

# **CHAPTER 1**

## **INTRODUCTION**

This chapter presents the foundation of the study, including the background of the study, statement of the problem, specific problem, objectives of the study, scope and delimitation of the study, and significance of the study. It sets the context, identifies the issues, defines the study's boundaries, and outlines its goals and potential contributions.

### **Background of the Study**

The rapid advancement of technology has created new educational opportunities for the study of diverse learning experiences. The field of technology, primarily programming, has attracted many aspiring learners who are eager to start but uncertain on how and where to begin. In spite of the abundance of learning materials and webinars online, the overwhelming nature of available information often hinders the potential learners' ability to complete their learning journey effectively. Most learners face challenges in identifying a suitable starting point and tend to be lost without proper direction, leading to disorientation in their pursuit of knowledge.

Mentorship is also crucial in bridging this gap, as it provides experienced practitioners and professionals the opportunity to pass on useful information, transferable skills to the profession, and guidance to help students avoid pitfalls. However, traditional mentorship programs are generally faced with geographical limitations, inaccessibility, and lack of participation, which hinder from providing sustained and personalized support.

This study seeks to address these challenges through the development of the COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, which aims to leverage CCST students' experience and expertise, along with their ability to connect with peers, to provide personalized mentorship that is both accessible and effective. The platform will also enable faculty mentors to extend support in order for the learners to get access to a balanced and complete mentorship. By creating a digital space that brings together a diverse range of mentors and mentees, this platform can overcome traditional mentorship barriers such as limited reach and lack of sustained engagement.

In the process of supporting a peer-to-peer model of mentoring, the platform basically eradicates the disparity between individuals who want to learn and individuals who are willing to share their knowledge. It provides a platform upon which students can enhance their skills, learn the required guidance, and join hands in a collaborative effort with fellow students who share a common inclination towards technology. With academic growth, this aims to empower students with the abilities and confidence to succeed in this dynamic technological era of modern society.

### **Statement of the Problem**

The general problem of the study is how to develop COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification that effectively connects Bataan

Peninsula State University (BPSU) - College of Computer Studies (CCST) faculty and student mentors with aspiring tech learners, in order to effectively foster skill development and academic growth.

### **Specific Problem**

- How to manage moderators?
- How to manage registration, login and user roles?
- How to schedule mentorship sessions efficiently and send SMS notifications for reminders?
- How to enable smooth real-time communication between mentees and mentors?
- How can mentees provide feedback and rate their mentors to enhance mentorship quality?
- How can users engage in group discussions, share knowledge, and ask questions within the platform?
- How to ensure accessibility and organization of shared learning resources?
- How to track and monitor skill development and learning progress?
- How to manage mentors, mentees, resources, and courses?

### **Objectives of the Study**

The main objective of the study is to develop COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU

and Aspiring Tech Learners with SMS Notification using web technologies that connects Bataan Peninsula State University (BPSU) - College of Computer Studies (CCST) faculty and student mentors with aspiring tech learners through an integrated web-based system with SMS functionality that will provide a structured and accessible mentorship system to enhance learning and communication.

Specifically, the study aims to:

- Develop COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification that capable of:
  - a) Enabling superadmins to create new admins and distribute new credentials through the admin access module.
  - b) Allowing mentees and mentors to register, users to log in, and create personalized profiles through the user account module.
  - c) Enabling mentees to choose specialty of interest, book mentorship sessions, and receive automated SMS reminders through the scheduling module.
  - d) Providing a live chat for direct mentor-mentee interactions through the live chat module.
  - e) Allowing mentees to rate and review mentors through the feedback and rating module.
  - f) Enabling mentors to upload and mentees to access learning resources through the resource sharing module.

- g) Enabling mentors and mentees to collaborate in discussion spaces to ask questions, share knowledge, and engage in group learning through the forum module.
- h) Allowing mentees to practice different activities to monitor advancements in the activity module.
- i) Allowing moderators to manage mentors and mentees, review session schedules, resources and mentor applications, monitor sessions and forums, and assign courses to mentors in the management module.
- Create the system using Visual Studio Code, XAMPP, phpMyAdmin, Twilio and Internet browser for software requirements, and Laptop and Wi-Fi Modem for hardware requirements.
- Perform testing on the system optimization in terms of usability, reliability, and compatibility attributes.
- Evaluate the performance of the proposed system based on functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

### **Scope and Delimitation of the Study**

The main scope of this study is to develop COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, an online mentoring platform that will promote collaboration between Bataan Peninsula State University (BPSU) and

aspiring tech learners. The platform will offer an extensive online setting to promote mentorship, skill acquisition, and knowledge exchange.

The system will include a user account module, where both mentees and mentors can sign up, users can securely log in, and manage their personalized profiles with relevant information. A scheduling module will allow mentees to explore various areas of interest, set appointments for mentorship sessions, and receive timely SMS notifications for their upcoming sessions. For real-time interaction, the live chat module will serve as the primary channel for mentors and mentees to communicate directly and exchange insights.

Mentees will be able to share their experiences and provide constructive input about their mentors through the feedback and rating module. Learning content will be organized and shared via the resource sharing module, where mentors can upload materials and mentees can conveniently access them. The forum module will act as a collaborative environment where participants can post questions, discuss topics, and participate in group conversations for shared learning.

To track progress, the activity module will feature interactive tasks and exercises that mentees can complete to gauge their skill development. Oversight of the platform will be handled through the management module, empowering moderators, specifically from the BPSU-CCST organization, the Archwizards Society, to oversee user activity, validate mentor credentials, manage shared content, and assign responsibilities to mentors as needed. Additionally, the admin

access module will provide superadmins the ability to onboard new moderators and distribute system credentials securely.

The system will be used mainly by mentees, mentors, moderators, and superadmins. It will be online-only, allowing for simplicity of access and user convenience by all involved parties. The system will be developed to provide long-term availability and scalability for future revisions and growth as BPSU expands its mentoring programs.

The platform's communication will be limited to live chat only, and mentees must be at least 12 years old to register, which is suitable for those beginning to explore technology as they enter secondary education. Only student and faculty mentors from the College of Computer Studies (CCST) will be eligible to apply as mentors, provided they submit the complete requirements and successfully pass the assessment process. Additionally, mentors can only handle one assigned course as their specialty.

The system will not include coverage of financial transactions, payment processing for every session, or monitoring of face-to-face mentorship sessions.

To assess the effectiveness and usability of the system, this study will gather feedback from 100 randomly selected respondents. Their insights will help evaluate the platform's functionality, user experience, and overall impact on mentorship and learning.

With the utilization of this platform, BPSU can facilitate an interactive, efficient, and web-based learning platform that encourages the growth of potential tech learners.

## **Significance of the Study**

Mentorship programs have evolved in the digital age, transforming how knowledge and skills are shared. With the development and implementation of the COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, Bataan Peninsula State University (BPSU) - College of Computer Studies (CCST) has embraced technology to provide a structured, accessible, and effective mentorship platform. This web-based system bridges the gap between experienced mentors and aspiring tech learners, fostering a dynamic learning environment that promotes skill acquisition, career development, and industry preparedness. By utilizing digital tools and real-time communication, this platform ensures that mentorship is not limited by location or availability, allowing a broader reach and greater inclusivity in the tech community.

The study benefits the following:

**Tech Learners** – The study helps people of every age and background by offering structured guidance, access to curriculum resources, and the ability to advance their careers in the technology industry.

**Faculty and Student Mentors** – The study enables mentors to improve their professional growth, teaching, and leadership capabilities, as well as enrich the learning community.

**Bataan Peninsula State University (BPSU)** – The study improves the university's extension, promotes knowledge sharing, and creates a learning community and teachers dedicated to ongoing improvement and innovation.



On a broader scale, this research benefits the nation to advance in technology and education by allowing individuals to locate mentors more conveniently and enhance their online learning. This enables ongoing learning and the development of new ideas, leading the nation to advance its IT sector and tech industry. Through the facilitation of peer work and job readiness, the platform provides a mechanism to offer online digital mentorship that is expandable and easy to maintain. Through this initiative, BPSU demonstrates that it is committed to quality education, knowledge sharing, and the training of professionals, and supports individuals and organizations to succeed in the modern era of technology.

## **CHAPTER 2**

### **CONCEPTUAL FRAMEWORK**

In this chapter, the review of the related literature and studies, the conceptual framework of the study, and the operational definition of terms related to the study are presented. The chapter also includes information on the necessary software and hardware requirements. This section aims to provide a clear understanding of the system's purpose and functionality.

#### **Review of the Related Literature and Studies**

##### **Online Mentorship Learning**

Edukeit (2024) defined that online mentorship helps people learn by giving personal support and advice. It connects a more experienced mentor with someone who needs guidance, help to reach their school, work, or personal goals. Unlike regular classroom learning, it fits each person's way of learning, making it more interesting and easier to follow. For it to work well, both the mentor and mentee should have clear goals, talk regularly, and stay committed. This kind of support helps mentees by giving helpful tips, encouragement, and learning tools.

Similarly, Andersen, C. L., & West, R. E. (2021) talked about how online mentorship supports students. It's stated that it's a flexible, online connection that gives advice, learning help, and motivation. Additionally, since it's done online, it removes the problem of distance and lets students talk freely with their mentors. Their study also showed that mentorship gives more than school help as it also offers emotional support to keep students feeling strong and focused.

Furthermore, Mercier et al. (2024) found that peer online mentoring helped young people with learning difficulties feel better mentally and socially. The program connects with mentors who had similar experiences, helping build trust and reduce loneliness. It gave mentees a safe space to talk, feel understood, and grow their confidence.

These findings reinforce the significance of online mentorship as an accessible, effective method for supporting youth with learning differences, not only in their academic pursuits but also in their overall development and well-being.

### **Learning Management & Educational Platforms**

According to Shurygin et al. (2021), Learning Management Systems (LMS) are platforms used to manage, deliver, and track learning in schools, universities, and workplaces. These systems allow students to take courses online, learn at their own pace, and access lessons anytime. This also includes tools for managing courses, giving tests, sending messages, and generating reports, making education more organized and accessible.

Coincidentally, Josué et al. (2023) described LMS as digital tools that offer online spaces for accessing lessons, working together, and completing tests. These systems improve learning by providing personalized content, flexible learning paths, and features like discussion boards and online quizzes. Which then benefits both teachers and students through structured, tech-based learning.

Quadoud et al. (2021), on the other hand, explained that LMS as a form of “electronic education” that uses computer networks like the Internet to deliver

courses. These platforms give the technical setup needed to manage and share educational content. There are both free and paid versions, each with different features, depending on the learning needs of users.

These studies show that LMS and educational platforms are important tools for improving how learning is delivered and managed. Making education more flexible, organized, and engaging by offering online spaces for lessons, supporting education more.

### **SMS Notifications**

Austin, E. (2025) states SMS notifications are brief text messages that inform individuals of updates, reminders, or notifications pertaining to their accounts, services, or activities. The messages are immediate, and mostly accessible on any mobile phone. They are cheap to send and provide two-way communication, making them ideal to reach customers quickly and conveniently. SMS notifications are a powerful yet underused tool that can increase customer engagement and assist businesses in increasing their growth.

Additionally, Morrow, J. (2024) describes that it works through a trigger that processes an application that sends a message through an SMS gateway to the person's mobile carrier. Unlike internet-based systems, SMS notifications do not need a data connection, and thus can be received even in areas where connectivity is low. This allows companies to reach more people faster and more reliably.

Moreover, Paavola, A. (2023) observes that sms notifications differ from push notifications in that they do not require a mobile app and one can respond to them. They remain in the message inbox until you remove them, hence they are longer-lasting than push alerts that disappear. SMS notifications are more regulated and can be sent to any mobile phone without the use of the internet. This makes them the optimal option for the delivery of real-time updates and customer satisfaction promotion.

So, adding SMS alerts to a website or an application is vital for better communication, timely notifications, and increased user engagement. Since they tend to be frequently opened, user-friendly, and delivered in an instant, SMS alerts inform the users and maintain them active without needing internet connection.

## **Web Technologies**

VirtuBox (2025) defines web technology as the set of tools and methods used to build and manage websites and web applications. This includes front-end languages like HTML, CSS, and JavaScript for layout and design, as well as back-end tools like PHP and databases for server-side tasks. These technologies help create interactive, responsive websites that support communication and information sharing.

Additionally, Bhadwal (February 2025) explains that web technology allows computers and servers to interact using markup languages and multimedia tools. It supports the development of platforms with different features using

programming languages, helping devices communicate more efficiently and automatically.

Moreover, Bawa (December 2022) points out how web technology has grown from simple static pages to advanced applications that can handle complex tasks. Important elements include web browsers to access content, web servers to store and deliver it, and web pages, usually built with HTML. The World Wide Web links all these parts, while web development focuses on creating and managing websites to support smooth online experiences.

The findings highlight the important role of web technology in supporting dynamic communication, smooth automation, and easy sharing of information online. By using both front-end and back-end tools, web technologies help create efficient and interactive web systems, showing their value in the growth of modern digital platforms.

## **ISO 25010**

The ISO/IEC 25010 standard is a widely recognized model for evaluating software quality. As explained by Britton J. (2021), it outlines eight key quality characteristics: functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. These helps ensure that software meets user needs by assessing both its design and how it performs in real use.

Codacy (2023) adds that using ISO 25010 helps developers measure and evaluate software quality in a clear and organized way. Which ensures that all important areas of quality are covered.

Moreover, Zavgorodniy A. (2025) also notes that the standard is important for building reliable and efficient systems, reducing errors, and improving system maintenance.

In the context of the COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, integrating the ISO 25010 evaluation criteria is essential to ensure the platform meets academic and technical requirements. Functional suitability ensures the platform includes key features for communication and collaboration. Usability makes the system easy to use and understand, helping users engage more effectively. Performance efficiency and reliability ensure the platform runs smoothly with minimal downtime. Security protects user data and privacy, creating a safe space for mentorship. Maintainability and portability help the platform stay up to date and work across different systems. By following ISO 25010, the system can offer a reliable, user-friendly, and secure mentoring experience, supporting its goal of providing quality academic guidance through technology.

### **Google Classroom**

Google Classroom according to Edwards L. (2024) is an online suite of tools that enables teachers to distribute, accept, grade and return assignments. It

was designed to cut paper out of classrooms and enable digital learning. It is also connected with other Google tools like Docs, Drive, and Meet, which enables teachers to organize classwork and communicate with students effectively. Which makes it easy to distribute assignments, give feedback, and have one learning environment, particularly in blended or fully online learning environments.

Similarly, both Google Classroom and the proponents' proposed system, COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, aim at facilitating digital learning and communication among users. Both offer online access to the resources, facilitate interaction between learners and mentors, and collaborative construction of knowledge. However, the system aimed to focus on technology skill development, thus being a specialized system to facilitate mentorship, monitor learning progress, and improve tech readiness among aspiring learners.

### **Bahay Turo**

Bahay Turo (n.d.) is an online tutoring platform created by professionals from different fields of work such as education, business, and technology who want to help improve Philippine education. It connects students and parents with teachers through video calls, making it easier to find help and learn in different subjects. With that said, the platform allows users to choose what to learn and matches with a tutor who will guide through a personalized, one-on-one tutoring session.



Similarly, Bahay Turo and the proponents' proposed system, COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, are both designed to bridge gaps in education through digital means. This promotes learner-teacher connections and aims to deliver personalized educational support. However, the system is more mentorship-focused and peer-driven, specifically targeting aspiring tech learners and involving both student and faculty mentors from BPSU. Unlike Bahay Turo's one-on-one subject-based tutoring model, emphasizing skill-building, collaboration, and career-readiness through real-time chats, and learning resource sharing.

### **Skooli**

Skooli is a tutoring website online that assists students with school assignments via live video classes, just like Bahay Turo. Skooli provides students with a chance to meet certified teachers and professional tutors in areas such as Math, Science, English, and more to learn. This also enables students to schedule lessons whenever needed or schedule in advance. With a virtual classroom, an interactive whiteboard, and session recording, Skooli aims to provide a useful online platform for students to succeed in school.

Similarly, Skooli and the proposed system, COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, both support online learning by connecting students with knowledgeable individuals. However, Skooli focuses

mainly on academic tutoring for various subjects, while the system is centered around mentorship in the tech field. Wherein, it is intended to unite BPSU mentors with students who would like to learn about technology, offering learning support, advice, and skill enhancement.

## **Software Requirements**

The system's development requires a combination of essential software tools, including Visual Studio Code, XAMPP, phpMyAdmin, Twilio and Internet browser. These components are necessary to ensure smooth functionality, seamless integration, and efficient operation throughout the development process.

### **Visual Studio Code**

According to Heller, M. (2022), Visual Studio Code is a free, lightweight code editor available for Windows, macOS, Linux, and Raspberry Pi OS. It supports many programming languages through extensions and includes features like IntelliSense, built-in Git, and visual debugging to boost productivity.

Furthermore, Jasiulionis, D. (2025) adds that Visual Studio Code allows customization with themes, shortcuts, and layouts. It includes a terminal for running commands and the Live Share feature for real-time collaboration, making it ideal for remote teams and beginners.

Similarly, Sandu, B. (2025) highlights that Visual Studio Code helps developers work faster with real-time error checking, tooltips, and parameter hints.

It also supports version control through Git and ensures clean code with integrations like ESLint and Prettier.

Given its features and flexibility, Visual Studio Code is the primary tool used by the proponents to develop the system, ensuring efficient and smooth development.

## **XAMPP**

According to Nagendrag, S. (2024), XAMPP is a free web development tool that provides everything needed to create websites and applications. It includes Apache, MySQL, PHP, and Perl, making it ideal for local testing without needing an external server. It also features phpMyAdmin for managing databases, making server setup easier.

Similarly, Ganesan, P. (2022) highlights that XAMPP is user-friendly for both beginners and experts because of the listed key tools.

Kumar A. (2023) also adds that XAMPP also includes FileZilla for file transfers and OpenSSL for web security. It works on Windows, Linux, and macOS, and is easy to install, which makes it popular among developers.

XAMPP is an easy-to-use tool for web development with all the necessary features. Its cross-platform support and essential tools make it a good choice for developers

## **phpMyAdmin**

Sprogis, J. (2024) describes phpMyAdmin as an open-source tool for managing MySQL and MariaDB databases through a web browser. It simplifies tasks like creating tables, running queries, and controlling data access. It also supports importing and exporting data for backups and works well with most web servers and operating systems, making it popular among developers and beginners.

Similarly, Agarwal, Y. (2023) notes that phpMyAdmin's web-based nature allows remote use, making it ideal for teams working on databases. It helps with real-time tasks like optimizing tables, error reporting, and enhancing security through various login methods.

Additionally, Saad, S. (2025) adds that phpMyAdmin allows customization, supports graphical views of database relationships, and can automate tasks like backups. It also offers multilingual support, making it accessible worldwide.

phpMyAdmin is an excellent database management tool due to its intuitive interface, web-based accessibility, and capacity to streamline major database activities such as creating tables, executing queries, and managing backups in an effective manner.

## **Twilio**

Twilio (2024) is a cloud-communication platform that allows developers to integrate voice, text, and video into apps using APIs. It enables businesses to

increase customer interaction with secure and scalable real-time communication capabilities.

Similarly, Hoory, L. (2022) also brings into focus Twilio Flex, which is an end-to-end programmable cloud contact center with support for omnichannel customer service. It also integrates with CRM platforms for the purpose of enabling intelligent routing, real-time analytics, and workforce optimization.

In addition, Singh et al. (2023) highlight Twilio's contribution to safety applications, where it provides real-time SMS notifications for incidents such as drowsy driving detection, enhancing responsiveness and preventing accidents.

Twilio offers a secure, adaptable platform for integrating communication, enabling business operations, customer support, and real-time alert systems across sectors.

## **Internet Browser**

Mozilla (2023) describes an internet browser as an application program that fetches and renders web pages by interpreting HTML, enabling users to view text, images, videos, and execute web applications.

Further, BrowserStack (2023) describes that a browser is a client in the client-server paradigm, making requests to web servers and interpreting HTML, CSS, and JavaScript to provide an interactive and smooth user experience.

In addition, Webopedia (2024) adds that web browsers fetch and present web contents from the World Wide Web via devices such as smartphones,

tablets, and personal computers, thus allowing users to engage with multi-mediated sites.

Web browsers are critical agents for web navigation, rendering technologies for the web, and facilitation of the interaction with internet-based content. Providing consistency in user interface across platforms through support for web applications, navigation, and multimedia.

### **Hardware Requirements**

The developed system has hardware requirements that will be used for developing and implementing the system. The following requirements are: Laptop and Wi-Fi Modem.

#### **Laptop**

DevX (2025) defined a laptop as a mobile personal computer that has revolutionized the way individuals live, work, and interact. It combines major elements like a display screen, keyboard, and touchpad into one mobile unit. This device can also store large databases, run complex applications, and communicate wirelessly, making it easy to use for online work and distance learning.

In addition, Sharief K. (2024) explained laptops as rechargeable battery-powered mobile computers that can be used anywhere. This makes laptops particularly useful for professionals and students who require flexibility to study, work, or conduct business on the go.

Similarly, ComputerHope (2025) also added that newer laptops are also thinner and lighter, becoming more tablet-like and something used on a daily basis by people of all ages.

This makes laptops such essential tools in modern life as a result of their usability, flexibility, and advanced options. Their versatility in supporting varied operations, besides other functionalities, renders it advantageous in education, professional, as well as for common usage at any age range in this modern age.

### **Wi-Fi Modem**

A wi-fi modem, as HelloTech (2025) defines it, is a device connecting local area network (LAN) to the internet, otherwise referred to as the wide area network (WAN). The modem converts internet service provider's (ISP) analog signal into a digital signal that can be processed by the router, computer, and other devices.

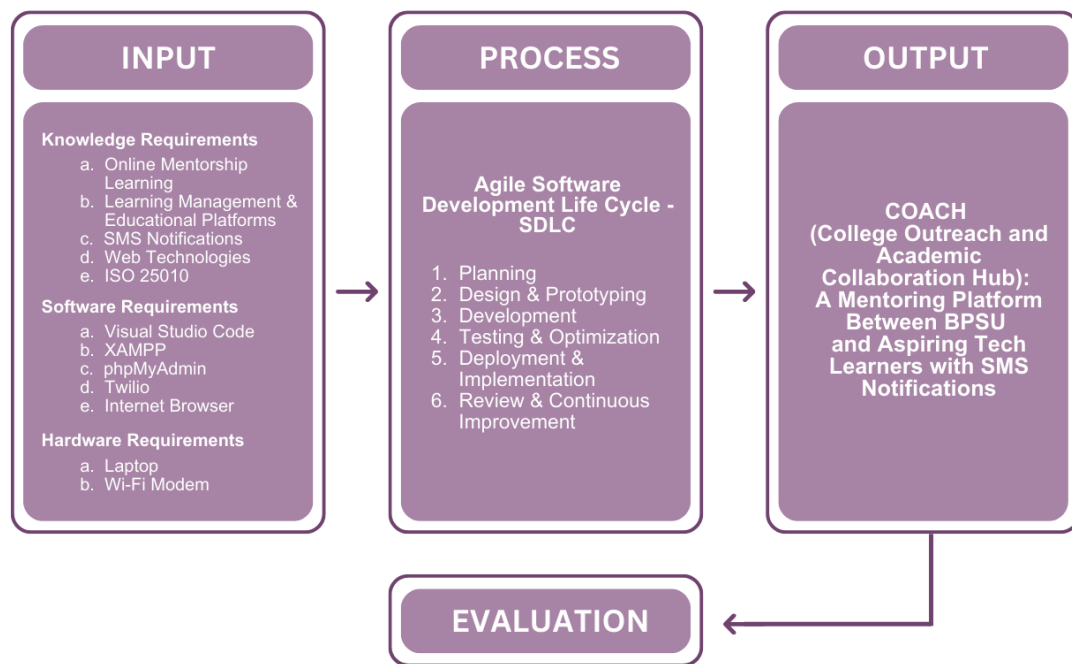
Similarly, CitizenSide (2023) states the majority of modern modems also act as routers, creating a Wi-Fi network so that multiple devices can connect without the need for cables.

Parrish K. (2024) further contributes that the modem is crucial since it is the central link between home network and the ISP. Devices would not be able to access the internet without it. Through the translation of signals into useful data, modems enable users to browse, stream, work, and communicate online, thus making it an essential device in this modern era.

These findings indicate that modems have a significant function in making the internet accessible through the connection of networks, signal transformation, data handling, and support of wireless connections.

### Conceptual Model of the Study

Swaen, B. and George, T. (2024) define the model of the study as a conceptual framework that presents the expected relationships between variables, grounded in existing research, to guide the study and its conclusions.



**Figure 1.** Conceptual Model of the Study.

In this study, Figure 1 illustrates the conceptual model using the Input-Process-Output-Evaluation (IPOE) framework, which outlines the essential components and workflow involved in the development of the COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification.



The Input Phase consists of three key requirements: knowledge, software, and hardware. Knowledge requirements include familiarity with online mentorship learning, learning management systems, SMS notification systems, web technologies, and the ISO 25010 software quality standard. These form the theoretical and technical foundation of the system. The software requirements involve the use of Visual Studio Code as the development environment, XAMPP for local server setup, phpMyAdmin for database management, Twilio for SMS integration, and a modern internet browser for testing and usage. The necessary hardware includes a laptop and a Wi-Fi modem to support system development and deployment. These inputs collectively support the creation of a mentoring platform that aims to bridge BPSU (Bataan Peninsula State University) with aspiring technology learners through structured academic and outreach collaboration.

The Process Phase follows the Agile Software Development Life Cycle (SDLC), which allows for flexibility and iterative improvement throughout the system development. This phase includes six major steps: (1) Planning, which involves identifying system goals and user needs; (2) Design and Prototyping, where system architecture and user interfaces are created; (3) Development through incremental sprints, enabling manageable and iterative progress; (4) Testing and Optimization to ensure functionality, security, and performance; (5) Deployment and Implementation, where the system is made available for use; and (6) Review and Continuous Improvement, ensuring the platform evolves based on user feedback and performance data.

The Output Phase is the result of the system development process which will be COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification, a mentoring platform designed to connect BPSU mentors with students interested in technology. The platform provides structured mentorship experiences and enhances learning opportunities, particularly through features such as SMS notifications to maintain communication and engagement between mentors and mentees.

Finally, the Evaluation Phase ensures the effectiveness, usability, and overall performance of the platform. Through user testing, feedback collection, and performance assessment, this phase identifies areas for refinement. The insights gained are then used to improve the platform further, making it more efficient, responsive, and user-friendly for all stakeholders involved.

### **Operational Definition of Terms**

The terms listed below are defined operationally to ensure clear understanding of their specific meanings as used in this study:

#### **COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification**

— is a web-based mentoring platform connecting Bataan Peninsula State University (BPSU) with aspiring tech learners. It facilitates mentorship, skill development, and knowledge sharing through features like communication tools, learning resources, progress tracking, and feedback evaluation. Designed for long-

term scalability, the system supports BPSU's growing mentoring initiatives and enhances the learning experience for future tech professionals.

**Superadmin** — An individual who oversees the moderators' access.

**Mentor** — A BPSU-CCST student or professor guiding mentees in programming and technology.

**Mentee** — An aspiring tech learner of ages 12 and above of any gender receiving mentorship and learning support.

**Moderator** — An ArchWizards Society organization member responsible for overseeing discussions and ensuring a positive mentoring environment.

**Archwizards Society** — A student organization at BPSU responsible for supporting the mentoring platform through the role of moderators and peer mentors.

**Tech Learner** — An individual, typically a BPSU student or aspiring professional, looking to develop skills in programming, technology, or related fields, and seeking mentorship.

**Learning Resource** — Educational content such as tutorials, articles, videos, and tools provided on the platform to support mentees' skill development.

**Live Chat** — A real-time messaging system on the platform allowing mentees and mentors to communicate instantly for guidance or feedback.

## **CHAPTER 3**

### **METHODOLOGY**

This chapter presents the development process of the study, including the Project Design, Use Case, Activity Diagram, Entity Relationship Model (ERD), Data Dictionary, Project Development and Gantt Chart that will explain how the flow of the system will function.

#### **Project Design**

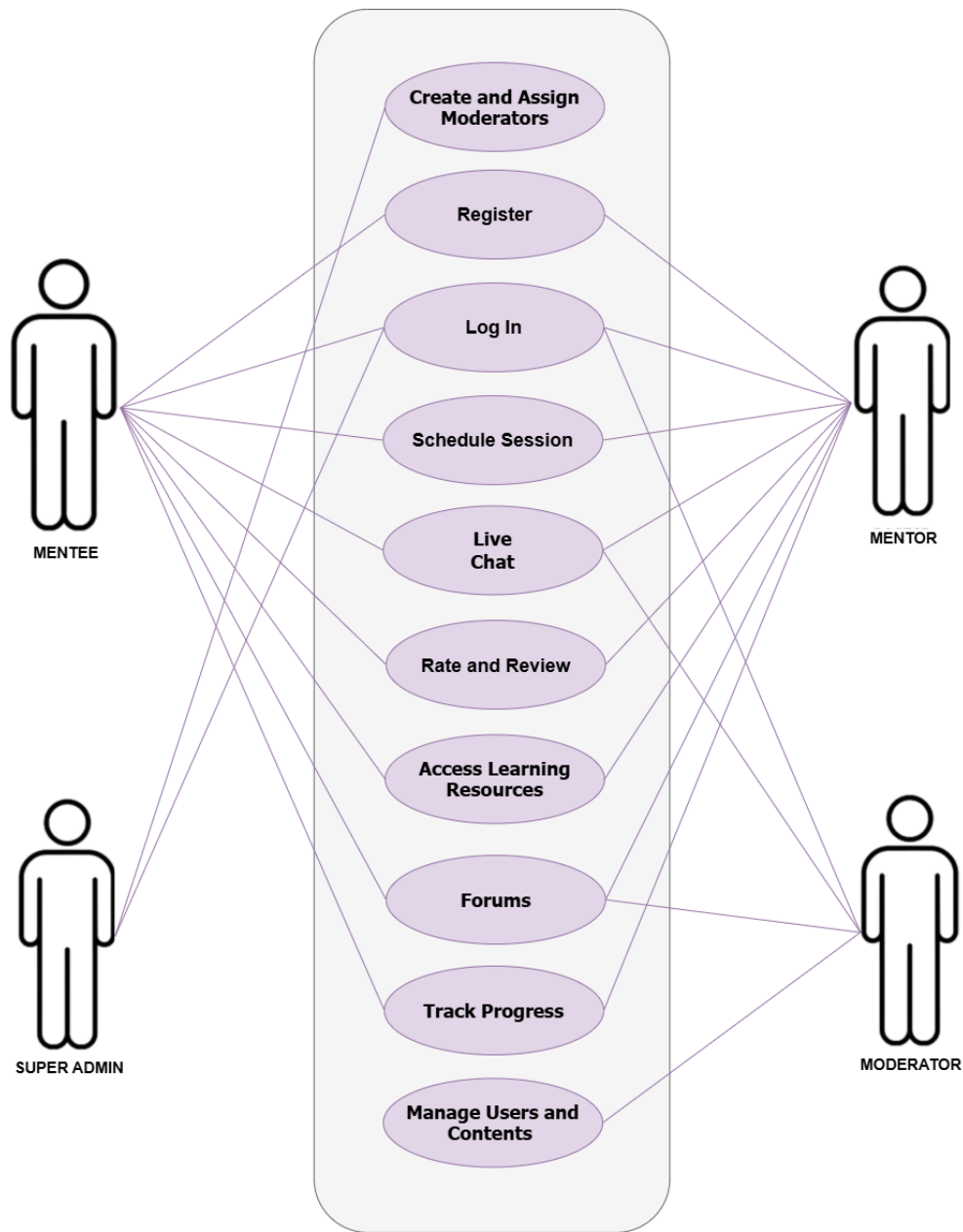
COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification is a web-based platform designed to facilitate structured mentorship and academic collaboration between BPSU–CCST faculty and student mentors, and aspiring tech learners, aiming to improve learning experiences and promote educational growth in the field of technology.

#### **Use Case**

Based on Carter, M. (2024), use case diagrams are visual representations that show how users (actors) interact with a system to achieve specific goals. This defines the functional requirements of a system and facilitates effective communication among developers, stakeholders, and clients by breaking down intricate processes into an easily understandable graphical diagram.

Figure 2 on the following page, presents the Use Case Diagram of the COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification to

discuss the main processes of the proposed system. All of the users are required to have an account and log in before accessing the system.



**Figure 2.** Use Case Diagram.

Mentees can select their preferred area of interest, schedule mentorship sessions, receive SMS reminders, and communicate with mentors via live chat. Additionally, mentees can also access learning resources, track their

progress, give feedback and ratings to mentors, and join forum discussions for collaborative learning.

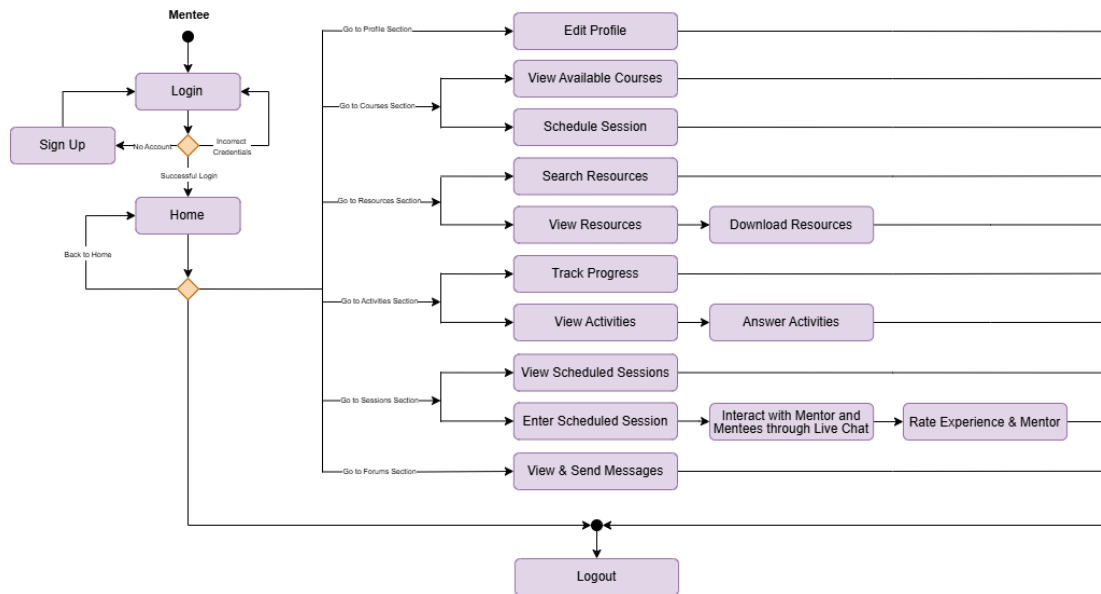
Mentors can create and manage their mentorship profiles, set their availability, and interact with mentees through the live chat feature. Mentors can also participate in forum discussions to support group learning and submit educational resources and activities to track mentees' progress, which are subject to approval by the moderators.

Moderators, represented by the ArchWizards Society, are tasked with verifying mentor applications, reviewing and approving uploaded learning materials, managing user reports, enforcing platform guidelines, and monitoring overall system activity to ensure a smooth and productive user experience.

Superadmins have the highest level of access, responsible for managing and creating admin accounts, and admin management to maintain platform integrity and security.

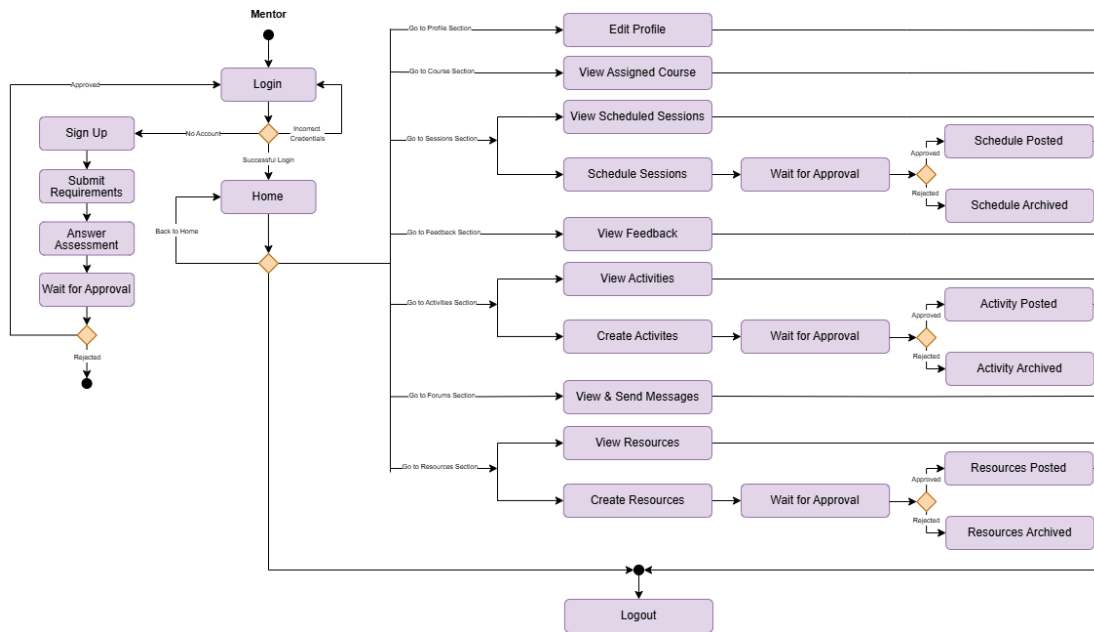
## **Activity Diagram**

Carter, M. (2024) describes an activity diagram as a visual representation of how activities move around in the system to achieve a specific goal. It illustrates the sequence of actions, decisions, and events in order to help users, developers and stakeholders comprehend how the system works and its workflow. Activity diagrams are therefore useful in analyzing processes, identifying performance issues, and guiding system design and development.



**Figure 3.** Mentee - Activity Diagram.

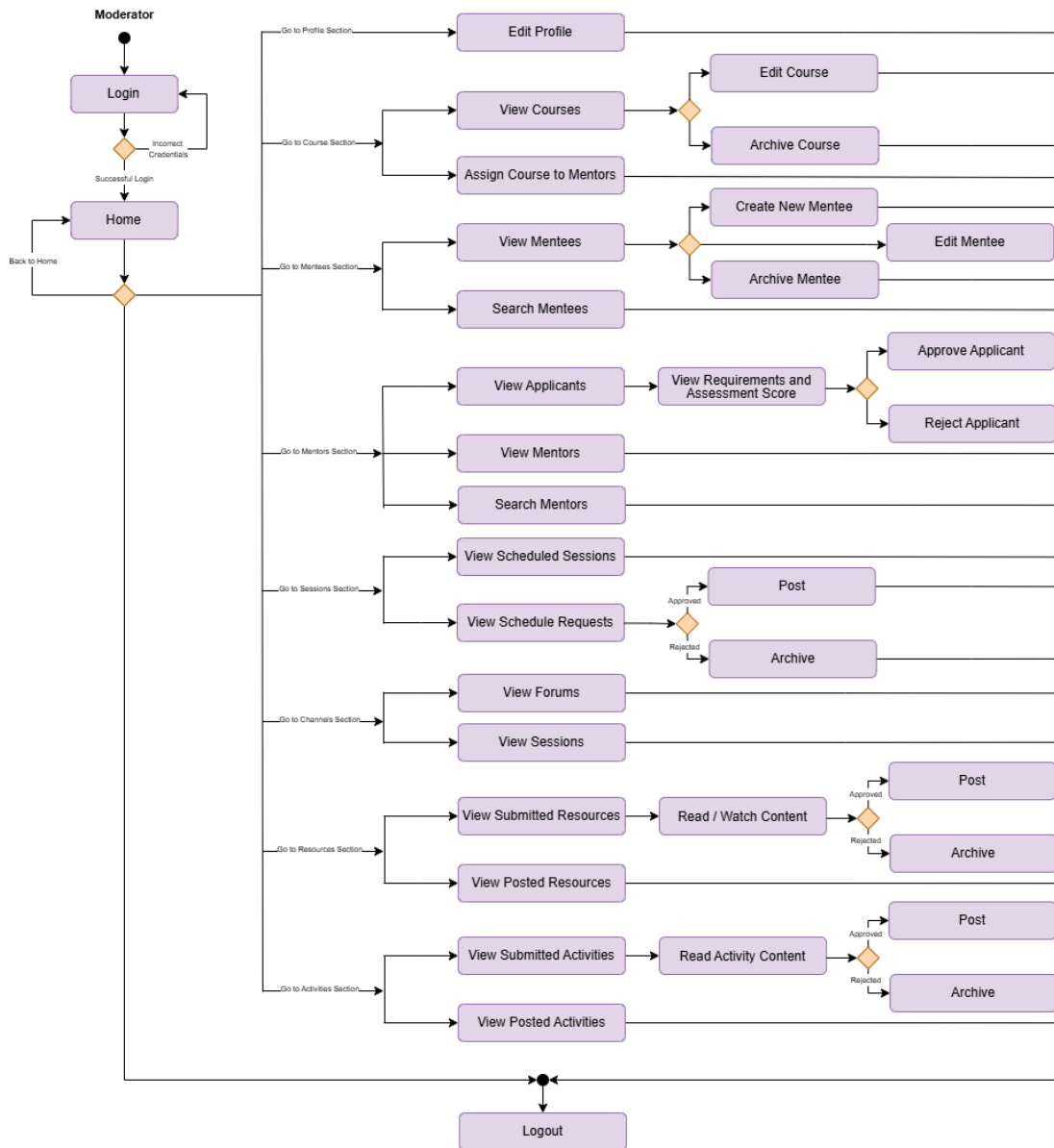
Figure 3 illustrates the activity flow for mentees in the system, starting from logging in or signing up. Once on their homepage, mentees can use the navigation bar to access different system features. Mentees can view and enroll in courses, schedule mentorship sessions, and access the Resource Library to search, view, and download learning content. Mentees can also view mentor profiles and chat live during live sessions. After the session, mentees can give feedback, do assigned work, and view progress. The system also allows for forum discussions, where mentees can send and respond to messages. Profile management involves editing personal details and receiving notifications; which can also be in SMS to remind of the session schedules. The diagram ends with options to go back to the homepage or log out.



**Figure 4.** Mentor - Activity Diagram.

Figure 4 illustrates the activity flow for mentors in the system, beginning with either logging in or signing up. New mentors are required to complete an application form, upload their certificates and resume, and select their area of specialization. Once approved, mentors are able to see their own homepage with a navigation bar. The bar assists to manage mentorship sessions, participate in live chats with mentees, and access feedback. Mentors are also able to upload learning materials in the Resources Library, which are required to be approved by a moderator, and participate in community discussions in the Forum section. Additionally, update their profile information and manage notifications under the Profile section. Activity concludes with options to return to the home page or log out.





**Figure 5.** Moderator - Activity Diagram.

Figure 5 illustrates the activity flow for moderators in the COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification system, beginning with login and access to the Moderator Home Page. From there, the Moderator Home Page can utilize the navigation bar to work with significant portions of the platform: Courses, Sessions, Forums, Resource Library, and

Applications. Moderators can add, modify, or remove courses; view and monitor chat rooms and delete inappropriate forum content to ensure a safe environment. In the Resource Library, moderators add, modify, delete, and verify materials submitted by mentors. Moderators also review and verify mentor applications. Activity concludes with options to return to the home page or log out.

## **Database Design**

This section discusses the major tables used in the database of the developed system: mentee profiles, mentor profiles, admins, courses, resources, sessions, session bookings, chat messages, mentee assessment and feedback.

## **Entity Relationship Diagram (ERM)**

Brown, F. (2024) discussed Entity-Relationship Model (ERM) as a high-level conceptual data model used to represent real-world entities and their relationships. It helps in analyzing data requirements systematically to design an efficient database. ERM is considered a best practice before actual database implementation because it provides a clear and organized blueprint of the database structure, reducing errors and ensuring all data requirements are addressed.

Figure 6 on the next page displays the Entity-Relationship Model that consists of ten (10) major tables that stores the different data used inside the COACH system.



The resources table contains learning materials uploaded for each course, including file details and descriptions. The mentee\_assessment table tracks the tasks or evaluations assigned to mentees under specific courses. Lastly, the chat\_messages table stores the messages exchanged by users, including the type of chat, message content, and any attached files.

These major tables are what make up the core of the COACH system, ensuring that all users: mentees, mentors, and moderators, can interact efficiently within a structured and organized platform for learning, communication, and feedback.

## Data Dictionary

According to Singh, S. (2025), a data dictionary is a document that outlines the major elements of a database, including tables, fields, data types, and relationships. It provides the standardized names, definitions, and rules to keep data usage concise and consistent. This tool allows teams to understand, manage, and validate data effectively. Which then allows better data quality, governance, and collaboration on all the data that the organization protects.

**Table 1.** Data Dictionary of Mentees.

Data Dictionary			References Number		
			Version Number 1.0		
System Name: COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification					
Subject: Mentee					
PK	FK	Field Name	Data Type	Length	Description
Yes	No	Mentee_ID	int	11	Unique ID for mentee
No	No	First_Name	varchar	70	Mentee's first name

No	No	Last_Name	varchar	70	Mentee's last name
No	No	DOB	date	—	Date of birth
No	No	Gender	varchar	20	Mentee's gender
No	Yes	Username	varchar	50	Login username
No	No	Password	varchar	255	Account password
No	No	Email	varchar	70	Email address
No	No	Email_Verification	varchar	50	Email verification status
No	No	Contact_Number	varchar	100	Phone number
No	No	Contact_Verification	varchar	50	Number verification status
No	No	Full_Address	varchar	100	Complete address
No	No	Student	varchar	20	Indicates if user is a student
No	No	Student_YearLevel	varchar	30	Year level in school
No	No	Occupation	varchar	40	Current job
No	No	ToLearn	text	—	Learning goals or topics
No	No	Mentee_Icon	varchar	200	Profile image filename or path

Table 1, shows the Mentee Profiles. This table stores all the needed information about the mentees including Mentee\_ID, First\_Name, Last\_Name, DOB, Gender, Username, Password, Email, Email\_Verification, Contact\_Number, Contact\_Verification, Full\_Address, Student, Student\_YearLevel, Occupation, ToLearn and Mentee\_Icon. The primary key of this table is Mentee\_ID and has no foreign key.

**Table 2.** Data Dictionary of Mentors.

Data Dictionary			References Number		
			Version Number 1.0		
System Name: COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification					
Subject: Mentor					
PK	FK	Field Name	Data Type	Length	Description
Yes	No	Mentor_ID	int	11	Unique identifier for each mentor
No	No	First_Name	varchar	80	Mentor's first name

No	No	Last_Name	varchar	80	Mentor's last name
No	No	DOB	date	—	Date of birth
No	No	Gender	varchar	30	Gender
No	No	Email	varchar	80	Email address
No	No	Contact_Number	varchar	100	Contact number
No	Yes	Applicant_Username	varchar	70	Username used by the mentor
No	No	Applicant_Password	varchar	255	Password used by the mentor
No	No	Mentored_Before	varchar	20	Indicates if the applicant has mentored before
No	No	Mentoring_Experience	text	—	Details about the applicant's mentoring experience
No	No	AreaofExpertise	varchar	100	Field or subject the mentor specializes in
No	No	Resume	varchar	200	File path or link to the mentor's resume
No	No	Certificates	varchar	200	File path or link to the mentor's certificates
No	No	Assessment_Score	int	20	Score from the mentor's assessment
No	No	Status	varchar	60	Account status of the mentor
No	No	Mentor_Icon	varchar	200	Path to the mentor's profile image or icon

Table 2, presents the Mentor Profiles. This table stores all the needed information about the mentors including Mentor\_ID, First\_Name, Last\_Name, DOB, Gender, Email, Contact\_Number, Applicant\_Username, Applicant\_Password, Mentored\_Before, Mentoring\_Experience, AreaofExpertise, Resume, Certificates, Assessment\_Score, Status and Mentor\_Icon. The primary key of this table is Mentor\_ID and has no foreign key.

**Table 3.** Data Dictionary of Courses.

Data Dictionary			References Number		
			Version Number 1.0		
System Name: COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification					
Subject: Courses					
PK	FK	Field Name	Data Type	Length	Description
Yes	No	Course_ID	int	11	Unique identifier for each course
No	No	Course_Title	varchar	200	Title or name of the course

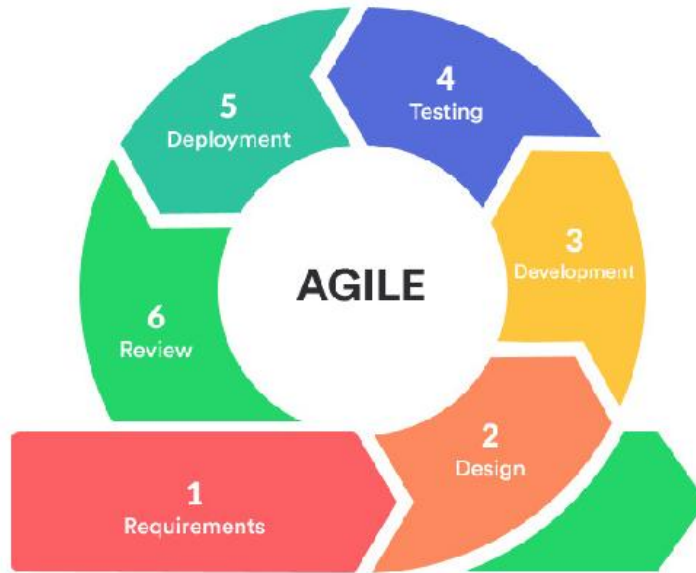
No	No	Course_Description	text	—	Detailed description of the course
No	No	Skill_Level	varchar	100	Required skill level to take the course
No	No	Assigned_Mentor	varchar	200	Name or ID of the assigned mentor
No	No	Course_Icon	varchar	100	Path to the course's icon or image

Table 3, displays the Courses. This table stores all the needed information about the courses available on the system including Course\_ID, Course\_Title, Course\_Description, Skill\_Level, Assigned\_Mentor and Course\_Icon. The primary key of this table is Course\_ID and has no foreign key.

## Project Development

As stated by Malsam, W. (2025), project development is the planning, organizing, and use of resources to turn an idea into a finished product or service. It includes setting goals, making schedules, and tracking progress using tools like Agile Model to ensure success.

Agile Model, according to Agrawal, V. (2025), is a project management approach focused on flexibility, team collaboration, and customer satisfaction. It breaks the project into sprints, allowing to view quick results and immediate adjustments. This is why agile model was chosen for COACH (College Outreach and Academic Collaboration Hub): A Mentoring Platform Between BPSU and Aspiring Tech Learners with SMS Notification to enable feedback, collaboration, and adaptability. The process includes six phases: planning, design, development, testing, deployment, and review.



**Figure 7.** Agile Model.

Retrived from [https://www.researchgate.net/figure/Agile-Development-Model\\_fig1\\_370966965](https://www.researchgate.net/figure/Agile-Development-Model_fig1_370966965)

## 1. Planning

TST Technology (2024) explained that the planning phase in Agile is where the team understands what the user needs, breaks the work into smaller tasks, and sets clear goals to start the project. This helps the team stay flexible and work better throughout the project.

In this phase, the proponents will gather information and plan accordingly, including the assigned roles and responsibilities for each member. The members will brainstorm together and draft the first version of the documentation, identifying the specific problems, objectives and requirements needed to build the system. At the end of this phase, the team outlines the project scope and timeline to guide the progress of the development.



## **2. Design & Prototyping**

Based on Nehra, M. (2022), the design and prototyping phase in agile development focuses on creating mock-ups and planning on how the system will work, defining the system architecture. Stakeholder input is important and will be gathered to make sure all needed features and functions are included.

The workflow of the system will be determined in this phase. This includes the creation of the needed diagrams: wireframes, UI mockups, activity diagrams and entity-relationship diagram of the proposed study. These visual representations will serve as a guide for developers during implementation, ensuring a clear and consistent understanding of the system's structure and functionality.

## **3. Development**

According to Baletska, Z. (2025), the development phase in Agile focuses on building the product in small, functional increments. After planning and design, the team works on turning the visual and structural plans into actual features. This is the time where the team meets regularly in daily standups, to check progress and solve problems. Some tasks may take longer if they are complex or require extensive testing, which can extend the development time.

After completing the planning and designing phase, the structured workflow will now be started to be implemented in code. The assigned programmers of the team will now work with the system itself and turn the created

ideas into concepts in machine language. The diagrams created from the designing phase will be used here as a guide to the development.

#### **4. Testing & Optimization**

Ramani, D. J. (2025) explained that the testing phase in Agile focuses on finding and fixing bugs. The team does different tests to make sure the software works well. This helps avoid big problems and ensures users have a smooth and good experience in using the system.

The proponents in this phase will test each part and feature of the system to make sure that it works how it should be and properly. User feedback will be collected to identify any problems that have not been seen yet. Additionally, any issues found will be fixed to improve the system before its final deployment.

#### **5. Deployment & Implementation**

Moreover, Ramani, D. J. (2025) also defined that the deployment and implementation phase in Agile is the stage where the finished system is launched for users to access. It can be a full release or beta testing, depending on the plan. This phase ensures the system is live, working properly, and ready for real time use.

In this phase, the system will be deployed online ready for the target respondents to use and evaluate. The team will monitor the system to check if it runs smoothly and without errors. If the deployed system encounters any mishaps the proponents will make sure that it will be fixed immediately.

## **6. Review & Continuous Improvement**

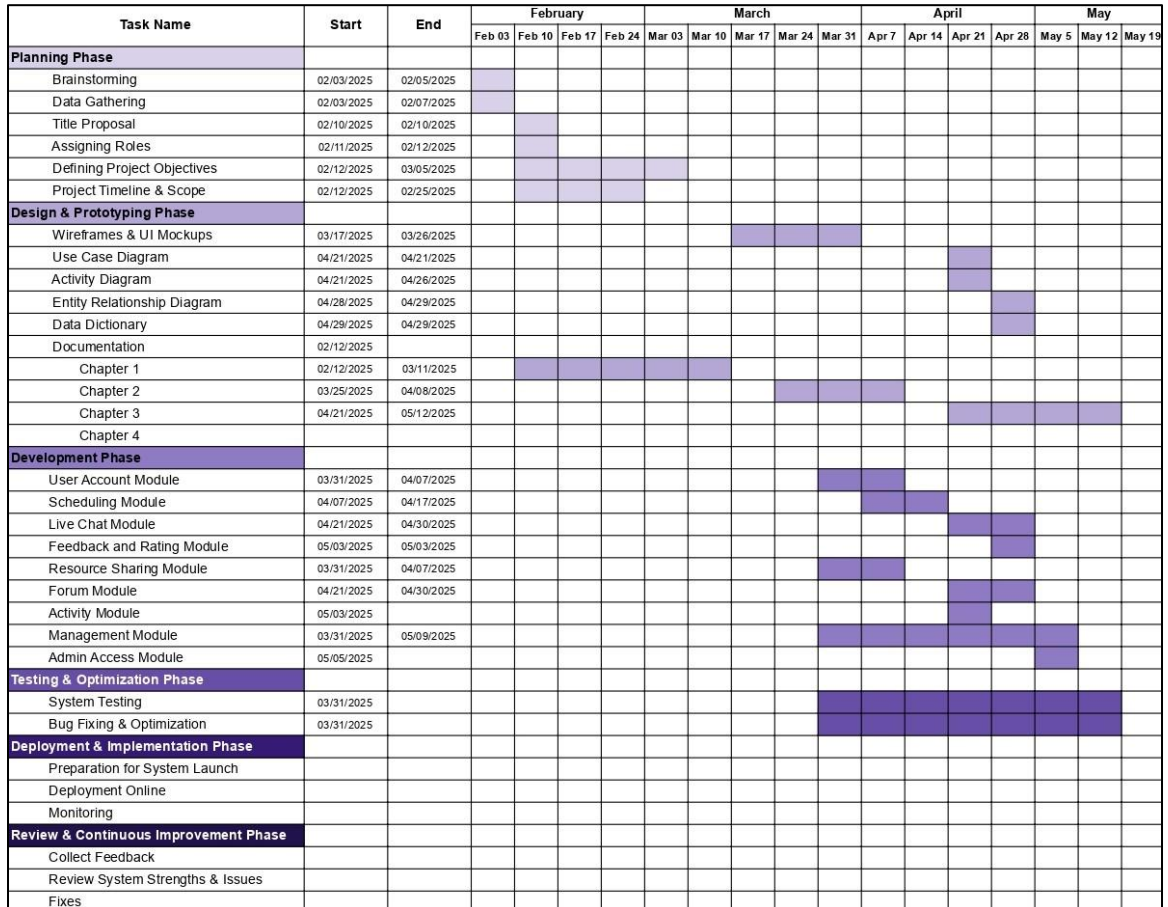
After all the phases are completed, it is important to undergo the Review and Continuous Improvement phase. As stated by Codewave (2024), this phase focuses on identifying ways to improve both the system and the development process. Feedback from users and team members is gathered to highlight areas for enhancement. Then all this feedback will be applied by repeating the Agile cycle to implement improvements and deliver better results.

The proponents will review the system itself, identifying all the strengths and weaknesses it has. Evaluation will be done to assess if the system meets the original goals and user expectations towards the progress of completing the requirements. Based on the findings, necessary changes will be planned and be implemented for growth.

### **Gantt Chart**

According to Wadhwa (2024), commonly utilized in project management for mapping out the progress, pointing out interdependencies between tasks, and conducting management of resource assignment are Gantt charts. Before now, this tool was developed by Henry L. Gantt in 1917, and it has become the indispensable tool of any contemporary project manager to plan and schedule the projects. It helps to coordinate tasks effectively with a guarantee that the project is accomplished on time. Based on the research the use of Gantt charts

improves communication and collaboration since everybody would have a visual idea about project progress; hence in most cases they are fundamental.



**Figure 8.** Gantt Chart.

Figure 8 shows project timeline, starting from the Planning Phase where primary brainstorming and data collection generate the title proposal and the determination of project aims and scope, the schedule. After this, the Design & Prototyping Phase concentrates on producing graphical representations including wireframes and UI mockups, developing important diagrams including use case and entity-relationship diagrams, developing the data dictionary and the first documentation of the architecture of the system and chapters. The

Development Phase then entails actual construction of a number of system modules such as user accounts, scheduling, live chat, feedback and rating, resource sharing, forums, activity management, overall management and admin access functionalities. After that, the Testing & Optimization Phase is devoted to hardcore tests of systems and the essential procedure of bug detection and correction, as well as performance optimization. Then the project enters the Deployment & Implementation Phase that includes preparation for system launch, system deployment into an online environment, and constant monitoring. Finally, the Review & Continuous Improvement Phase guarantees further success of the project, collecting users' feedback, answering the questions about system strengths and weaknesses and making sure the proper fixes and enhancements are made, showing an iterative approach to the development and maintenance of the project.

### **Operation and Testing Procedure**

This section discussed the operation and testing procedure of the COACH system. The test is done through different procedures such as unit testing, integration testing, system testing and acceptance testing.

### **Operation Procedure**

The system's operation begins with the account creation process. A prospective mentee initiates the journey by signing up and providing the necessary personal information to create an account. Similarly, an individual who wishes to

become a mentor must also sign up, but the process includes additional steps such as submitting required documents and completing an assessment. The submitted documents and assessment are reviewed by a moderator. Based on the evaluation, the mentor application is either approved, granting access to the system or rejected. A moderator does not sign up manually. Instead, the superadmin creates and manages the moderator account and provides the login credentials.

Once registration is complete, each user logs in to access the designated dashboard and system functionalities. A mentee, after logging in, is directed to the home area. From there, the mentee can manage the profile, explore courses and resources, track learning progress, participate in activities, interact with mentors through scheduled sessions and live chat, provide feedback to mentors, and communicate through the messaging feature. After completing the activities, the mentee logs out of the system.

An approved mentor follows a similar flow. After logging in, the mentor accesses the home area, where profile management, assigned course viewing, mentoring session scheduling, mentee feedback review, activity creation and management, resource management, and communication functionalities are available. Once tasks are completed, the mentor logs out of the system.

A moderator, using login credentials provided by the superadmin, gains access to the moderator dashboard. The moderator is responsible for managing courses, users, mentoring sessions, forums, resources, and activities. The moderator has the authority to post new content, approve or reject submissions,

and archive items as needed. After completing the administrative tasks, the moderator logs out of the system.

## **Testing Procedure**

Testing procedure shows how the proponents will perform testing using unit testing, integration testing, system testing and acceptance testing.

### **1. Unit Testing**

According to Hamilton, T. (2024), unit testing is a type of software testing where individual components of a program are tested to ensure they work correctly. It is done by developers during the coding phase to verify that each unit functions as expected.

In here, the proponents will create and run unit tests for each function and module of the Coach System. These tests will check if individual features like user login, schedule creation, and progress tracking work correctly. The goal is to detect and fix errors early in the development phase.

### **2. Integration Testing**

Carpenter, A. (2024) states that integration testing involves testing different modules of software as a group to ensure they work together seamlessly. It is important because it helps detect bugs and errors that can occur when multiple developers' code is combined.

In here, the proponents will integrate modules of the Coach System. Testing will be conducted to verify proper interaction and data flow between these modules. This process ensures the entire system functions smoothly without errors during integration.

### **3. System Testing**

Based on Das, S. (2024), system testing is a level of software testing that checks the complete and integrated software to ensure it meets all specified requirements. It is done after integration testing to validate that the entire system works correctly under real-world conditions.

The behavior of the complete COACH system is then assessed during system testing, where the primary objective is to validate that the system adheres to the specified requirements and effectively fulfills its intended purpose, often representing the final comprehensive test before deployment.

### **4. Performance Testing**

Gillis, A. S. (2023) described performance testing as a method used to evaluate the speed, responsiveness, and stability of a system under workload. It helps identify performance bottlenecks to ensure the software delivers a smooth and consistent user experience.

In here, the proponents will test the COACH System under different levels of user activity and data load. This will measure how fast and stable the system performs during peak usage. The evaluation will also check if the



system meets the necessary standards for reliability, efficiency, compatibility, usability, security, and maintainability. Any performance issues found will be addressed to ensure the system satisfies the users' needs effectively.

The listed testing procedures will utilize the test script form below:

**Table 4.** Test Script Form.

<b>Date</b>			
<b>Tested By</b>			
<b>Test Case Number</b>			
<b>Test Case Name</b>			
<b>Test Case Description</b>			
<b>Item(s) to be tested</b>			
<b>Procedural Steps</b>			
<b>Specifications</b>			
<b>Input</b>	<b>Expected Output/Result</b>	<b>Pass Y/N</b>	<b>Actual Result/Output</b>

## EVALUATION PROCEDURE

These are the following activities that the proponents will perform during the evaluation:

1. The proponents will introduce the system and explain its features to the respondents.
2. The system will be prepared and installed in a testing setup.

3. Evaluation forms covering ISO 25010 criteria will be given to the respondents.
4. Respondents will use the system and assess it based on functionality, reliability, efficiency, usability, security, compatibility, maintainability, and portability.
5. The proponents will collect the filled evaluation forms from the respondents.
6. The processed data will be computed using a weighted scoring formula.
7. The gathered data will be analyzed, and the ratings will be interpreted using the Likert scale.

**Table 5.** Likert's Scale.

Rank	Numerical Scale	Interpretation
5	4.51 – 5.00	Highly Acceptable
4	3.51 – 4.50	Very Acceptable
3	2.51 – 3.50	Acceptable
2	1.51 – 2.50	Moderately Acceptable
1	1.00 – 1.50	Not Acceptable