

UNIVERSITI TEKNOLOGI MARA

**THE DEVELOPMENT OF SMOOTEA
LEARNING ACCESS & CLASS ENROLLMENT
SYSTEM**

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**The Development of Smootea Learning Access &
Class Enrollment System**

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SUPERVISOR APPROVAL

THE DEVELOPMENT OF SMOOTEA LEARNING ACCESS & CLASS ENROLLMENT SYSTEM

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The thesis was prepared under the supervision of the project supervisor, Dr Maslina Abdul Aziz. It was submitted to the Faculty of Computer and Mathematical Sciences and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Information Technology (Hons.) Information Systems.

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STUDENT DECLARATION

I certify that this thesis and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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ABSTRACT

Smootea Academy is an emerging educational brand that initially relied on manual and static web-based systems, which lacked the capability to manage classes and track student progress efficiently. This limitation created barriers to scalability, progress tracking and user experience, while the use of fixed platforms such as Facebook and WhatsApp raised concerns around security, authentication, and resource management. To address these challenges, this project aimed to identify requirements and design and develop the Smootea Learning Access and Class Enrollment System (SLACES), a centralized and dynamic solution. SLACES enables students to register and enroll in classes using a unique code and access learning materials dynamically, while admins can control classes, monitor progress, and confirm enrollments independently of social media platforms. Role-based access and dashboard analytics contribute to an interactive and organized learning environment. Future enhancements such as certificate creation, payment gateway integration, real-time notifications, and attendance tracking could increase the system's scalability and adaptability for broader institutional use. Also, it is possible to add advanced LMS features like certificate creation, payment gateway, real-time notifications and a more detailed attendance record. The study of agile methodology and its application to other external institutions would also enhance its scalability and adaptability.

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LIST OF ABBREVIATION

SLACES	Smootea Learning Access & Class Enrollment System
F&B	Food and Beverage
LMS	Learning Management System
CMS	Content Management System
MVC	Model-View-Controller
UI	User Interface
UX	User Experience
DB	Database
CRUD	Create, Read, Update, Delete
PDF	Portable Document Format
SQL	Structured Query Language
ERD	Entity Relationship Diagram
IDE	Integrated Development Environment
OS	Operating System
HTTPS	HyperText Transfer Protocol Secure
API	Application Programming Interface
OTP	One-Time Password
SDLC	Software Development Life Cycle
QA	Quality Assurance
LAN	Local Area Network
WAN	Wide Area Network
TCP/IP	Transmission Control Protocol/Internet Protocol
RAM	Random Access Memory
CPU	Central Processing Unit
MOOC	Massive Open Online Courses

CHAPTER ONE

INTRODUCTION

This chapter describes the background of the study, problem statement, project objectives, project scope and project significance of the project.

1.1 Background of Study

In the domain of education technology, digital platforms are being used more and more to improve instruction and learning engagement as well as the management of education resources. These kinds of systems allow schools, academies and organizations to distribute courses online, track student performance and automate administrative tasks, thus simplifying education processes in terms of access and efficiency. Smootea Academy is a company that works in this field and provides professional training and online courses to those who want to become entrepreneurs. Smootea aims to enhance enrollment operations, facilitate access to learning materials, and provide a secure and scalable solution that is of advantage to students and administrators by switching to a centralized digital framework that replaces manual and non-automated processes.

Smootea, founded at the end of 2021 during Malaysia's MCO 3.0, has quickly grown into a lifestyle beverage brand specializing in unique cheese-topped drinks. Smootea first launched in the Klang Valley and has since expanded from a single outlet to three locations in Kajang, Shah Alam and Kuantan, Pahang. The brand aims to extend its reach throughout Malaysia and attract investors, with a vision to become a renowned cheese beverage brand locally and abroad. Smootea offers a range of innovative drinks, from their signature cheese-topped drinks and brown sugar pearl milk tea to frappes and refreshing soda beverages. With a mission to share the “Peace and Cheese” concept, Smootea focuses on expanding strategically and innovating its product offerings, solidifying its presence in the competitive beverage market.

Beyond its beverage offerings, Smootea empowers entrepreneurs through SMOOTEA Academy, an educational arm aimed at fostering the growth of future F&B business leaders. SMOOTEA Academy provides specialized training for aspiring entrepreneurs interested in the food and beverage industry. Its courses cover essential aspects such as crafting unique, viral beverages, sourcing quality ingredients and building sustainable business models. Through these

classes, led by experienced professionals, SMOOTEA Academy not only teaches practical skills but also offers insights into the F&B industry, encouraging students to turn their passion into viable business ventures.

1.1.1 Current Access and Management Process

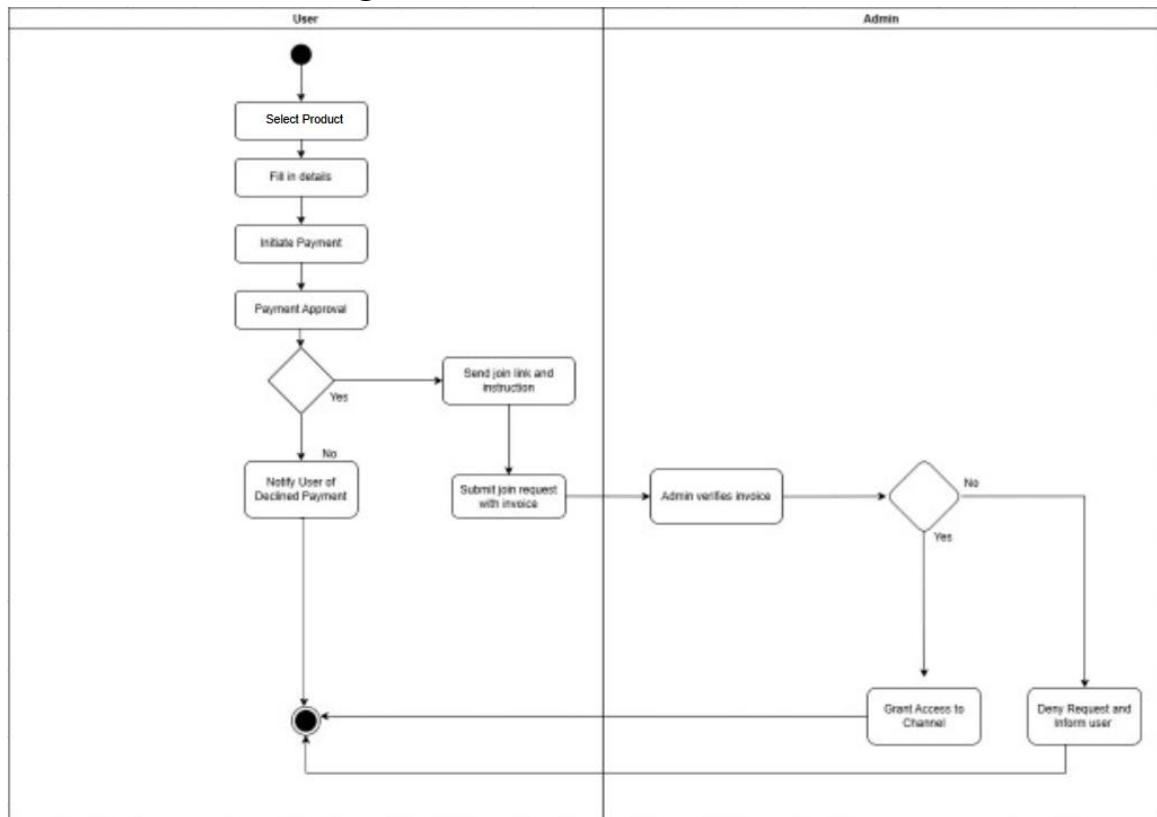


Figure 1.1 Activity Diagram

The purchase and access procedure of SMOOTEA Academy starts with a customer choosing a learning product on the site. After selecting a product, users proceed with filling in their details and then initiate the payment, which then undergoes an approval check. Payment can be made via online banking (Billplz) for automatic confirmation, or by manual bank transfer with a receipt upload. If the payment is approved, the system sends a join link and access instructions via email or WhatsApp, prompting the student to request entry into a private Facebook channel by submitting their invoice number. An admin verifies the invoice, granting access if it is authentic or denying it if not, with notification sent accordingly. If the payment is declined, the system immediately informs the student via email or WhatsApp.

1.1.2 Enterprise Architecture (EA) Modelling - AS-IS Analysis

The current diagram shows the workflow of the class enrollment and material-access in Smootea Academy. It outlines the steps a student follows to select and buy a product, make payment (online or physically), and wait to be approved by the administration before getting access. After confirmation of payment, student can access course materials and attend classes, which are offered as part of standard and premium packages. The diagram also defines the roles of admins, instructors, and other employees, along with the processes through which users can engage with the system using mobile devices or laptops, and the Smootea web site and the database that supports it.

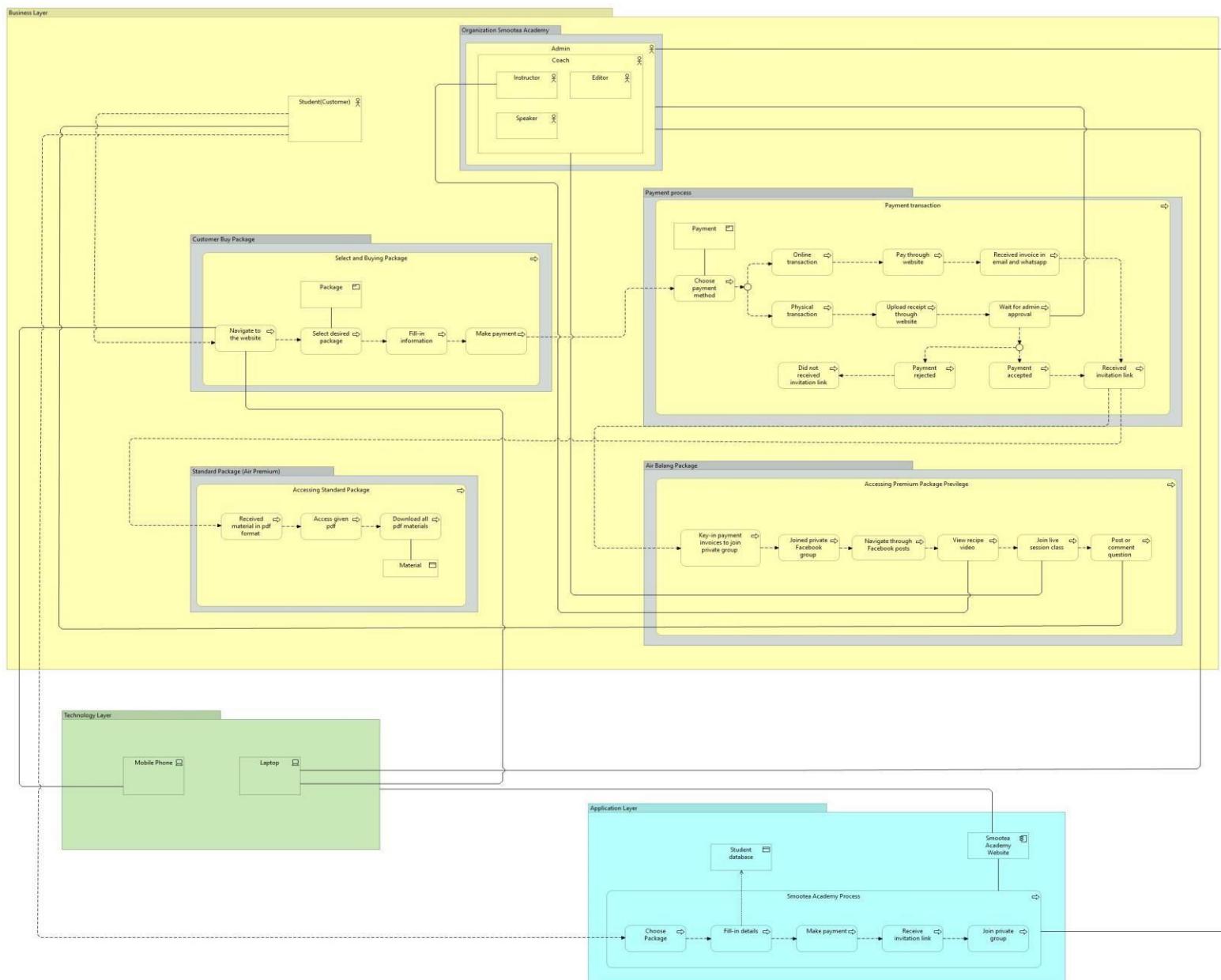


Figure 1.2 Enterprise Architecture (EA) Modelling - AS-IS Analysis

1.2 Problem Statement

Learning access and class enrollment systems are important in today's classroom education. These systems make it easier for the educators to organize the delivery of content and monitor the course material, as well as improving the overall experience.

There are several problem that have been identified:

1.2.1 Static Website Limitation

The interviews with stakeholders and a review of the operations informed that SMOOTEA Academy has no specific, integrated web site to enroll in the classes and receive learning materials at present. Instead, the institution continues to use manual and disjointed processes that are supported by third party platforms such as Facebook, WhatsApp and even simple order forms on a mini site. The students are required to provide payment receipts and personal information repeatedly and the administrators process the transactions and give access manually, which leads to delays, confusion and missed notifications.

Both the students and the administrators have frustrated about the inefficiency and lack of transparency of this system. Learners are unable to follow their progress, safely access learning content, and get updates in time, whereas administrators are faced with the huge task of handling enrollments and records on multiple systems. Such dependence on an external, non-educational instrument weakens the professionalism of the academy, its scalability and the possibility to provide the high-quality learning experience.

Lack of centralized, purpose-built system is the underlying cause of such challenges. The academy will be unable to automate the enrollment process, facilitate the access to materials, and promote efficient learning management without a specific online platform. The current initiative will fill this gap by presenting a safe, scalable, and convenient web-based system that will integrate enrollment, payment verification, content delivery, and progress monitoring, which directly corresponds to the needs of the stakeholders and allows the academy to expand.

1.3 Project Objectives

The objectives of this project were:

- To identify the requirements of a Smootea Learning Access & Class Enrollment

System.

- To design a Smootea Learning Access & Class Enrollment System.
- To develop a Smootea Learning Access & Class Enrollment System.

1.4 Project Scope

SMOOTEA Learning Access & Class Enrollment System is a web-based system designed to be used by SMOOTEA Academy in order to make the process of class enrollment and access to learning materials as simple as possible. The system has two main users, namely, the students who have bought online classes in the academy and the administrators who control the information about the classes and the access of the students.

The system will be an internal system by SMOOTEA Academy via a web browser where students will be able to register and access their respective classes. After registration, the students will be asked to input a unique invoice number that they received during the purchase. The system will check the code with the records that are in the database. When the information is a match, the student will be allowed to access the corresponding class information without any manual authorization by the administrator.

Under this system, the management of all classes are centralised and this leads to less administrative burden and delivery of content to the students at a faster rate. The system will cover user registration and authentication, invoice code validation, role-based access control (student and admin), administration of class and invoice records on the admin side, progress tracking and student dashboards to access the enrolled classes and digital materials. Nonetheless, integration with payment gateways, external social media APIs, automated certificate generation, and live online classes are not part of this project.

This project was developed using the Waterfall methodology, following a structured and sequential process from requirements gathering and analysis, through system design and implementation and deployment.

1.5 Project Significance

The evolution of SMOOTEA Learning Access & Class Enrollment System is of great importance to the efficiency of the operations of SMOOTEA Academy and the experience of its students. In the past, the academy used various third-party systems including Facebook, WhatsApp and Google Drive to manage enrollment, sharing of content, and communication in classes. This disjointed system of work frequently led to misunderstandings, delays in the approval of access and extra workload of administrators that needed to manually approve purchases and control student access to the private groups.

The system also lessens the administrative load by centralising the enrollment and access to learning into one web-based platform. Students no longer have to wait to be approved by someone manually to get access to learning content, they can now simply register and confirm their purchase with a secure invoice code system. This allows access to educational resources quicker and more reliably and makes the learning process more professional and organised.

In the administrative scenario, the SLACES system makes it much easier to administer classes, manage invoices and ease the process of student enrollment because it will have all these tasks on a single, web-based platform. This platform will increase data accuracy, reduce manual workload and will ensure the integrity of invoice codes, therefore, allowing only students with valid invoices to have access to premium learning materials a move that is aimed at not only protecting the intellectual property, but also to maintain the quality of the paid services offered by SMOOTEA Academy.

In general, this system does not only contribute to the digitalization of the academy but also increases its learning environment scalability, security and professionalism.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews literature from existing research on learning management systems which conclude E-Learning and Digital Education Trends.

2.1 E-Learning and Digital Education

Emerging educational platforms and lifestyle brands in the food and beverage (F&B) sector are increasingly turning to online education to expand their reach and develop new revenue streams (Mangaroska et al., 2021). Many of these businesses, initially focused on brick-and-mortar operations, have identified the potential of educational programs to empower entrepreneurs and grow their communities (Patel et al., 2017). By establishing academies or training centers, they provide specialized courses aimed at fostering new talent and enhancing industry-specific skills.

The education system experienced a transformation through e-learning which introduced sessions that offer adaptable formats combined with reduced prices and adjustable scope. The adoption of digital platforms strengthens institutions because they improve student accessibility to learning along with increasing their participation and delivering educational content better. Educational experiences receive substantial optimization through artificial intelligence-based tools and learning management systems (LMS) alongside content management systems (CMS).

Digital education's expansion results from technological progress as well as enhanced internet connectivity together with students' requirement of remote learning solutions. The research shows LMS platforms drive substantial improvements in three key areas of educational institutions which include content delivery, student involvement and administrative process efficiency (Pacheco et al., 2025). Traditional static websites were the prevalent tool in educational institutions before LMS adoption because they prevented dynamic interactions and current content changes. Cloud-based dynamic systems together with their shift have enabled customized teaching experiences and simplified academic resource and student record management (Szabo, 2021).

Educational organizations which adopted e-learning technologies achieved better student involvement while obtaining better content scheduling systems and educator-student

engagement metrics. The LMS platforms automate enrollment functions together with grading procedures and content distribution processes which frees up teacher time for better pedagogical practice development (Abuhassna et al., 2023). Digital tools integrated into the education system create better data management systems that enable efficient resource storage and retrieval and continuous updates when needed (Morze et al., 2021).

LMS and CMS platforms are crucial in modern education as they provide structured content delivery, progress tracking, and tiered access control. Open-source LMS platforms such as Moodle and proprietary solutions like Blackboard have demonstrated their effectiveness in facilitating collaborative learning environments and personalized instruction (Vera Salazar, 2015). Studies suggest that LMS platforms with integrated analytics tools help educators monitor student engagement and adjust instructional strategies accordingly (Trejo Alvarado, 2020).

Despite the advantages of e-learning, challenges such as digital literacy gaps, technical limitations, and engagement barriers persist. To address these issues, educational institutions are increasingly incorporating gamification, artificial intelligence, and adaptive learning technologies to enhance student motivation and performance (Zhou et al., 2021). Research also highlights the growing trend of hybrid learning models that combine digital and face-to-face instruction to offer more flexible and effective learning experiences (Hamilton, 2021).

In conclusion, e-learning continues to transform education by providing accessible, interactive, and efficient learning environments. The evolution of digital platforms, coupled with advancements in LMS and CMS technologies, has significantly contributed to the enhancement of academic experiences for both educators and learners.

2.2 Business in Digital Learning

The rapid integration of digital technology into education has significantly transformed business education, leading to the emergence of various digital learning strategies and tools. The demand for adaptable, scalable, and accessible learning platforms has driven institutions to adopt innovative pedagogical approaches that facilitate engagement and enhance learning outcomes (Ng et al., 2023).

Learning Management Systems (LMS) alongside simulation software as well as collaboration platforms and gamified learning modules represent digital technologies which have gained widespread recognition to support business education. Through these tools students gain access to an immersive and efficient learning space that lets them put theory into practice (Liu, 2023). Studies prove that these digital platforms enable students to understand and remember complex business topics including finance and marketing and strategic management (Mariam, 2023). Various investigations show that educational tools such as Nearpod and Padlets along with Zoom breakout rooms prove successful in strengthening student engagement in remote business education environments. The inclusion of such educational tools within blended learning approaches leads to enhanced academic results together with increased student contentment (Navío-Marco, 2024).

Despite the widespread adoption of digital tools, several challenges persist in online business education. Digital literacy gaps among students and educators remain a significant barrier to the effective implementation of interactive learning resources (Lin & Ironsi, 2024). Additionally, online learning environments often struggle with issues of student isolation, lack of motivation, and difficulty in maintaining long-term engagement (Ng et al., 2023).

Studies indicate that merging business simulations with real-world applications within digital learning platforms helps resolve several of these existing issues. Business simulation games according to Loon, Evans and Kerridge (2015) improve student engagement through an environment that allows theoretical concept application in real-world business scenarios without risk. Current research puts a high priority on investigating how well blended learning performs as an educational method for business courses. A new learning approach called blended learning connects traditional classroom instruction to digital online tools to result in better student engagement along with improved educational results for business management students (Mariam, 2023).

Researchers studied blended interactive educational resources' effects on business education students through digital platforms and reported that these digital tools showed better results when integrated into disciplined instructional arrangements. Student learning reached its maximum potential through digital tools used collectively instead of depending solely on one platform according to Zhou (2025).

As digital learning continues to evolve, further research is needed to explore the long-term impact of interactive educational tools in business education. Future studies should examine how emerging technologies such as artificial intelligence, virtual reality, and blockchain can further enhance business learning environments (Parida et al., 2023). Overall, the literature indicates that while digital learning tools have significantly transformed business education, continuous innovation and improvements are necessary to address existing challenges and optimize learning outcomes.

2.3 Digital Learning Trends in Malaysia.

Digital learning has become an essential component of modern education, offering accessibility, flexibility, and a wide range of learning materials to users across Malaysia. The significance of this trend increased dramatically during the COVID-19 pandemic, as they facilitated continued education during lockdowns and restrictions (Szabo, 2021). This literature review explores the concept, functionality and effectiveness of digital learning platforms, citing relevant authors and studies.

Digital learning are digital environments designed to facilitate learning by providing educational content, interactive features and assessment tools. These can host a variety of courses across multiple disciplines, allowing users to access educational resources from any location (Naik & Shivalingaiah, 2009). Learning systems typically incorporate tools for content creation, management, and delivery, addressing the needs of diverse learners.

The evolution of digital learning can be traced to the early 2000s, but their widespread adoption occurred in the last decade, driven by advancements in internet technology and digital tools (Szabo, 2021). Major platforms such as Coursera, Udemy, edX, and FutureLearn emerged as leaders in the sector. Coursera, founded in 2012, partners with top universities and organizations to offer courses in various subjects, while Udemy allows industry professionals to create and sell their own courses (Szabo, 2021).

Digital learning plays a crucial role in modern education, offering flexible, cost-effective, and diverse learning opportunities. Their importance was underscored during the COVID19 pandemic, and their continued growth suggests a lasting impact on the educational landscape. Future research could explore strategies to enhance engagement and bridge the digital divide.

2.4 Static vs Dynamic Website

The two main types of websites are static and dynamic. The understanding of these website categories proves essential to creating web-based development projects.

2.4.1 Static Website

Static websites are composed of fixed web pages that do not change dynamically and are primarily built using HTML and CSS (Tomiša et al., 2019). These websites are pre-designed and can be accessed without server-side data processing, making them relatively simple to develop. Due to their minimal resource usage and fast loading times, static websites are cost-effective (Tomiša et al., 2019). This web solution lacks two crucial features which result in limited user interaction and no capability to create tailored content based on user choices (Dias & Ferreira 2017). Conversion or addition of new content to large applications proves difficult for maintenance because source code requires manual alterations according to Dias and Ferreira (2017). Static websites do not work for applications which need real-time content changes and user-driven activities (Tomiša et al., 2019).

2.4.2 Dynamic Website

The differentiating factor between these platforms is that dynamic websites produce content through user-driven actions and database storage (Dias & Ferreira, 2017). Web applications with interactive data-drives functionality become possible through the combination of PHP and MySQL technologies together with WordPress and other CMS solutions (Tomiša, 2019). The user experience becomes stronger through interactive features enabled by dynamic websites (Dias & Ferreira 2017). These websites show updated content that suits each user's profile automatically (Tomiša, 2019). The management of educational platforms benefits from dynamic websites through their implementation of role-based access control systems (Dias & Ferreira, 2017). Features such as performance tracking dashboards and automated content delivery systems contribute to a more engaging and effective learning environment (Dias & Ferreira, 2017). Therefore, for educational and large-scale digital platforms, dynamic websites provide superior functionality and scalability compared to static alternatives (Tomiša, 2019).

2.5 Advanced CMS Features for Education

These additional CMS features may greatly contribute learning effectiveness or personal organization, effective interactions and tailored instruction. CMS systems are presented as the main solutions for maintaining the efficient content management in the online context. Some of the functions, for example, the presence of structured work in tables and opportunities for interactivity, correspond to the requirements of an academy.

2.5.1 Content Delivery Optimization

Content delivery optimization is one of the critical characteristics of the current CMS platforms, which confine educational materials and keep them organized. CMS tools comprise rules, processes and workflows supported centrally for the effectiveness of content management. This type of structures is most effective when used to sort the content based on user privileges or membership level. For instance, providing a set of links available for new users, another set for middle rank users and the third one for high-ranking users. This is in line with how an academy can serve tiered access of materials to different levels of students.

Another indispensable component of CMS tools is the tracking of the progress. This is because elements such as document control and auditing can be used effectively to track learners progress. They grant users an ability, and flexibility to create goals for the learning process, to monitor one's progress, and to fulfil objectives, thus providing users with the feeling of accomplishment.

2.6 Comparison of The Existing System

An analysis of the available learning systems Google Classroom, UiTM uFuture, Udemy, and MC Plus (Tuition Model) shows the difference in online learning. Google Classroom and UiTM uFuture provide organised settings of formal academic learning that focus on assignment management and integration with institutional resources. Udemy is also highly flexible and offers a great variety of self-paced courses that address various learners and topics. MC Plus which is based on a tuition model is dedicated to individual guidance and student progress monitoring. The two systems have distinct advantages and shortcomings regarding user experience, content availability, and administrative control, which is used to inform the development needs of a better centralized solution.

2.6.1 Google Classroom

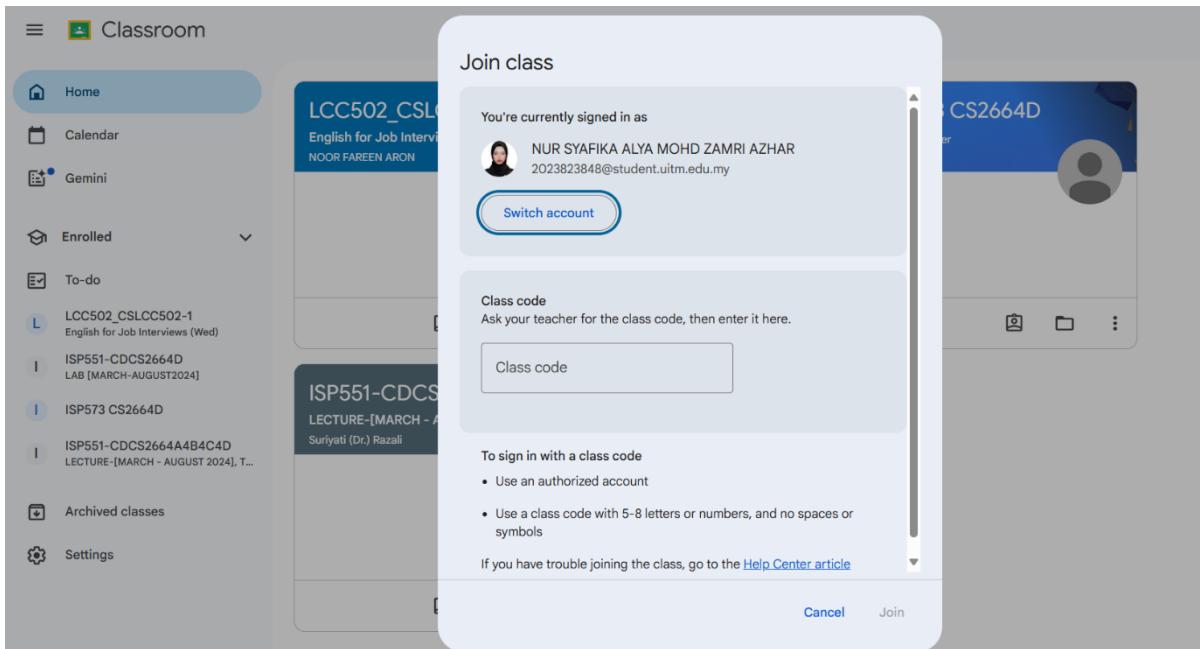


Figure 2.1 Google Classroom User Interface

Google Classroom is a cloud-based learning management system developed and released by Google in 2014 to make it easier to manage a digital classroom (Desai, 2014). It is also closely connected to Google Workspace (Drive, Docs, Forms, Meet) where teachers can create several virtual classes, put assignments and materials there, and students can access them and submit work (Desai, 2014). Students sign in using a Google account and join a course through a link supplied by a teacher, an invite email, or by entering a special class code. When in a class, the interface will have a Stream (announcements and discussions) and Classwork tab (organized assignments and resources). The most important UI functions are the real-time collaboration of documents, automatic sorting of student submissions in Google drive folders, quizzes and grading tools (Desai, 2014). All in all, the simple and user-friendly interface of Google Classroom enables an instructor to send out announcements and assignments to the central location where students read the materials, follow, and monitor their grades (Google LLC, n.d., Desai, 2014).

2.6.2 UiTM UFUTURE

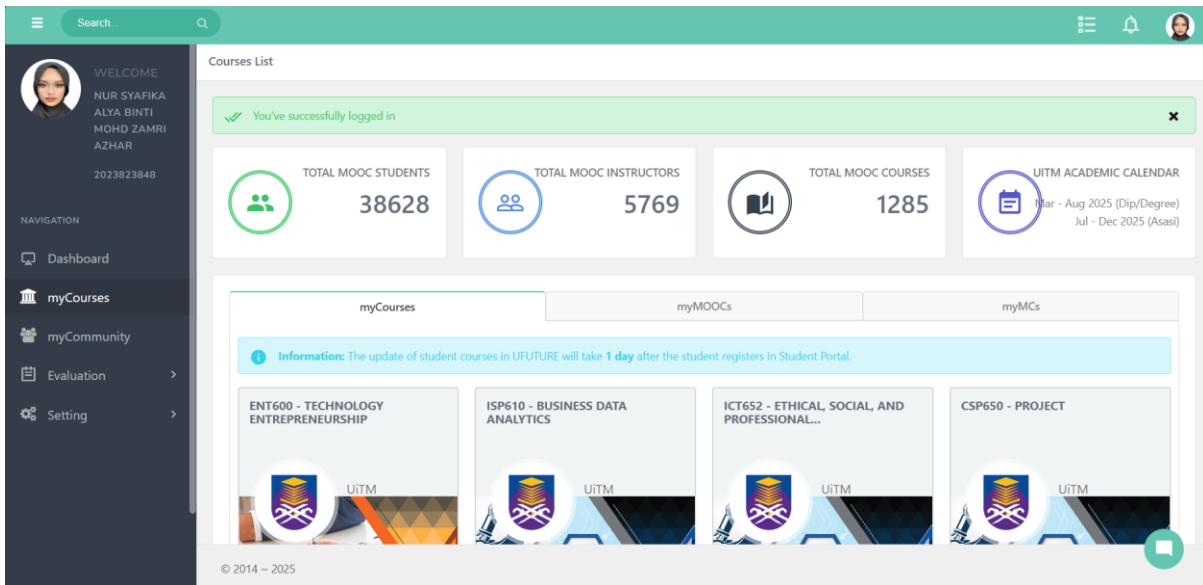


Figure 2.2 UiTM UFUTURE User Interface

The UFUTURE platform is a self-developed LMS and MOOC portal by Universiti Teknologi MARA (UiTM) to provide UiTM courses and open online courses to its students and beyond (Ghafar et al., 2023). The users of UiTM can use the campus single-sign-on (i-Student or i-Staff portal) to log in, but outsiders are required to fill a registration form with their role and institution. Upon authentication, learners can navigate or search the course catalog the homepage has a search bar and menus of UiTM Courses, UiTM MOOCs, Micro-Credentials, etc. When a course is clicked, its details are displayed and a Join or Enroll button appears (in the case of most UFUTURE courses, they are open-access MOOCs, and therefore the user just clicks to join). The UI features categories and featured courses (with thumbnail images and titles). A help based on chat helps navigation. Lecturers are provided with pages where they can post contents and students are given a dashboard where they can see their courses. Overall, UFUTURE is a typical university LMS where it unifies course listings, course material and communication resources in a single web portal that is easily accessible.

2.6.3 Udemy

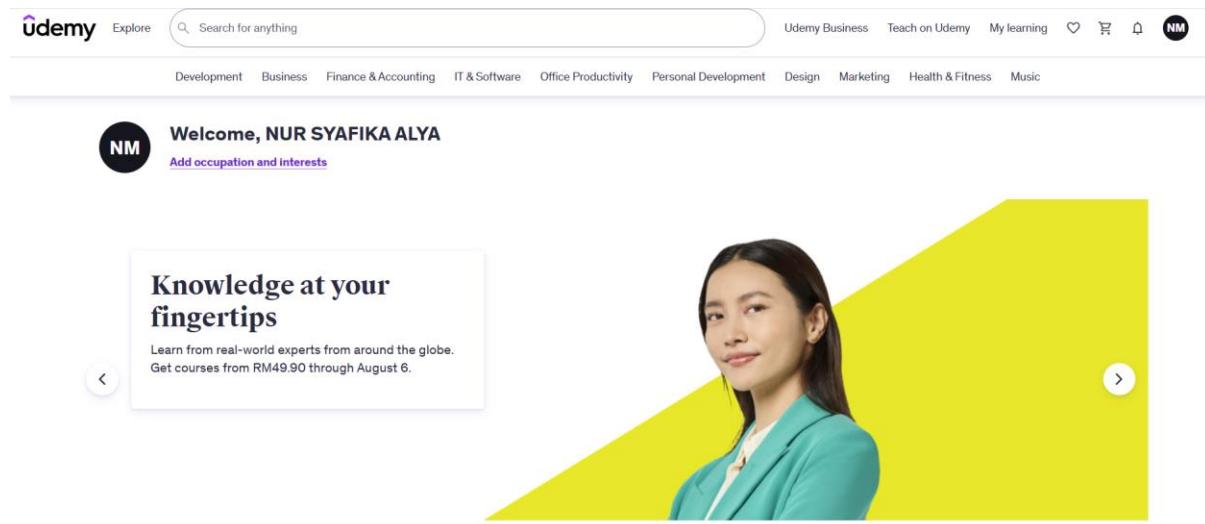


Figure 2.3 Udemy User Interface

Udemy is a massive open online course marketplace as opposed to an institution-specific learning management system. It offers hundreds of thousands of video-based courses that span over many disciplines, including programming, business, foreign languages, and so on. According to the statistics recorded by Shah et al. in 2024, the platform has about 262,000 courses and over 75 million registered users across the world. Any Internet user can create a Udemy account without paying and, by making a purchase, access any course (although many are paid, some courses are free or discounted). No traditional class codes or group enrollment systems are used, but rather enrollment is through a standard e-commerce shopping-cart process. Once the course is enrolled on, the modules are made accessible in the learner under the section of My Courses. The user interface of Udemy is similar to that of a commercial online retailer: a user can find courses either by search or by browsing categories, view detailed pages about each course with lists of lecture materials, and enroll by clicking an Enroll button. In the courses, lectures are given in a sequential sidebar playlist. The lecture materials can include videos or text-based articles with quizzes embedded in them and additional files that can be downloaded. The other interface features are a specific Q&A board that allows the instructor and the students to communicate, note-taking features, progress monitoring systems, and the provision of certificates once the course is complete. Udemy is available on the web and through mobile apps, both of which allow streaming videos, offline video playback and bookmarks. Overall, the design priorities of Udemy focus on the ease of discovery (search filters, consistent category structures) and linear, course-based structure of content delivery.

2.6.4 MC Plus

The screenshot shows a web-based user interface for creating a student profile. At the top, a red header bar contains the text "Student Profile". Below this, a section titled "Student Information" includes fields for "Full Name", "IC No./Identification ID", "Level" (with a note: "*Fill in without * symbol"), and "Hp. No.". There are two radio buttons for gender: "MALE" and "FEMALE". A "Submit" button is located at the bottom right. The footer of the page displays the text "MC Corporate Consultant Sdn Bhd".

Figure 2.4 MC Plus User Interface

MCPlus is the largest online tuition service in Malaysia (MC Corporate Consultant Sdn Bhd) of school subjects (Year 5 to Form 5). It also provides timetabled live lessons and recorded lessons in the national curriculum, including 12 core subjects at primary to secondary levels. Students have to register with MCPlus by creating an account through the site by providing their email address and a password. On logging in, students have access to the course schedules (a timetable) and can attend online classes of the enrolment which is usually per class or package and is usually paid or at times on trial. The home user interface is mainly promotional and shows tutor profiles, student counters and partner logos and focuses on the idea of a classroom without walls. The most important interface components of enrolled users are a class schedule and a virtual classroom interface (not visible to the outside world). Essentially, the MCPlus interface resembles a portal of a tuition center- it is simple (log in, choose class) and has a big menu bar to show the timetable, log in and detailed subject listings.

2.6.5 Table Comparison of The Similar System

The tables shown are the comparisons for structural and functional features of the similar system

Table 2.1 Comparison of The Similar System

Feature / Aspect	Google Classroom	UiTM uFuture	Udemy	MC Plus (Tuition Model)
Target Audience	School students	UiTM students	Public learners (global)	Tuition students (Malaysia-based)
Enrollment Method	Class code (shared)	Auto via iStudent	Auto after purchase	Registration form + payment
Access Control	Code can be shared	Centralised login	User login + auto-grant	Verified manually by staff (IC)
Automation Level	Manual join by students	Fully integrated	Fully automated (email-based)	Partially automated (paid), trial = manual
Admin Involvement	Create class + approve	Maintains courses	Instructor dashboard	Creates Zoom links, verifies trial manually
Communication Tools	Built-in comments	LMS messages	Internal system messages	WhatsApp, SMS, Email, Telegram
Payment Integration	Not supported	Centralised via portal	Built-in, full payment flow	eWallet/FPX for paid classes
Customisability	Fixed interface	Institutional control	Limited (hosted platform)	Limited (for tuition model only)
Unique Element	Simple class code	LMS features (quizzes, etc.)	Course marketplace	ID verification for trial access
Learning Content Access	After join via code	Timetabled content	Instant after payment	After login approval or payment
Time to Access	Immediate after code	Immediate (once enrolled)	Instant	Trial: delayed by verification

2.7 Software Development Life Cycle (SDLC)

Software Development Life Cycle (SDLC) can be described as a business technique that is broken down into small stages for software system development. It guarantees the right management throughout the development process in addition to reducing risks of development and at the same time improving the quality of the system. When it comes to designing the Smootea Learning Access & Class Enrollment System it is paramount to determine the right SDLC model to adopt to facilitate project development and accommodate all the system needs.

a) Planning

Indeed, the planning phase is when the goals of the project are set and the system needs are analyzed. Pre-feasibility studies are made to assess the practicability, efficiency and appropriateness of the project to the organization's goals.

b) System Analysis

When the system analysis comes into focus, user requirements are collected to identify the development environment. This stage ensures that the knowledge acquired is about the system environment's operating capabilities, utilization and potential hitches.

c) System Design

The system design segment is the development of a system that will promote the layout of a graphical user interface, the designing of the database and other system entities. Here, detailed design specifications' main function is to act as a road map to the developers when implementing a particular system.

d) Implementation

In this phase, the developers type all the code of the system in, in compliance with recommended and standard encoding practices. This stage transforms the systems design developed in the previous stage into an operating software system.

e) Testing

Testing is done to expose functional or performance problems that may prevail with a program or system. To attain reliability, accuracy and to verify that it meets the required specifications, the system passes through different test phases.

Deployment

2.7.1 Waterfall Methodology

Waterfall is an old fashioned, linear SDLC whereby development is carried out in a series of discrete steps (requirements analysis, system design, implementation/coding, testing and maintenance). One phase has to be completed before the other one starts. This sequential procedure imposes elaborate pre-planning and reporting. As Diansyah et al. (2023) note, waterfall offers more structure and clarity to projects that have stable and clearly defined requirements. It has the benefits of having clear milestones, comprehensive documentation and simpler tracking of progress and thus it is appropriate in cases where changes are not expected (Diansyah et al., 2023). The rigidity of waterfall is however a big disadvantage. It is difficult to incorporate late changes: Mishra and Alzoubi (2023) refer to it as being rigid and inflexible to changes. The testing and customer feedback are very late (at end of development), and thus defects or requirement mistakes may only appear after the bulk of the work. Agile techniques, in contrast, are based on short iterative cycles and constant customer interaction, which enables the changing requirements to be managed without any trouble. According to Diansyah et al., Agile and Scrum are very adaptive to changing needs, as opposed to waterfall, which focuses on a rigid plan. To conclude, the discipline and clear plan of waterfall are appropriate in projects with fixed scopes (Diansyah et al., 2023), whereas the rigidity and slow feedback of waterfall yield to more risk and low response time than more flexible Agile methods (Mishra & Alzoubi, 2023).

2.7.2 Agile Methodology

Agile methodology is a lightweight, iterative, or process of software development and project management. It divides projects into brief iterations (usually referred to as sprints) of a few weeks, during which working software is released at the end of each iteration. Agile teams focus on cross-functional teamwork and quick adaptation to change. As an example, Behrens et al. (2021) define Agile project management as an iterative process that encourages customer

involvement, adapts to change, and creates a functioning product Omonije (2024) points out that Agile replaces the focus on rigid upfront planning with adaptive collaboration and continuous improvement where iteration takes precedence and teams build value in increments. The most important Agile concepts are: delivering in small, incremental iterations, active collaboration with customers, and responding to changing requirements. Agile teams in practice often engage users and stakeholders in planning and reviews and refine scope each cycle. Agile emphasizes the focus on the needs of the customer, with small releases more often than large ones, cross-functional teams, and communication (as opposed to heavy documentation). According to Al-Saqqa et al. (2020), Agile methods can be characterized as lightweight, iterative, and faster development that well-adapts to change due to a focus on people and interaction. Agile has gone mainstream in software development. According to industry surveys, organizations implement Agile primarily to accelerate delivery, improve the management of changing requirements and enhance productivity. According to Behrens et al. (2021), a report published in 2020 revealed that the acceleration of software delivery, as well as managing changing priorities and increasing productivity, were the top adoption drivers. Omonije (2024) also notes that the main concepts of Agile, initially developed in software engineering, have been adapted to numerous spheres, which attests to its flexibility outside of IT.

2.7.3 Comparison of the Approaches

The tables shown are the comparisons for the approaches model which is waterfall, agile and spiral.

Table 2.2 Comparison of the Approaches

Aspect	Waterfall Model	Agile Model
Development Approach	Sequential, structured	Iterative, flexible
Process	Phases (planning, analysis, design, implementation, testing, maintenance) are completed one after the other	Development in small, incremental cycles (sprints)
Ideal For	Well-defined projects with minimal changes	Projects with evolving requirements and high stakeholder involvement
Flexibility	Low (difficult to accommodate changes once started)	High (accommodates frequent changes and feedback)

Documentation	Comprehensive documentation at each phase	Minimal documentation, focuses on working software
Risk Management	Risk is typically addressed at the beginning, with little flexibility for changes	Risks are addressed incrementally through constant feedback
Time & Resource Efficiency	Can be less resource-intensive but may take longer if changes are needed	Time-consuming and resource-intensive due to continuous testing and iteration
Stakeholder Involvement	Limited after requirement gathering phase	High, as continuous feedback from stakeholders is crucial
Suitability	Suitable for projects with well-defined objectives and minimal changes	Not ideal, as constant feedback and iteration may not be needed

2.7.4 Reason for Choosing SDLC and Waterfall Model

The development of the Smootea Learning Access & Class Enrollment System utilizes the Waterfall Model mainly because its step-by-step methodology match well with both the project's detailed objectives and well-defined scope. The Waterfall Model works best for systematic development because the system serves academic functions with defined specifications and minimal projected changes to the project. The framework continues development steps from planning through requirement analysis through design through implementation through testing and finally to maintenance until all phases receive proper focus.

The Waterfall Model provides extensive documentation through all phases of development because this detailed record enables better system maintenance throughout its lifecycle. SMOOTEA Academy objectives together with scheduling needs become easier to meet through the extensive documentation process. Step-by-step execution in the Waterfall Model helps reduce inconsistencies that might emerge from altered requirements because the project exists within the academic environment which requires fixed objectives and a clear roadmap.

The Waterfall Model allows easy progression management due to its requirement of finishing each development phase before proceeding to the next stage. The requirements of SMOOTEA Academy match this approach because it demands a systematic documented system for both

current implementation and future scalable development that requires minimal changes and restricted flexibility.

2.8 Summary

The Development of Smootea Learning Access & Class Enrollment System is aimed at introducing changes to the technical environment of the academy, because a static web site has several flaws that contradict modern needs. The integration of a professional opensource Content Management System (CMS) for learning material support is a key component in the proposed solution's approach to creating a dynamic, highly usable, easily upgradable learning management system. The system specific components will include Role base authorizations, Real time updates, Personalization of content, Modularity and User interface. All these are intended to automate the processes employed by administrators and address the needs of the academy as it expands. Most importantly, the platform will take advantage of the current and advanced CMS features including metadata, versioning and fun-based learning tools. Due to such issues as poor organization of content, little or no access control and limited interaction with users in particular, this project can place an academy a step ahead in its field. This system is essentially a long-term end-to-future growth solution for an increasingly high-tech efficient and user centered learning management environment.

CHAPTER THREE

PROJECT METHODOLOGY

This chapter explained the project methodology describing the method that the researcher applied in this project. This chapter will also describe tools and activities and explain how the objectives will be achieved that was stated in the first chapter of this research study.

3.1 Overview of Project Methodology

The proposed system has been developed using the waterfall model, which follows a sequential and structured approach. This project therefore accomplished in four phases and each phase would involve the development of this system. The waterfall model was chosen due to the comprehensible, step-by-step structure, which was less likely to develop chaos during the project.

The development of the Smootea Learning Access & Class Enrollment System has followed a few phases. The phases are requirements gathering and analysis, system design and implementation. Figure 3.1 below shows all phases involved in this development.

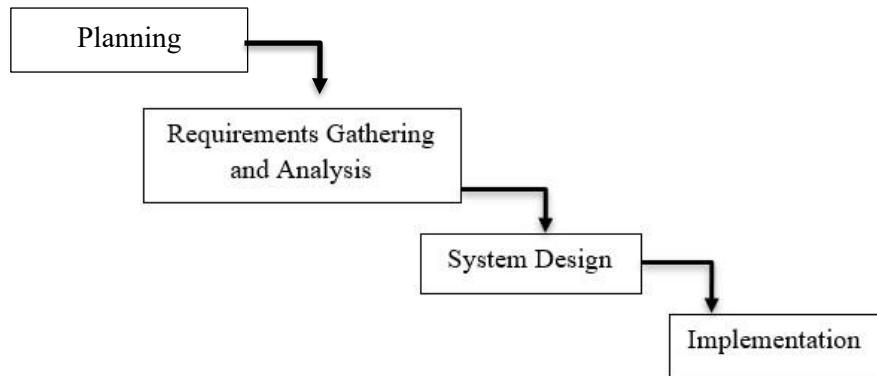


Figure 3.1 Waterfall Model

Overview Of the Phases Involved in This Project

Table 3.1 Project methodology & approach table with each activity's deliverables and objectives

Phases	Activities	Deliverables	Objectives
Planning	<ul style="list-style-type: none"> - Define the project background. - Identify flaws in the current system - Review current academy processes (Facebook group) 	<ul style="list-style-type: none"> - Activity diagram - Enterprise Architecture of Business Model 	RO1- To identify the requirements for the Smootea Learning Access & Class Enrollment System.
Requirements Gathering and Analysis	<ul style="list-style-type: none"> - Conduct stakeholder interviews - Analyse data from interviews and review - Identify system requirements and user needs 	<ul style="list-style-type: none"> - Objectives - Problem statement - Project significance - Scope - Software Requirements Specification (SRS) 	
System Design	<ul style="list-style-type: none"> - Design and specify GUI design principles for usability - Design system structure with modular architecture - Document Software Design Document (SDD) - Design dashboard structure plan 	<ul style="list-style-type: none"> - System use case and use case descriptions - Domain class diagram - Activity diagram - Sequence diagram - Dashboard structure - System UI prototype - Software Design Document (SDD) 	RO2- To design the Smootea Learning Access & Class Enrollment System.
Implementation	<ul style="list-style-type: none"> - Implement system code 	<ul style="list-style-type: none"> - Fully operational system 	RO3- To develop the Smootea Learning

	- Integrate admin management, features and dashboards		Access & Class Enrollment System.
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In the requirement gathering and analysis process of the project, collaboration was conducted with SMOOTEA Academy to establish its needs. This involves collation of all the information that is required to define the objectives of the project relative to the overall vision of the academy of improving the content delivery to users. Despite the inherent weakness that is also highlighted, the analysis largely fits into the goal of meeting the needs of both students and administrators through the consideration of important features targeting tiered access, organization of content and interaction of the user.

This activity involved preparing a detailed project plan, starting with the definition of project activities, the time taken to complete all the development phases, target set apart from the human and material resources required to accomplish each phase. That aligned these activities with the Waterfall model enabled the development of a systematic approach in the design and implementation of the strong learning access & class enrollment system of SMOOTEA Academy with consideration to the existing challenges and for future expansion.

3.1.1 Planning

The Planning Phase stands as the essential fundamental starting point for developing the Smootea Learning Access & Class Enrollment System. This phase involved defining the project background, identifying flaws in the current system, and reviewing current academy processes such as the Facebook group to inform the direction and scope of the project.

The enterprise architecture design depicted the present operational format of SMOOTEA Academy and shows how the new system will work with existing business workflows. The Activity Diagram provided visual representation of essential system processes to ensure efficient system functionality among other diagrams. The deliverables for this phase are the Activity Diagram and Enterprise Architecture of Business Model.

3.1.2 Requirement Gathering and Analysis Phase

This phase involves stakeholder interviews, review of current academy processes, and identification of user needs and system requirements. The main deliverables are the objectives, problem statement, project significance, scope, and the Software Requirements Specification (SRS) document. This addresses RO1. Further quantitative data was also collected through the interview with pre-identified leads on user preferences, system problems and issues faced, kind of features should be added. To get more grounded view, permission to join academy's closed Facebook group was received which gave an opportunity to watch the content delivery process and users' engagement as well as see the limitations of the system. These activities provided insight into the current operations of the academy and help to formulate a clear and detailed project proposal which includes, objectives, goals, resources and time frame required for this project. This phase reassured execution of the project in accordance with the desired vision of the SMOOTEA Academy, that is improvement of content presentation and user interaction and usability.

The analysis of evaluating responses from the open interviews conducted with the stakeholders, review and analysis of the private Facebook channel. Some disadvantages of the current system included the organization's inability to provide structured content, tiered access and low users engagement and all these flaws were considered essential in defining the critical areas of concern. Also, flow requirements which refer to customizable interface, the ability to track advancements were established to address these challenges. Other requirements, for example, system scalability, security and usability were also defined to enable future system growth. The user needs were matched to system features with an eye on possible risks and the foundation for coming up with a solution to meet the operational and educational goals of the academy was laid.

3.1.3 System Design Phase

The Design Phase converts requirements into a system blueprint emphasizing usability and modularity. Key activities include specifying GUI design principles, documenting the Software Design Document (SDD), preparing the dashboard structure plan, and creating diagrams (use case, domain class, activity, sequence) and a system UI prototype. These deliverables fulfill RO2.

Use Case Diagrams, Domain Class Diagrams and Activity Diagrams were drawn with the tools draw.io and PlantUML extension in StarUML. These diagrams assisted in visualizing the way the things in the system are connected and work.

3.1.4 Implementation

The Implementation phase process involved the actual creation of the system in followed the specifications that had been made. It ranged from database construction, code writing and connecting diverse parts of the program. Visual Studio Code was used as the coding system for the development of the program and MySQL and phpMyAdmin was used in the management of the database. The code for the system was written utilizing standard practices in the ability to code as well as in the ability to maintain and scale the resulting code base.

Built-in components like real-time dashboard and real-time progress status were other areas considered in the development. This ensured the components met the requirements highlighted during analysis. The database was also designed and the tables filled with test data for effective content management for users. During implementation, therefore, there was a consideration of the principles of modular development to enable future improvements and easier maintenance.

To highlight functional or performance problems that may have arisen internally, there were tests on its components to ensure that they seamlessly provided optimal functionality as expected by the academy. This phase meant a shift from the ideas on paper to a workable system chipping to indicate a state that is viable for all round testing and implementation.

3.2 Hardware Requirements

Table 3.2 a list of all the software that is used comprehensively in developing and in making projects.

Table 3.2 Hardware Requirements

No.	Hardware	Details
1.	Laptop	Device name: alya Processor: Intel(R) Core (TM) i5-1035G1 CPU @ 1.00GHz 1.19 GHz Installed RAM: 12.00 GB Device ID: 9A8527F1-068A-40F2-873C-971A17EA747D Product ID: 00327-30878-76596-AAOEM System type: 64-bit operating system, x64based processor Pen and touch: No pen or touch input is available for this display
2.	Mouse	Logitech wired mouse

3.3 Software Requirements

Table 3.2 a list of all the software that is used comprehensively in developing and in making projects.

Table 3.3 Software Requirements

No.	Software
1.	WhatsApp Messenger
2.	Microsoft Words
3.	Facebook
4.	Windows 10
5.	Draw.io
6.	Microsoft Edge
7.	Visual Studio Code
8.	MySQL

9.	Apache HTTP Server
10.	GitHub
11.	Laravel Framework
12.	StarUML
13.	phpMyAdmin
14.	Laragon
15.	Git

3.4 Summary

This chapter described the process of the development of the SMOOTEA Learning Access & Class Enrollment System. It started by defining the scope and objectives of the project in line with the operations of SMOOTEA Academy. The needs were identified by interviewing and studying the current system based on Facebook. Such important problems as the access to classes by hand and the absence of a structure were determined.

Diagrams and modular architecture were then used to design the system that would be clear and scalable. The development was performed with the help of Visual Studio Code and SQL Developer, and such important functions as the enrollment based on the invoice and the role-based dashboards were added. This systematic process saw to it that the system was functional and also satisfied the expectations of the users.

CHAPTER FOUR

RESULTS AND FINDINGS

This chapter explains how the researcher interpreted, organized and concluded the data gathered in the design and development stage of the Smootea Learning Access & Class Enrollment System. Results and findings are explained in detail to indicate the choices taken during the requirement analysis.

4.1 The requirement of Smootea Learning Access & Class Enrollment System

The primary goal of the requirement gathering of this project is to gather appropriate information regarding the real needs of the system administrator (SMOOTEA team) and the users of the system (students). These requirements are divided into two broad categories, namely functional and non-functional. Functional requirements are those needed functions that the system must hold to facilitate the core functions of the system like user registration, invoice code validation, class enrollment, content access and the management of classes by the admins. Non-functional requirements are concerned with such features as user-friendliness, access control, system security, and mobile responsiveness. This section is subdivided into two parts: the first part describes the requirements on the basis of the interviews with key stakeholders, whereas the second part provides the summarized version of the findings in the form of a table to make it easier to understand and comprehend.

4.2 Analysis of Smootea Learning Access & Class Enrollment System

The stakeholder interviews were done in a form of a requirement analysis of the Smootea Learning Access & Class Enrollment System via WhatsApp, phone calls, and face-to-face interviews. The researcher designed a list of interview questions in a Microsoft word document, which the stakeholder responded to directly depending on the current practice in the operations.

This started as early as January 2025 and would be followed up regularly during the system planning phase. The last discussion was held on 16 June 2025, when additional clarification and refinement of requirements were collected. These interviews were meant to determine the functional and non-functional requirements of the system, particularly the features that would facilitate the enrollment process of students, automate class access via invoice codes and enhance the delivery of the content.

There was a discussion of the drawbacks of the existing manual process through Facebook and WhatsApp, and what a centralized platform could do to make it easier to manage a class.

The feedback that was gathered during this time was used as the basis of defining system features, use cases, and interface design of both the admin and student roles.

4.2.1 Analysis Study

This section shows the findings of the requirement gathering exercise of the Smootea Learning Access & Class Enrollment System. The answers given by the stakeholder were analyzed and grouped into functional and non-functional requirements. These results were discussed and organized according to the general workflow of the system and the roles of its users.

- Functional Requirement:

Table 4.1 below shows the functional requirements that were identified in this study. They are the fundamental characteristics required to facilitate major activities like student enrolment, access to classes and administration. The table provides an overview of the questions posed, answers obtained and the way in which each input was converted to system requirements.

Table 4.1 Analysis of Functional Requirement

Interview Question	Stakeholder Response	System Requirement	Feature Summary	Question ID
Would tagging content by class/type help improve organization?	Yes, tagging would make it easier to locate content, especially if issues arise.	Content Tagging [R01]	<ul style="list-style-type: none">• Tag by class• Tag by class or content type	Q35
Do you want to be able to search for content/classes by keyword or tags?	Yes, searchability would improve efficiency.	Search Feature [R02]	<ul style="list-style-type: none">• Keyword search• Filter by tag	Q37

Should the system notify you of pending tasks like unposted content?	Absolutely. Automated alerts are essential.	Dashboard overview [R03]	<ul style="list-style-type: none"> View recent enrolled student and pending invoices. 	Q38
Where do you currently store class content?	Most materials are stored in Google Drive.	Content Storage Integration [R04]	<ul style="list-style-type: none"> Upload system to replace Google Drive 	Q32
Would a centralized place to manage enrollments help?	Definitely. Makes everything faster.	Invoice Management Page [R05]	<ul style="list-style-type: none"> View student-invoice-class list Approve/manage easily 	Q53
How do you enroll students now?	Students submit invoice, admin manually confirms.	Invoice Verification Module [R06]	<ul style="list-style-type: none"> Upload invoice manually Match with email 	Q51
Can you describe the workflow of your company?	Admins are responsible for creating class offerings, uploading materials, and managing content delivery.	Class Material Management [R07]	<ul style="list-style-type: none"> Upload video, PDF, or link Assign material to specific class Edit or delete materials Filter by class or material type Preview materials 	Q9
What kind of report is useful?	Active student count, engagement, attendance.	Analytics & Report [R08]	<ul style="list-style-type: none"> View stats per class 	Q45

Would you benefit from a visual dashboard of active classes & student access?	Yes. Dashboard helps monitor and make decisions.	Admin Dashboard Overview [R09]	<ul style="list-style-type: none"> • Class overview • Enrollment count 	Q47
How do students gain access to class after payment?	After payment, students are given access instructions via WhatsApp or email. Then they submit invoice.	Enrollment Step [R10]	<ul style="list-style-type: none"> • Input invoice after register • System matches invoice with student email 	Q10
What common issues do students face using Facebook-based class access?	Can't access links / waiting for manual approval frustrates them.	Class Access Flow [R11]	<ul style="list-style-type: none"> • Remove broken links • Grant instant access if invoice valid 	Q18
What's the top thing that would benefit students in a new platform?	Easier content access is top priority.	Class Dashboard [R12]	<ul style="list-style-type: none"> • Simple “View Class” button • Email and code must match 	Q73
What features would students like: dashboards, reminders?	Yes. Helps them stay on track.	Student Dashboard [R13]	<ul style="list-style-type: none"> • Summary of enrolled classes • Progress indicator 	Q75
What system improvement would make students more satisfied & engaged?	A dashboard with structure & reminders and students doesn't know what to access now.	Home / Dashboard [R14]	<ul style="list-style-type: none"> • List all joined classes • View button for each class 	Q75

What process happens after invoice is submitted?	Admin currently verifies manually, which is slow.	Invoice Verification Logic [R15]	<ul style="list-style-type: none"> • Automate verification • Match invoice with email 	Q10
Would a single system (not FB/WhatsApp) improve student experience?	Yes, easier access, integrated communication, and better structure.	Web System [R16]	<ul style="list-style-type: none"> • Everything inside system • WhatsApp only for emergency 	Q63
If u have your own system and someone wants to join a class, what's the first step you expect them to take?	I think they should make payment and register an account first.	Registration Page [R17]	<ul style="list-style-type: none"> • Form with name, email, password • Must match email in invoice 	Q76
Do you think it's necessary for users to log in before they access their class?	Yes, logging in is important before they can access or join any class.	Login Page [R18]	<ul style="list-style-type: none"> • Secure login before invoice validation 	Q77
What should happen if a student enters a wrong or invalid?	Sometimes they get rejected from the Facebook group. Then they'll contact us and we have to check manually whether the code is valid.	Invoice Code Error Page [R19]	<ul style="list-style-type: none"> • Error message for invalid/mismatched invoice 	Q78

How do students usually contact the admin if they have problems accessing the class?	They'll usually WhatsApp us directly or reply to our automated message.	WhatsApp Support Button [R20]	• Opens wa.me link to contact admin	Q79
Do you as admin have any special system to manage classes or students right now?	No.	Admin Login Page [R21]	• Admin login form with authentication	Q80
If you need to remove a student from a class, how do you currently do that?	We'll remove them manually from the Facebook group or revoke their access if they misused the code.	Delete Invoices[R22]	• Delete button in invoice management table.	Q81
If you or your team entered the wrong info when preparing invoice data, how do you handle that?	We'll have to check our own records and update or double-check payment email manually.	Edit Invoice Record [R23] Delete Invoice Record [R24]	• Edit button next to invoice listing • Delete button on invoice table	Q82

- Non-Functional Requirements:

The non-functional requirements, such as interface and system-related expectations, were identified from a smaller set of interview questions. The analysis is grouped based on its respective categories and is presented in Table 4.2 below.

Table 4.2 Analysis of Non-Functional Requirement for Interface

Question	Answer	Requirement Identified
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What tone do you prefer for the student dashboard? a. Corporate b. Vibrant c. Soft and welcoming	c. Soft and welcoming	Design Tone: Soft and welcoming
Preferred main colour theme? a. Blue b. Green c. Purple/lavender	c. Purple/lavender	Colour Theme: Purple/lavender
What background style do you prefer? a. White b. Light pastel c. Gradient	b. Light pastel	Background Style: Light pastel
Sidebar layout preference? a. Top menu b. Hidden menu c. Fixed vertical	c. Fixed vertical	Navigation Style: Fixed vertical
Sidebar colour style? a. Solid b. Gradient c. Transparent	b. Gradient	Sidebar Colour: Gradient
Button style? a. Round with icon b. Rectangle solid c. Rectangle border	b. Rectangle solid	Button Style: Rectangle solid
Card/box style? a. Flat b. Shadow and rounded edges c. Outlined	b. Shadow and rounded edges	Card Style: Soft shadow and rounded

Font style? a. Formal serif b. Clean sans-serif	b. Clean sans-serif	Font: Clean sans-serif
---	---------------------	------------------------

4.3 Use Case

The list of use cases, which were obtained based on the requirements identified in Table 4.1 and Table 4.2, is presented in Table 4.3 below. Each use case is associated with one or more system requirements which were identified in the analysis phase. The first column, Use Case ID, is used to give each use case a unique identifier. The prefix UC is an abbreviation of Use Case and the number that follows it is the number of the particular function.

The second column, Use Case Name, gives the name of the core system functionality represented by each use case. The third column gives a short description of the use case, giving the primary action or purpose of the use case within the system. The last column, Requirement ID, associates each use case with the corresponding requirements it satisfies, functional or non-functional. This mapping will make sure that all the necessary functions of the system have been covered in the use case model and can be traced back to the requirements identified by the stakeholder.

Table 4.3 Analysis of Use Case

Requirement ID	Use Case Name	Description	Use Case ID
R16, R17, R18	Login	User logs into the system.	UC-B01
R10, R11, R15, R19	Join New Class	Student submits invoice number to enroll in class.	UC-S01
R11, R13, R14	View My Classes	Student views list of joined classes and its progress.	UC-S02
R12	Access Class Materials	Student search and view class content.	UC-S03
R20	Contact Admin	Student clicks WhatsApp button to ask for help.	UC-S04

R01, R07, R08	Manage Classes	Admin creates and updates class info including title, description, thumbnail.	UC-A01
R01, R04, R07, R08	Manage Class Materials	Admin creates, add, edit and delete class material.	UC-A02
R05, R06, R08 R22, R24, R23	Manage Invoices	Admin adds, updates, or deletes invoice records.	UC-A03
R02, R08	View Enrolled Students	Admin views student list, joined class and their progress	UC-A04

4.3.1 Use Case Diagram

The use case diagram of the SMOOTEA Learning Access & Class Enrollment System shows how two major actors, Admin and Student, interact with the system and the central features of the system. Both users will be able to log in, making it secure. Students can enroll in new class by entering their invoice numbers, see a list of the classes they are registered to, access course materials and contact the admin should they need to. In the meantime, the admins can have a larger range of opportunities, such as working with invoices, creating and managing classes, uploading and organizing the class materials, as well as viewing the enrolled students. This diagram gives an illustrative review of how various users interact with the system to facilitate a smooth enrollment, access to materials and general management of classes.

Smootea Learning Access & Class Enrollment System

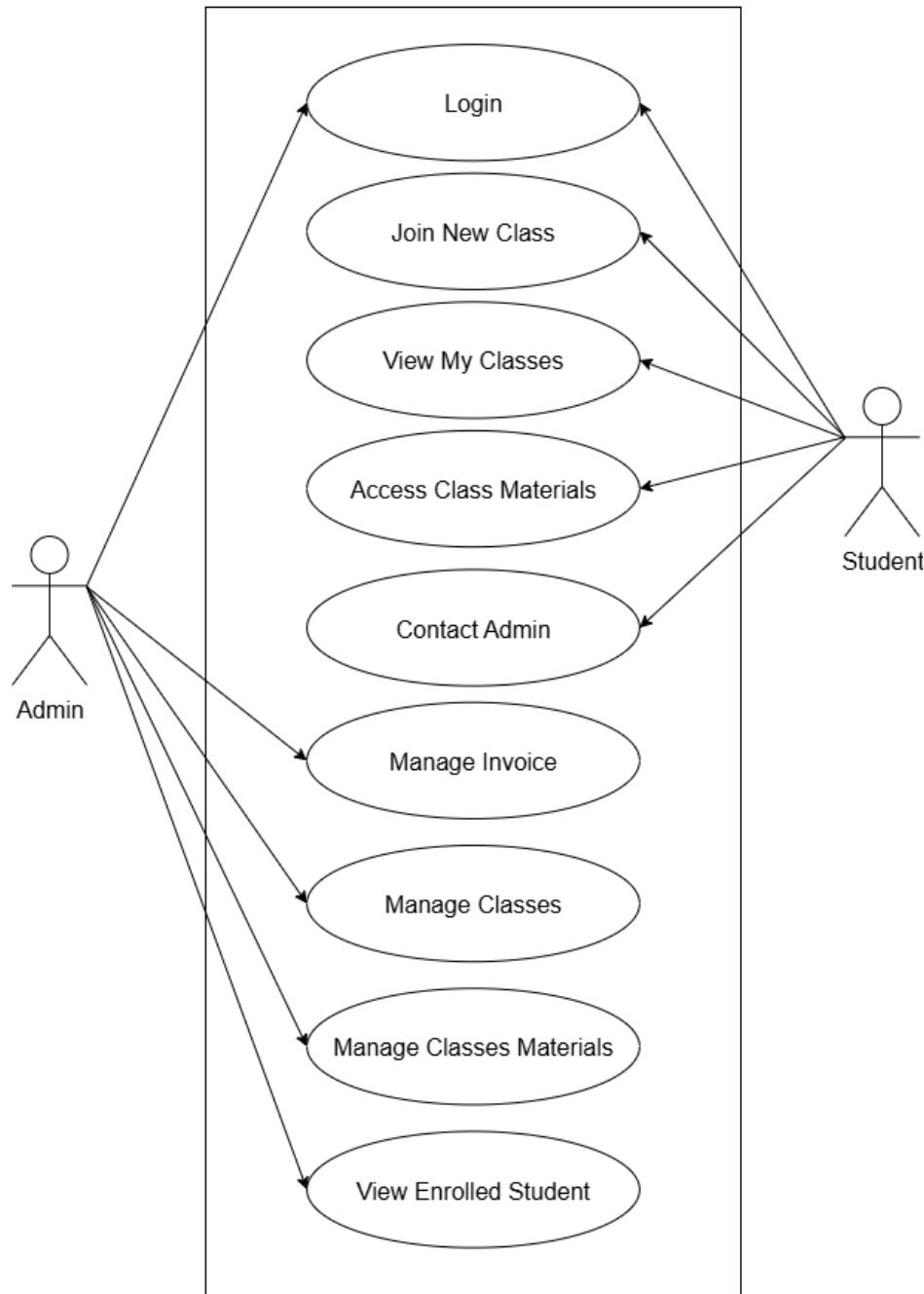


Figure 4.1 Use Case Diagram

4.4 Use Case Description

The Use Case Description describes the interactions of the users and the system in details of each functional requirement. It explains the situations where the users (students and admins) will interact with the system to carry out certain tasks. Every use case contains the goal, the sequence of actions, players, the system response, and exceptions to provide a complete picture and traceability of system functions.

Table 4.4 Use Case Description Login

Use Case ID	UC-B01	
Created By	Nur Syafika Alya	
Use Case Name	Login	
Scenario	A user (student or admin) wants to log into the system to access their dashboard.	
Triggering Event	User clicks the "Login" button from the landing page.	
Brief Description	This function allows users who have registered to log in using their email and password. Based on their role (student or admin), they will be redirected to the appropriate dashboard.	
Actor	Student / Admin	
Related Use Case	Join New Class, View My Classes	
Stakeholder	Admin and Student	
Pre-Conditions	User must be registered in the system. Login form must be accessible.	
Post Conditions	User is authenticated and redirected to their respective dashboard.	
Flow Activities	ACTOR	SYSTEM
	1.0 User clicks on the Login button.	1.1 System displays the login form
	1.3 User submits the form.	

		<p>1.4 System validates the credentials. [E1: Invalid Credentials]</p> <p>1.5 If valid, system identifies user role.</p> <p>1.6 System redirects user to corresponding dashboard.</p>
Exceptions Conditions	[E1: Invalid Credentials] System will display “Invalid email or password” if the login fails.	
Special Requirements	<ul style="list-style-type: none"> The system must support role-based redirection upon login. Passwords must be encrypted and securely stored. 	
Assumptions	<ul style="list-style-type: none"> User accounts are already created in the system. Roles are assigned during or after registration 	
Notes and Issues	-	

Table 4.5 Use Case Description Join Class

Use Case ID	UC-S01
Created By	Nur Syafika Alya
Use Case Name	Join New Class
Scenario	A student who has already purchased a class wants to enter their invoice code to join and access the class.
Triggering Event	Student clicks “Join New Class” and submits invoice code.
Brief Description	This function allows a student to enroll in a class using a unique invoice number received during purchase. If the code and email match a record in the system, the student is enrolled in the class.
Actor	Student
Related Use Case	Login
Stakeholder	Student, Admin

Pre-Conditions	User must be logged in and use the same email as in their invoice. The invoice data must already be uploaded by the admin.	
Post Conditions	Student is enrolled in the class and the class will appear in their dashboard.	
Flow Activities	ACTOR	SYSTEM
	1.0 Student navigates to “Join New Class” 1.2 Student enters their invoice number. 1.3 Student submits the form.	1.1 System displays the invoice code input form. 1.4 System checks if the invoice exists. 1.5 System checks if the invoice matches student’s email. 1.6 If valid, system links the student to the class. [E1: Invalid Code] [E2: Code Already Used] 1.7 System redirects to student dashboard with class now visible.
Exceptions Conditions	[E1: Invalid Code] – System displays error “Invoice not found or mismatched email.” [E2: Code Already Used] – System displays “This code has already been used.”	
Special Requirements	<ul style="list-style-type: none"> • Each invoice number can only be used once and is tied to a specific email. • Email entered during registration must match the one used in payment. 	

Assumptions	<ul style="list-style-type: none"> • Admin has uploaded invoice data beforehand. • Student is using the correct email used during class purchase.
Notes and Issues	-

Table 4.6 Use Case Description View My Classes

Use Case ID	UC-S02	
Created By	Nur Syafika Alya	
Use Case Name	View My Classes	
Scenario	A student wants to view all classes they are currently enrolled in.	
Triggering Event	Student logs in and clicks on “My Classes” from the dashboard.	
Brief Description	This function allows the student to see a list of classes they are enrolled in, along with basic information such as title, progress and access button	
Actor	Student	
Related Use Case	Join New Class, Access Class Materials	
Stakeholder	Student	
Pre-Conditions	User must be logged in and already enrolled in at least one class.	
Post Conditions	System displays a list of all classes the student has joined.	
Flow Activities	ACTOR	SYSTEM
	1.0 Student logs in and accesses the dashboard. 1.2 Student clicks on “ Classes”.	1.1 System fetches enrollment data for the logged-in user. 1.3 System filters all classes linked to the student. [E1: No Enrollment

	<p>1.5 Student clicks “View Class” to open specific class.</p>	<p>Found] – System displays “You are not enrolled in any class yet.”</p> <p>1.4 System displays list of class cards showing title, instructor, and “View Class” button.</p>
Exceptions Conditions	[E1: No Enrollment Found] – System displays “You are not enrolled in any class yet.”	
Special Requirements	<ul style="list-style-type: none"> • Display should be clear and mobile-friendly. • Each class card should include course title and instructor. • View Class button must only be active for enrolled classes. 	
Assumptions	<ul style="list-style-type: none"> • Enrollment data has been created correctly via valid invoice. • User is assigned student role. 	
Notes and Issues	-	

Table 4.7 Use Case Description Access Class Materials

Use Case ID	UC-S03
Created By	Nur Syafika Alya
Use Case Name	Access Class Materials
Scenario	A student wishes to view and interact with learning content for a specific class they are enrolled in, including marking materials as done for progress tracking.
Triggering Event	Student clicks the “View Class” button from their class list.
Brief Description	This function allows the student to access all learning materials (PDFs, videos, links) associated with their enrolled class, and to mark individual

	materials as done to track their progress and update their completion percentage.							
Actor	Student							
Related Use Case	View My Classes							
Stakeholder	Student, Admin							
Pre-Conditions	<ul style="list-style-type: none"> • Student must be logged in. • Student must be enrolled in the selected class. • Materials must have been uploaded by admin. • Enrollment and material relationships must exist in the database. 							
Post Conditions	<ul style="list-style-type: none"> • Student successfully views or downloads class materials. • Student can mark materials as done/undone, affecting their progress. • Progress/completion percentage is recalculated and reflected in dashboard and admin views. • Enrollment status may be updated (pending/active/completed). 							
Flow Activities	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">ACTOR</th> <th style="text-align: left;">SYSTEM</th> </tr> </thead> <tbody> <tr> <td>1.0 Student clicks on “My Classes”.</td> <td>1.1 System loads the list of classes the student is enrolled in. [E2: Unauthorized Access] – System blocks access if the student is not enrolled in the class.</td> </tr> <tr> <td>1.2 Student clicks on “View Class” for a class.</td> <td>1.3 System fetches and displays the class content page. [E1: No Materials Available] – System displays “No materials have been</td> </tr> </tbody> </table>	ACTOR	SYSTEM	1.0 Student clicks on “My Classes”.	1.1 System loads the list of classes the student is enrolled in. [E2: Unauthorized Access] – System blocks access if the student is not enrolled in the class.	1.2 Student clicks on “View Class” for a class.	1.3 System fetches and displays the class content page. [E1: No Materials Available] – System displays “No materials have been	
ACTOR	SYSTEM							
1.0 Student clicks on “My Classes”.	1.1 System loads the list of classes the student is enrolled in. [E2: Unauthorized Access] – System blocks access if the student is not enrolled in the class.							
1.2 Student clicks on “View Class” for a class.	1.3 System fetches and displays the class content page. [E1: No Materials Available] – System displays “No materials have been							

		uploaded for this class.”
	<p>1.4 Student selects a material (e.g. PDF, video, link) to view.</p> <p>1.6 Student clicks “Mark as Done” for a material.</p> <p>1.8 Student may click “Mark as Undone” to revert.</p>	<p>1.5 System loads and displays/serves the selected file or link (download/preview/external redirect).</p> <p>1.7 System records completion in progress table, sets completed=true, stores timestamp. Recalculates completion percentage for class, updates enrollment status (pending, active or completed if 100%) and displays visual feedback. [E3: Invalid Marking Request] – System rejects marking/unmarking if material or enrollment is not found.</p> <p>1.9 System removes completion record for the material, recalculates completion percentage, updates enrollment status accordingly.</p>
Exceptions Conditions	<p>[E1: No Materials Available] - System displays “No materials have been uploaded for this class.”</p> <p>[E2: Unauthorized Access] - System blocks access if the student is not enrolled in the class.</p>	

	[E3: Invalid Marking Request] - System rejects marking/unmarking if material or enrollment is not found.
Special Requirements	<ul style="list-style-type: none"> Only students enrolled in the class may access or mark materials. All progress/completion must be tracked per material and per class.
Assumptions	<ul style="list-style-type: none"> Admin has uploaded and published the class materials in advance. All file URLs and links are valid and accessible. User authentication and enrollment checks are handled by the backend. Completion status and progress are visible to both student and admin.
Notes and Issues	Progress and status changes are reflected instantly in dashboard and admin views.

Table 4.8 Use Case Description Contact Admin

Use Case ID	UC-S04
Created By	Nur Syafika Alya
Use Case Name	Contact Admin
Scenario	A student needs help and wants to contact SMOOTEA admin directly via WhatsApp.
Triggering Event	Student clicks on the “Contact Admin” or WhatsApp icon from the dashboard.
Brief Description	This function allows a student to open a direct WhatsApp chat with the SMOOTEA admin. It removes the need to search for phone numbers manually or use a chatbot.
Actor	Student
Related Use Case	None
Stakeholder	Student, Admin
Pre-Conditions	Student must be logged in. Admin’s WhatsApp number must be correctly set in the system.

Post Conditions	WhatsApp (or WhatsApp Web) opens in a new tab with the admin's contact ready to chat.	
Flow Activities	ACTOR	SYSTEM
	1.0 Student logs into the system. 1.2 Student clicks "Contact Admin".	1.1 System loads dashboard with WhatsApp contact button. 1.2 System opens WhatsApp chat using wa.me link (e.g. wa.me/601.....). [E1: WhatsApp not installed (mobile)] [E2: Invalid admin number] [E3: Admin number is not registered to Whatsapp]
Exceptions Conditions	<p>[E1: WhatsApp not installed (mobile)] – Redirect fails or user is prompted to use WhatsApp Web.</p> <p>[E2: Invalid admin number] – If the number is wrongly formatted, the redirect fails.</p> <p>[E3: Admin number is not registered to Whatsapp] – If the number is not registered to whatsapp “invite number to Whatsapp” will show up.</p>	
Special Requirements	<ul style="list-style-type: none"> • Button must be clearly visible on dashboard. • No login or verification is required to chat (external app opens). • WhatsApp link must be encoded properly. 	
Assumptions	<ul style="list-style-type: none"> • WhatsApp is available on the user's device (or browser supports it). • Student is using a valid internet connection. 	
Notes and Issues	-	

Table 4.9 Use Case Description Manage Invoices

Use Case ID	UC-A01
Created By	Nur Syafika Alya
Use Case Name	Manage Invoices

Scenario	Admin wants to upload, edit or delete invoice data to allow student enrollment using valid invoice codes.	
Triggering Event	Admin navigates to the “Invoices” section from the sidebar.	
Brief Description	This function allows the admin to manage invoice records by uploading records manually. Each invoice links an invoice number, a student email, and a specific class.	
Actor	Admin	
Related Use Case	View Enrolled Students	
Stakeholder	Admin, Student	
Pre-Conditions	Admin must be logged in. Classes must already exist in the database.	
Post Conditions	Invoice records are created, updated, or deleted. Students with matching emails can now enroll using valid codes.	
Flow Activities	ACTOR	SYSTEM
	1.0 Admin clicks on “Manage Invoices”.	1.1 System displays a list of current invoices and action buttons.
	1.2 Admin clicks “Add Invoice”.	1.3 System shows form to input: invoice number, email and class, amount and invoice status as unused.
	1.3 Admin submits invoice form.	1.5 System validates fields and saves to database. [E1: Missing Required Fields]

	<p>1.6 Admin clicks “Edit” for existing row.</p> <p>1.8 Admin clicks “Delete” for an invoice.</p>	<p>1.7 System loads record into form for editing.</p> <p>1.9 System confirms and deletes invoice from database.</p>
Exceptions Conditions	[E1: Missing Required Fields] – System shows validation errors.	
Special Requirements	<ul style="list-style-type: none"> • Email in invoice must match what student will use during registration. • Each invoice code can only be used once. • Class ID must exist in class table. 	
Assumptions	<ul style="list-style-type: none"> • Admin has invoice data ready in correct format. • Admin checks accuracy before upload. • Admin set new user invoice as unused. 	
Notes and Issues	-	

Table 4.10 Use Case Description Manage Classes

Use Case ID	UC-A02
Created By	Nur Syafika Alya
Use Case Name	Manage Classes
Scenario	Admin wants to create a new class, edit existing class details, or delete a class from the system.
Triggering Event	Admin clicks on “Manage Classes” from the sidebar.
Brief Description	This function enables the admin to view and perform CRUD (Create, Read, Update, Delete) operations on class records and choose between grid view (card-style) or list view (table-style) for better usability. Each class contains a title, description, status and thumbnail.
Actor	Admin

Related Case	Manage Invoices, Manage Class Materials, View Enrolled Students	
Stakeholder	Admin, Students	
Pre-Conditions	Admin must be logged in. System must be connected to the database.	
Post Conditions	<ul style="list-style-type: none"> Classes are listed and managed according to admin's actions. View mode (grid or list) is toggled and persists for session. Changes to classes are reflected system-wide. 	
Flow Activities	<p>ACTOR</p> <p>1.0 Admin clicks “Manage Classes”.</p> <p>1.2 Admin chooses to toggle view (grid or list).</p> <p>1.4 Admin clicks “Add New Class”.</p> <p>1.6 Admin fills in the form and submits.</p>	<p>SYSTEM</p> <p>1.1 System displays a list of existing classes with options to add, edit, view, or delete. Provides toggle for grid or list view.</p> <p>1.3 System switches display mode and remember choice (session/local storage).</p> <p>1.5 System opens a form to input class title, description, status, and thumbnail.</p> <p>1.7 System validates the fields. [E2: Missing Fields]</p>

	<p>1.9 Admin clicks “Edit” for a class.</p> <p>1.11 Admin updates and submits changes.</p> <p>1.13 Admin clicks “Delete” for a class.</p> <p>1.15 Admin clicks “View” for a class.</p>	<p>1.8 System saves the new class to the database and refreshes the class list. [E1: Duplicate Class Title]</p> <p>1.10 System loads the class data into an editable form.</p> <p>1.12 System validates and saves edits to the database, then refreshes the class list. [E2: Missing Fields]</p> <p>1.14 System prompts for confirmation, then removes the class and updates the list.</p> <p>1.16 System displays class details, including enrolled students and materials.</p>
Exceptions Conditions	[E1: Duplicate Class Title] - System displays “Class title already exists.” [E2: Missing Fields] - System shows error if any field is left empty.	
Special Requirements	<ul style="list-style-type: none"> • Title and instructor fields are mandatory. • Description field can be optional or short. • System should confirm deletion to prevent accidental loss. 	
Assumptions	<ul style="list-style-type: none"> • Admin understands which instructor is assigned to which class. • Class data is used in other modules (e.g., material upload). 	
Notes and Issues	Alternative:	

	<ul style="list-style-type: none"> • Grid View: Classes shown as cards (thumbnail, title, status, actions). • List View: Classes shown in table/list (columns for ID, title, status, date, students, actions). • Toggle: Admin can switch anytime; system updates UI and remembers preference.
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Table 4.11 Use Case Description Manage Class Materials

Use Case ID	UC-A03	
Created By	Nur Syafika Alya	
Use Case Name	Manage Class Materials	
Scenario	Admin wants to upload, update, or delete learning materials for specific classes.	
Triggering Event	Admin clicks “Materials” and selects a class to manage its materials.	
Brief Description	This use case enables the admin to manage class materials such as video files, PDFs, or links. Each material is assigned to a class and tagged by type. Admin can also preview, filter, or edit existing content.	
Actor	Admin	
Related Use Case	Manage Classes	
Stakeholder	Admin, Student	
Pre-Conditions	Admin must be logged in. Class must already be created. Materials must be linked to existing classes.	
Post Conditions	Learning materials are available for students enrolled in that class.	
Flow Activities	ACTOR	SYSTEM
	1.0 Admin clicks “Materials”.	1.1 System displays list of materials.

	<p>1.2 Admin clicks “Upload New Material”.</p> <p>1.4 Admin fills out the form (title, type, file/link, description). [E2: Invalid File Type]</p> <p>1.5 Admin submits material form.</p> <p>1.7 Admin clicks “Edit” for a material.</p> <p>1.9 Admin updates and submits.</p> <p>1.10 System saves changes.</p> <p>1.11 Admin clicks “Delete” for a material.</p>	<p>1.3 System opens material upload form.</p> <p>1.6 System validates fields and saves material. [E1: Missing Required Fields]</p> <p>1.8 System loads material data into form.</p> <p>1.12 System confirms and removes material.</p>
Exceptions Conditions	[E1: Missing Required Fields] – System shows validation errors. [E2: Invalid File Type] – System blocks unsupported uploads.	
Special Requirements	<ul style="list-style-type: none"> • Each material must be assigned to a valid class. • System must support file previews and material type filtering. • System should confirm deletions. 	
Assumptions	<ul style="list-style-type: none"> • Admin understands the type of content each class requires. • Files are within size limits and properly labeled. 	
Notes and Issues	-	

Table 4.12 Use Case Description View Enrolled Students

Use Case ID	UC-A04
Created By	Nur Syafika Alya
Use Case Name	View Enrolled Students

Scenario	Admin wants to view the list of enrolled students, their associated classes, enrollment status, and course completion percentage.	
Triggering Event	Admin selects the “Enroll Students” option from the sidebar/dashboard.	
Brief Description	This use case allows the admin to view and filter enrolled students by class and status. Admin can view student details including name, email, class name, status and completion progress.	
Actor	Admin	
Related Use Case	Manage Invoices, Manage Classes	
Stakeholder	Admin, Student	
Pre-Conditions	Admin must be logged in. Enrollment data must already exist. Students must have successfully submitted valid invoice codes.	
Post Conditions	Admin views enrollment list.	
Flow Activities	<p>ACTOR</p> <p>1.0 Admin clicks on “Enroll Students”.</p> <p>1.2 Admin searches or filters by class/status.</p> <p>1.4 Admin clicks the “View” button beside a student.</p>	<p>SYSTEM</p> <p>1.1 System loads the list of all enrolled students. [E1: No Students Enrolled]</p> <p>1.3 System updates the list based on the selected filter.</p> <p>1.5 System displays detailed information (name, email, class, completion status and other class enrolled).</p>

Exceptions Conditions	[E1: No Students Enrolled] – System displays “No students have joined this class yet.”
Special Requirements	<ul style="list-style-type: none"> Only admin has access to this screen.
Assumptions	<ul style="list-style-type: none"> Students are already properly enrolled via invoice code. Admin uses this feature for verification and correction only.
Notes and Issues	-

4.5 Activity Diagram

The activity diagrams show the dynamic workflows of the Smootea Learning Access & Class Enrollment System. They represent the flow of user and system activities in each use case, which assists in the clarification of logic, decision paths, and user interactions across all the system functions. These diagrams help in knowing how activities are carried out step by step both as a student and as an admin.

Login

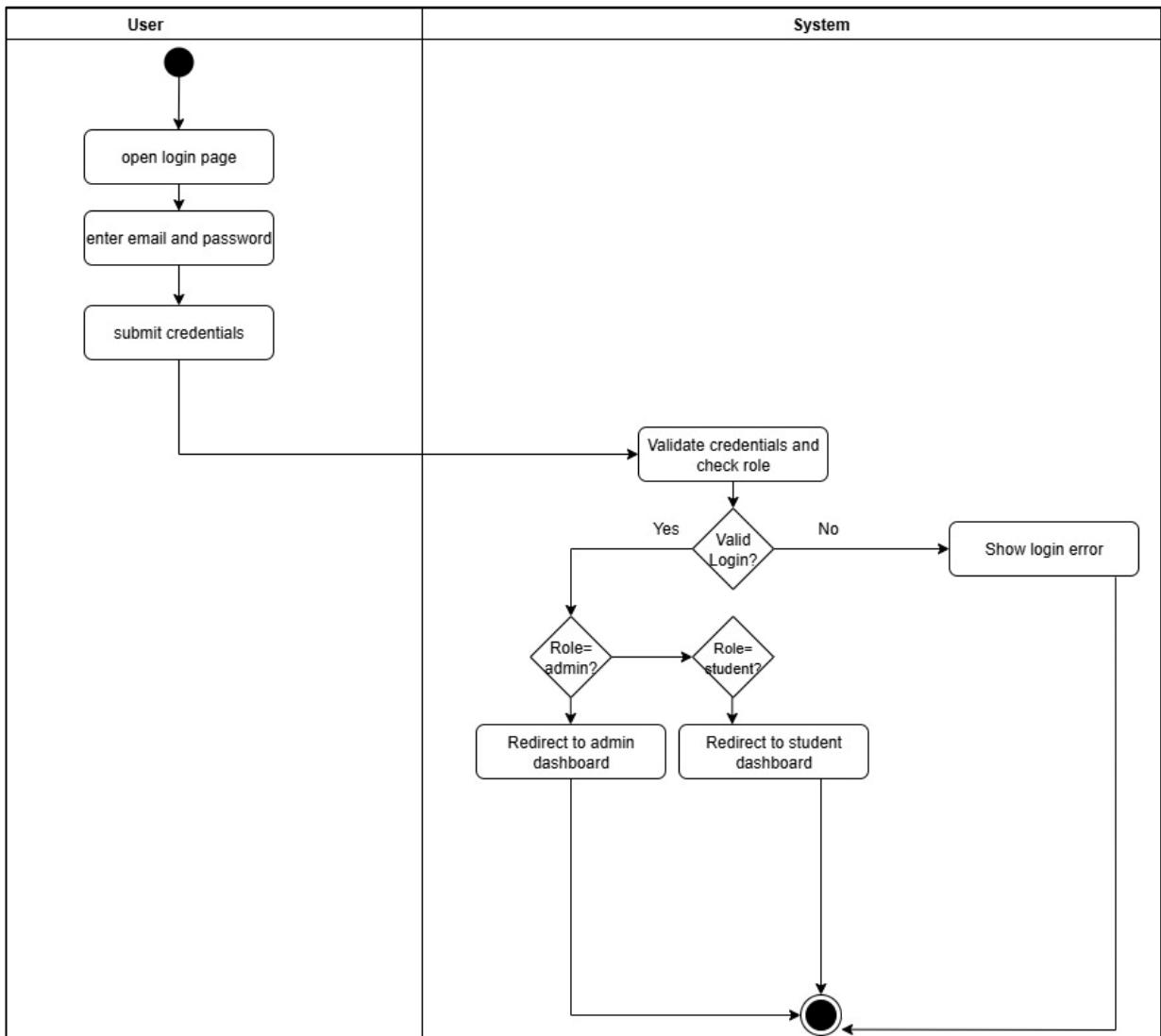


Figure 4.2 Activity Diagram Login

Join New Class

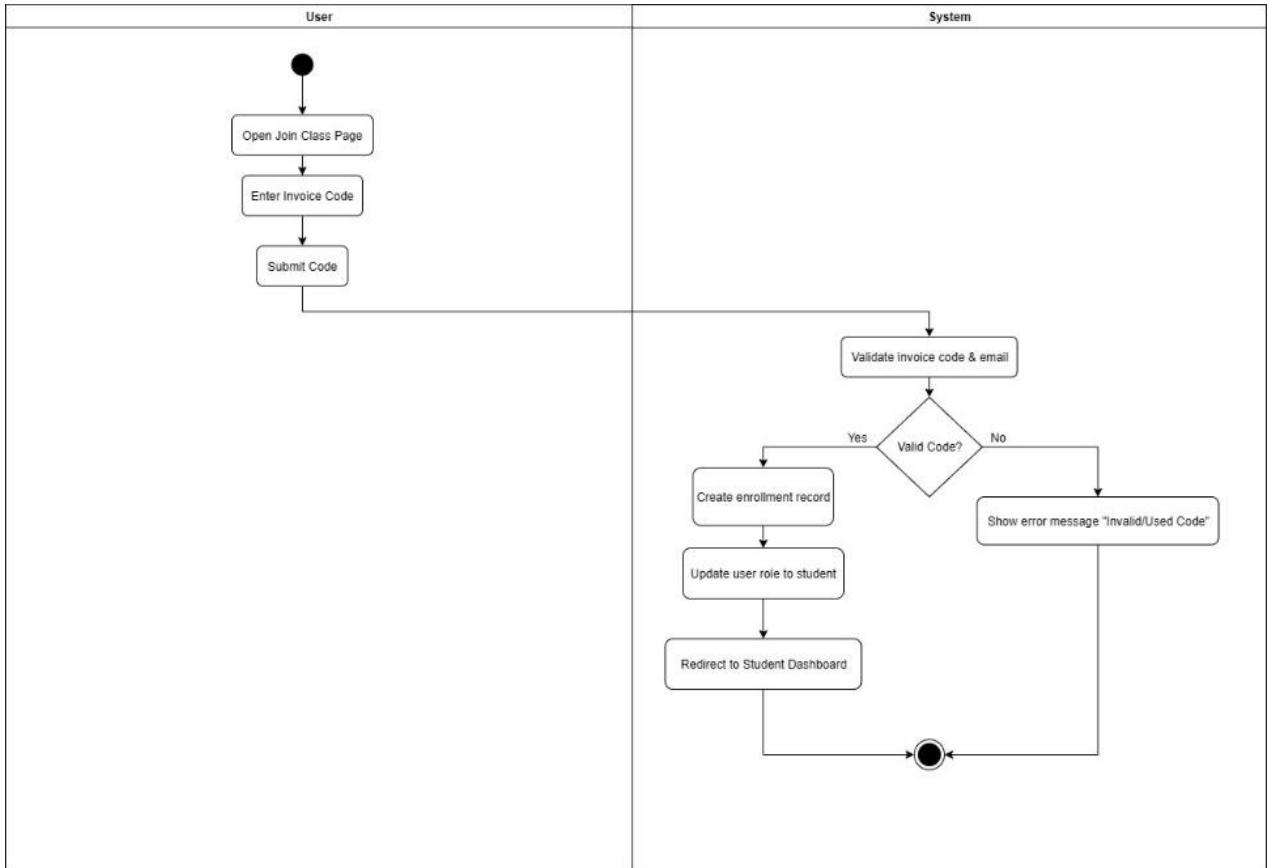


Figure 4.3 Activity Diagram Join New Class

View My Classes

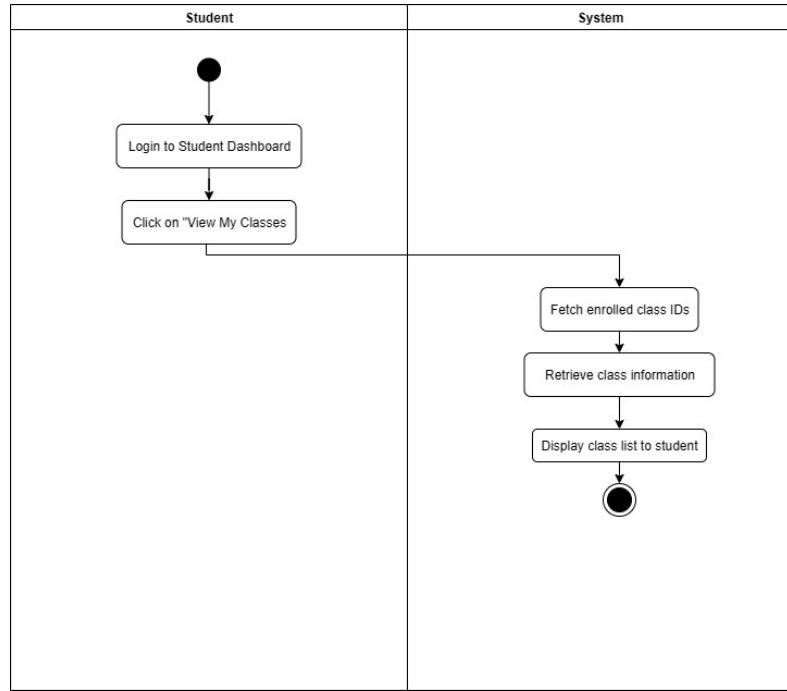


Figure 4.4 Activity Diagram View My Classes

Access Class Materials

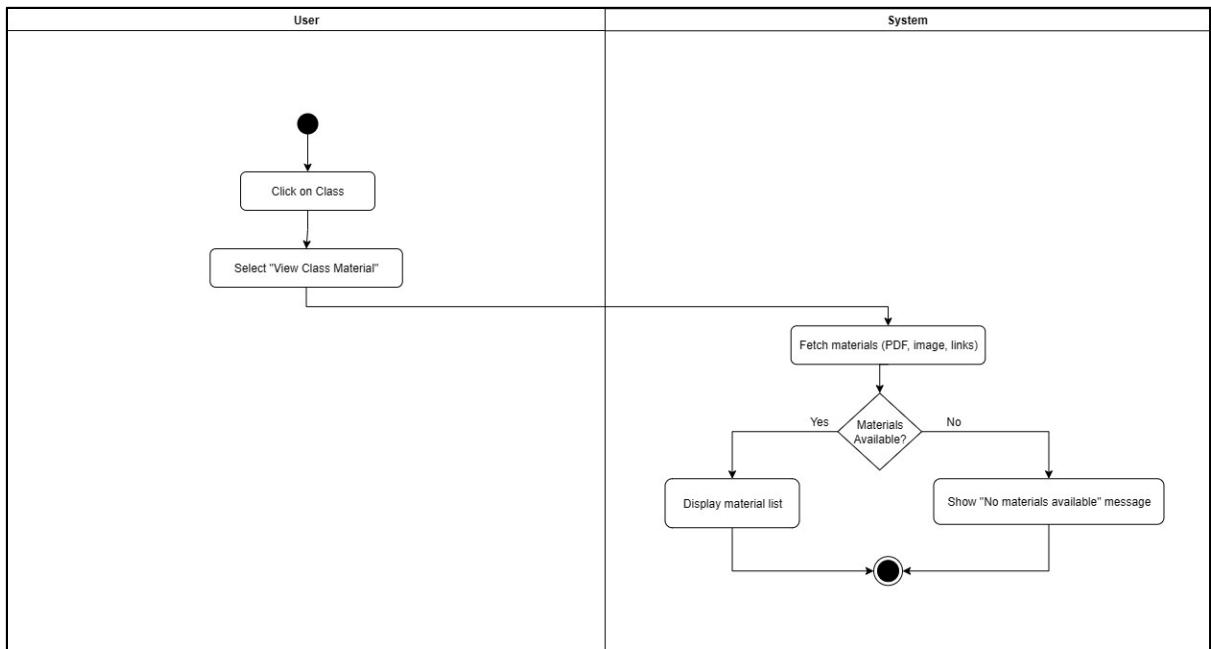


Figure 4.5 Activity Diagram Access Class Materials

Contact Admin

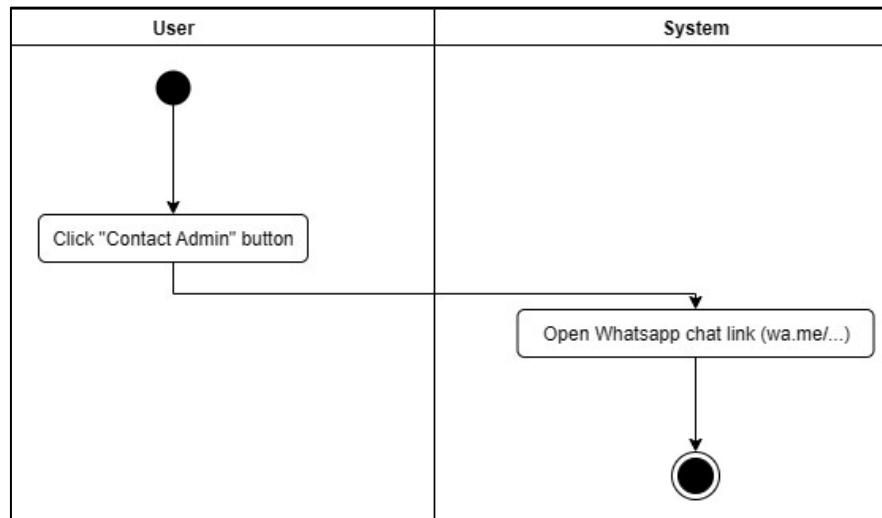


Figure 4.6 Activity Diagram Access Contact Admin

Manage Classes

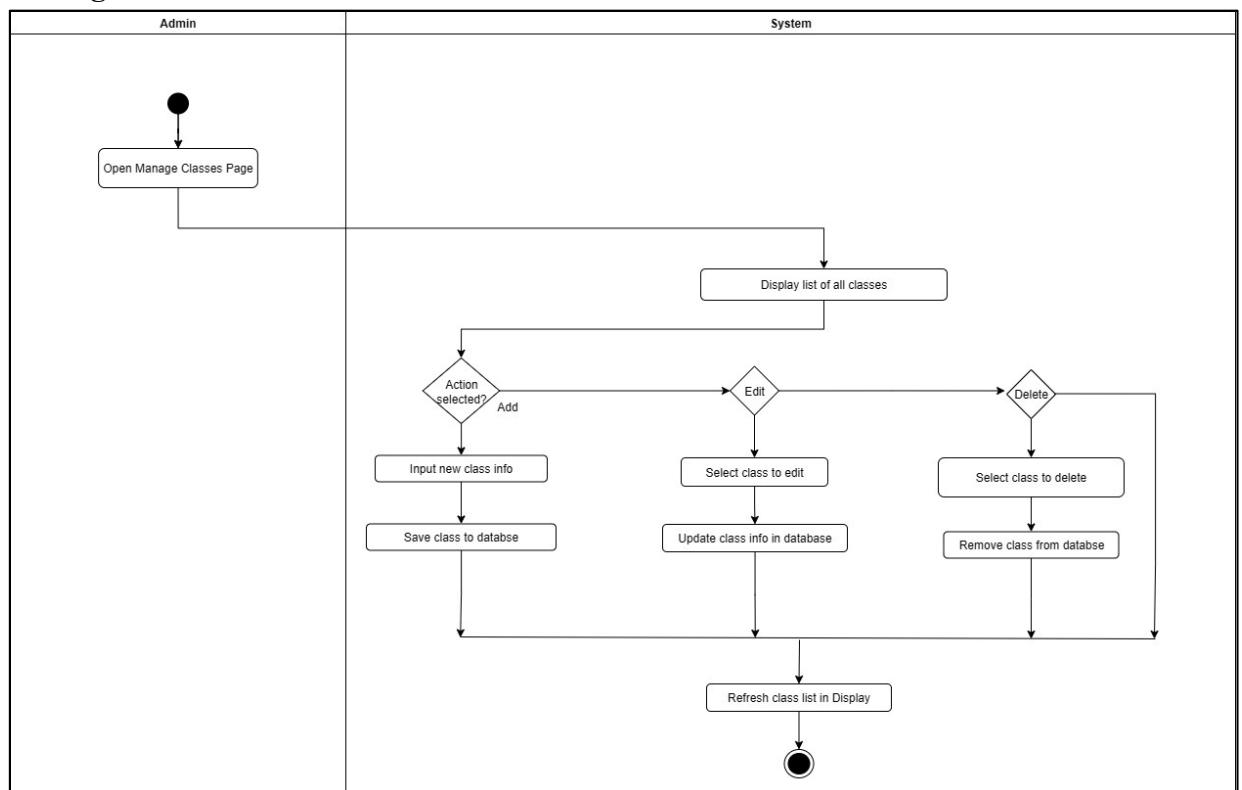


Figure 4.7 Activity Diagram Manage Classes

Manage Class Materials

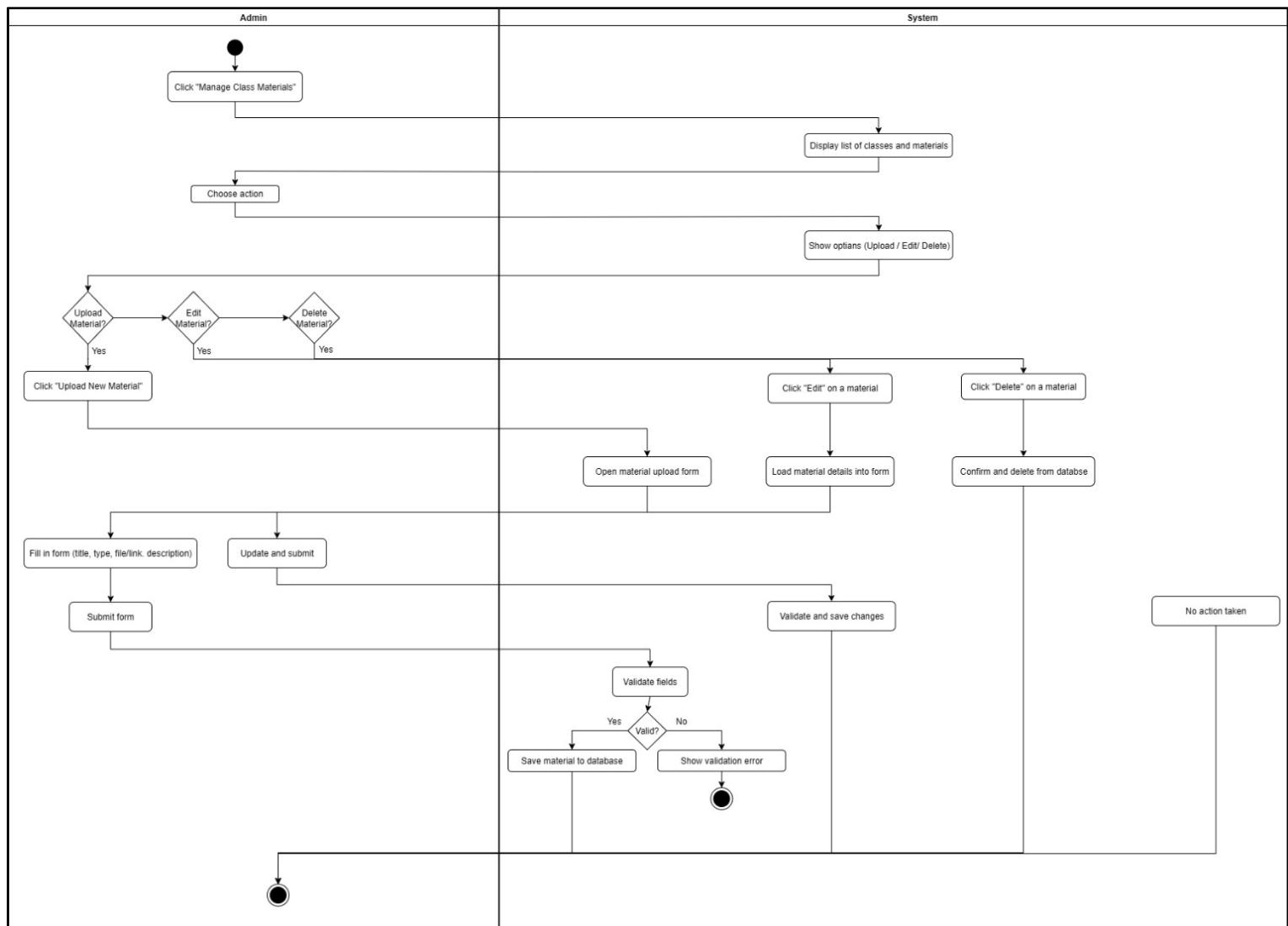


Figure 4.8 Activity Diagram Manage Class Materials

Manage Invoices

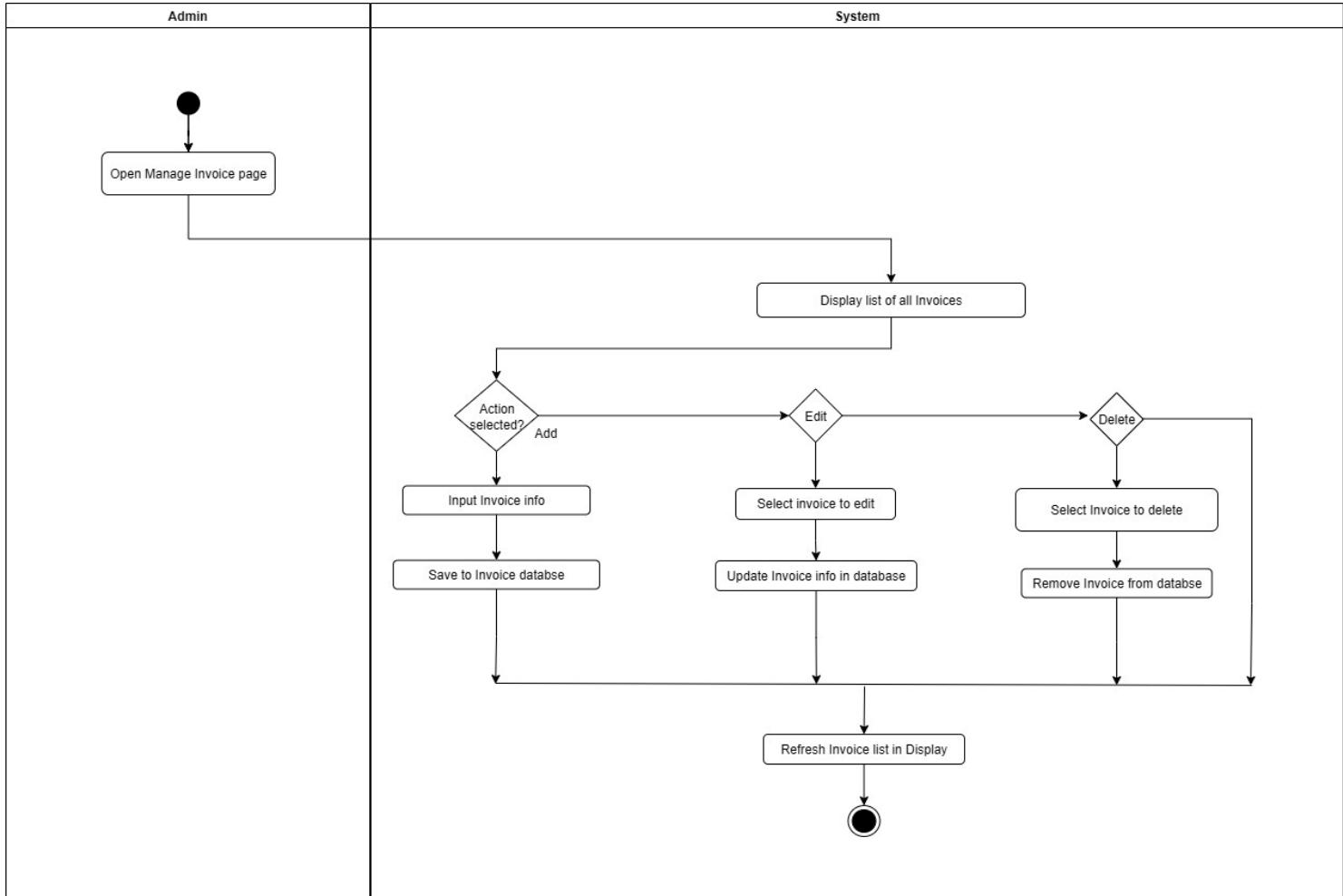


Figure 4.9 Activity Diagram Manage Invoice

View Enrolled Students

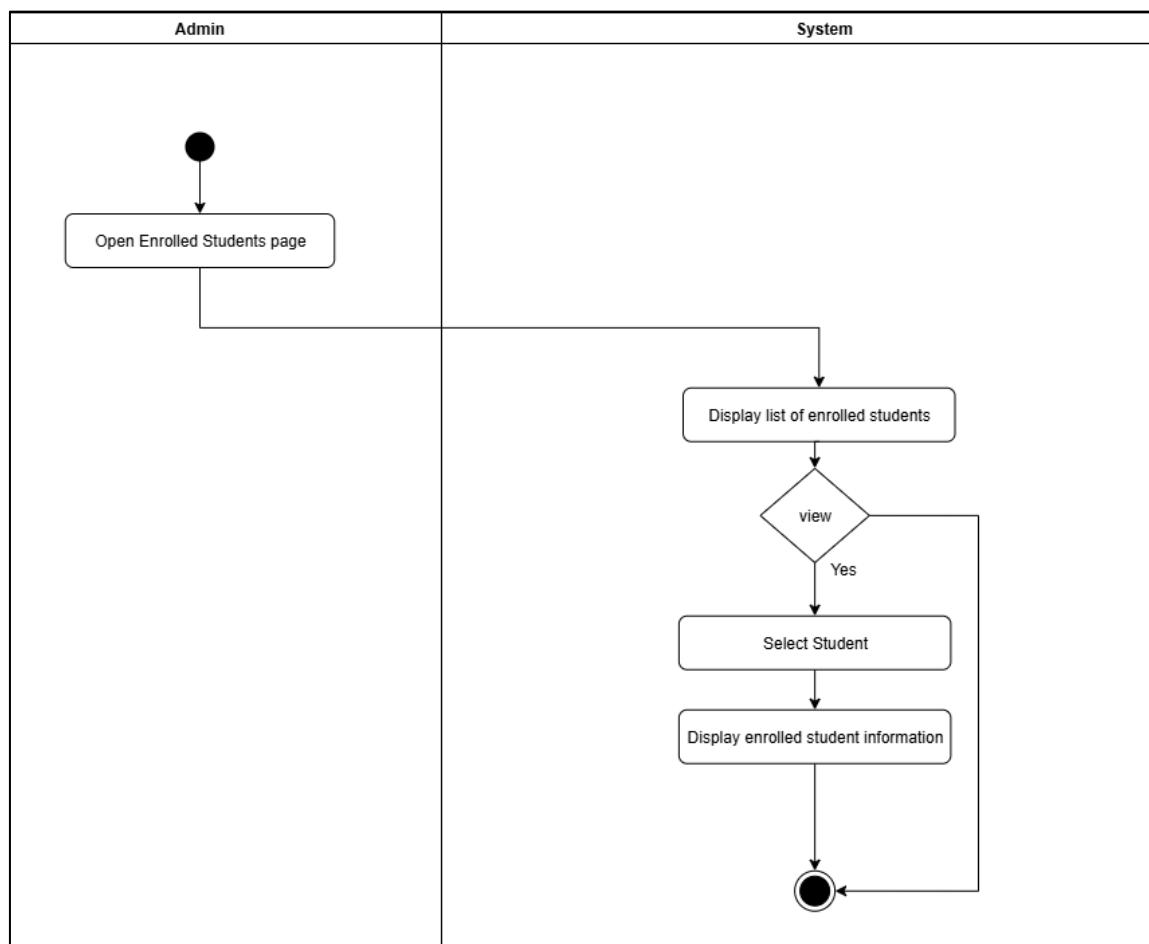


Figure 4.10 Activity Diagram View Enrolled Students

4.6 Domain Class Diagram

The domain class diagram is a visual representation of the main entities, their properties and the connections among these entities in the SMOOTEA Learning Access & Class Enrollment System. It is planned at the system design stage to store and group the business logic and design of the application in an object-oriented format. This diagram gives a clear picture of the interaction between the classes like Student, Admin, Class, Invoice and Material with each other and forms a basis of database designing and implementation of the system.

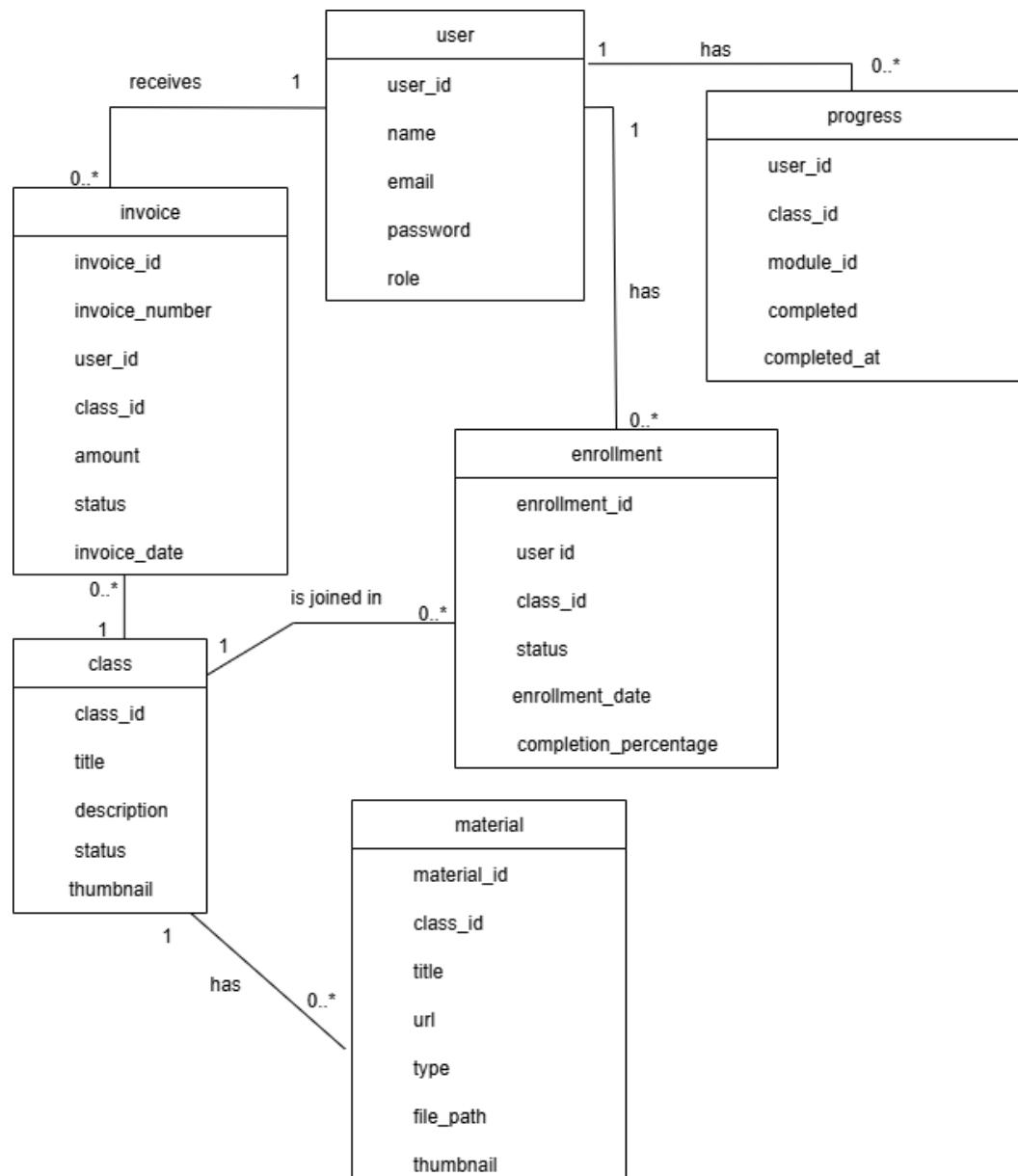


Figure 4.11 Domain Class Diagram

4.7 Sequence Diagram

This section shows the sequence diagrams that have been drawn to each of the identified use cases in the system. Sequence diagrams show the details of the interaction between actors and system elements in a step-by-step manner, emphasizing message and process flow. These charts assist in conceptualizing the dynamic nature of the system and that the functional requirements are well reflected.

Login

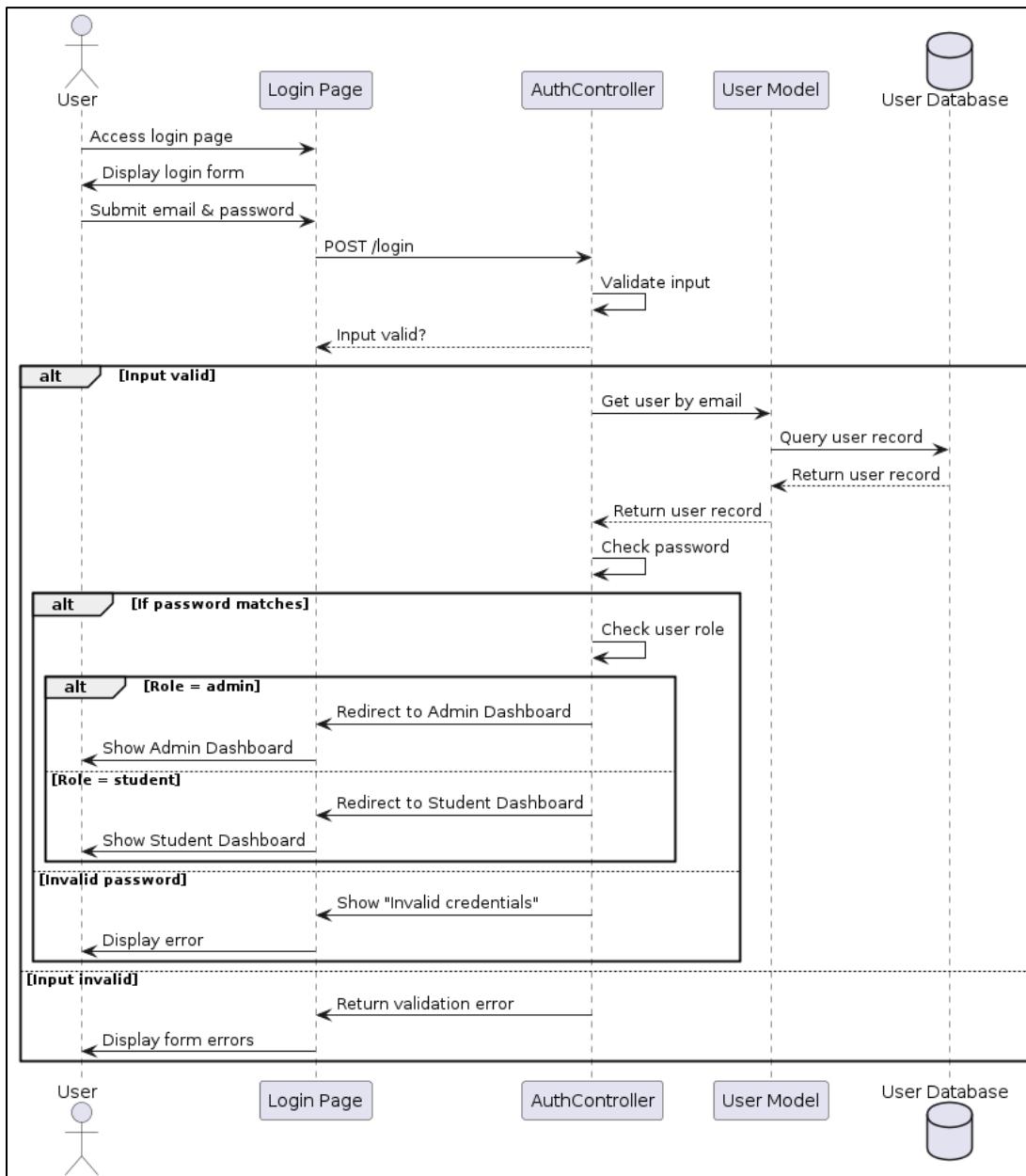


Figure 4.12 Sequence Diagram Login

Join New Class

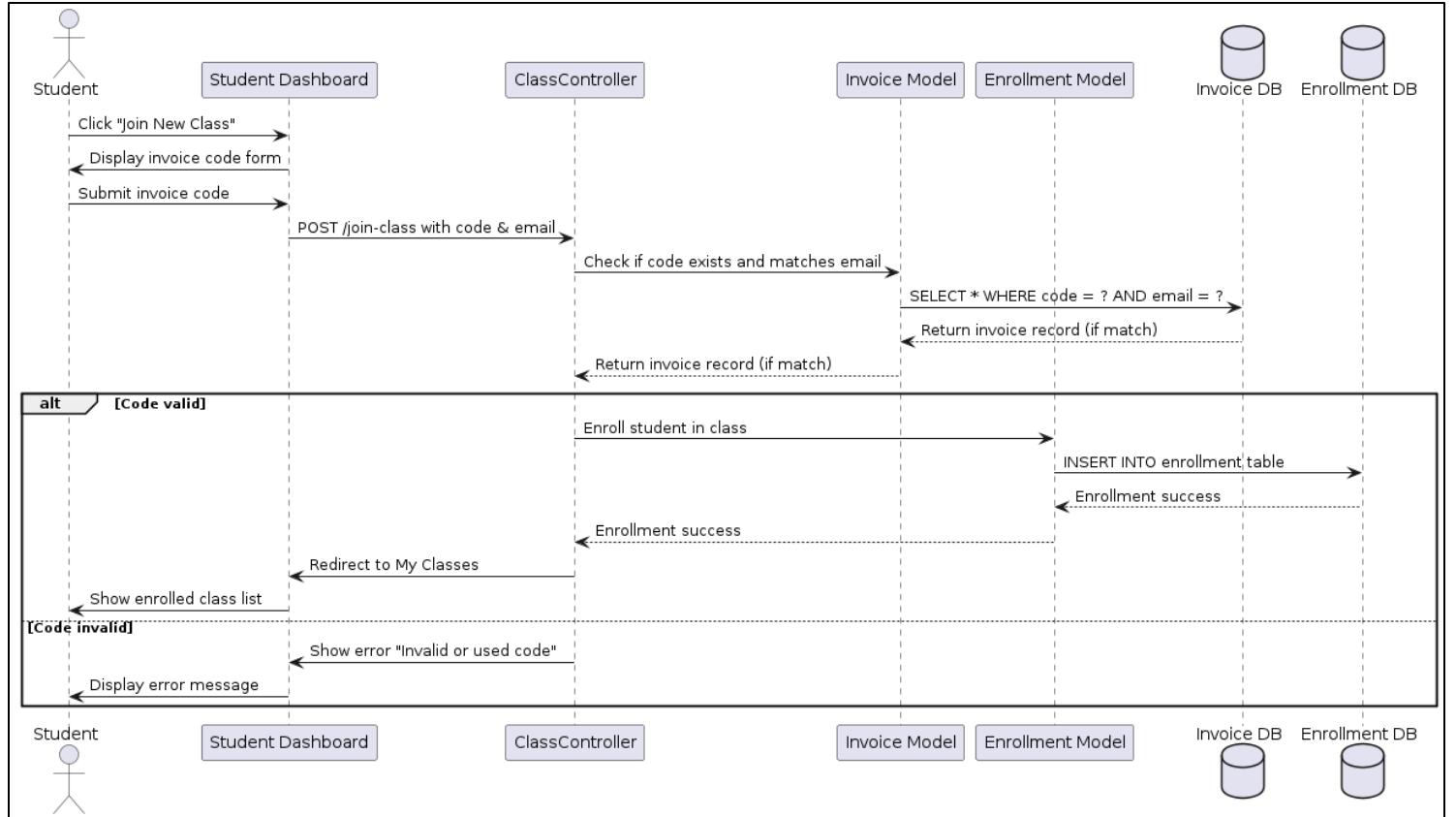


Figure 4.13 Sequence Diagram Join New Class

View My Classes

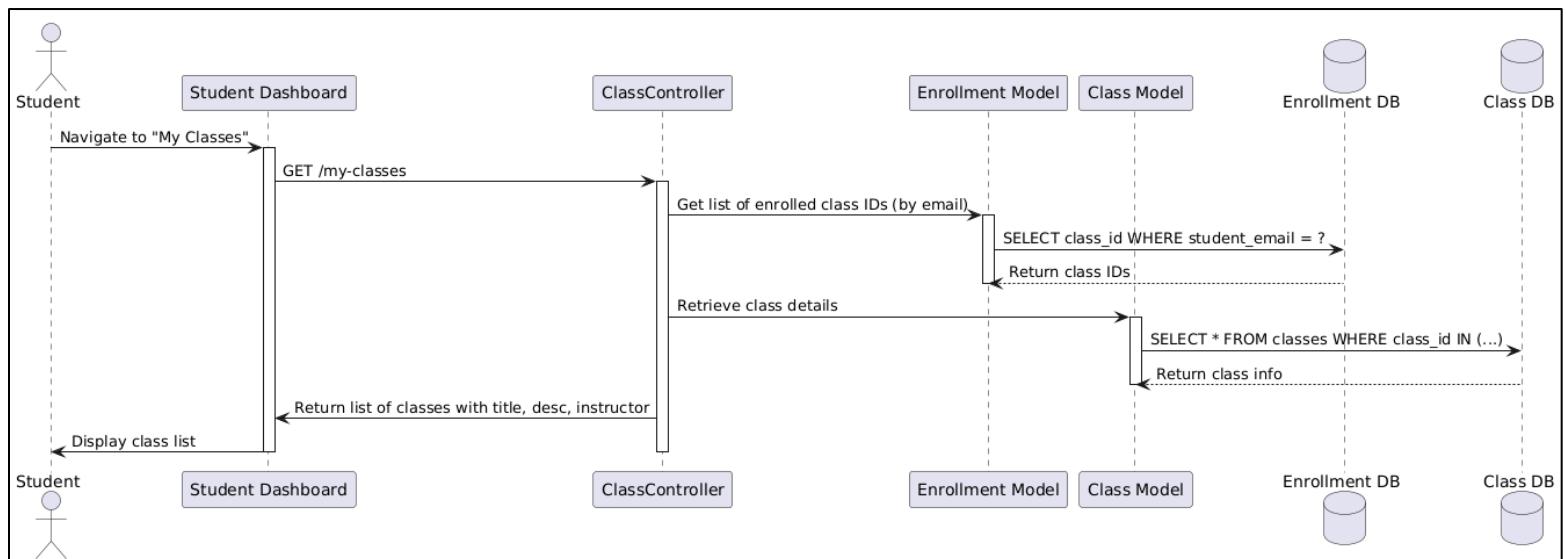


Figure 4.14 Sequence Diagram View My Classes

Access Class Materials

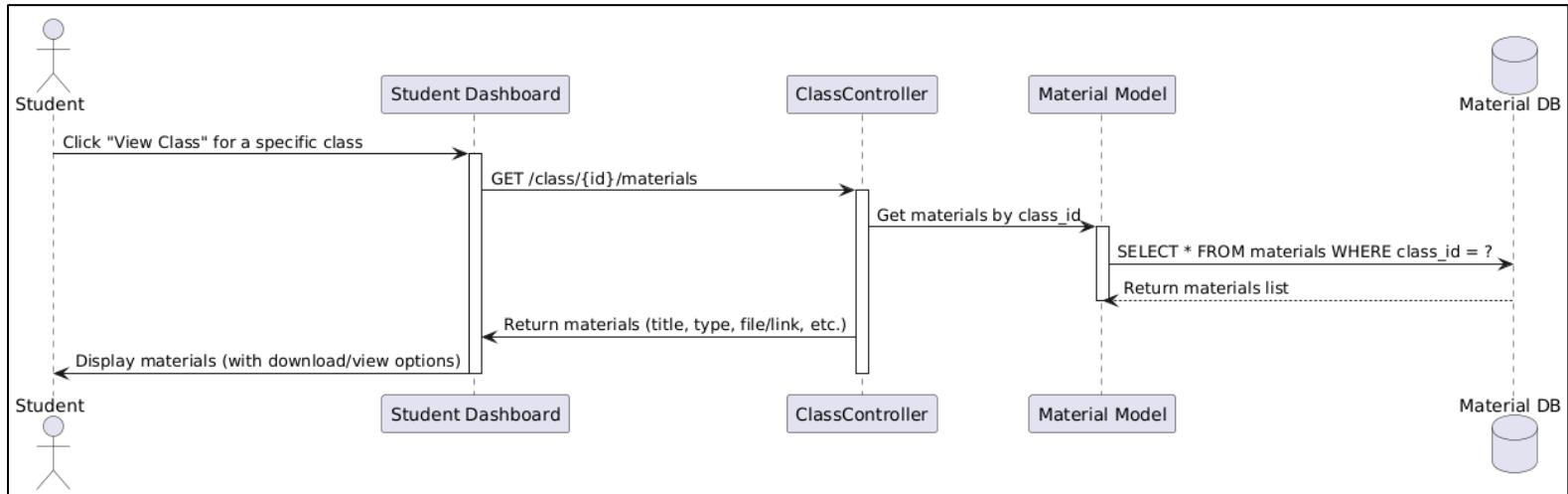


Figure 4.15 Sequence Diagram Access Class Materials

Contact Admin

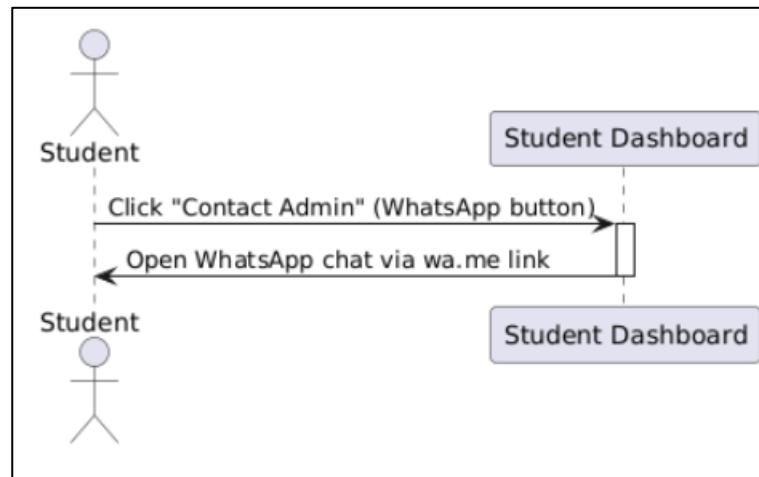


Figure 4.16 Sequence Diagram Access Contact Admin

Manage Invoices

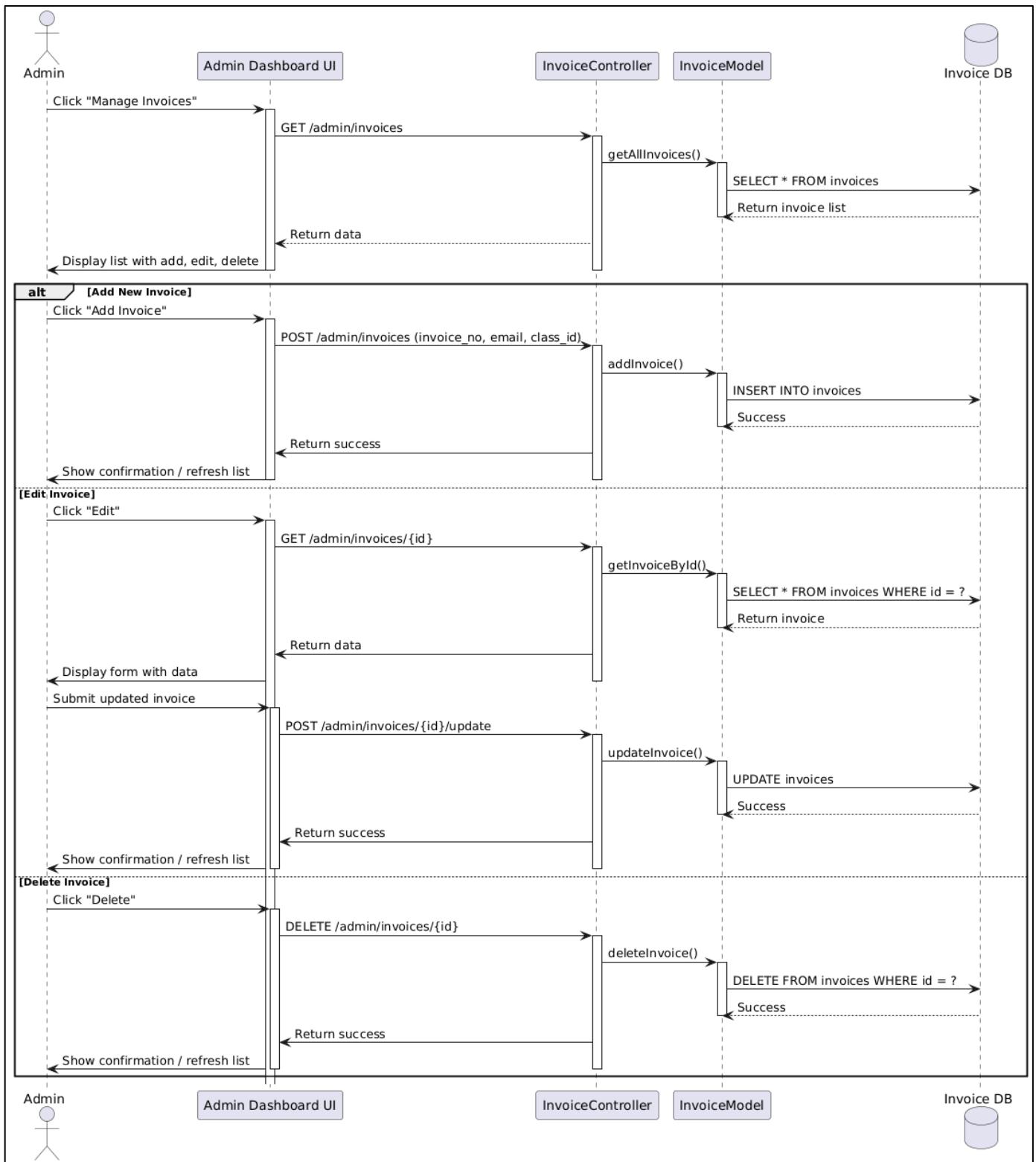


Figure 4.17 Sequence Diagram Manage Invoice

Manage Classes

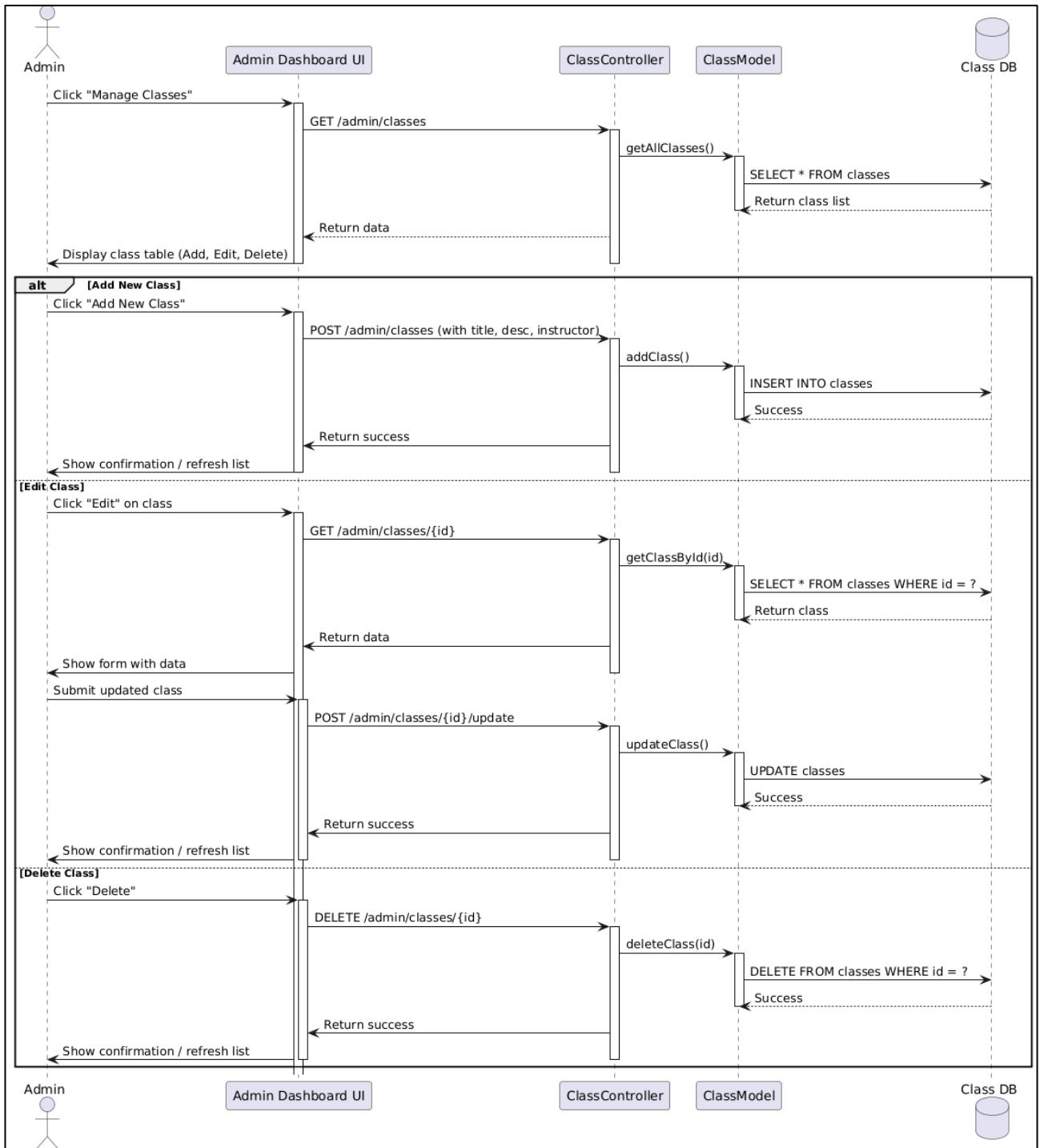


Figure 4.18 Sequence Diagram Manage Classes

Manage Class Materials

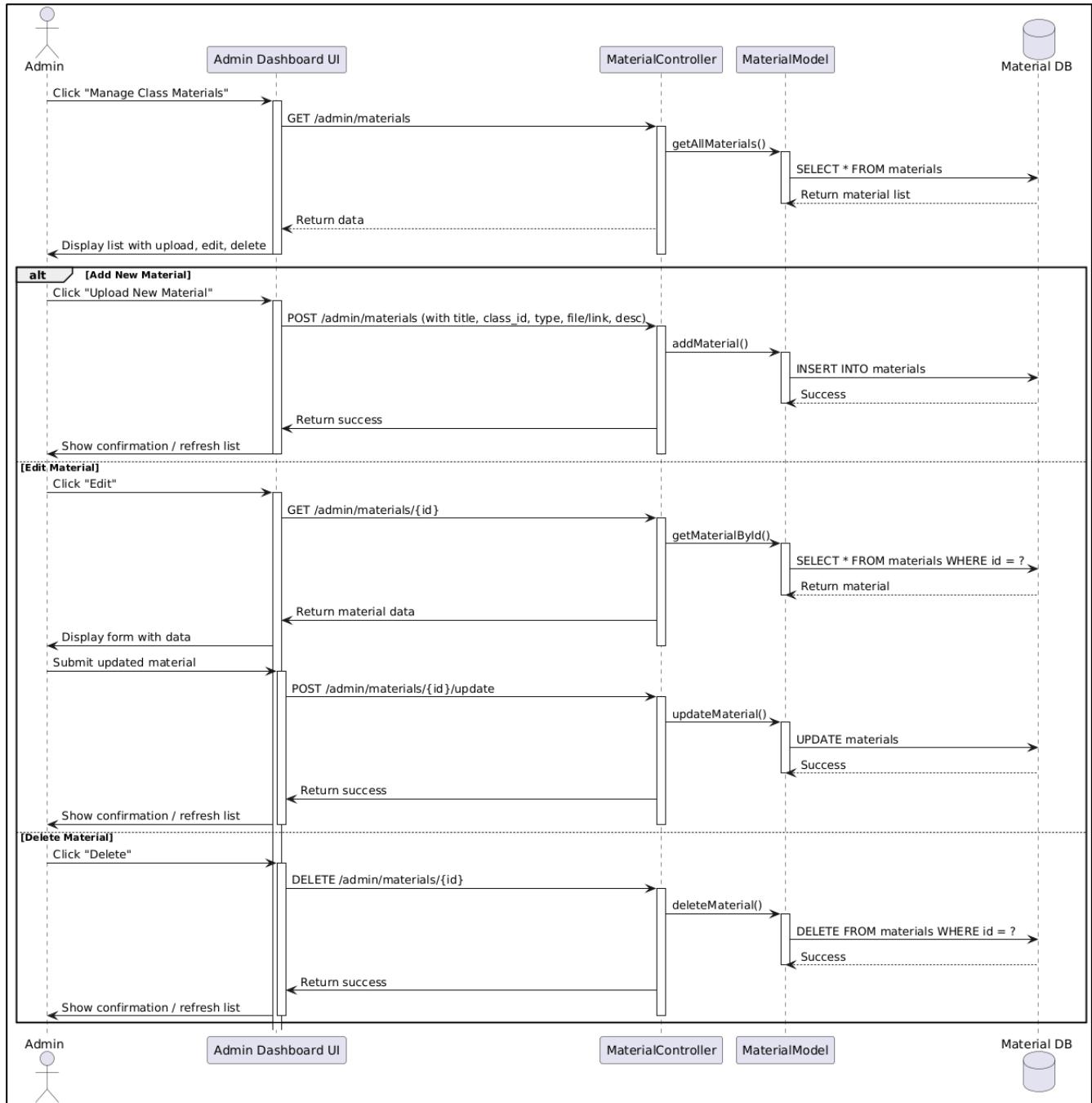


Figure 4.19 Sequence Diagram Manage Class Materials

View Enrolled Students

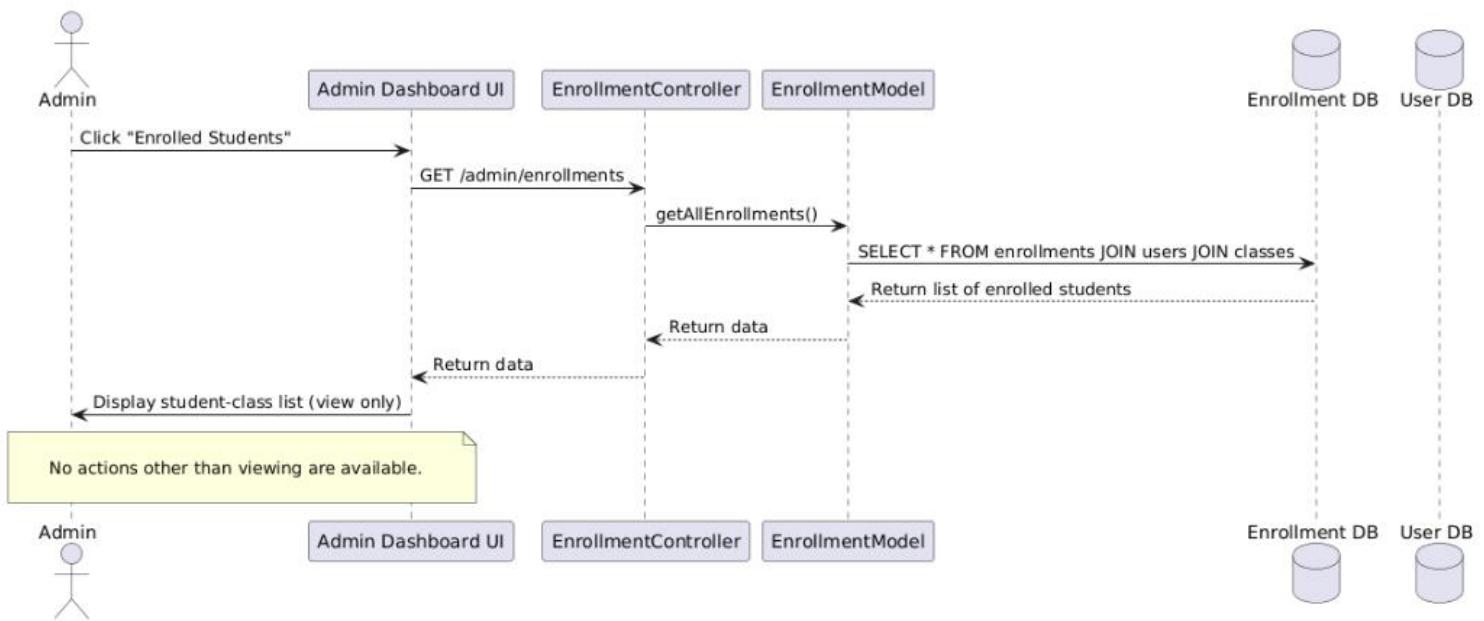


Figure 4.20 Activity Diagram View Enrolled Students

4.8 User Interface Prototype

The User Interface prototype of the Smootea Learning Access & Class Enrollment System is a visual of the main functions of the proposed system. It offers stakeholders a preview of the user interface and feature flow of the system early enough, where they can evaluate and validate it before it is implemented. The prototype is based on core modules which include student registration, joining classes, accessing class content and admin controls like invoice management and material management.

Landing Page

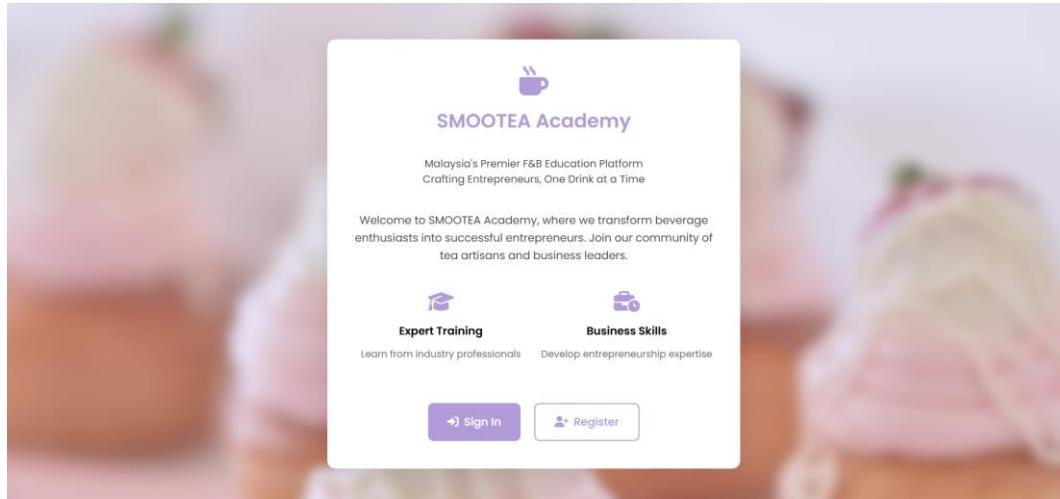


Figure 4.21 Landing Page

The landing page introduces users to SLACES, featuring options to register or log in.

Register Page

The image shows a registration form titled "Join SMOOTEA Academy" with a purple header. Below the title, a subtitle reads "Begin your journey in beverage entrepreneurship education". The form consists of several input fields: "Full Name" (placeholder: "Enter your full name"), "Email Address" (placeholder: "Enter your email address"), "Phone Number" (placeholder: "Enter your phone number"), "Password" (placeholder: "Create a password", note: "Password must be at least 8 characters long"), "Confirm Password" (placeholder: "Confirm your password"). At the bottom right is a purple "Register" button with a key icon. Below the button, a link says "Already have an account? Sign in".

Figure 4.22 Register Page

Registration form for new users, requiring name, email, and password. The system validates inputs and ensures email uniqueness before account creation.

Login Page

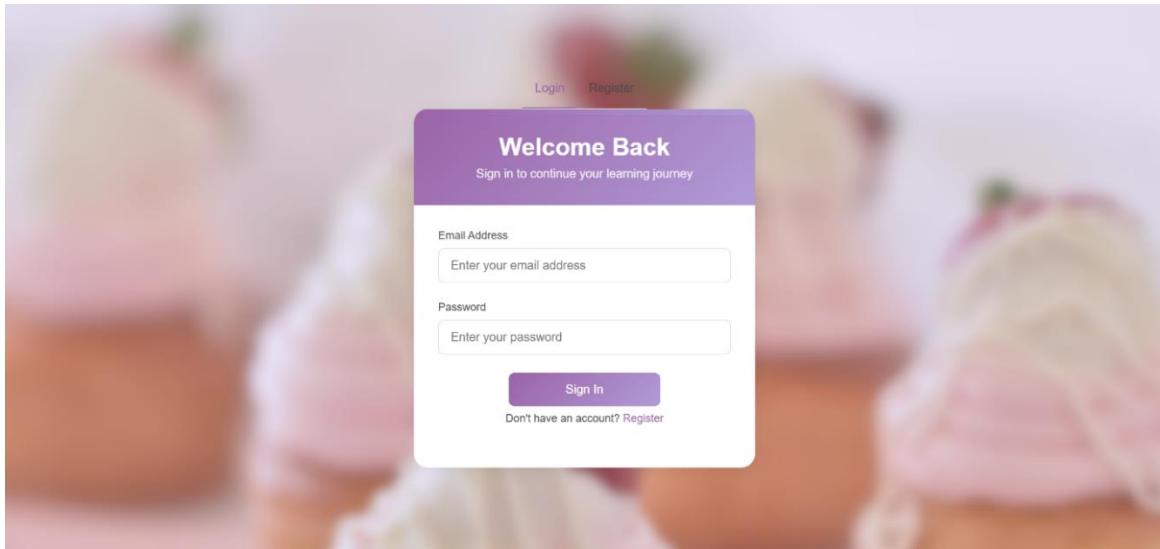


Figure 4.23 Login Page

Login interface for students and admins. Role-based redirection directs users to their respective dashboards upon successful authentication.

Student Dashboard

A screenshot of the Student Dashboard. The sidebar on the left includes links for "Dashboard", "My Classes", and "Modules". The main area shows "Enrolled Classes" (1), "Overall Progress" (25%), and "Learning Materials" (4). A section for "My Progress" displays "Air Balang Vol.1" with "ACTIVE" status, "Progress: 25%", and "1/4 modules". A "Logout" button is at the bottom left of the sidebar.

Figure 4.24 Student Dashboard

Personalized dashboard for students, displaying active classes, recent activity, and progress metrics. Includes quick access to learning resources and support

View My Class Page

The screenshot shows the Student Dashboard with a purple sidebar on the left. The sidebar has the SMOOTEA Academy logo at the top, followed by navigation links: Dashboard, My Classes (which is highlighted in blue), and Modules. Below these are copyright information ('© 2025 SMOOTEA Academy Version 1.0') and a Logout button. The main content area is titled 'Student Dashboard' and 'My Classes'. It features a search bar 'Search classes...'. A large image of various colorful yogurt-based drinks is labeled 'ACTIVE'. Below it, a card for 'Air Balang Vol.1' is shown with a progress bar at 25% completion. Buttons for 'Start Learning' and 'Enrolled: Jul 24, 2025' are present. A green WhatsApp icon is in the bottom right corner.

Figure 4.25 View My Classes Page

List of enrolled classes with titles, instructors, and access buttons. Students can navigate to specific class materials from this centralized view

Module Page

The screenshot shows the Student Dashboard with a purple sidebar on the left. The sidebar has the SMOOTEA Academy logo at the top, followed by navigation links: Dashboard, My Classes, and Modules (which is highlighted in blue). Below these are copyright information ('© 2025 SMOOTEA Academy Version 1.0') and a Logout button. The main content area is titled 'Student Dashboard' and 'Learning Materials'. It features a search bar 'Search materials...'. A filter section allows filtering by 'All Classes' and 'All Types'. Three learning materials are listed: 'Cara Buat Air Balang Yogurt' (Video, Air Balang Vol.1, Jul 24, 2025, View, Mark as Undone), 'Resepi Premium Series Step-by-Step' (Video, Air Balang Vol.1, Jul 24, 2025, View, Mark as Done), and 'Template Kiraan Kos & Resepi' (PDF, Air Balang Vol.1, Jul 24, 2025, View, Mark as Done). A green WhatsApp icon is in the bottom right corner.

Figure 4.26 Module Page

Class materials hub, featuring downloadable/streamable content (PDFs, videos, links). Organized by module for structured learning.

Admin Dashboard

The Admin Dashboard page features a purple sidebar on the left with the SMOOTEA Academy logo and navigation links for Dashboard, Classes, Enroll Students, Invoices, Materials, and Logs. The main content area has a light blue header with the title "Admin Dashboard" and a welcome message "Welcome back, Admin!". Below this are four cards showing system metrics: Total Invoices (3, up 12% from last month), Students Enrolled (3, up 8% from last month), Active Classes (4, up 2 new this week), and Pending Enrollments (0). The "Recent Enrollments" section lists columns for Student, Email, Class, Date Joined, and Status, with a "View All" button. A footer at the bottom shows the copyright information "© 2025 SMOOTEA Academy Version 1.0" and a "Logout" button.

Figure 4.27 Admin Dashboard Page

Admin overview panel showing system metrics (total classes, students, invoices). Provides quick access to management tools and recent activity logs.

Manage Classes

The Manage Classes page follows a similar layout to the dashboard. It includes a sidebar with the SMOOTEA Academy logo and navigation links for Dashboard, Classes, Enroll Students, Invoices, Materials, and Logs. The main area is titled "Manage Classes" and includes a search bar, a status dropdown, and buttons for "Card View" and "List View". Three active class offerings are listed: "Air Balang Vol 1", "Air Balang Vol 2", and "Air Premium & Pudding Series". Each listing includes a thumbnail image, the class title, a brief description, the creation date (2025-07-23), and three small icons for edit, delete, and other actions. A "View All" button is located at the bottom right of the card view area.

Figure 4.28 Admin Manage Classes

Class management interface for admins. Supports CRUD operations (Create, Read, Update, Delete) for class records, including titles and status assignments.

Admin Manage Classes – Add new Class

The screenshot shows the 'Add New Class' form. The 'Class Name' field contains 'Air Balang Vol.I'. The 'Description' field contains 'Learn to make yogurt-based and premium balang drinks with full R&D recipes and tips to start your drink business.' The 'Status' field is set to 'Active'. The 'Created Date' field shows '23/07/2025'. The 'Thumbnail' field has a placeholder 'Choose File No file chosen'. On the right, a preview of the class card is displayed with the title 'Air Premium & Pudding Series' and a small image of three different drink variations.

Figure 4.29 Admin Add New Class

Form to add new classes. Mandatory fields include title, description, and instructor. Ensures data consistency for future enrollments.

Admin Manage Classes – Edit Class

The screenshot shows the 'Edit Class' form for the class 'Air Balang Vol.I'. The 'Class Name' field is pre-filled with 'Air Balang Vol.I'. The 'Description' field contains 'Learn to make yogurt-based and premium balang drinks with full R&D recipes and tips to start your drink business.' The 'Status' field is set to 'Active'. The 'Created Date' field shows '23/07/2025'. The 'Thumbnail' field has a placeholder 'Choose File No file chosen'. On the right, a preview of the class card is displayed with the title 'Air Premium & Pudding Series' and a small image of three different drink variations.

Figure 4.30 Admin Edit Classes

Class editing interface. Admins modify existing class details (e.g., title, description, status and thumbnail) with real-time database updates.

Admin Manage Classes – Delete Class

The screenshot shows the 'Manage Classes' section of the SMOOTEA Academy admin dashboard. A modal window titled 'Delete Class' is open, asking for confirmation to delete the class 'Air Balang Vol.1'. The modal has 'Cancel' and 'Delete' buttons. In the background, there are cards for two classes: 'Air Balang Vol.1' (Active, 2025-07-23) and 'Air Premium & Pudding Series' (Active, 2025-07-23). The sidebar on the left includes links for Dashboard, Classes, Enroll Students, Invoices, Materials, Logs, and Logout.

Figure 4.31 Admin Delete Classes

Confirmation dialog for class deletion. Prevents accidental data loss with a verification step.

Manage Class Materials

The screenshot shows the 'Class Materials' section of the admin dashboard. It displays a grid of materials categorized by type (Video, Link, PDF) and class (e.g., Air Balang Vol.1). Each material card includes a play button, edit icon, and delete icon. The sidebar on the left includes links for Dashboard, Classes, Enroll Students, Invoices, Materials, Logs, and Logout. A 'PRICING strategy' template is also visible on the right side of the screen.

Figure 4.32 Admin Manage Class Materials

Material management panel. Admins upload, tag and organize resources (PDFs, videos) by class, with filtering options for efficiency.

Manage Class Materials – Upload New Material

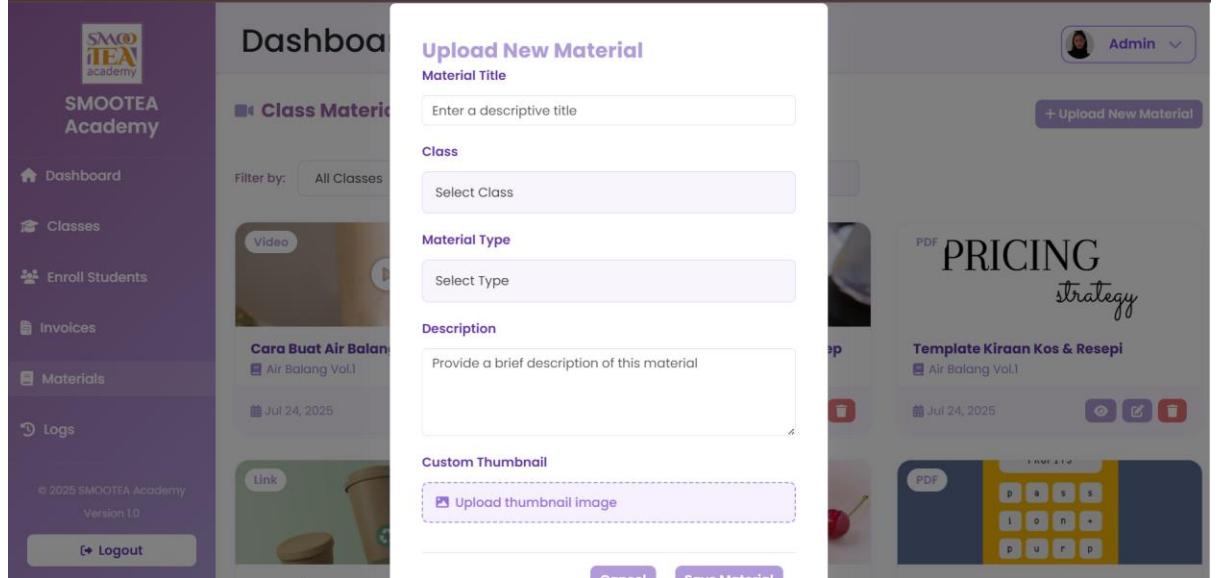


Figure 4.33 Admin Upload New Material

Form for uploading new learning materials. Supports files (PDF, video) or external links, with fields for title, type, and description.

Manage Class Materials – View Material

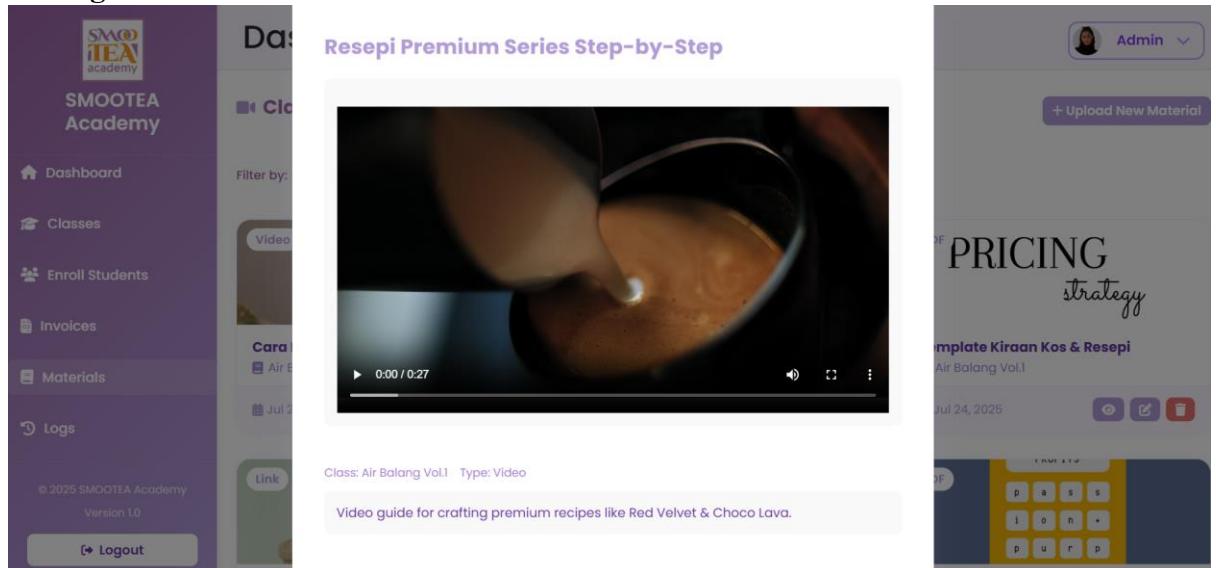


Figure 4.34 Admin View Material

Preview mode for uploaded materials. Admins verify content accuracy before publishing to students.

Manage Class Materials – Edit Material

The screenshot shows the 'Edit Material' form. The material title is 'Cara Buat Air Balang Yogurt'. The class is 'Air Balang Vol.1' and the material type is 'Video'. A placeholder for 'Upload Video' says 'Click or drag to upload video'. The duration is set to 'e.g. 15'. The description is 'step-by-step video on preparing yogurt-based balang drinks using basic tools.'

Figure 4.35 Admin Edit Material

Edit interface for existing materials. Admins update metadata (title, description) or replace files as needed.

Manage Class Materials – Delete Material

A modal dialog box titled 'Delete Material' asks, 'Are you sure you want to delete "Resepi Premium Series Step-by-Step"? This action cannot be undone.' It has 'Cancel' and 'Delete' buttons.

Figure 4.36 Admin Delete Material

Material deletion confirmation. Includes safeguards to prevent unintended removal of critical resources.

Admin Manage Invoices

The screenshot shows the 'Invoices' section of the admin dashboard. It features a table with the following data:

Invoice Number	Student	Class	Amount	Status	Invoice Date	Actions
222	guest guest@gmail.com	Air Balang Vol.I	RM56.00	Used	2025-07-25	
333	Test Guest testguest@gmail.com	Air Premium & Pudding Series	RM16.00	Used	2025-07-25	
111	Student User student@gmail.com	Air Balang Vol.I	RM15.00	Used	2025-07-24	

Figure 4.37 Admin Manage Invoices

Invoice management table. Admins add, edit or delete invoice records to validate student enrollments.

Admin View Enrolled Student

The screenshot shows the 'Enrolled Students' section of the admin dashboard. It features a table with the following data:

Name	Email	Class	Status	Completion	Action
Student User	student@gmail.com	Air Balang Vol.I	Active	26%	
guest	guest@gmail.com	Air Balang Vol.I	Active	100%	
Test Guest	testguest@gmail.com	Air Premium & Pudding Series	Active	33%	

Figure 4.38 Admin View Enrolled Student

Enrollment oversight panel. Admins view enrolled student and their progress.

4.9 The Development of Smootea Learning Access and Classes Enrollment System.

The Smootea Learning Access and Classes Enrollment System is created on the basis of modern technologies and with the help of a modern design solution, which is why it is a powerful and convenient tool that allows managing educational materials, enrollments and access to classes. This section describes the tools and frameworks that are used and the architectural choices that were taken in the development process. It discusses the development environment, system architecture and database design, which are the main components of the system.

It is constructed on Laravel framework, which offers a secure, scalable and maintainable backend that is expressive and easy to develop quickly. Visual Studio Code is the main development environment that provides powerful code editing capabilities and in-built version control that simplify the development process. Laragon has been used to manage servers and local development, which makes it easier to set up and manage Apache, MySQL and PHP services and have a pleasant development experience. The information is stored in a properly designed MySQL database, specifically developed to accommodate the needs of the Smootea Learning Access and Classes Enrollment System. This schema supports administration of users, classes, enrollments, invoices, materials and progress monitoring and provides data integrity and efficient retrieval.

4.9.1 Database design and schema

The database used in this project is called cms_db, which is specially created to assist the activities and data management of Smootea Learning Access & Class Enrollment System (SLACES). It has structured and relational data that contains user registrations, invoice verification records, class data, and online learning materials. The system is based on MySQL to provide efficient processing of queries, scalability and data integrity whilst phpMyAdmin is the graphical user interface (GUI) of database development and management. It is an easy to use and effective environment to perform local testing, data tables management, queries, and data consistency during the development of the system.

	Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/>	classes		5	InnoDB	utf8mb4_0900_ai_ci	16.0 KiB	-
<input type="checkbox"/>	enrollments		1	InnoDB	utf8mb4_0900_ai_ci	48.0 KiB	-
<input type="checkbox"/>	invoices		1	InnoDB	utf8mb4_unicode_ci	32.0 KiB	-
<input type="checkbox"/>	logs		22	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/>	materials		16	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/>	migrations		13	InnoDB	utf8mb4_unicode_ci	16.0 KiB	-
<input type="checkbox"/>	progress		1	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/>	users		3	InnoDB	utf8mb4_unicode_ci	32.0 KiB	-

Figure 4.39 Table of database table

Table 4.13 Database table summary

Table Name	Description
users	Stores user account information. Common fields include id, name, email, password, role (admin, student), avatar, and timestamps.
progress	Tracks a user's progress on specific class materials. Typically records which materials a user has completed, completion status, and timestamps.
migration	Tracks the migrations that have been run in the Laravel application. This table is managed by Laravel to keep the database schema in sync with the codebase.
classes	Stores information about each class. Includes fields like id, title, description, status, thumbnail and timestamps.
invoices	Holds invoice records including invoice number, student email, and the class associated with the purchase.
enrollments	Maps students to the classes they are enrolled in, linking the user and class based on a valid invoice.
materials	Stores learning materials for each class, including title, file path, content type, and upload timestamp.
logs	Stores system or user activity logs for auditing and tracking actions within the system. May include user actions, timestamps and details of changes or events.

Figure 4.40 is a depiction of the ERD of the important entities, which are associated with one another in the database system. It provides pictorial representation of data flow across the tables. gives a concept of the database structure.

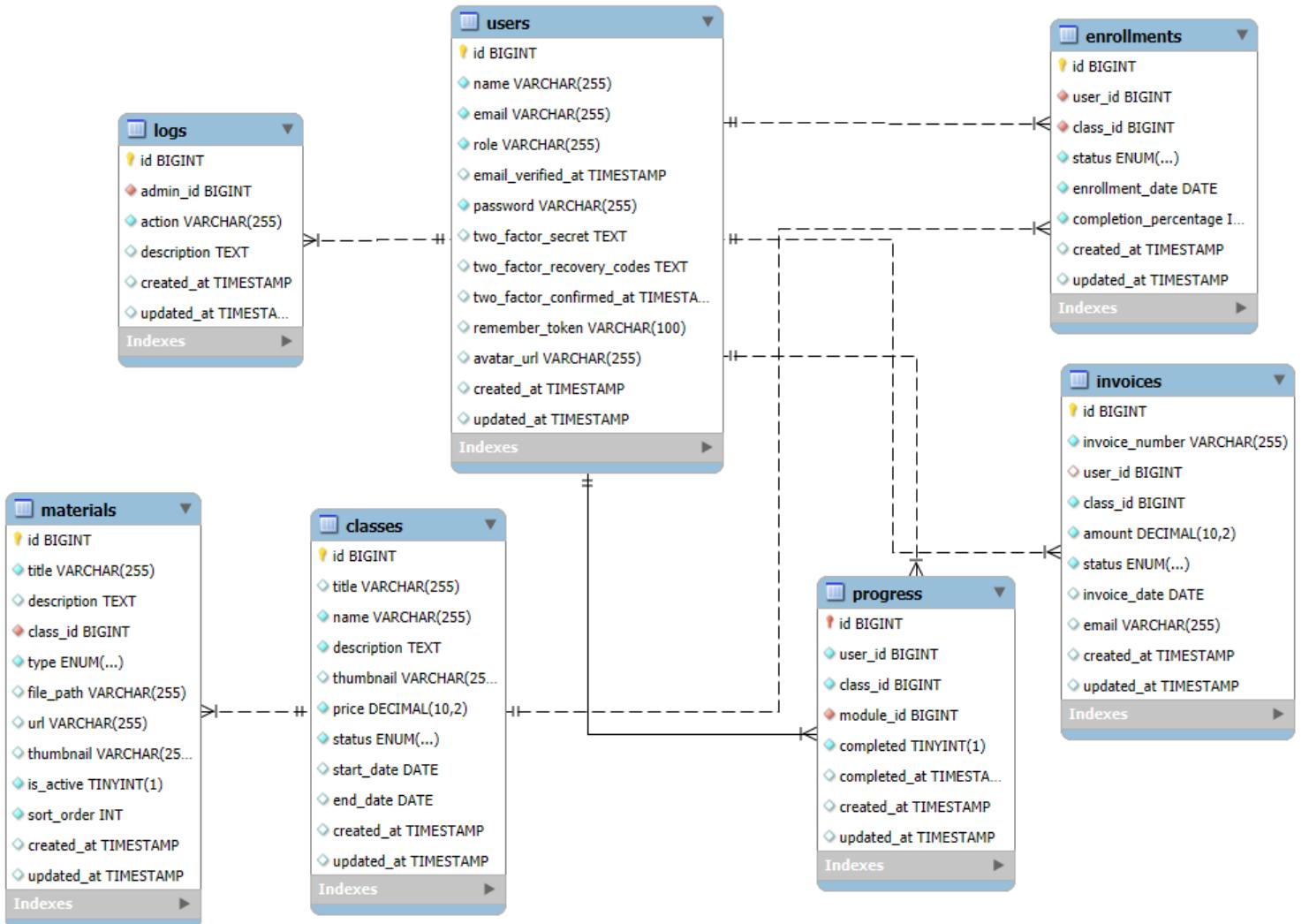


Figure 4.40 Entity Relationship Diagram

4.9.2 System Design and Framework Structure

The Smootea Learning Access and Classes Enrollment System design and architecture were created based on the Laravel framework that follows the MVC (Model-View-Controller) design pattern. Laravel was chosen because of its broad capabilities and versatility, which is great in creating powerful and scalable web applications. MVC structure encourages separation of concerns the model is the data logic, the view is the presentation layer and the controller mediates between the model and view. Such a method leads to a clean and sustainable codebase. Figure 4.41 shows the Laravel

project directory structure in the file explorer, which gives an idea of the way the elements of the system are arranged.

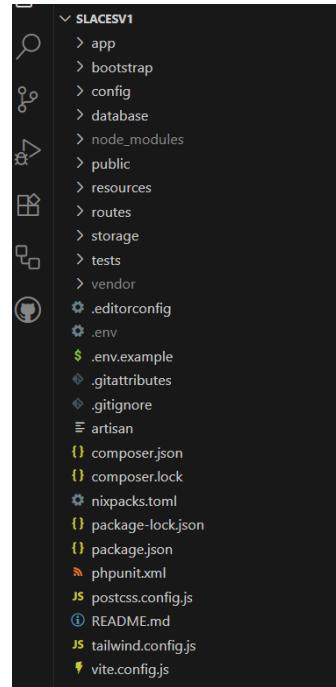


Figure 4.41 Laravel Project Directory

```

class Model extends Eloquent
{
    use HasFactory;

    protected $table = 'classes';

    protected $fillable = [
        'title',
        'description',
        'status',
        'thumbnail',
        'start_date',
        'end_date'
    ];

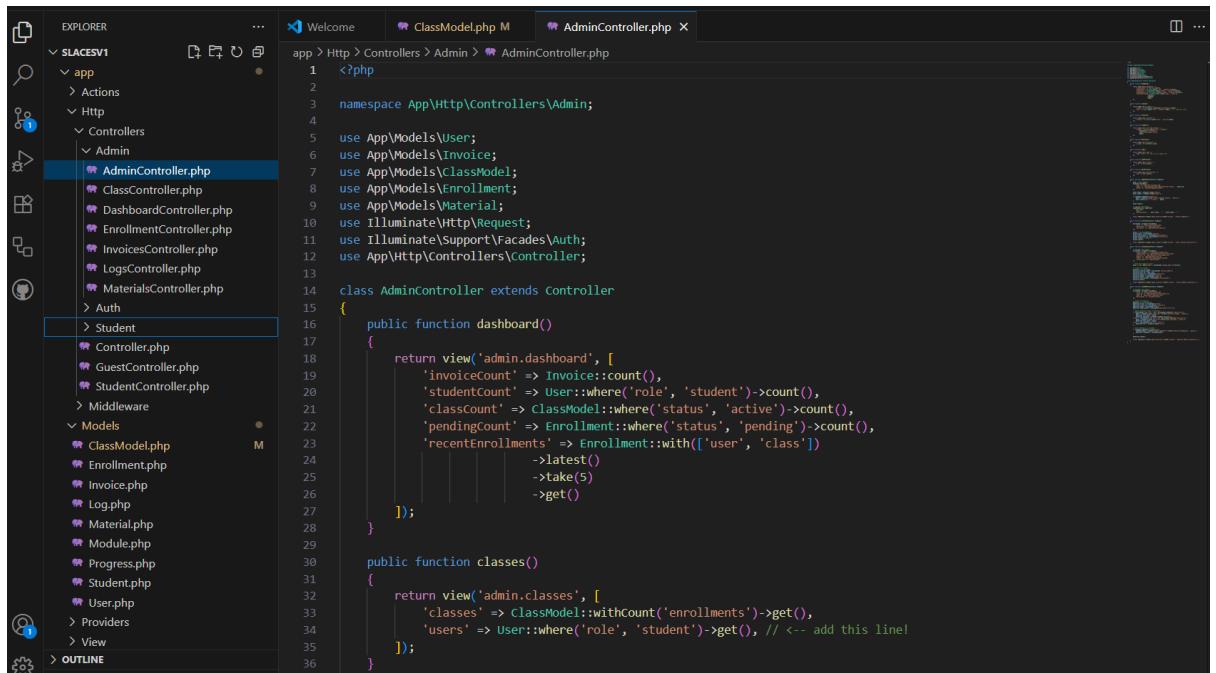
    protected $casts = [
        'price' => 'float',
        'start_date' => 'date',
        'end_date' => 'date',
        'created_at' => 'datetime',
        'updated_at' => 'datetime'
    ];
}

/**
 * Get the enrollments for this class
 */
public function enrollments()
{
}

```

Figure 4.42 Laravel Model

Figure 4.42 demonstrates the model applied in the Smootea Learning Access and Classes Enrollment System. This model establishes the data structure and clearly created the connection between different data fields. It also captures the business logic that is needed to maintain data integrity when performing database functions like updating and retrieving records. The model also describes the mass assignable columns, which simplifies the work with data and improves security, as it is possible to specify which fields can be changed via mass assignment.



The screenshot shows a code editor interface for a Laravel application named 'SLACESV1'. The left sidebar (EXPLORER) displays the project structure under 'app' (Actions, Http, Controllers, Models, Providers, View). The 'Controllers' section contains several files: AdminController.php, ClassController.php, DashboardController.php, EnrollmentController.php, InvoicesController.php, LogsController.php, MaterialsController.php, and StudentController.php. The 'AdminController.php' file is currently selected and open in the main editor area. The code is as follows:

```

1 <?php
2
3 namespace App\Http\Controllers\Admin;
4
5 use App\Models\User;
6 use App\Models\Invoice;
7 use App\Models\ClassModel;
8 use App\Models\Enrollment;
9 use App\Models\Material;
10 use Illuminate\Http\Request;
11 use Illuminate\Support\Facades\Auth;
12 use App\Http\Controllers\Controller;
13
14 class AdminController extends Controller
15 {
16     public function dashboard()
17     {
18         return view('admin.dashboard', [
19             'invoiceCount' => Invoice::count(),
20             'studentCount' => User::where('role', 'student')->count(),
21             'classCount' => ClassModel::where('status', 'active')->count(),
22             'pendingCount' => Enrollment::where('status', 'pending')->count(),
23             'recentEnrollments' => Enrollment::with(['user', 'class'])
24                 ->latest()
25                 ->take(5)
26                 ->get()
27         ]);
28     }
29
30     public function classes()
31     {
32         return view('admin.classes', [
33             'classes' => ClassModel::withCount('enrollments')->get(),
34             'users' => User::where('role', 'student')->get(), // <-- add this line!
35         ]);
36     }
}

```

Figure 4.43 Laravel Controller

The logic of the controller which drives SLACES is shown in figure 4.43. Controllers are the interface between models and views and they receive requests, perform business logic and provide the correct data to the user interface. Controllers are important in ensuring responsiveness and reliability of systems since they control the flow of data between the backend and frontend.

The screenshot shows the VS Code interface with the following details:

- EXPLORER** view: Shows the project structure for "SLACESV1". It includes the "app" directory, which contains "Models" (Log.php, Material.php, Module.php, Progress.php, Student.php, User.php), "Providers", "View Components" (bootstrap, config, database, node_modules, public, resources, css, js, markdown), and "views" (admin, api). Under "views/admin", there are partials (classes.blade.php) and files (dashboard.blade.php, enrolled-students.blade.php, invoices.blade.php, logs.blade.php, materials.blade.php, profile.blade.php).
- CODE** view: Displays the contents of "dashboard.blade.php". The code is a Blade template with the following structure:

```

1  @extends('layouts.admin')
2
3  @section('content')
4      <div class="welcome-section">
5          <h1 class="welcome-title">Admin Dashboard</h1>
6          <p class="welcome-text">Welcome back, {{ Auth::user()->name }}!</p>
7      </div>
8
9      <!-- Stats Grid -->
10     <div class="stats-grid">
11         <!-- Total Invoices -->
12         <div class="stat-card">
13             <div class="stat-card-header">
14                 <div>
15                     <div class="stat-card-title">Total Invoices</div>
16                     <div class="stat-card-value">{{ number_format($invoiceCount) }}</div>
17                 </div>
18                 <div class="stat-card-icon invoices">
19                     <i class="fas fa-file-invoice"></i>
20                 </div>
21             </div>
22             <div class="stat-card-footer">
23                 <i class="fas fa-arrow-up"></i> 12% from last month
24             </div>
25         </div>
26
27         <!-- Students Enrolled -->
28         <div class="stat-card">
29             <div class="stat-card-header">
30                 <div>
31                     <div class="stat-card-title">Students Enrolled</div>
32                     <div class="stat-card-value">{{ number_format($studentCount) }}</div>
33                 </div>
34                 <div class="stat-card-icon students">
35                     <i class="fas fa-users"></i>
36                 </div>

```
- OUTLINE** and **TIMELINE** views: These are standard VS Code navigation tools.

Figure 4.44 Laravel View

Figure 4.44 includes the Blade view which displays the data in SLACES. The view provides a responsive interface as example to show enrolled students or available classes- based on table layouts and dynamic rendering that makes it easy to use by the administrators and users. The Blade templates make the information available and easy to handle, facilitating such activities as viewing enrollment information, tracking progress, and class information.

The MVC pattern used in the Laravel framework makes SLACES well-structured and scalable. This feature enables future improvements to be made without much disturbance since changes in one layer (model, view and controller) do not necessitate major revisions or changes in the other. In general, the architecture is maintainable and adaptable as the system changes to support new requirements.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

This chapter concludes the final report and addresses its limitations and recommendations for future work.

5.1 Conclusion

The Waterfall Model as the methodology chosen to be used in this project was critical in ensuring success of the Smootea Learning Access & Class Enrollment System. This linear method enabled systematic planning and execution of the project from the initial requirement gathering to the final deployment phase, which is consistent with the stable and well-defined scope of the project. The main goal of the system was to resolve the inefficiencies of the manual class enrollment process of SMOOTEA Academy. Previously, class access relied on third-party platforms such as Facebook, where students were manually accepted using invoice passwords. This caused unwarranted delays and administrative workload.

The project started with the intensive requirements gathering, which involved the analysis of the existing issues related to manual class enrollment and access at SMOOTEA Academy. This led to a precise definition of user needs system functionality, and operating limitations, so that the solution could take into account all critical areas.

A system design was done based on the requirements identified. This involved the architecture, user interface prototypes, database schema and the interaction of components all designed to facilitate secure, efficient and user-friendly class enrollment and access to learning.

The implementation of the system was effective and the Waterfall Model was used to achieve this goal, which provided a complete platform. SLACES has gained centralized, automated class enrollment, secure invoice validation, and student and administrator-specific dashboards to enhance efficiency and the user experience.

With this system, a safer and centralized enrollment process was adopted. The students will now be expected to log in with the same email address they used to make the payment and enter their special

invoice number to access their designated classes. This process minimizes the dependency on the approval of the admins and still preserves the integrity of access controls. The platform was also designed to be user-friendly and has dedicated dashboards depending on the user roles. Students are able to easily view and manage their unlocked classes and the administrators have tools to manage the content of classes, enrollment and assigning invoice codes.

On the whole, the system served its purpose of making the access to classes easier, automating routine work and providing a scalable solution to future digital learning requirements at SMOOTEA Academy. The result was in line with the initial objectives and offered an improved alternative to manual verification, improving administrative efficiency as well as the student learning experience.

5.2 Limitation

Although the Smootea Learning Access & Class Enrollment System was developed and implemented successfully, a number of limitations were experienced in the process. Although the Waterfall Model is quite useful in directing the structured development of this project, it is not very flexible in terms of managing changes in requirements after the development process has commenced. This complicated the ability to make scope changes following the design process, particularly as input was obtained through supervisor and reality checks.

Moreover, the system was designed on the basis of the needs and business organization of SMOOTEA Academy. It had features that were specific to the operations of the academy, including invoice-based access and role-based dashboards. Therefore, the system can be not directly applicable to other educational institutions with other workflows or enrollment systems of a larger scale without a substantial customization.

The other limitation is that it does not integrate with other services like payment gateway or social media. Access verification was done manually based on preloaded invoice records as opposed to real-time payment validation due to limited technical capability and time constraints. This might cause possible abuse when users share invoice numbers with unauthorized persons but these risks were reduced by using one-time-use code validation logic.

Moreover, the system was constructed with simple user management and tracking of classes. More advanced functionalities like attendance tracking, learning progress analytics, and real-time notifications were deemed out of scope because of development constraints and time constraints. Although the current system addresses the goals it was designed to achieve, these drawbacks indicate that it can be improved in the future.

5.3 Recommendations for Future Work

To enhance and enlarge the functions of the Smootea Learning Access & Class Enrollment System, several suggestions can be given in the future. Despite the fact that the Waterfall Model offered a well-structured and clear development process, the subsequent versions of this system may be improved by implementing more flexible Agile model. This would enable subsequent refinement and a more responsive approach to user feedback, particularly in the event of a scale-up or modification of the system to other educational contexts.

The other major improvement that should be made in future is integration of real-time functionality like a payment gateway to automatically approve purchases and eliminate manual matching of invoices. This would enhance the security of the system, discourage unauthorized access and even automate the enrollment process further. Also, OTP or email verification might be introduced to check the validity of student registrations.

To enhance the learning process, the upcoming versions of the system may feature the attendance tracking, the ability to download the certificates, the learning progress indicators, and the in-class quizzes. These features would enhance the performance of the platform as a learning management system and provide additional value to students and instructors. In addition, the incorporation of real-time messaging (a secure WhatsApp chatbot or in-app messaging) would provide faster assistance to those students that encounter problems when enrolling or accessing classes, further eliminating the need to rely on the administration.

Finally, the implementation of the system into a wider educational context, e.g., external tuition centers or institutions, might allow gaining more insight into its scalability and flexibility. Constant testing by users of the various user groups would also assist in perfecting the usability of the system, its security and general effect.

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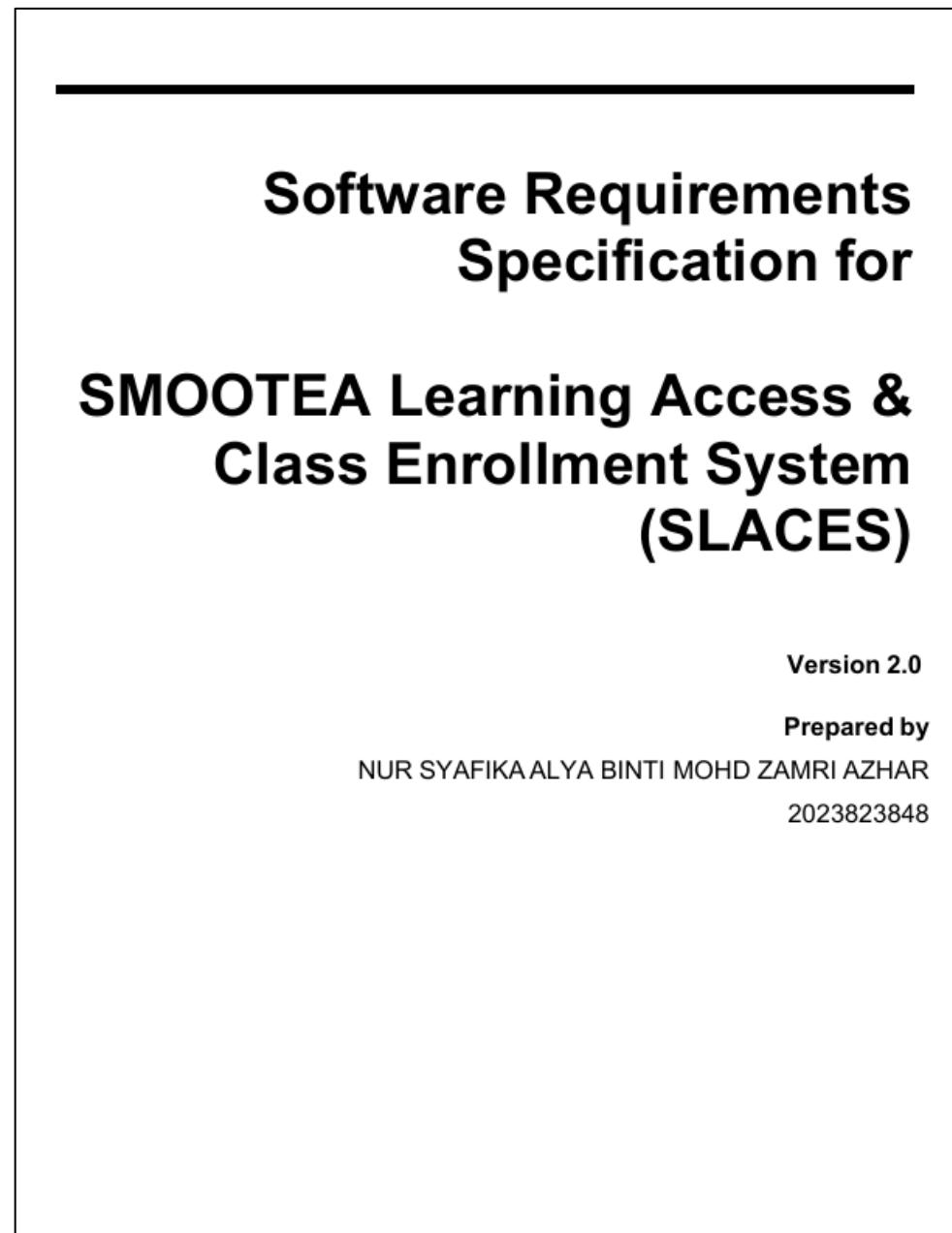
APPENDICES

Appendix A.1: Interview Questions

<p style="text-align: center;">Due to the stakeholder's limited availability for a verbal interview, some of the data was obtained by submitting written questions for them to answer at their convenience.</p>		
Q. ID	Question	Answer
Company Overview		
Q1	How long has this company been established?	This company has been established for 4 years and was founded at the end of 2021 during the MCO 3.0.
Q2	How many branches do you have?	Prior to shifting focus to education, SMOOTEA had 3 F&B outlets located in Kajang, Shah Alam, and Kuantan. However, since December 2023, the physical F&B outlets have been closed, and the company now operates as an educational platform for beverage entrepreneurs.
Q3	How many workers do you guys have in each branch?	Currently, SMOOTEA operates with a central team of 4 headquarters staff who handle operations related to the educational and training business, including class management, content creation, and student support.
Business Challenges & Management		
Q4	Have you ever gathered any feedback from your partner or workers regarding management of the business?	Yes, feedback is collected through one-time manual evaluation forms, where team members assess each other. These are then reviewed and approved by the Admin or HR.
Q5	What is your approach to innovation and staying competitive in this business?	SMOOTEA focuses on launching new classes based on current trends and market demand.

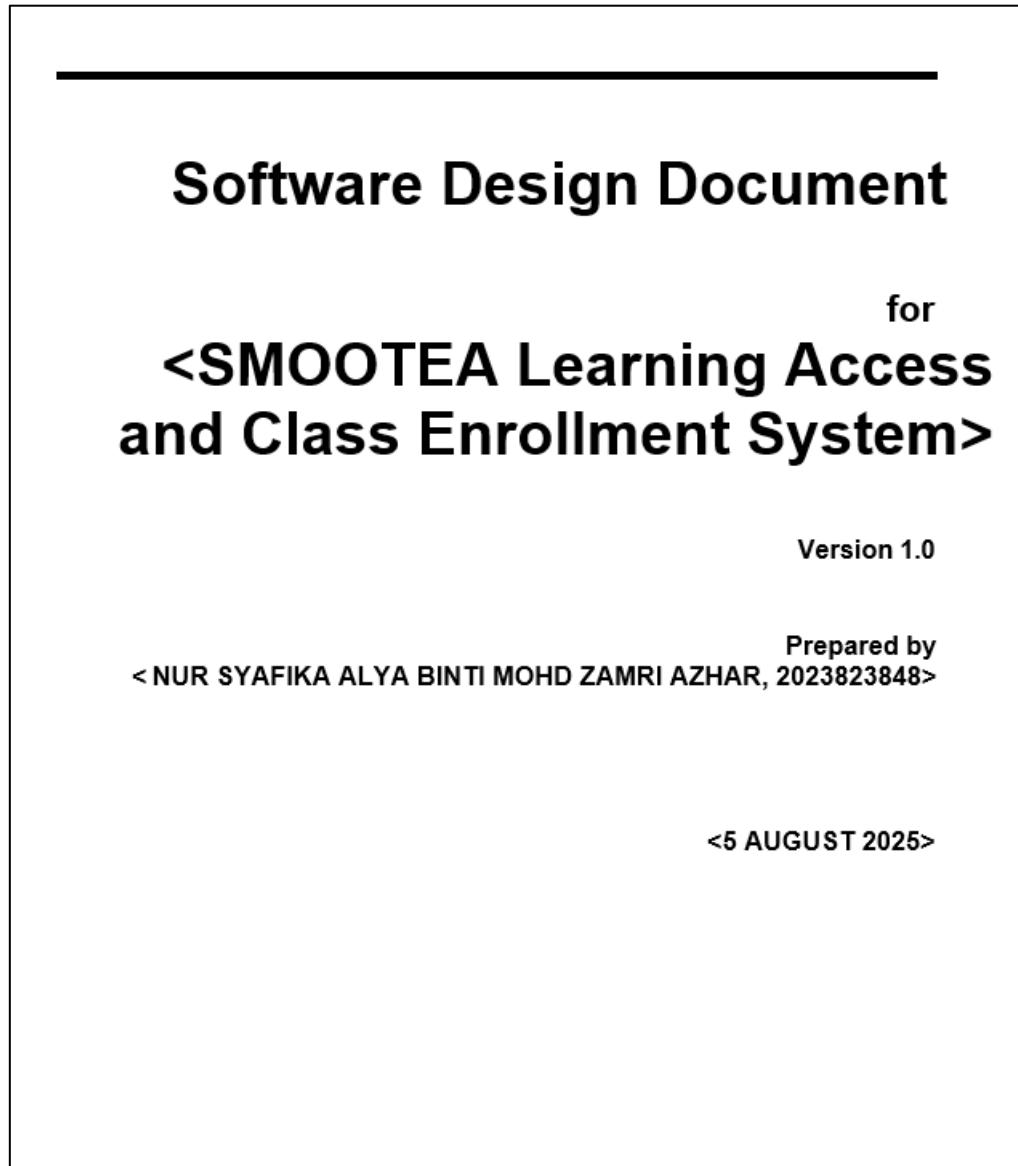
INTERVIEW

Figure A.1 Interview questions to Stakeholder



Link: [Software Requirement Specification](#)

Figure A.2 Software Requirement Specification (SRS)



Link: [Software Design Document](#)

Figure A.3 Software Design Document

Appendix A.4: Gantt Chart



Figure A.4 Gantt Chart