous request to a PHP script.

3. PHP processes the request and accesses the database if needed.

4. PHP returns a JSON response.

5. JavaScript updates the page content dynamically.

DataTables and Select2 Libraries

DataTables is a JavaScript plugin used to enhance tables by adding searching, sorting, and pagination. Select2 is used to improve dropdown menus with search and better usability. These libraries are applied in user management, enrollment lists, and program outcome filtering. They help manage large amounts of data efficiently and improve usability.

The workflow of DataTables in the system follows these steps:

1. Data is loaded into tables or dropdown elements.

2. The plugin initializes and enhances the interface.

3. Users can search, filter, or sort data instantly.

4. Selected data is passed to the server when forms are submitted.

Laragon Local Development Environment

Laragon is used as the local server environment providing Apache, PHP, and MySQL services. It allows developers to test and run the system locally before deployment. Laragon simplifies development setup and supports fast testing and debugging.

The workflow of Laragon in the system follows these steps:

1. The developer runs Apache and MySQL services.

2. The system is accessed via localhost in the browser.

3. PHP scripts execute using the local server.

4. MySQL handles database transactions locally.

5. Errors and logs can be monitored for debugging.

Security Mechanisms

Security is integrated into the system to protect academic records and personal information. The system uses authentication, role-based access control, session validation, soft delete mechanisms, and controlled file uploads. These controls ensure that only authorized users can access specific features and that data integrity is maintained.

The workflow of Security Mechanism in the system follows these steps:

1. Users must log in to access the system.

2. The system verifies credentials and user roles.

3. Sessions are created to maintain authentication.

4. Access to pages is restricted based on user type.

5. Deleted records are marked using soft delete instead of permanent removal.

6. Uploaded files are validated and linked to specific users and tasks.

This chapter discussed the core technologies that support the system, including PHP, MySQL, HTML, CSS, JavaScript, AJAX, DataTables and Select2 Libraries, Laragon, and security mechanisms. Each section detailed their functionalities, workflows, and integration within the system. The next chapter will focus on system design and methodology.

CHAPTER IV

DESIGN AND METHODOLOGY

This chapter presents the design and methodology used in developing the system. It outlines the conceptual framework, software development process, data collection and analysis approach, and ethical considerations. The design serves as a blueprint for the project, while the methodology provides a systematic approach to solving the identified computing problem.

Conceptual Framework

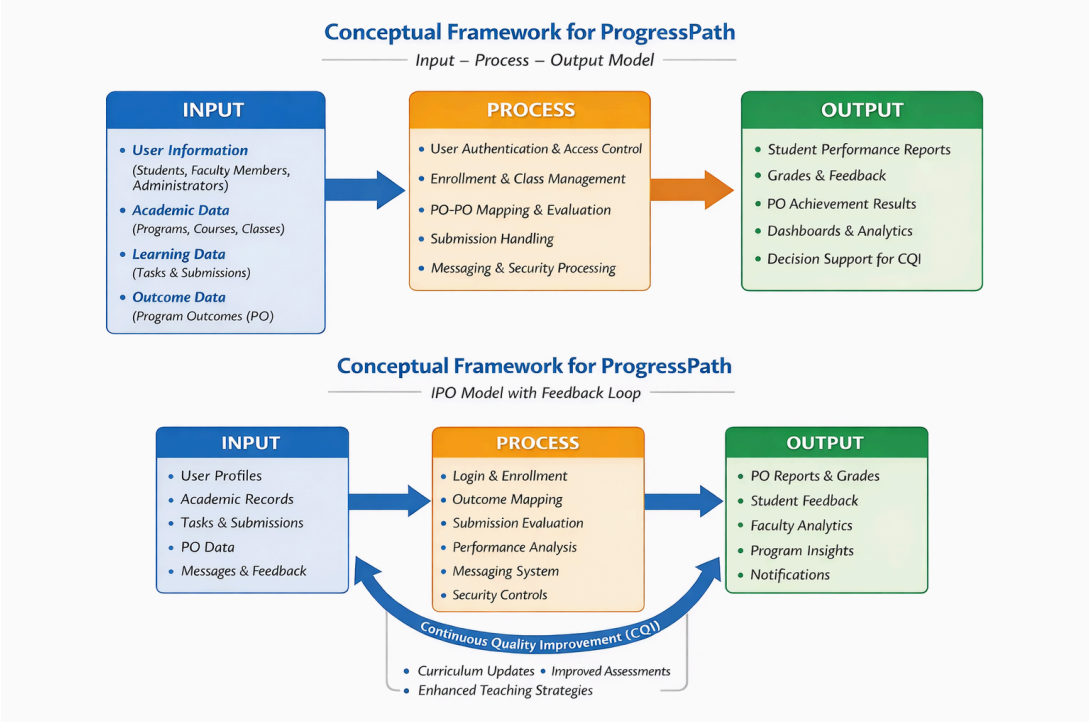


Figure 1. Conceptual Framework

The conceptual framework of ProgressPath follows the Input–Process–Output (IPO) model with a Continuous Quality Improvement (CQI) feedback loop. This framework

explains how data enters the system, how it is processed, and how useful information is produced to support Outcome-Based Education.

At the center of the framework is the ProgressPath Student Performance Tracking System, which serves as the core engine of the system. Inputs are received from the primary users, such as students, faculty members, and administrators, who interact with the system through a web-based portal and personalized dashboard. These users provide academic data such as course records, grades, submissions, and program outcome information, which are processed by the system to generate reports and feedback that support Outcome-Based Education.

Once inputs are provided, the system processes the data through key modules such as:

- User Authentication and Access Control Module – verifies user identity and ensures that each user can only access features based on their role (student, faculty, or administrator).
- Enrollment and Class Management Module – manages student activities, subject assignments, and class records.
- Program Outcome Mapping Module – links course activities and assessments to specific program outcomes to support Outcome-Based Education.
- Submission and Grading Module – handles student submissions, grade recording, and performance evaluation.

Processed data is stored and retrieved from the MySQL database, which ensures secure and efficient handling of system records such as user profiles, academic records, grades, and program outcome data. The output is then delivered back to the users in the form of

grades, feedback, and system-generated academic summaries that support decision-making and performance monitoring.

This framework supports the study's objectives by ensuring that student performance monitoring and outcome-based assessment are addressed through the system's program outcome mapping, grading, and monitoring. Additionally, the feedback and logging mechanisms embedded in the system provide support for continuous performance monitoring, academic evaluation, and system usage tracking. Overall, the conceptual framework demonstrates how the proposed system integrates user interaction, data processing, and output generation in an organized and goal-driven manner, offering a structured approach to solving the identified problem in the field of academic management and outcome-based education.

Software Development Phase

This section describes the methodology used in the software development process, including the development model, tools, and techniques applied throughout the project lifecycle.

We chose the Agile method because it is efficient for the ProgressPath and will help us with the project quickly. Agile makes this easier by breaking the work into small parts and including documentation and quality checks at each step. This helps us manage programming, development, and the whole application more smoothly.

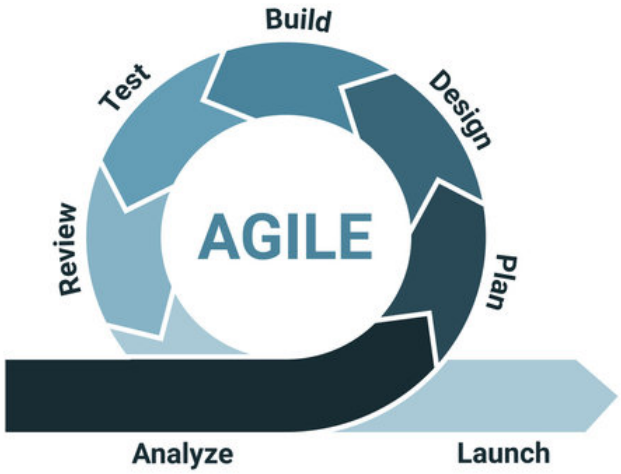


Figure 2. Agile Methodology Development Life Cycle

In the Agile method, teams work closely together to make sure they meet all the users' needs. This close cooperation helps the team quickly respond to changes and finish the application faster. Agile has several advantages compared to other ways of developing applications. First, users can see the app while it is being built, so the design process is faster. Second, if there are any mistakes or bugs, they are smaller problems that are easier to fix and don't affect the whole plan. Third, users are more satisfied because the app is

made to match what they want. Lastly, Agile reduces the risk of failure because users can easily use the app as it is developed [62].

Planning

In the planning stage, the development team sets the direction and purpose of the system. The main goal of the project is to create a web-based platform that improves academic tracking, manages program and program outcomes, and enhances the interaction between students, faculty members, and administrators. Key stakeholders such as students, faculty members, and school administrators from the College of Computing and Information Sciences (CCIS) are identified and consulted through surveys and interviews. Their input helps the team understand current issues and expectations. Based on this, the team defines the scope of the project and identifies the tools and technologies needed, including PHP, MySQL, HTML, CSS, JavaScript, and Laragon. Time, resources, and development costs are also estimated to ensure the project stays on track and within its limitations.

Analysis

The analysis stage focuses on understanding what the system needs to do by reviewing existing academic processes and identifying current problems. Students and faculty often deal with delayed access to records, scattered data, and manual outcome tracking. To address these issues, functional requirements include allowing students to view their grades and academic progress, enabling faculty to manage classes and track performance, and giving administrators access to system controls. Non-functional requirements highlight the need for the system to be secure, user-friendly, and accessible through a web browser. System constraints, such as the need for an online connection and

limited offline features, are also noted. This phase ensures that all necessary system features are clearly defined and aligned with the users' needs.

Design

In the design phase, the technical and visual structure of the system is mapped out before development begins. The system employs a three-tier architecture with the presentation layer (frontend), logic layer (backend), and data layer. The frontend uses HTML and CSS to create a clean, responsive interface. The backend logic is built with PHP, Laragon for local hosting, while MySQL is used to manage and store data securely.

Implementation

The backend of the system is built using PHP and MySQL on an Apache server. The frontend uses HTML and CSS for the design. The code is written in a clear and organized way to make it easy to reuse and update when needed [63].

Testing and Evaluation

The system is tested to ensure it works properly and is easy to use. Functionality testing checks if all features are working for students, faculty members, and administrators. Usability testing involves System Usability Scale (SUS) letting actual users try the system and give feedback through surveys and questionnaires. These surveys measure the ease of use, usefulness, and overall experience. The development team also checks for errors or bugs and fixes them before launching the system. All feedback is reviewed to improve the system and ensure it meets the users' needs.

Deployment and Maintenance

Deployment

ProgressPath system will be deployed using the school's local server to allow authorized users to access the application within the institution's network. During development and initial deployment, Laragon will be used as the server environment to host and manage the system. This setup enables the application to operate without relying on external or cloud-based platforms, providing better control over data and system access.

The local server environment offers a secure and controlled setting for system operation. Laragon will manage essential components such as the Apache web server, PHP interpreter, and MySQL database, ensuring smooth communication between the system's modules. This deployment approach allows the institution's IT personnel to easily monitor system performance, manage user access, apply updates, and maintain data security.

The deployment process will follow a structured approach. First, the system files and database will be prepared for installation, including configuration of environment settings and dependencies. Next, the system will be installed and tested on the server to verify that all features function correctly. Security configurations, such as user roles and access permissions, will then be implemented. After successful testing, the system will be made available to students, faculty members, and administrators within the school network.

To ensure effective system use, basic user training will be conducted. Training sessions or user guides will be provided to introduce users to key system features, navigation, and proper data handling procedures.

Maintenance

System maintenance will be handled by the development team in coordination with the institution's IT staff. Regular maintenance activities will include monitoring system performance, fixing bugs, updating features, and applying security patches. Updates may be conducted monthly or as needed based on system performance and user feedback.

To support continuous improvement, the system will include feedback mechanisms that allow users to report issues and suggest enhancements. A support or reporting feature will enable students, faculty members, and administrators to submit concerns related to system functionality. Collected feedback will be reviewed to identify recurring issues and areas for improvement.

Routine database backups and system checks will also be performed to prevent data loss and ensure system reliability. Through proper deployment, training, and maintenance planning, ProgressPath is expected to remain stable, secure, and effective in supporting outcome-based education processes.

Data Collection and Analysis Phase

This section details the data gathering methods, sources, techniques, and analytical methods used in the study to evaluate the system's usability, performance, and effectiveness.

Measures

Measures in this study are collected using a combination of surveys and usability tests, Surveys include structured questionnaires with Likert-scale and System Usability Scale to assess user satisfaction, ease of use, and overall experience. Usability tests involve participants performing specific tasks within the system while researchers observe and record their performance, such as task completion rates and error frequency [60].

Respondents

The respondents included both faculty members and students from the College of Computing and Information Sciences (CCIS). They were intentionally chosen because they are directly involved in and familiar with the academic processes related to student management.

Data Gathering Procedure

The data gathering process for this study will follow a structured approach to ensure that reliable and relevant information is collected to evaluate the usability, effectiveness, and user satisfaction of the system.

1. **Securing Approval** - A formal approval from the Dean to proceed with the research data collection activities.
2. **Preparation Phase** - Before data collection begins, the system will be finalized and deployed in a testing environment accessible via web browser. Participants will be composed of students and faculty members. A brief orientation will be given to introduce the purpose of the study. The researchers will explain how the system works, provide consent forms, usability task instructions, and post-task survey questionnaires.

3. **Usability Testing -** Participants will be asked to perform specific tasks using the ProgressPath. Observers will record completion time, errors, and whether users were able to complete tasks without help. Screen recordings or observation checklists may be used to track user interactions and behaviors during the session.
4. **Survey Distribution** - After completing the tasks, participants will fill out a post-test survey. The survey will include questions using Likert scales to measure ease of use, satisfaction, and perceived accuracy of recommendations.
5. **Data Analysis phase** - The survey responses will be summarized using descriptive statistics. Task performance metrics such as completion rates and error rates will be calculated. All the feedback will be reviewed to identify common issues and usage patterns, helping to assess the overall usability and functionality of the system.

Analysis and Interpretation

This section presents the methods used to analyze the data collected from the usability testing and surveys of the ProgressPath application. The analysis focuses on evaluating the system's effectiveness, usability, and overall user satisfaction using both quantitative and qualitative approaches.

- Descriptive statistics such as the mean, median, and standard deviation were used to summarize numerical data collected from Likert-scale surveys, including user satisfaction, ease of use, and ease of learning.

- Usability metrics such as task completion rate, error rate, and time on task were measured and analyzed to evaluate how efficiently users performed key functions within the system.

Descriptive statistical methods were applied to summarize participants' responses. These included the computation of mean scores, frequency counts, and percentage distributions for the Likert-scale and USE questionnaire responses. The System Usability Scale (SUS) was also used as a standard usability metric to measure overall system usability. The SUS scores were calculated and interpreted using established usability benchmarks to classify the system's usability level [64].

Ethical Considerations

Ethical considerations are very important when doing research because they help protect the participants and ensure the study is fair and trustworthy. These considerations guide how researchers should treat participants, handle data, and conduct the study in a way that respects the rights and well-being of everyone involved.

- **Informed Consent:** Informed consent assures the participants that they comprehend the purpose, risks, and voluntariness of the study. They receive a consent form describing the purpose, procedures, risks, benefits, and measures of confidentiality of the study prior to participation. The participants are assured of their freedom to leave at any time without any consequences. The consent form should be read and signed prior to data collection to ascertain their assent to the term of the study [65].
- **Anonymity:** Anonymity ensures that participants' personal information is kept confidential and untraceable to their identity. In this study, all data collected from

respondents, such as survey responses or system usage, will be anonymized by removing any identifiable information like names, contact details, or other personal identifiers. Instead of using participant names, a unique code or ID will be assigned to each respondent. This process helps ensure that the data cannot be linked back to any specific individual, protecting their privacy and encouraging honest participation. Additionally, all data will be securely stored and only used for research purposes [66].

- **Confidentiality:** Confidentiality ensures that participants' personal information is protected and used solely for the study. Identifiable data will be separated from research data, with participants assigned unique identifiers. All data will be securely stored and can only be accessed by the authorized personnel [67].

This chapter discussed the conceptual framework, development methodology, data collection and analysis approach, and ethical considerations that guide the project's design and implementation. The next chapter will present the results and findings based on the collected data.

CHAPTER V

RESULTS AND DISCUSSION

This chapter presents and interprets the results of the study. The findings are aligned with the design and development of the application, usability evaluation, and application log analysis. Data is presented using diagrams, tables, and figures, ensuring a clear representation of key insights.

Design and Development of the ProgressPath

The application was designed and developed following the Agile methodology, allowing continuous improvement through iterative development and regular feedback. The system was built using PHP, MySQL, HTML, CSS, JavaScript, AJAX, and supporting libraries such as DataTables and Select2, ensuring modularity, scalability, security, and ease of maintenance.

Figure 3: System Architecture Diagram

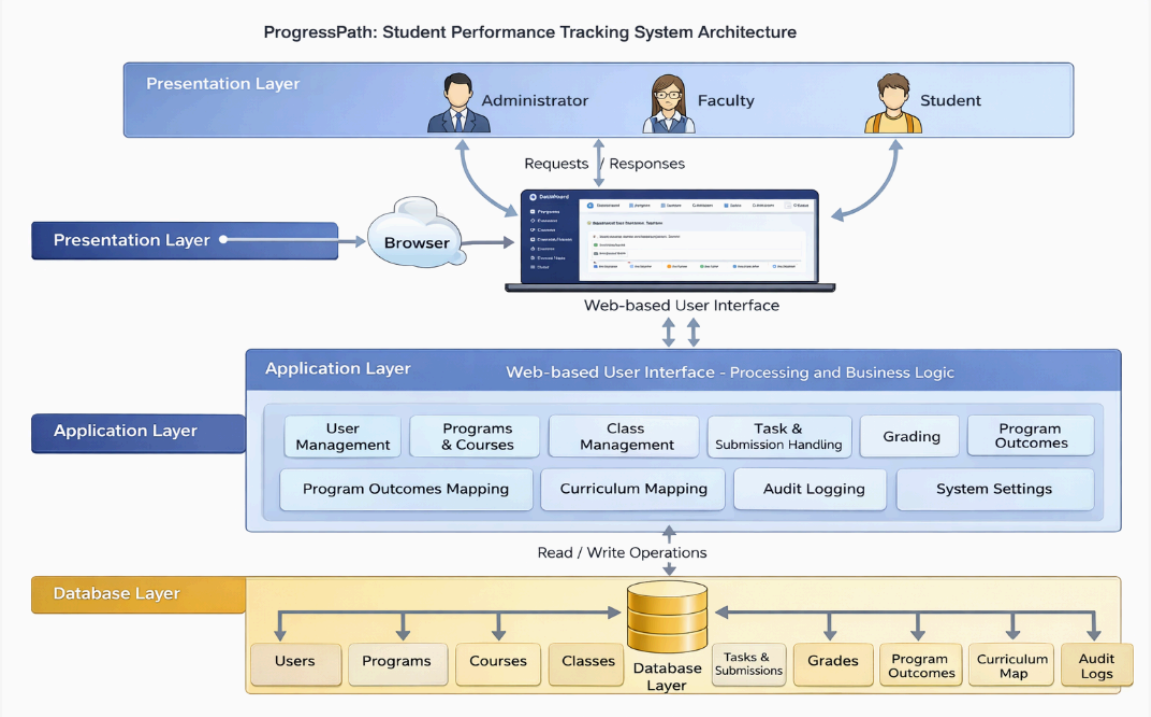


Figure 3. System Architecture Diagram

The system architecture (Figure 3) illustrates the key components of the application, which are organized into three main layers: the Presentation Layer, Application Layer, and Database Layer. The Presentation Layer consists of the web-based user interface accessed through a browser by three types of users: Student, Faculty Member, and Administrator allowing them to interact with the system through dashboards, forms, and reports. The Application Layer handles all processing and business logic, including user management, program and course management, class management, task and submission handling, grading, program outcomes mapping, curriculum mapping, audit logging, and system settings. This layer ensures that user requests are properly processed and validated before being executed. The Database Layer serves as the central data repository that stores all system records such as users, programs,

courses, classes, tasks and submissions, grades, program outcomes, curriculum maps, and audit logs.

Figure 4: User interface and Key functionalities

Key functionalities

1. **User Authentication and Role-Based Access**
   The system allows students, faculty, and administrators to log in using secure accounts. Each user will only see features based on their assigned role.

2. **Personalized Dashboard**
   Each user will have a customized dashboard that shows relevant information, such as enrolled courses for students, class lists for faculty, and system statistics for administrators.

3. **Course and Subject Management**
   Administrators and faculty can create, update, and manage courses, subjects, and class records.

4. **Student Enrollment and Records Management**
   The system manages student profiles, enrollments, and academic records in a centralized database.

5. **Submission and Activity Management**
   Students can submit academic activities and outputs through the system, while faculty can view and assess submissions.

6. **Grade Encoding and Performance Tracking**
   Faculty can encode grades and track student performance, while students can view their grades and academic progress.

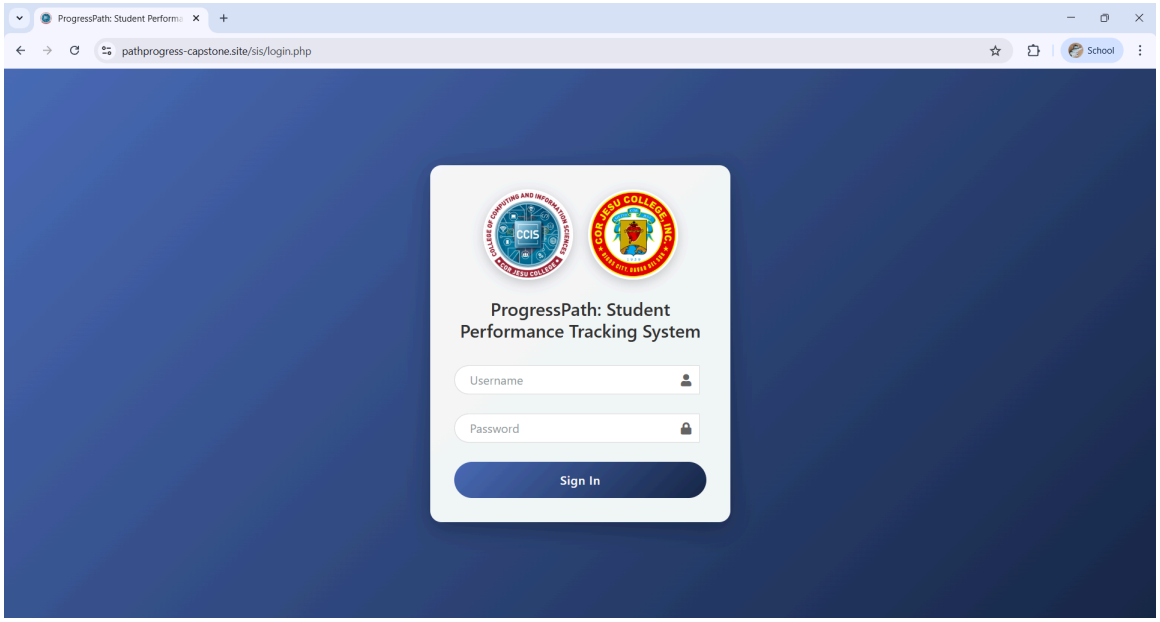
7. **Program Outcome Mapping**
   Faculty can map course activities and assessments to Program Outcomes (Introductory, Enabling, and Demonstrative) to support Outcome-Based Education.

8. **Reporting and Analytics**
   The system generates reports and dashboards that summarize student performance and program outcome achievements.

9. **Messaging and Notifications**
   The system supports communication between students, faculty, and administrators through messages and alerts.

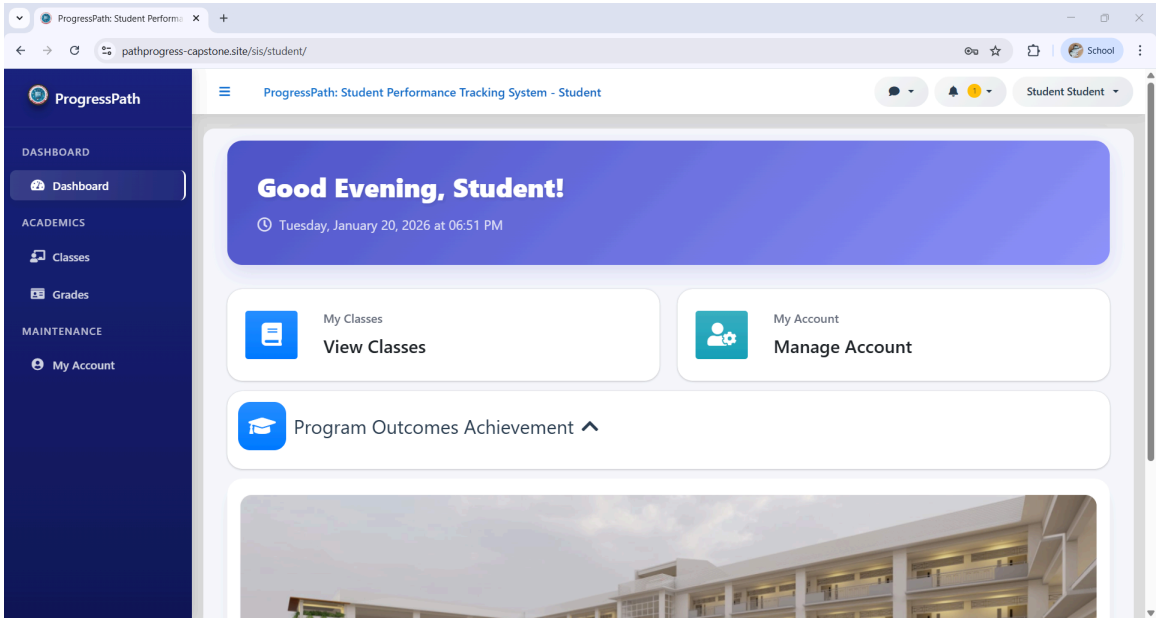
10. **System Administration and Maintenance**
    Administrators can manage users, departments, courses, and system settings to ensure smooth operation.

User Interface Screenshots



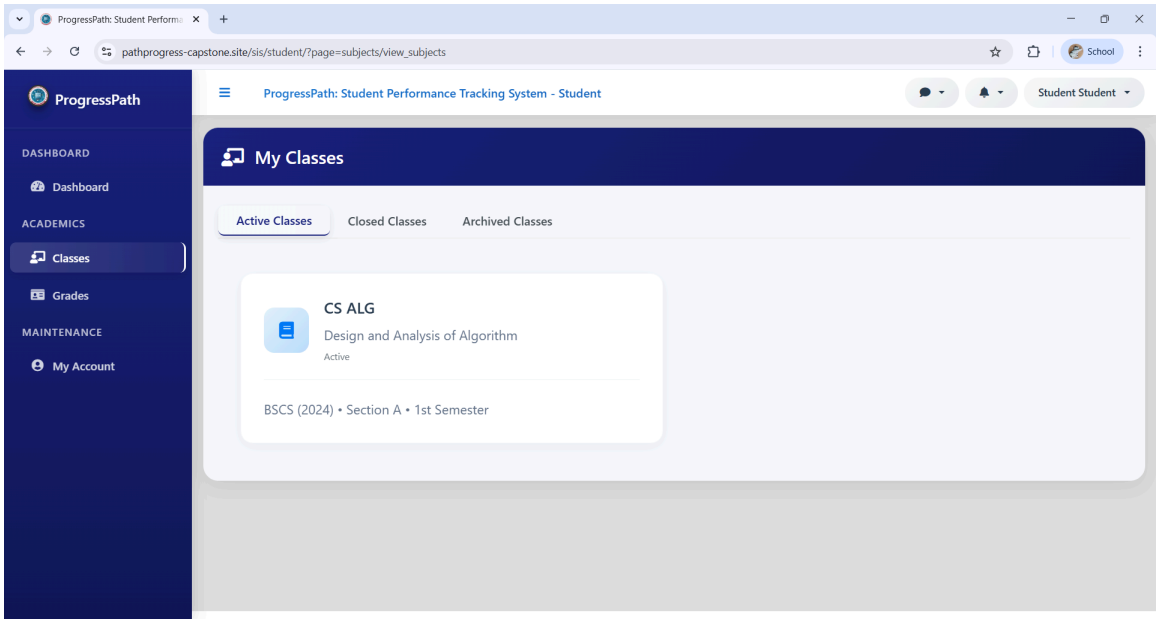
Login Page (Student, Faculty Member, Administrator):

The login screen introduces ProgressPath: Student Performance Tracking System and provides a simple and clear way for users to access the system using their Username and Password. The page displays the CCIS and Cor Jesu College logos to show official school branding and to help users trust that they are logging into the correct platform. The login form is centered on the screen with only the required fields and a single main action button ("Sign In"), which reduces confusion and keeps the process easy for first-time users.



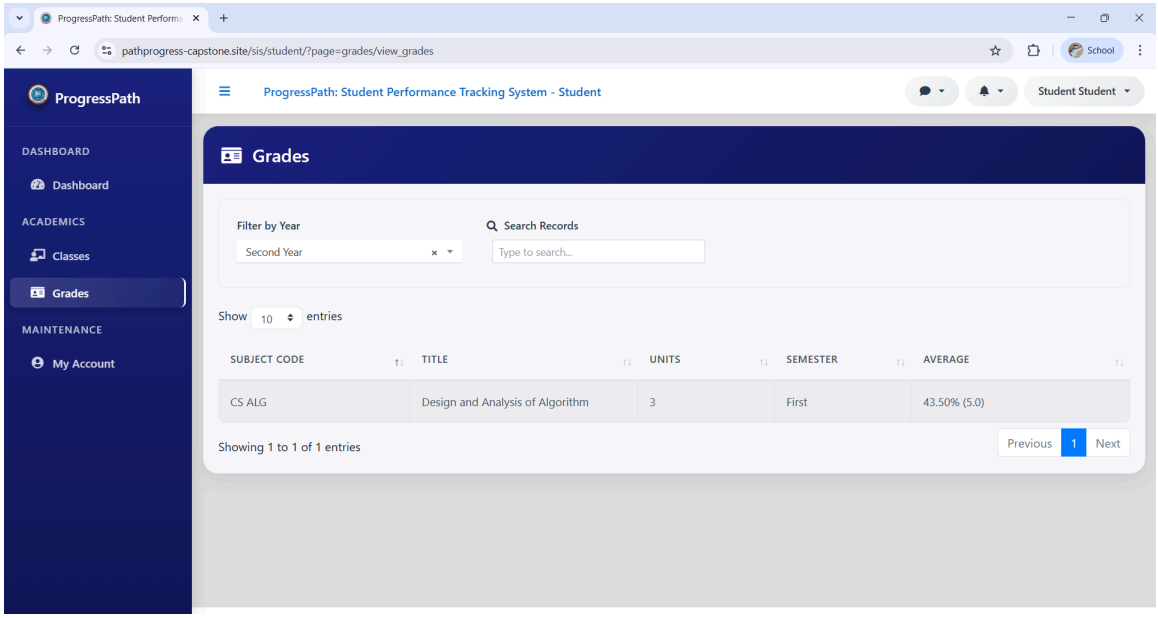
Student Dashboard:

The Student Dashboard serves as the main landing page after a successful login and provides students with a clear overview of their academic information.



My Classes Page:

The My Classes page showcases one of the key features of the ProgressPath system, which is centralized class management for students. In this interface, students can easily view all the subjects they are enrolled in, organized into Active Classes, Closed Classes, and Archived Classes. This categorization helps students clearly distinguish between ongoing subjects, completed classes, and past records, reducing confusion and improving organization.

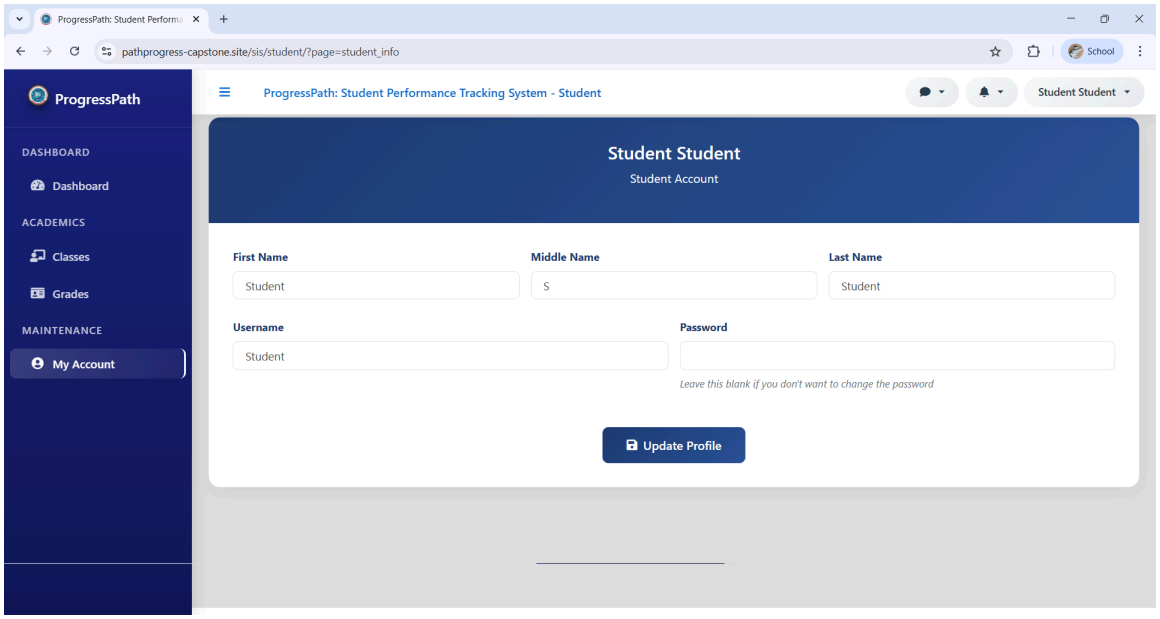


Grades Page:

The Grades page highlights another key feature of the ProgressPath system, which is transparent and centralized grade viewing for students. This interface allows students to easily access their academic performance records in one place without needing to request them manually from faculty or the registrar.

The page includes a filter by year option and a search bar, enabling students to quickly locate specific subjects or academic periods. Grades are displayed in a clean table format showing important details such as subject code, course title, number of units, semester,

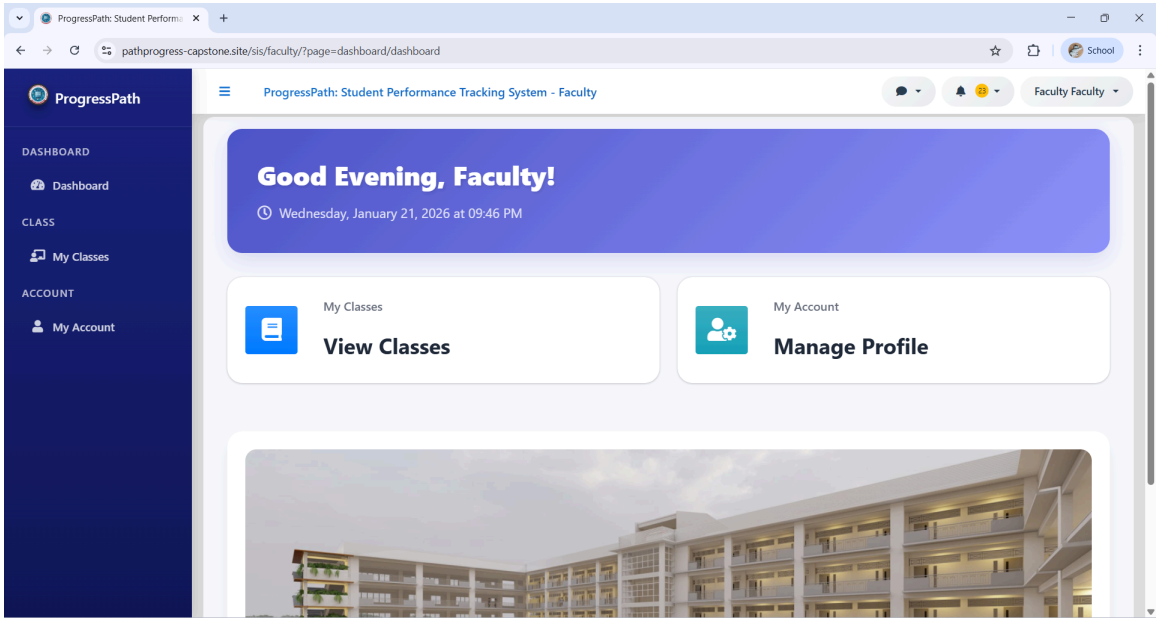
and average grade. This organized presentation helps students clearly understand their academic standing and track their progress over time.



My Account Page:

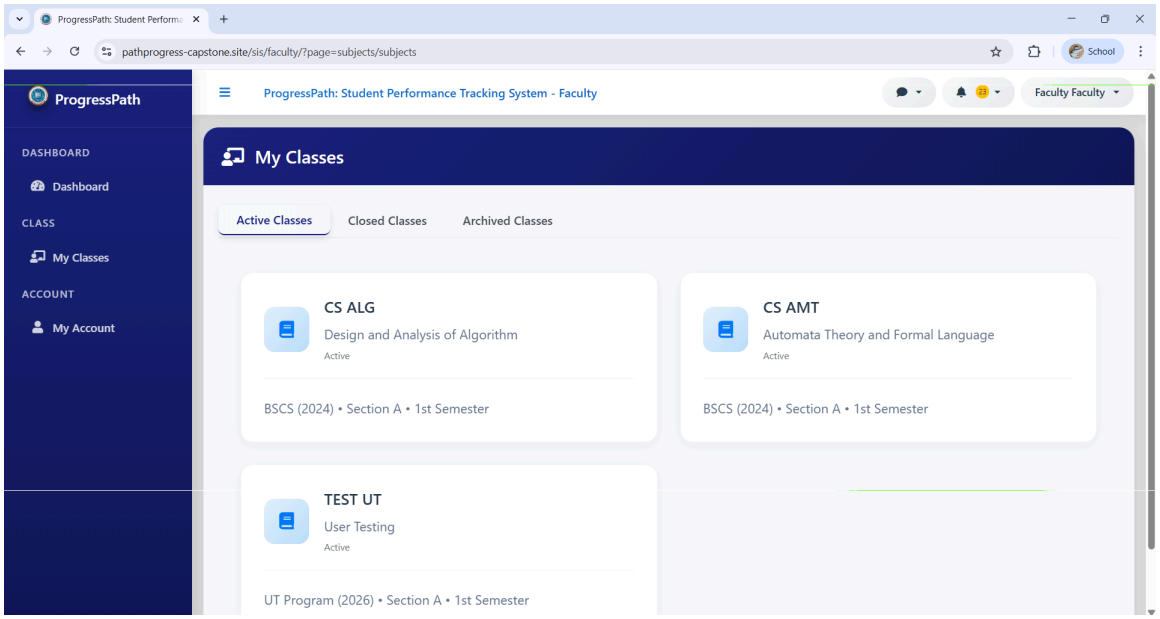
The My Account page demonstrates another important feature of the ProgressPath system, which is secure and user-managed profile information. This interface allows students to view and update their personal account details such as their first name, middle name, last name, username, and password in one centralized location.

The form is designed to be simple and easy to use, with clearly labeled fields and an option to update the password only when needed. The note below the password field ("Leave this blank if you don't want to change the password") helps prevent accidental changes and ensures better account security.



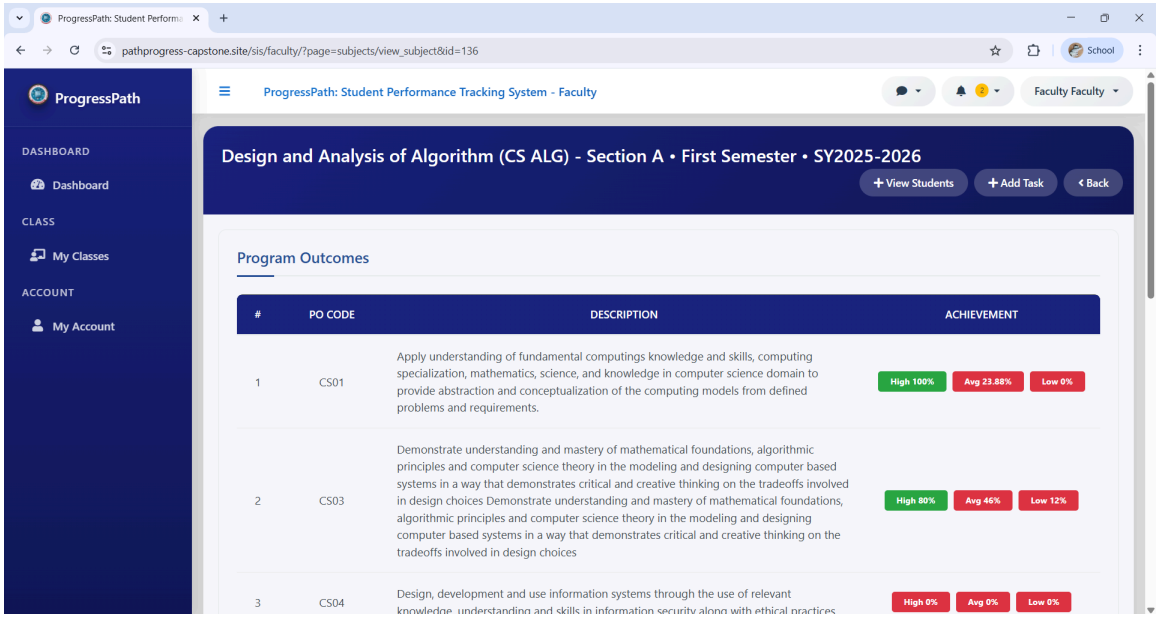
Faculty Dashboard:

The Faculty Member Dashboard serves as the main landing page after a successful login and provides faculty members with a clear overview of their academic information.



My Classes Page:

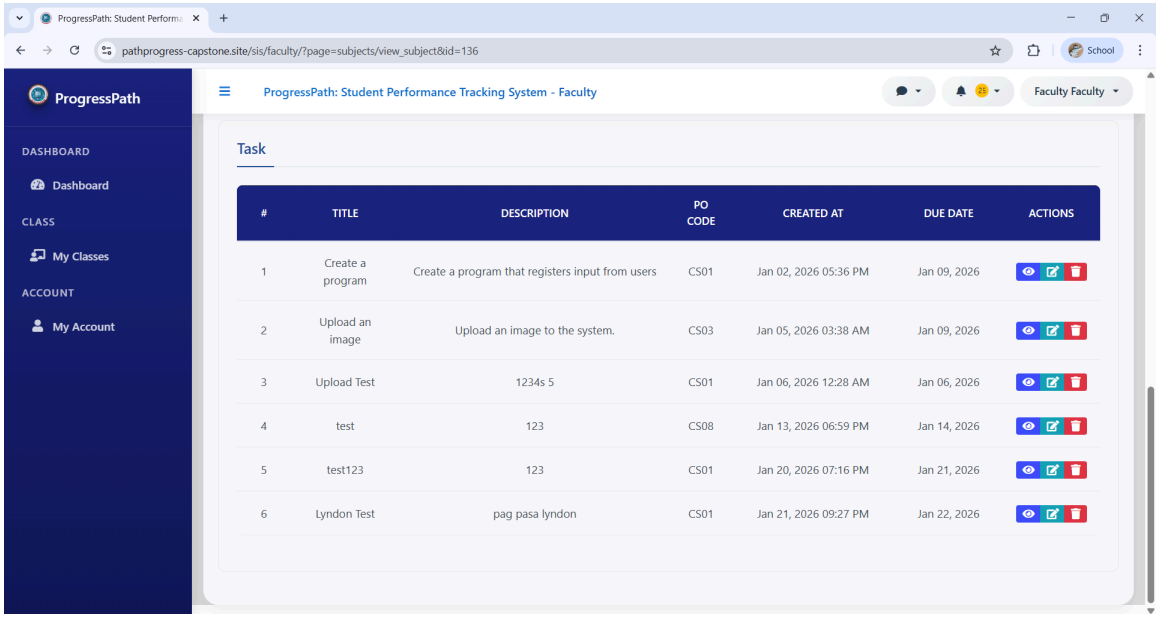
The Faculty My Classes page is a centralized class management for faculty members. This interface allows instructors to easily view all the subjects they are currently handling, organized into Active Classes, Closed Classes, and Archived Classes for better organization and tracking.



Program Outcome Page:

The Program Outcomes Achievement page highlights one of the most important features of ProgressPath, which is Outcome-Based Education monitoring and evaluation. This interface allows faculty members to view how students are performing in relation to specific Program Outcomes (POs) for a selected subject and class. The page displays a clear table showing the PO code, detailed description, and achievement level for each outcome. The achievement indicators are presented using color-coded labels such as High, Average, and Low, making it easy for faculty to quickly assess student performance and identify areas that need improvement.

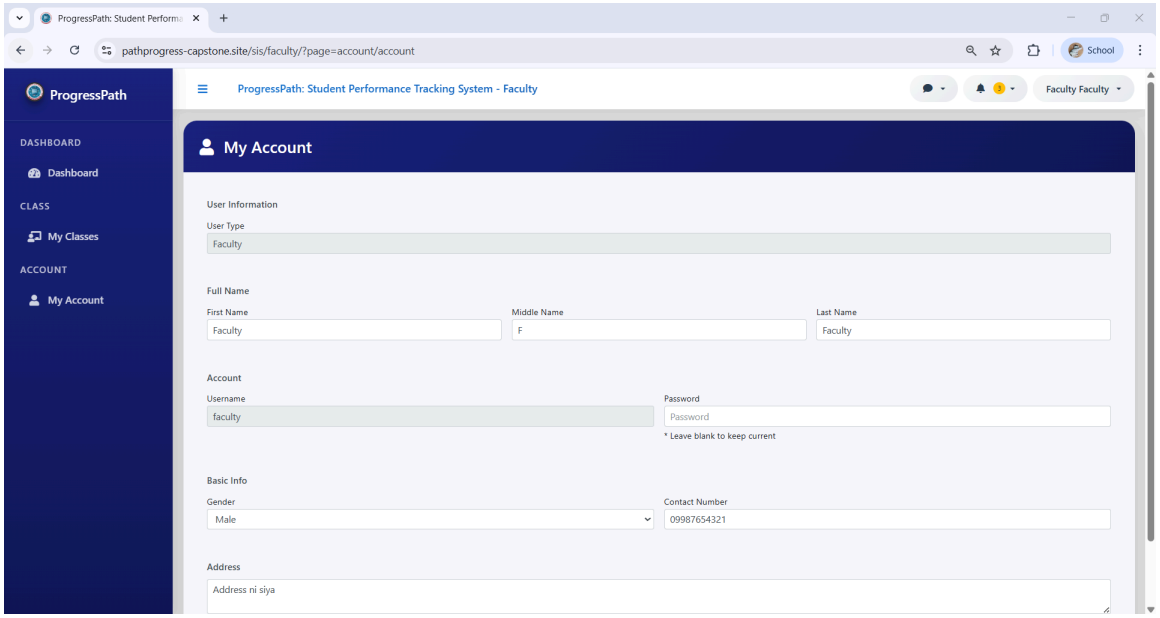
This visual presentation supports faster decision-making and academic evaluation. At the top of the page, faculty members can also access quick actions such as View Students and Add Task, allowing them to immediately manage class activities and assessments linked to each program outcome.



Task Management Page:

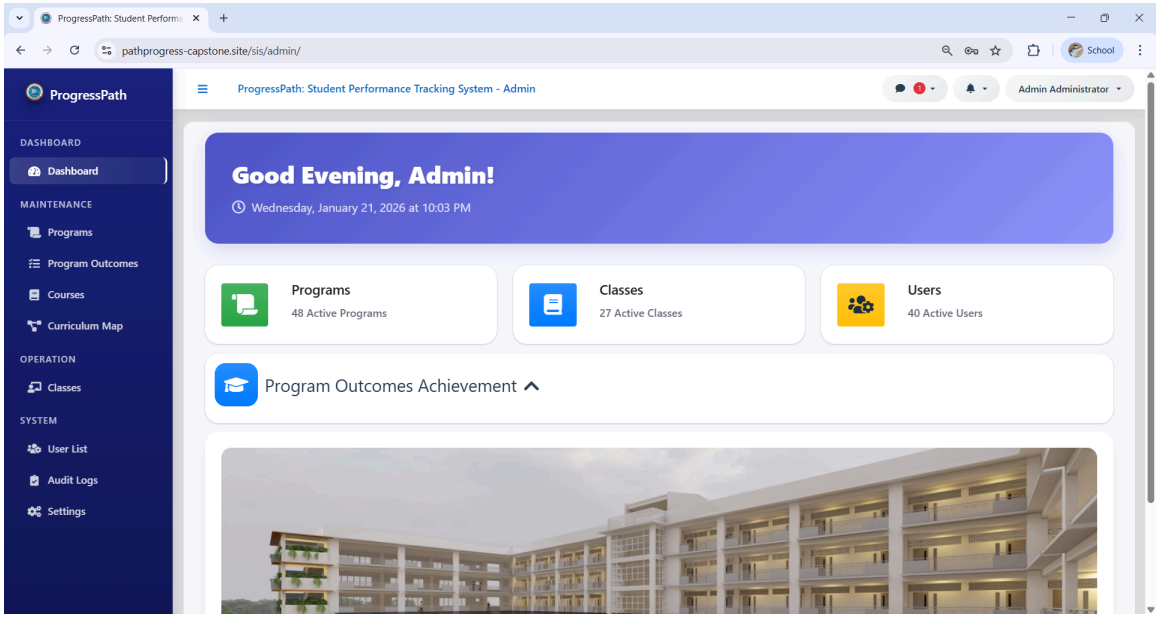
The Task Management page showcases one of the most important features of the ProgressPath system for faculty members, which is the ability to create, manage, and monitor student activities aligned with program outcomes. This interface displays all assigned tasks in a clear table format, including the task title, description, associated Program Outcome (PO) code, date created, due date, and available actions.

Faculty members can easily add new tasks, edit existing ones, view task details, and delete tasks when necessary using the action buttons on the right side of each row. Each task is linked to a specific Program Outcome code, which supports Outcome-Based Education by ensuring that every activity contributes directly to the intended learning outcomes.



My Account Page:

The Faculty My Account page highlights another essential feature of the ProgressPath system, which is secure and centralized account management for faculty members. This interface allows instructors to view and update their personal and account information in one place, including their full name, username, password, gender, contact number, and address.

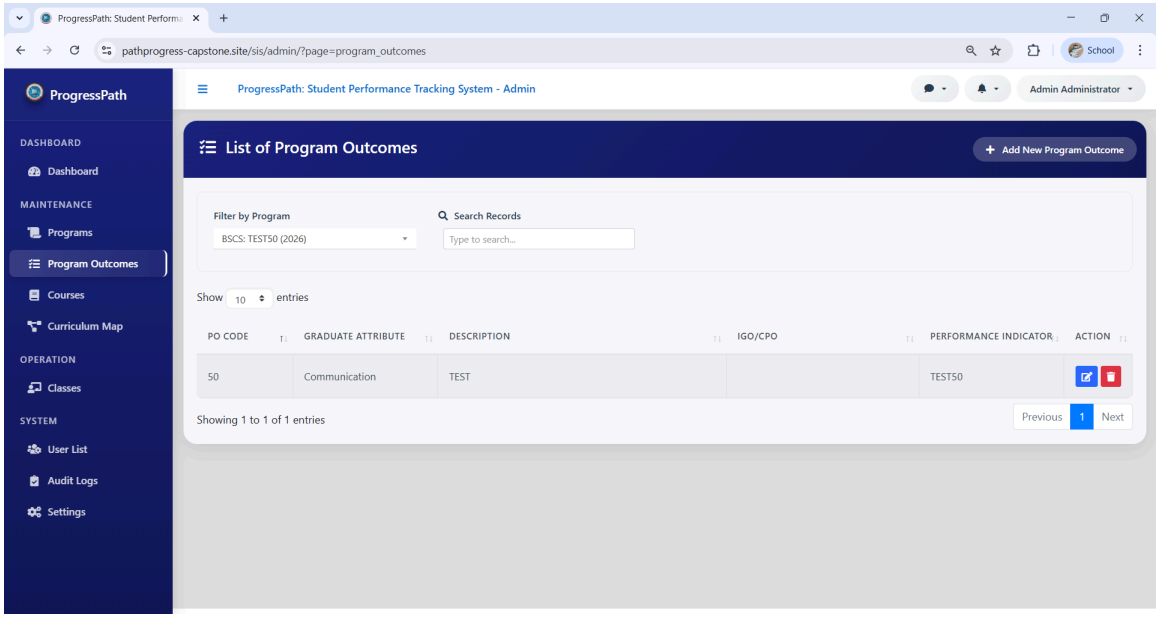


Admin Dashboard:

The Admin Dashboard showcases the centralized management and monitoring features of the ProgressPath system. This interface serves as the main control panel for administrators, giving them a clear overview of the entire academic system at a glance.

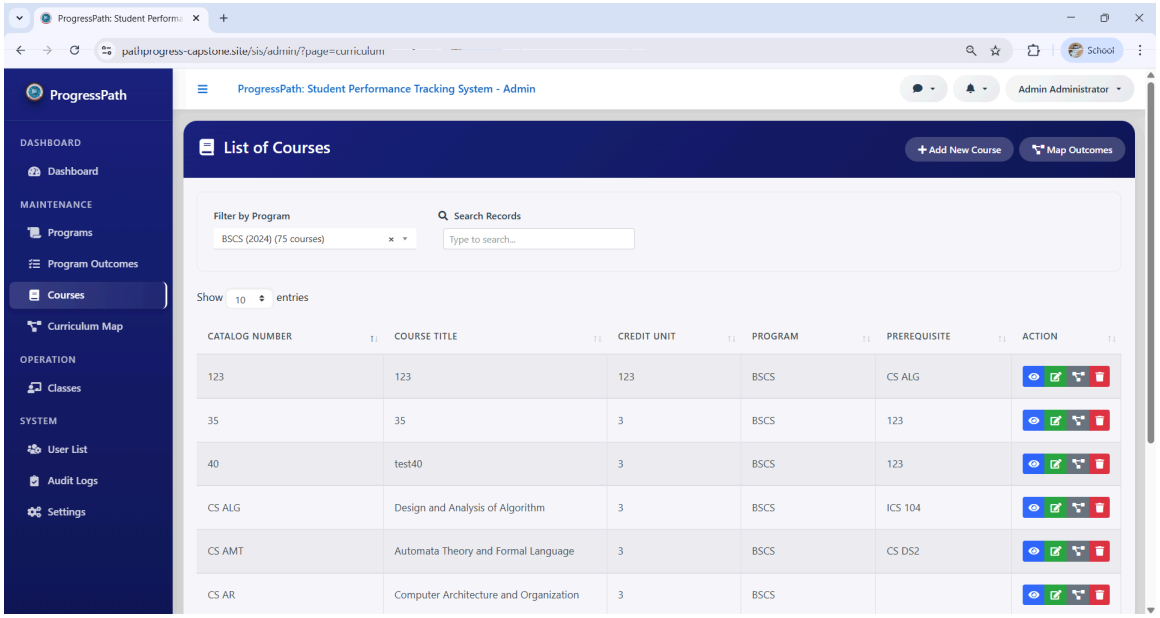
The dashboard presents summary cards that display key statistics such as the number of active programs, classes, and users, allowing the admin to quickly monitor the overall system status.

The left navigation panel provides access to essential administrative functions, including Programs, Program Outcomes, Courses, Curriculum Map, User List, Audit Logs, and System Settings. These tools allow administrators to manage academic structures, monitor program outcome achievements, oversee users, and review system activities for accountability and security.



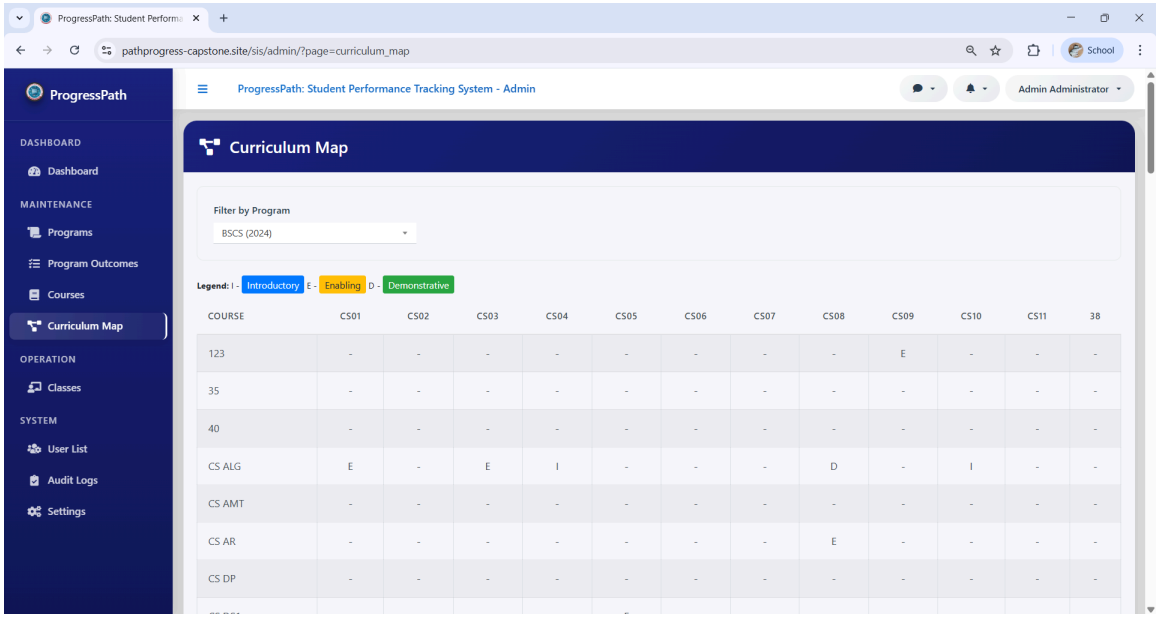
Program Outcomes:

The Program Management under the Admin module presents a centralized view of all academic programs registered in the ProgressPath system. This interface allows the administrator to easily monitor and manage programs through a clean card-based layout that displays each program's name, academic year, description, and current status. From this page, the administrator can add new programs, update existing program information, or remove outdated records using the provided action buttons. The recycle bin feature also ensures that deleted programs can be recovered if needed, preventing accidental data loss.



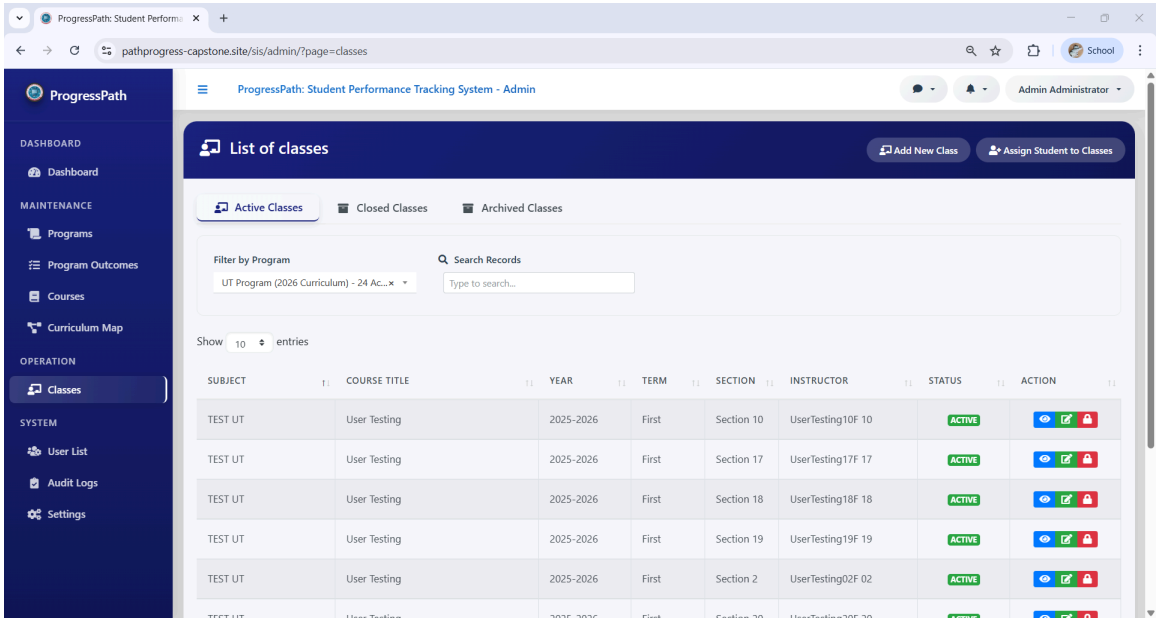
Course Page:

The Course Management screen in the Admin module provides a complete and organized list of all courses offered under a selected academic program. This interface allows the administrator to easily manage course records by displaying important details such as catalog number, course title, credit units, program, and prerequisites. Through the built-in search and filter options, the administrator can quickly locate specific courses and review their information. The action buttons allow the admin to view course details, edit course information, map course outcomes to program outcomes, or delete outdated courses.



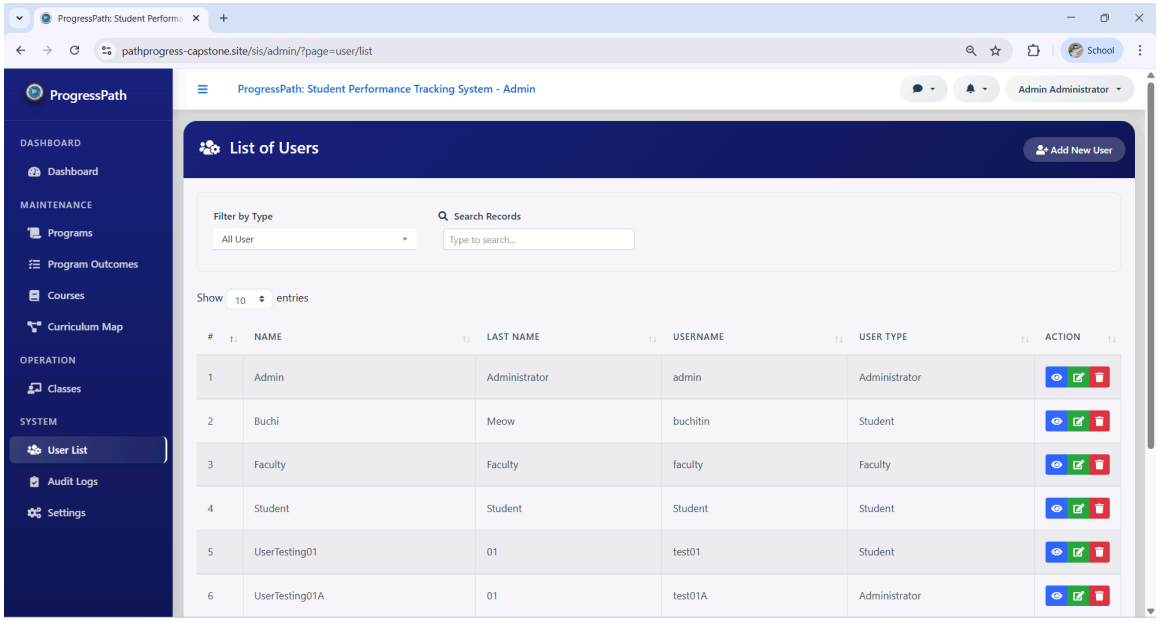
Curriculum Map Page:

The Curriculum Map module provides a visual and structured overview of how each course in a selected academic program contributes to specific program outcomes. This screen allows the administrator to filter courses by program and view a matrix that shows the alignment between courses and outcome codes. Each cell in the table is marked as Introductory (I), Enabling (E), or Demonstrative (D), indicating the level at which a course supports a particular program outcome. This mapping helps ensure that all outcomes are properly covered throughout the curriculum and that students are gradually developed from basic introduction to full demonstration of required skills.



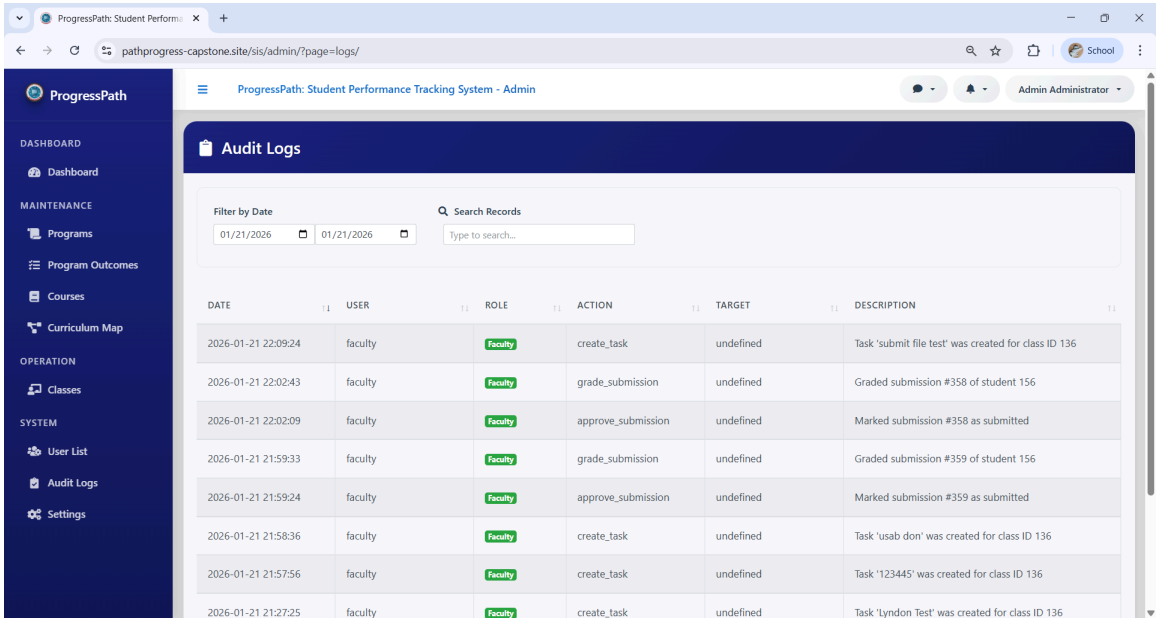
Classes Page:

The Classes module allows administrators to manage and monitor all class offerings within the system. This screen displays a complete list of active, closed, and archived classes, with options to filter by program and search specific records for easier navigation. Each class entry shows important details such as subject, course title, academic year, term, section, assigned instructor, and current status. Administrators can add new classes, assign students to classes, update class information, or archive classes when they are no longer active.



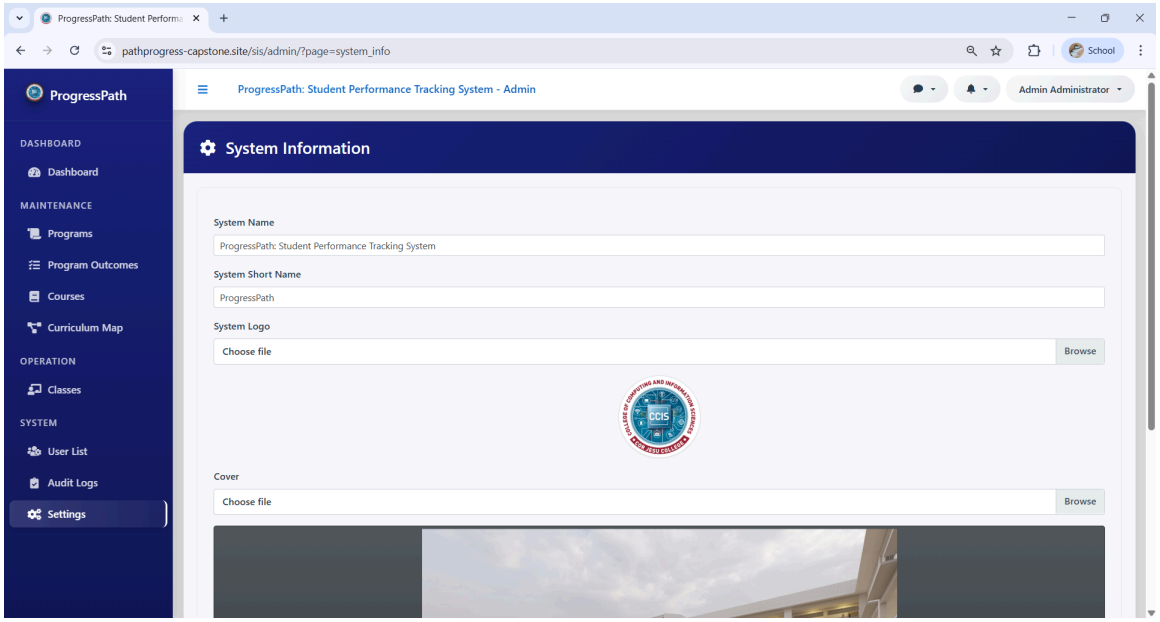
User List Page:

This screen displays a complete list of registered users, including their name, username, and user type (Student, Faculty, or Administrator). Administrators can filter users by type, search for specific accounts, and control the number of records displayed for easy monitoring.



Audit Logs Page:

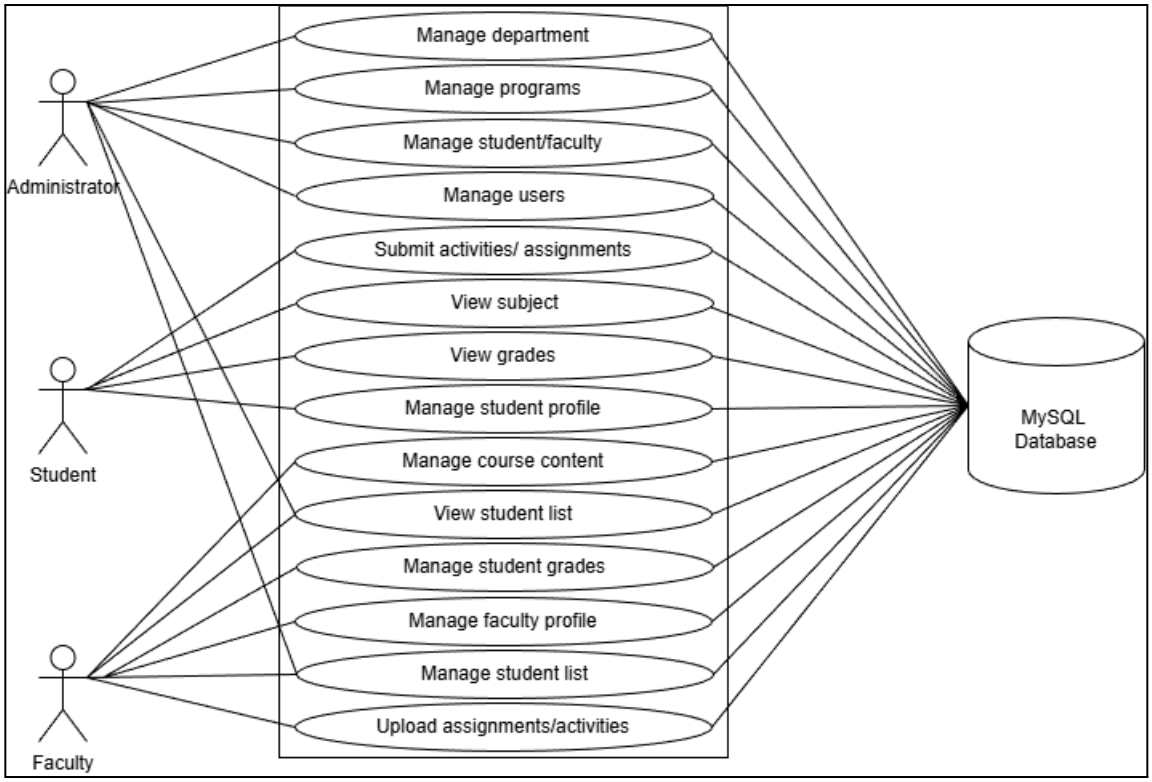
The Audit Logs module provides administrators with a detailed record of all important activities performed inside the system. This screen shows a complete history of user actions such as creating tasks, grading submissions, approving student work, and other system operations. Each log entry includes the date and time, the user who performed the action, their role, the type of action, the target, and a short description of what happened. Administrators can filter logs by date and search for specific records, making it easy to monitor system usage, track changes, and investigate any issues. This feature helps improve accountability, transparency, and security by keeping a clear trail of all system activities.



Settings Page:

The System Information module allows administrators to manage the basic identity and appearance of the ProgressPath system. In this section, the administrator can configure important details such as the system name, short name, system logo, and cover image. These settings define how the system is branded and presented to users across the platform. By updating the logo and cover image, the institution can customize the visual identity of the system to match official school branding. This module ensures that the platform maintains a professional and consistent look while allowing administrators to easily update system-level information when needed.

Use Case Diagram:



ProgressPath introduces several improvements compared to existing manual or semi-digital student management systems by providing a centralized, web-based platform that aligns student records and performance tracking with Outcome-Based Education (OBE) standards. Unlike traditional systems that rely heavily on paperwork and fragmented records, ProgressPath automates performance monitoring, outcome alignment, and reporting, reducing human error and improving efficiency. The system design meets the project requirements by supporting core features such as student profile management, course and outcome tracking, academic performance monitoring, and role-based access control for students, faculty, and administrators, ensuring secure and organized data handling.

During development, challenges such as limited development time, complexity of aligning outcomes with performance indicators, and ensuring usability for different user

roles were encountered. These were addressed by prioritizing essential features, simplifying the outcome-mapping process, and conducting iterative testing to refine the interface. Key functionalities implemented include centralized student records, outcome-based performance evaluation, automated progress tracking, and secure access control. Some advanced features, such as deeper analytics and real-time alerts, were adjusted or deferred from the initial design due to scope and time limitations, but they are documented for future enhancement.

Usability Evaluation

Usability testing was conducted using [mention usability evaluation method, e.g., surveys, heuristic evaluation, think-aloud testing]. A total of 50 respondents participated in the study, providing feedback on the system's effectiveness, efficiency, and user satisfaction.

Table X: Usability Test Results Summary

Post-Test Questionnaire (SUS) Result Table

Test	Result
Number of Participants	50
Overall SUS Score	69.5
SUS Interpretation	Good Usability
Overall Assessment	The system demonstrates good usability and is generally easy to use, effective, and well-accepted by users. While most participants were satisfied with the system, minor improvements can further enhance the user experience.

Table 1. SUS Test Summary Results

The overall SUS score was 69.5, which falls into the “Good” usability range according to standard SUS interpretation. This indicates that participants generally found the ProgressPath usable, but there is still room for improvement.

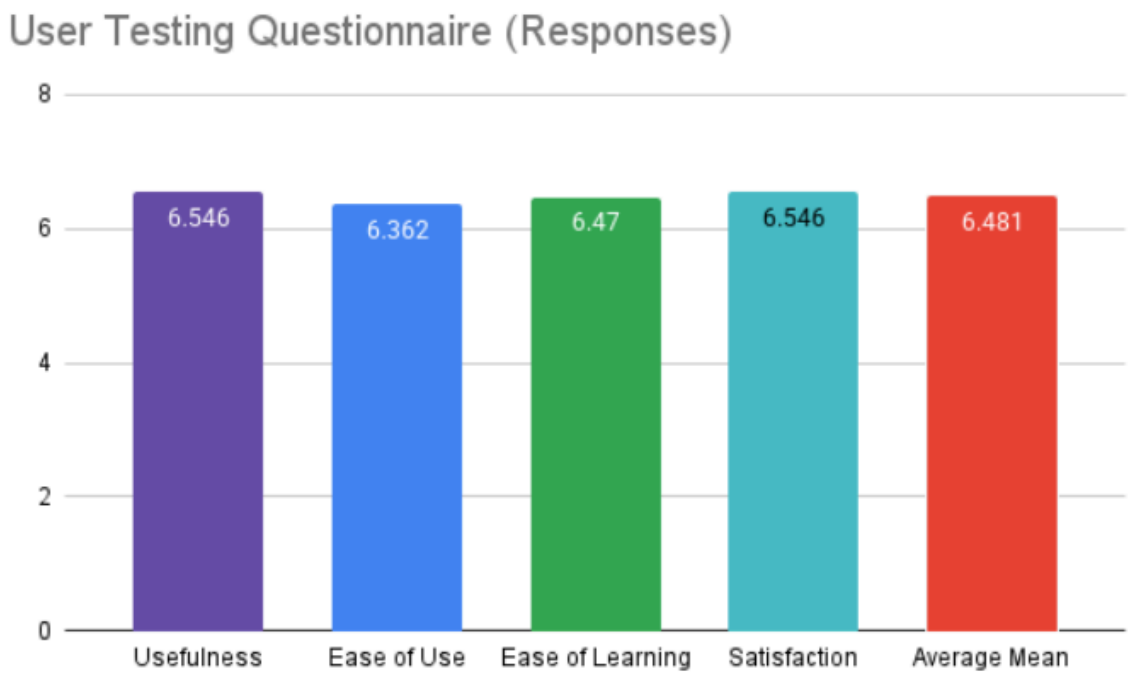
Post-Test Questionnaire (USE) Result Table

Test	Results
Number of Participants	50
USE - Usefulness	6.546
USE - Satisfaction	6.546
USE - Ease of Use	6.362
USE - Learning	6.47
Overall	6.48

Table 2. USE Test Summary Results

The overall mean usefulness rating of 6.48 on a 7-point Likert scale indicates that participants strongly agreed that the system is useful. This suggests that most users found the system’s features highly effective in supporting their tasks and meeting their needs. The score is close to the maximum value, reflecting a very high level of perceived usefulness.

Graph of Post-Test Questionnaire (USE) Mean Results



Task Completion Rate: Student Account

Participant	Task 1	Task 2	Task 3	Task 4	Task 5
1	✅	✅	✅	✅	✅
2	✅	✅	✅	✅	✅
3	✅	✅	✅	✅	✅
4	✅	✅	✅	✅	✅
5	✅	✅	✅	✅	✅
6	✅	✅	✅	✅	✅
7	✅	✅	✅	✅	✅
8	✅	✅	✅	✅	✅
9	✅	✅	✅	✅	✅
10	✅	✅	✅	✅	✅
11	✅	✅	✅	✅	✅
12	✅	✅	✅	✅	✅
13	✅	✅	✅	✅	✅
14	✅	✅	✅	✅	✅

15	✅	✅	✅	✅	✅
16	✅	✅	✅	✅	✅
17	✅	✅	✅	✅	✅
18	✅	✅	✅	✅	✅
19	✅	✅	✅	✅	✅
20	✅	✅	✅	✅	✅
21	✅	✅	✅	✅	✅
22	✅	✅	✅	✅	✅
23	✅	✅	✅	✅	✅
24	✅	✅	✅	✅	✅
25	✅	✅	✅	✅	✅
26	✅	✅	✅	✅	✅
27	✅	✅	✅	✅	✅
28	✅	✅	✅	✅	✅
29	✅	✅	✅	✅	✅
30	✅	✅	✅	✅	✅
31	✅	✅	✅	✅	✅
32	✅	✅	✅	✅	✅
33	✅	✅	✅	✅	✅
34	✅	✅	✅	✅	✅
35	✅	✅	✅	✅	✅
36	✅	✅	✅	✅	✅
37	✅	✅	✅	✅	✅
38	✅	✅	✅	✅	✅
39	✅	✅	✅	✅	✅
40	✅	✅	✅	✅	✅
41	✅	✅	✅	✅	✅
42	✅	✅	✅	✅	✅
43	✅	✅	✅	✅	✅
44	✅	✅	✅	✅	✅
45	✅	✅	✅	✅	✅
46	✅	✅	✅	✅	✅
47	✅	✅	✅	✅	✅
48	✅	✅	✅	✅	✅
49	✅	✅	✅	✅	✅
50	✅	✅	✅	✅	✅
Success	**50**	**50**	**50**	**50**	**50**

Completion Rates	100%	100%	100%	100%	100%

Task Completion Rate: Faculty Member Account

Participant	Task 1	Task 2	Task 3
1	✅	✅	✅
2	✅	✅	✅
3	✅	✅	✅
4	✅	✅	✅
5	✅	✅	✅
6	✅	✅	✅
7	✅	✅	✅
8	✅	✅	✅
9	✅	✅	✅
10	✅	✅	✅
11	✅	✅	✅
12	✅	✅	✅
13	✅	✅	✅
14	✅	✅	✅
15	✅	✅	✅
16	✅	✅	✅
17	✅	✅	✅
18	✅	✅	✅
19	✅	✅	✅
20	✅	✅	✅
21	✅	✅	✅
22	✅	✅	✅
23	✅	✅	✅
24	✅	✅	✅
25	✅	✅	✅
26	✅	✅	✅
27	✅	✅	✅
28	✅	✅	✅
29	✅	✅	✅
30	✅	✅	✅

Participant	Task 1	Task 2	Task 3
31	✅	✅	✅
32	✅	✅	✅
33	✅	✅	✅
34	✅	✅	✅
35	✅	✅	✅
36	✅	✅	✅
37	✅	✅	✅
38	✅	✅	✅
39	✅	✅	✅
40	✅	✅	✅
41	✅	✅	✅
42	✅	✅	✅
43	✅	✅	✅
44	✅	✅	✅
45	✅	✅	✅
46	✅	✅	✅
47	✅	✅	✅
48	✅	✅	✅
49	✅	✅	✅
50	✅	✅	✅
Success	50	50	50
Completion Rates	100%	100%	100%

Task Completion Rate: Admin Account

Participant	Task 1	Task 2	Task 3	Task 4	Task 5
1	✅	✅	✅	✅	✅
2	✅	✅	✅	✅	✅
3	✅	✅	✅	✅	✅
4	✅	✅	✅	✅	✅
5	✅	✅	✅	✅	✅
6	✅	✅	✅	✅	✅
7	✅	✅	✅	✅	✅
8	✅	✅	✅	✅	✅
9	✅	✅	✅	✅	✅

10	✅	✅	✅	✅	✅
11	✅	✅	✅	✅	✅
12	✅	✅	✅	✅	✅
13	✅	✅	✅	✅	✅
14	✅	✅	✅	✅	✅
15	✅	✅	✅	✅	✅
16	✅	✅	✅	✅	✅
17	✅	✅	✅	✅	✅
18	✅	✅	✅	✅	✅
19	✅	✅	✅	✅	✅
20	✅	✅	✅	✅	✅
21	✅	✅	✅	✅	✅
22	✅	✅	✅	✅	✅
23	✅	✅	✅	✅	✅
24	✅	✅	✅	✅	✅
25	✅	✅	✅	✅	✅
26	✅	✅	✅	✅	✅
27	✅	✅	✅	✅	✅
28	✅	✅	✅	✅	✅
29	✅	✅	✅	✅	✅
30	✅	✅	✅	✅	✅
31	✅	✅	✅	✅	✅
32	✅	✅	✅	✅	✅
33	✅	✅	✅	✅	✅
34	✅	✅	✅	✅	✅
35	✅	✅	✅	✅	✅
36	✅	✅	✅	✅	✅
37	✅	✅	✅	✅	✅
38	✅	✅	✅	✅	✅
39	✅	✅	✅	✅	✅
40	✅	✅	✅	✅	✅
41	✅	✅	✅	✅	✅
42	✅	✅	✅	✅	✅
43	✅	✅	✅	✅	✅
44	✅	✅	✅	✅	✅
45	✅	✅	✅	✅	✅
46	✅	✅	✅	✅	✅

47	✅	✅	✅	✅	✅
48	✅	✅	✅	✅	✅
49	✅	✅	✅	✅	✅
50	✅	✅	✅	✅	✅
Success	**50**	**50**	**50**	**50**	**50**
Completion Rates	**100%**	**100%**	**100%**	**100%**	**100%**

Task completion results show that all 50 participants successfully completed all six tasks (100%), demonstrating that the system's core workflow can be performed without task failure. This indicates that users were able to navigate the main functions of the system, access required features, and complete essential actions needed to support effective learning and task execution.

Qualitative Feedback Summary

Participants consistently rated the system highly, suggesting that the interface, features, and overall workflow were intuitive and user-friendly.

The overall usability rating shows that the system is easy to use and user-friendly, which matches the expected results of the study. Most users were able to navigate the system easily, complete tasks efficiently, and understand the main features without difficulty. The positive scores from the usability tests indicate that the system meets user needs and supports its intended functions. Although some minor issues were identified, they did not greatly affect overall usability. This confirms that the system performed as expected and is suitable for use by students, faculty members, and administrators.

The key usability issues observed include unclear words or labels, small or confusing icons, low visibility of some buttons, and the need to scroll more when grading tasks. These issues can cause confusion and slow down users, especially when they are

trying to complete tasks quickly. While the system is generally easy to use, these problems may affect the overall user experience by making some actions less clear and requiring extra effort from users.

To further improve usability, the system can use clearer words and labels to avoid confusion. Icons and buttons should be made larger and more visible so users can easily recognize their functions. Reducing the need to scroll, especially when grading tasks, can help users work faster and more comfortably. Adding tooltips or short instructions for icons and features can also help users understand the system better. These improvements can make the system easier to use and provide a better overall user experience.

Summary of Findings

The application was successfully developed and met its intended design and functional requirements for ProgressPath. The system supports core features such as user authentication, progress tracking, task-based monitoring, role-based access for students and administrators, and centralized storage of academic records. These features demonstrate that the system functions as planned and aligns with its goal of helping monitor and manage student progress effectively. Usability testing results indicate that users found the system intuitive and effective, supported by an overall SUS score of 69.5, high USE ratings, and 100% task completion across all evaluation tasks. Most participants were able to complete assigned tasks with minimal difficulty, suggesting that the interface is easy to understand and navigate. However, minor areas for refinement were identified, such as improving button visibility and streamlining navigation between progress views, which can further enhance the user experience. Log analysis revealed valuable insights into user

behavior and system performance. Frequently accessed features included viewing progress dashboards and updating student records, while less-used areas highlighted opportunities for interface improvement. The system generally performed well, with only minor delays during data loading and record updates. The errors observed were non-critical and did not prevent task completion. These findings guide further optimization efforts, particularly in improving performance efficiency and usability clarity in future versions of ProgressPath.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

This chapter presents the overall conclusions drawn from the study. It also provides recommendations for future improvements, research directions, and potential enhancements for the developed system.

Conclusion

The developed system, ProgressPath, was successfully designed and implemented based on the proposed objectives. The system includes features such as centralized record management, academic performance tracking, and role-based access, which aim to address the challenges when it comes to monitoring, recording, and evaluating student performance. During the development process, data consistency issues, access control validation, and integration of program outcome computations were encountered, which were mitigated by improving database relationships, implementing role-based authorization checks, applying soft-delete mechanisms, and optimizing query logic for accurate performance calculations. The system met the functional requirements and was evaluated for usability and performance.

Usability testing was conducted with 50 participants, using System Usability Scale (SUS) and the USE (Usefulness, Satisfaction, and Ease of Use) questionnaire. Results indicate that the system achieved a usability rating of 4.456. Users particularly found the task submission and grading features, ability to add remarks on student submissions, and visually appealing interface to be beneficial. However, issues such as unclear terminology, the need for additional scrolling during grading, confusing or small

icons, and low visibility of some buttons were observed, which may require further refinement.

Log analysis was performed to assess task performance, user interaction patterns, and error occurrences during system use. The core features accessed during the evaluation included logging in, task submission, task grading, viewing grades, adding remarks, and tracking academic progress. Overall, system performance was generally stable and responsive, though minor slowdowns were observed during peak usage, particularly when multiple users accessed grading and report features at the same time. Non-critical issues such as session timeouts, and navigation-related difficulties were recorded. These findings provide useful insights into areas where system performance and usability can be further optimized.

Recommendations

Administrators should be implemented to integrate ProgressPath into the existing academic monitoring framework, ensuring that faculty consistently use the platform to track student progress and intervene when students are at risk. Administrators should also provide training sessions to familiarize staff with AI-driven features and progress dashboards.

Instructors should use ProgressPath to monitor real-time student performance, provide timely feedback, and adjust lesson plans based on data-driven insights. Faculty should also encourage students to actively engage with the platform and utilize personalized learning plans to improve academic outcomes.

Students should regularly check their ProgressPath dashboards, follow personalized learning recommendations, and respond to alerts to address areas of weakness promptly. They should also provide feedback on system usability to support continuous improvement.

The system should be enhanced by implementing automated alerts for at-risk students, expanding personalized learning features, improving dashboard navigation, and ensuring

seamless integration with existing LMS platforms. ProgressPath should also include smart notifications and visual analytics to increase engagement and usability.

Future studies should investigate the long-term impact of ProgressPath on student performance and retention rates, explore the effectiveness of AI-driven predictive analytics in different academic contexts, and examine user engagement patterns across diverse student populations to validate and expand the system's effectiveness.

System Enhancements

Enhance

- Improve the user interface by using larger and clearer icons, clearer text labels, and a more vibrant and lively color scheme.
- Redesign the dashboard to be progressive for both administrators and faculty, with filters for easier access to tasks, grades, and submissions.
- Fix inconsistencies in grade display and submission status.
- Add validation checks to prevent incorrect or duplicate submissions.

Optimize

- Strengthen error handling to reduce system failures.
- Improve system response time and overall performance.
- Enforce business rules to block unauthorized editing of submissions once they are finalized.
- Ensure consistent domain security configurations to protect system data.

Integrate

- Add Google account–linked login authentication for easier and more secure access.

- Implement notification features to alert students about pending tasks and submissions.
- Include advanced filtering tools to improve navigation and user efficiency.

Future Research Directions

To further enhance the system, usability testing should be conducted with a larger and more diverse sample of students, faculty members, and administrators to identify patterns in user interaction and uncover any accessibility or workflow challenges. System capabilities can be extended by integrating AI-driven analytics to provide predictive insights on student performance, automated alerts for at-risk students, and personalized recommendations for academic interventions. Additionally, the use of advanced learning analytics tools such as learning dashboards, heatmaps, and longitudinal performance tracking should be explored to validate system effectiveness and support the continuous improvement of academic progress monitoring.

This study successfully met its objectives by developing a functional ProgressPath prototype, evaluating its usability through user testing, and analyzing system logs to gain performance and usage insights. Usability results confirmed that users found the system easy to use, visually clear, and efficient in completing academic tasks such as submitting work, grading, and tracking progress. Log analysis provided valuable insights into user interaction patterns, frequently used features, and system performance during regular and peak usage. Recommendations for future improvements include automated alerts for students who are falling behind, customizable learning plans, and deeper integration with existing learning management systems, which will further optimize ProgressPath as an IT

solution for efficient monitoring, evaluation, and management of student academic performance in outcome-based education environments.

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APPENDICES

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CERTIFICATE OF EDITING AND REVIEW

Name of Students:	**CHRISTIAN JAY F. DIMAS** **JULIAH JANE B. GEALON** **XANDER JAVE P. JAMIO**
Degree Program:	Bachelor of Science in Information Technology
Title of Thesis:	**PROGRESSPATH: A STUDENT PERFORMANCE TRACKING SYSTEM WITH OUTCOME-BASED EDUCATION STANDARDS**

PART I. *For Editor*

This is to certify that the above capstone project prepared as a requirement for the course was submitted to the undersigned for grammar checking and proof reading. I endorse the manuscript submitted as it has generally met the standards and requirements, including the form and style prescribed by Cor Jesu College.

Signed: _____ Date: _____

PART II. *For Research Adviser/Mentor*

I am satisfied with the student's manuscript and accept this in partial fulfillment of the requirements for the degree identified.

Signed: _____ Date: _____

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Name of the Code Fragment. <*short description*>

```
public void a (){
//Font style = courier new
//font size = 10pt
//line spacing = 1.0

}
```

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xxx
Student's Signature over Printed Name

Date: December 2022

CURRICULUM VITAE

PERSONAL BACKGROUND

Name : XANDER JAVE P. JAMIO

Address : PUROK MANGGAHAN, TRES DE MAYO, DIGOS CITY, DAVAO DEL SUR

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School Attended			Year Graduated
College	:	COR JESU COLLEGE, INC.	2026
Program	:	BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY	
High School	:	HOLY CROSS ACADEMY INC	2020
Grade School	:	DIGOS CITY CENTRAL ELEMENTARY SCHOOL	2016

AFFILIATED ORGANIZATIONS

Affiliations	Position	Inclusive Years
College Red Cross Youth	Member	(2022-2023)
Math Club	Member	(2024-2026)
Association of Computer Studies Students	Member	(2022-2026)

CURRICULUM VITAE

PERSONAL BACKGROUND

Name	:	JULIAH JANE B. GEALON
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Civil Status	:	SINGLE
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EDUCATIONAL ATTAINMENT

School Attended			**Year Graduated**
College	:	COR JESU COLLEGE, INC.	2026
Program	:	BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY	
High School	:	DIGOS CITY NATIONAL HIGH SCHOOL	2020
Grade School	:	DIGOS CITY CENTRAL ELEMENTARY SCHOOL	2016

AFFILIATED ORGANIZATIONS

Affiliations	**Position**	**Inclusive Years**
College Red Cross Youth	Member	(2022-2023)

Association of Computer Studies Students	Member	(2022-2026)
College of Computing and Information Sciences	Finance Secretary	(2023-2026)
Math Club	Member	(2024-2026)

CURRICULUM VITAE

PERSONAL BACKGROUND

Name :

Address :

Birthdate :

Civil Status :

Father's Name :

Mother's Name :

Email Address :

EDUCATIONAL ATTAINMENT

		School Attended	**Year Graduated**
College	:	COR JESU COLLEGE, INC.	
Program	:	BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY	
High School	:		
Grade School	:		

AFFILIATED ORGANIZATIONS

Affiliations	**Position**	**Inclusive Years**
Club Name	xxx	xxxx-xxxx

CURRICULUM VITAE

PERSONAL BACKGROUND

Name :

Address :

Birthdate :

Civil Status :

Father's Name :

Mother's Name :

Email Address :

EDUCATIONAL ATTAINMENT

		School Attended	**Year Graduated**
College	:	COR JESU COLLEGE, INC.	
Program	:	BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY	
High School	:		
Grade School	:		

AFFILIATED ORGANIZATIONS

Affiliations	**Position**	**Inclusive Years**
Club Name	xxx	xxxx-xxxx

CURRICULUM VITAE

PERSONAL BACKGROUND

Name :

Address :

Birthdate :

Civil Status :

Father's Name :

Mother's Name :

Email Address :

EDUCATIONAL ATTAINMENT

		School Attended	**Year Graduated**
College	:	COR JESU COLLEGE, INC.	
Program	:	BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY	
High School	:		
Grade School	:		

AFFILIATED ORGANIZATIONS

Affiliations	**Position**	**Inclusive Years**
Club Name	xxx	xxxx-xxxx