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PATHWAY+

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PATHWAY+

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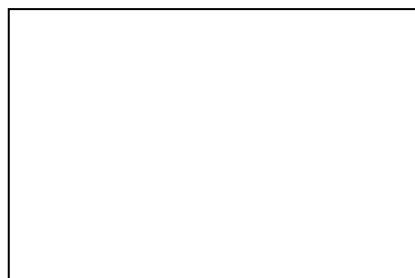
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Abstract

Pathway+ is an online system specifically designed in efforts towards addressing the growing issue of occupation and skill mismatch in graduates in Malaysia. It wants this transition between what can be taught in academics and what industry needs through provision in aiding careers and in computing skills. It wants it at university undergraduates and recent graduates that typically lack smoothness in what they have and what industry immediately needs in the labour market.

It follows the process of software development using Agile, as a result of which any enhancement can be included in the cycle in iterations. Incrementally functional modules were developed, which were personalized recommendations for jobs, personalized study material, mentor forums, resume builders, and work-at-home jobs. User requirements and system requirements were determined through interviews and surveys and were analyzed using diagrams like use case, and flowchart.

The ultimate-product, Pathway+, will offer users an integrated system in assisting them in making sensible and effective occupational choices and improving marketability in the job market. Preliminary reviews reflect that users will be able to make use of the system in the skills gaps analysis, Resume smoothenng, and exposure towards related work vacancies. This finding resonates with the potentiality of the system in solving graduate unemployment and building information-literate graduates in Malaysia.

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1 INTRODUCTION

1.1 Introduction

The Pathway+ is an online career and skill development platform developed to overcome the current digital skill and career mismatch among Malaysian graduates. The background of the project describes the problem areas, the goals of the project and the users for whom the project is intended. These are important to contextualize what the system is for and why it was designed. This chapter also highlights the background of the project as a response to graduate unemployment, underemployment and the context of the application of the solution promoted by Pathway+. By the time we wrap things up in this chapter, the importance of the system and the impact that can be made will become clear.

The background explains the problems encountered by recent graduates when transitioning from study to work. Increasingly, graduates have been found to be under employed due to the non-alignment of academic skills with required industry skills (Jeffri & Abdul Rahim, 2023). Historical approaches to job search and skill development like manual, career counselling, outdated job boards, and non-individualised training yield inefficiencies, missed opportunities and exposure only to limited, traditional digital job markets. Against the backdrop of rapid development of remote work, freelancing, and artificial intelligence-enabled recruitment algorithms, which change the needs of employers and hiring practices, there is a need for graduates to have easier access to integrated solutions along the continuum of the career readiness process (Tee et al., 2024).

The description of the problem says there are three key obstacles faced by Malaysian graduates: not-the-right-skills for job trends, lack of exposure to upcoming digital careers, such as freelance or remote roles, and limited access to affordable and relevant upskilling tools. These are in line with recent reported on the plight that over 70% of Malaysian graduates are seated in mismatch jobs and talents, pointing towards the systemic underemployment and overeducation (Malaysian Employers Federation, 2025; Khazanah Research Institute, 2023). The Repeat Escape Manual methods of preparing for and getting a job are obsolete and frequently result in wasted effort, frustration and lost opportunities. With no centralised point for guiding, preparing and matching users with career opportunities, the transition into work is disorganised and disconnected.

To overcome these obstacles, Pathway+ will create an online platform that offers live job places, tailored learning material, and tailored careers advice to users, based on their profiles and interests. The system will include a mentorship forum, resume builder and smart career assessments, he said. These features will mirror best in practice from successful platforms such as LinkedIn Learning at Coursera that map educational content to job market data to improve employment outcomes (LinkedIn, 2023; Coursera 2023). The key focus is to mitigate graduate unemployment, promote job-ready skills, and subsequently, making a contribution, in developing a digital capable work force for Malaysia.

1.2 Project Background

It's not easy for the recent grads or the students to make the transition to the workforce. Most of them also find it challenging to get suitable jobs where they get stuck with the mismatch between their educational qualification and growth requirements of the digital economy. With the advent of remote work, the gig economy and rapid disruption from technology, job seekers today need more than just professional experience – they also need digital skills that are in high-demand. But, not all students have the facilities or support to help them navigate these transitions. This has led to a higher unemployment and underemployment rates among graduates in Malaysia.

The Pathway+ was suggested as a solution to these problems. They are an online career development and skills coaching platform that helps university students and recent grads navigate their way from education towards employment. It provides personalized career path recommendations, access to a curated list of online learning resources, and aggregating job listing in real-time—freelance and remote jobs are listed alongside full-time roles. Collating all these resources into a one stop platform, Pathway+ assist users enhance their employability and readiness for the contemporary workplace.

This system is targeted to the potential users, which consist of Malaysian undergraduates' in their final year and the fresh graduates from local universities that actively looking for a job or to enhance their career. There would also be interest from academic supervisors and university career centres to track student progress and provide careers advice and job placement assistance.

The group that is developing the WebCTU3 system is an undergraduate UOW Bachelor of Information Technology group of students enrolled in CT204 (Application Development) subject. It seeks to cut down on the preparation time for careers with digital tools and one-stop informations. In the end, Pathway+ contributes to the national agenda of readying themselves for careers by revolutionizing the way students learn about, prepare for, and access the job market.

1.3 Problem Statement

1.3.1 Graduate Skill Mismatch with Industry Demands

The academic credentials of university students and fresh graduates in a number of Malaysian universities lack the digital and practical dimensions that employers expect. This discrepancy causes high unemployment or underemployment rates, with graduates forced to accept jobs outside their specialty or toiled in jobs for which they were overqualified. The absence of a formalized system of guidance and career preparation has also aggravated the situation which further results in a large percentage of graduates being unprepared for the job market (Jeffri & Abdul Rahim, 2023).

1.3.2 Limited Access to Career Development Resources

Access to these affordable, high-quality career development tools—think online courses, resume platforms, and career guidance services—remains out of reach for many students. Most of the available solutions are completely generalised, costly or dispersed across a number of different websites. This results in a situation whereby students and graduates do not know where to look for opportunities, what skills to acquire and whether they can receive guidance or know they have anyone to turn to (Khazanah Research Institute, 2023; Tee et al., 2024).

1.3.3 Lack of Exposure to Digital Job Markets

And as more of the world's labor pool moves online to remote and flexible freelancing gigs, students often have little idea of how to get there or how to prepare themselves. A lot of them can be found on things like job portals or campus hiring initiatives but these are quite analog and do not represent the change in the job world that we are currently going through. There is no real time-integration with job offerings, also remote (i.e., from other countries), and gig-job opportunities are not fully accessible (Malaysian Employers Federation, 2025).

1.4 Project Objectives

1.4.1 To Curate High-Quality Learning Resources for Graduate Upskilling

The system will feature curated online courses and certifications that are accessible and relevant to current market demands. These learning resources will support continuous professional development and empower users to bridge the gap between academic knowledge and practical workplace skills.

1.4.2

1.4.3 To Develop A Web-Based Platform That Offers Personalized Career Path Suggestions Based On User Profiles And Industry Trends.

Pathway+ aims to provide a centralized digital platform to help university students and fresh graduates navigate their transition from academic life to employment. This includes personalized career path recommendations based on user profiles, qualifications, and industry trends. The system will guide users toward relevant roles by offering tailored suggestions that reflect current job market needs.

1.4.4 To Provide A System That Employer Can Create Jobs For Student To View And Apply

The system will integrate external job listing APIs to display up-to-date employment opportunities, including freelance and remote roles. This function will expand the career options available to users and connect them to non-traditional but in-demand employment paths, helping them explore broader opportunities in Malaysia's growing digital economy.

1.5 Scope and Target User

Project scope encompasses all of the work and function it takes to get from the beginning to the end of the project itself. This is all about identifying what's in scope, as well as what isn't, so that scope doesn't expand and focus can be managed. While project scope describes the activities to be undertaken, the deliverables, the deadlines, as well as how the project will be managed, product scope on the other hand lists the features and functions of the end product.

1.5.1 Project Scope

The Pathway+ system project will entail requirements capture, design, development and testing of a web-based system that will aid the university students and the new graduates in Malaysia to get ready to join the digital workforce. The questionnaires and unstructured interviews with students and young alumni were used to collect information aimed at determining issues that are common in relation to job readiness, digital career guidance, and access to the upskilling opportunities.

It will take approximately three to four months to develop the system with the use of the Agile methodology and taking into account feedback that will arise already in the initial stages of development. The functionalities available consist of user authentication system, career advice feature using Google in order to give the suggestions tailored to the users profiles and unemployed trends, tailored learning content and resume builder. The backend of the platform would be developed with MySQL and phpMyAdmin, and

the front would be made using HTML, CSS, and JavaScript, and the UI/UX will be developed with Figma. At the completion of the project, a full system will be provided that will enhance access to digital careers and skill development tools among pupils.

1.5.2 Product Scope

Pathway+ is an online portal tailored to assist Malaysian university students and fresh graduates in forming a bridge between education and the working world. It provides tailored job advice, online curated courses and job opportunity postings, both remote and freelance. Users can develop a personal profile, and they will get some live real-time career suggestions depending on what they are best at and what they like. Recommendation of most pertinent trainings and certifications related to their field will also take place. The listings of jobs and internships will be aggregated by API scrapping of current job websites.

Other capabilities are resume builder, online career readiness checklist, and mentorship message boards. The platform will also be mobile friendly and user intuitive thus creating ease of use and user path. The secure access on a role base will mean that the data and modules can only be accessed by the user pertinent to his/her role. The platform will be scalable and reliable because all information will be kept secure and managed with the help of MySQL and phpMyAdmin. Pathway+ looks at simplifying the process of finding employment, upskilling, increasing employability, and enabling users to pursue the best opportunities in Malaysian digital economy.

1.5.3 Target User

The Pathway+ system is intended for several key user groups, primarily made up of individuals transitioning from academic study to employment. These users play critical roles in ensuring that the system remains useful, functional, and impactful.

1.5.3.1 University Students

Undergraduate students—especially those in their final year—who are seeking to understand and prepare for available job opportunities in the digital economy. These students often lack practical exposure to career planning and require a centralized platform to receive career suggestions, explore learning resources, and apply for jobs that match their interests and qualifications.

1.5.3.2 Fresh Graduates

Recent graduates who have completed their academic programs and are actively searching for employment or upskilling opportunities. They benefit from real-time job listings, access to relevant

certifications, and tools to help enhance their resumes and digital literacy. These users may also be seeking freelance or remote roles as entry points into the workforce.

1.5.3.3 Admin

The system administrators, who have the duty to control the operations of the platforms, access to the same and data integrity. The admins should be able to look at the activities of users, modify or approve job and course postings, moderate mentorship forums, and also take care of the quality of the contents on the platform. Their skills cannot be ignored to ensure the productivity, safety, and applicability of the system to all user interfaces.

1.6 Overview of This Report

This document details the development of the Pathway+ system, including an introduction to the project background, problem statements, aims, scope and target users. It introduces the rationale for the system and illustrates the main challenges it wants to tackle, especially concerning graduates' employability and digital career readiness. This paper lays the groundwork for the project by covering the needs of a central point of information and resources to help students as well as alumni through the job searches. More detail on the research, methodology, design and implementation is given in the next sections to help further clarify the procedure that results into meeting the system objectives.

2 LITERATURE REVIEW

2.1 Introduction

Aim of the Chapter This chapter combines existing research on systems and digital platforms that address graduate employment outcomes and the development of graduates' digital skills. The aim of this review is to explore the issues that the university student body as well as the recent graduate population experience when struggling to enter the labor market and to find how the existing solutions tackle these issues. It also underscores the critical role that technology has in closing the skill gap and connecting young jobseekers to relevant job opportunities. These findings justify the creation of the Pathway+ program.

2.2 Investigation

This section explores key themes that inform the development of the Pathway+ platform. It includes a review of graduate employability issues, the role of digital learning in skill development, and the importance of real-time job market integration.

2.2.1 Graduate Employability and Skill Mismatch

Jobless and underemployed graduates are still a problem in Malaysia. A lot of graduates are over-qualified but don't have much practical and digital skills that the industry need (Khazanah Research Institute, 2023). When graduate supply fails to meet the demand for what graduates can do, low job placement levels, underemployment of skills, and economic waste may result. This underscores the necessity for a response that provides students with practical skills and is in tune with emerging industry trends.

2.2.2 Importance of Digital Learning Platforms

The adoption of digital platforms like LinkedIn Learning and Coursera has fundamentally changed how professional development is delivered. They provide self-paced and flexible courses and certifications based on the industry demands. AI-driven recommendations are also used to nudge the users for relevant learning paths (Coursera, 2008). By incorporating such learning resources into a career guidance system, the readiness of the users for the digital jobs can be further improved.

2.2.3 Real-Time Job Matching and Exposure to Remote Work

Many graduates are ill-informed about, or removed from, the world of freelance, part-time, and remote work. Marketplaces such as JobStreet, Jobsora and MyFutureJobs collect all these listings, but they can be overcrowded or not provide personalised recommendations. Pathway+ searches job listing engines via an API, and filters for user's profiles, and helps to provide easier access to job opportunities and match students for roles that are in high demand.

2.3 Related Works

These three systems were chosen for a comprehensive analysis of their existing functions and features, facilitating a comparison of their respective advantages and disadvantages. This process will culminate in a discussion aimed at identifying valuable ideas for integration into the new project system, Pathway+.

2.3.1 Project A

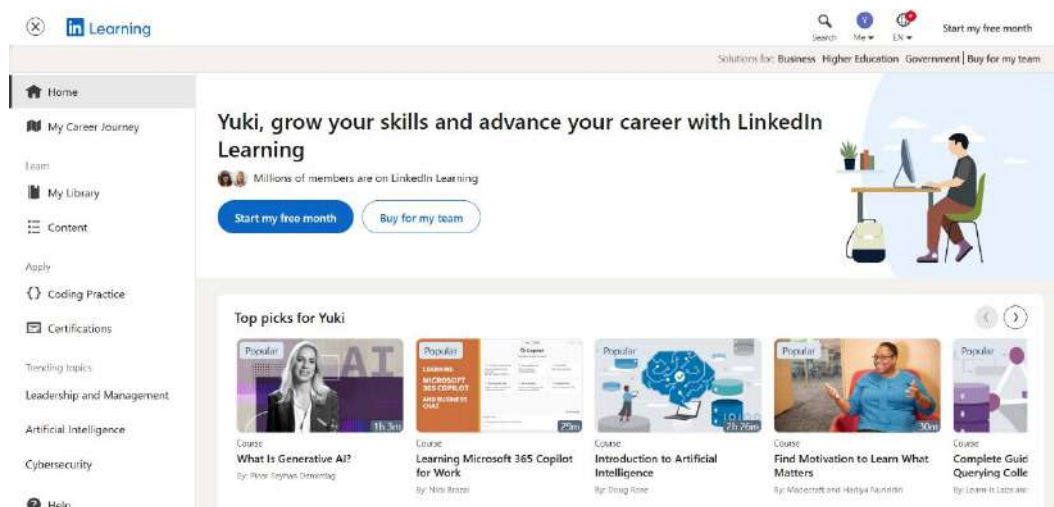


Figure 2.1: LinkedIn Learning

About LinkedIn Learning LinkedIn Learning is an online learning platform that helps anyone learn business, technology and creative skills to achieve personal and professional goals, offering thousands of expert-led, online courses. Among its main benefits is its strong integration with the LinkedIn professional network; enabling personalized course suggestions from a user's profile, and the ability to display new skills to recruiters without a fuss. As user-friendly as it gets, Udemy is not cost-effective for one-course learners, and its job matching is only within the LinkedIn universe, not the broader job market. For Pathway+ integration, LinkedIn Learning provides useful food for thought for personalised skill development, integrated with professional networking and perhaps showing employability link to gaining a skill or set of skills, maybe with a guided "Learning Path."

2.3.2 Project B

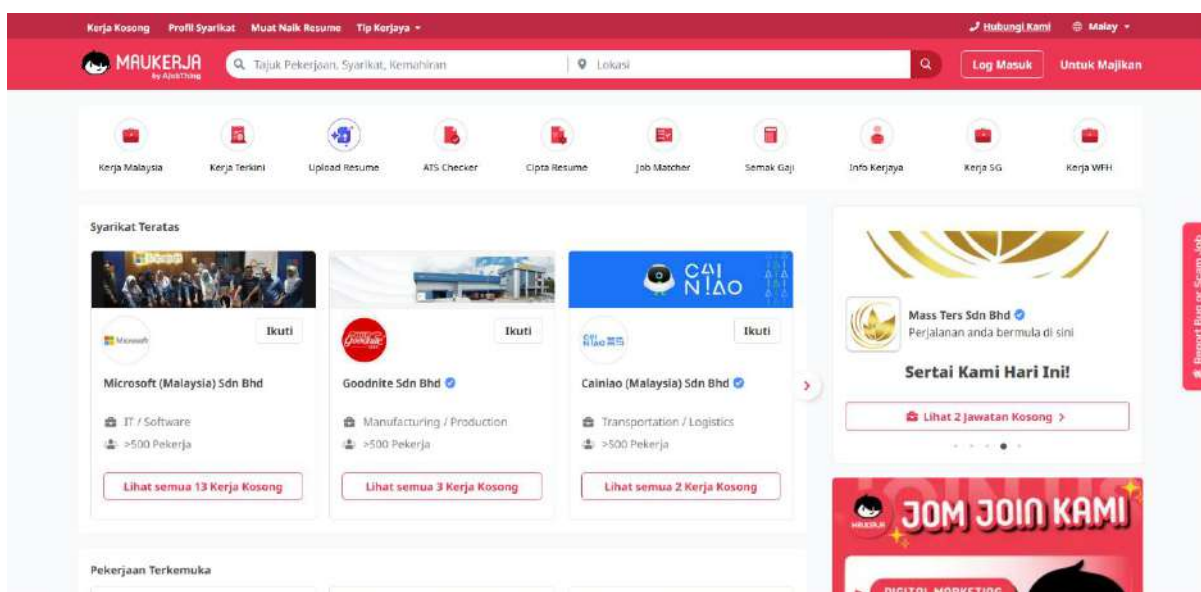


Figure 2.2: Maukerja

Maukerja is a local Malaysian job portal that focuses on the localization of the job postings at entry level jobs, blue collar workers and freshly graduated students delivering local jobs in various employment sectors like administration, retail and customer service as well as logistics and transportation. It also has a user-friendly and mobile-first design which is able to attract bilingual (in Bahasa Malaysia and English) job offers to Bahasa Malaysia and English speaking job seekers, they facilitate quick application by allowing concise job description and the use of quick-apply capabilities which makes the platform particularly attractive to younger job candidates. Although it offers high

relevancy to local job market, it does not feature highly advanced filtering and AI matching and it concentrates mostly in local, non-remote positions. Pathway+ has the potential to take advantage of Maukerja and combine it with career tips, preselected tracks and programs to be upskilled, and suggestions of suitable career paths that could be built around to ensure Malaysian graduates could be better directed towards the hiring market, both, in the traditional and in the digital economy.

2.3.3 Project C

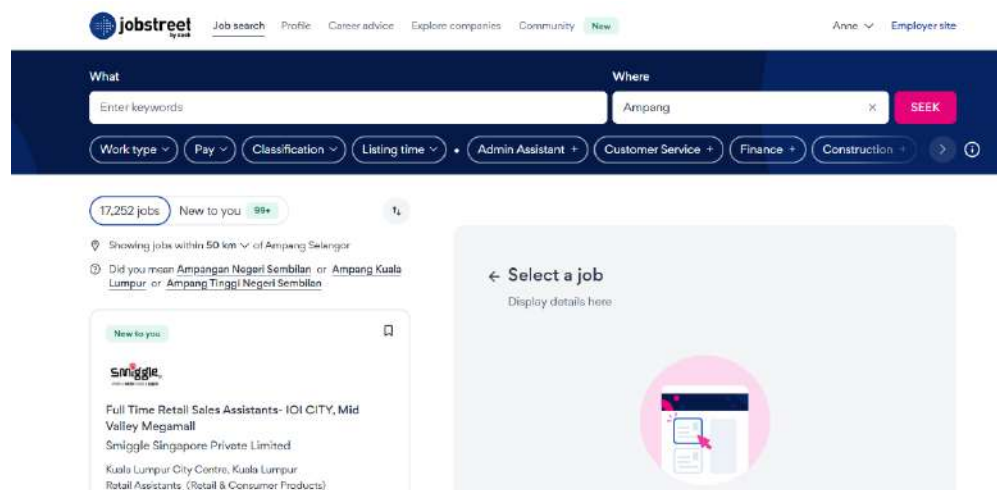


Figure 2.3: Jobstreet

JobStreet is a leading online employment platform in Malaysia and Southeast Asia. It provides diverse jobs in different industries for like fresh graduates/entry levels, job hunters, part-time in Metro Manila, Cebu, Davao & all other provinces throughout the Philippines. JobStreet also offer resume building tools, employer reviews, and even some basic application tracking components. However, there is no personal career planning and direct use of learning resources. Although it is an effective job-search portal, it only addresses the job-seeking aspect and does not cater for graduate employability or career guidance.

2.4 Comparison

The following is a comparison of the three existing systems or applications, compared according to the primary focus, type of content, certifications offered, integration with career tools, personalized recommendations, real-time job listings and learning vs employment emphasis available in each of these applications in Table 2.1.

Table 2.1: Comparison of Existing Project

Feature	LinkedIn Learning	Maukerja	Jobstreet
Primary Focus	Professional skill development through online courses	Job listings for fresh grads, entry-level, and blue-collar roles	Job listing platform for employment opportunities
Type Of Content	Short video courses (30 mins – 2 hours) on soft and technical skills	Job listings across various sectors, especially non-executive roles	Job listings across industries and experience levels
Certifications Offered	Yes – LinkedIn certificates shareable on profile	No direct certifications; focuses on accessible employment	No direct certifications; focuses on job placement
Integration With Career Tools	Strong integration with LinkedIn profiles, job recommendations, and recruiter visibility	Basic resume tips and mobile app; limited external tool integration	Core feature: resume builder, job alerts, company reviews, salary insights
Personalized Recommendations,	Yes – based on profile, job history, and interests	Limited – mainly filters based on location and job type	Yes – based on keywords, location, and job preferences
Real-Time Job Listings	Partial – only for LinkedIn jobs integrated into the network	Yes – active local listings, mobile alerts, quick-apply options	Yes – real-time updates from employers and agencies
Learning Vs Employment Emphasis	Learning-first platform	Employment-first platform	Employment-first platform

2.5 Discussion

One of the main findings of the comparison could be noted as the fact that, although current platforms do offer quite useful services, specialized and personalized career assistance is still not widespread. LinkedIn Learning is mainly a professional skills training platform whose courses are delivered online, and provides personalized learning plans driven by users profiles, however, cannot directly match users to jobs. Conversely, JobStreet and Maukerja are job-first options which provide immediate job postings, resume builders and not a certification or upskilling services. In particular, Maukerja focuses on entry-level and non-executive positions, so it can be useful to fresh graduates, yet provides few or no options in terms of integrating with career development features and personalizing to their preferences beyond location and job type filters.

Pathway+ would fill these gaps by integrating the learning-oriented capabilities of LinkedIn Learning and the arrangements of the job placement efficiency of such platforms as Maukerja and JobStreet. As part of its added value, in comparison to the available platforms, Pathway+ will use user profiles, consisting of academic background, interests and skillsets, to provide real-time job opportunities, upskilling opportunities as well as personalised career guidance that will also be specific to the Malaysian context. Also, whereas as the existing platforms provide job offers or education, Pathway+ combines them, and users can see courses that are consistent with the still-emerging job patterns and openings.

In addition, Pathway+ has an added edge of providing a better user experience through its available feature in tools, such as resume builders, career readiness checklists, and mentorship forums that are lacking, or not well-developed in currently existing platforms. Such a multi-functional strategy is not only lifting the job opportunities but also increasing the user confidence along with promoting digital literacy that prepares the graduates to pursue a sustainable career in the transforming digital economy.

2.6 Conclusion

The given chapter has provided a comparative review of the available job and learning platforms, namely, LinkedIn Learning, Maukerja and JobStreet, to identify the advantages and drawbacks of each of them regarding the support of graduate employability. Although these sites provide handy services in separate factions, they are lacking in providing an all-inclusive solution to the needs of Malaysian university

students and fresh graduates. The most significant gaps are the inability to match people with unique career preferences and a limited number of reasonably priced upskilling options, as well as a lack of the existence of tools that could facilitate the transition between school and work.

Pathway+ is meant to remedy these deficiencies by integrating real-time job postings, guided learning and custom career-building tools into one mobile-friendly interface. Pathway+ as a solution to keep abreast with the needs of a digital workforce in Malaysia comes at a well-timed juncture as this intertwines the strengths of the existing systems, as well as improving them with local relevance and incorporating functionalities that suit individual users. These reflections promoted by the comparison assisted in defining the profile of the system design and strengthening its status as a goal-oriented and effective tool of graduate achievement.

3 METHODOLOGY

3.1 Introduction

Methodology Identifies the disciplined set of practices and techniques that control the development of a system. The proper methodology selection is crucial in order for the outcome to be well done, efficient and in accordance with user requirements. According to Pressman (2020), the development methodology must be flexible and reactive to technical requirements and user comments. The Agile approach was chosen for the Pathway+ system as it encourages regular periods of reflection and review, repeat refinement and further checks, and constant feedback from all stakeholders—proving to be a successful system for a dynamic, user-focused platform such as this.

3.2 Agile Methodology

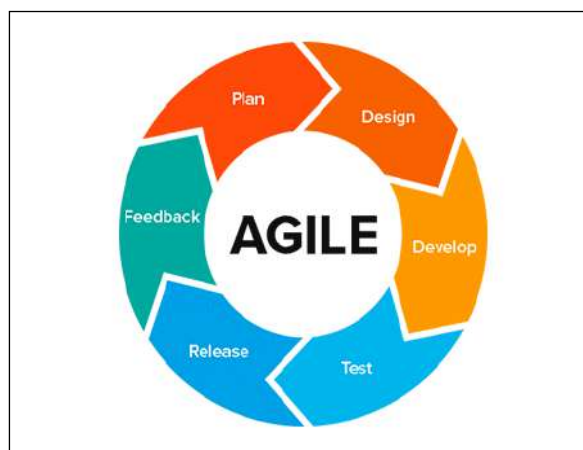


Figure 3.1: Agile Methodology Diagram (Aguayo Publicidad, 2020)

Agile is a process used in software development for speedy and iterative development of software, that promotes adaptive planning, teamwork, and delivery of working software through the development phase. It promotes frequent re-evaluation of priorities and progress, and enables the product development team to modify the product in a timely fashion. Agile is especially well suited for Pathway+ because the system is quite complex, with several modules including job listing integration, learning resource display, personalized recommendations, each of which can be increased iteratively with room for continued improvement, as shown in Figure 3.1.

Agile encourages team-work and customer participation, two key elements in developing a system that directly reflects the wants and desires of the student and graduate audiences. All the stages in Agile are time boxed and the output is a usable part of the total system which expedites the testing and validation of the system throughout the life of the project.

3.3 Phases in Agile Methodology

The development process is divided into multiple iterative cycles called Sprints in an Agile approach. Every sprint, part of the system is designed, programmed and tested before rolling on to the next. The fundamental stages adopted in the Pathway+ project are the following:

3.3.1 Phase 1: Planning

The planning stage is aimed at resolving the purpose of the system, user requirements, and functions that are potentially executable. In the case of Pathway+, young graduates and students were interviewed and polled in an informal way so that their needs could be determined. Based on findings the system scope was defined and important modules identified to prioritize. At this stage, such technology stacks as MySQL, phpMyAdmin, HTML/CSS, JavaScript, and API integration would be selected.

3.3.2 Phase 2: Design

In the second phase, mock ups of user interface and workflows were created in Figma. The system design was ideated, creating screens covering the phases of job posting, user introduction, custom recommendation, and course recommendation. Database models and entity relationships were also modeled. User-friendliness, mobile responsiveness and ease of navigation were key themes.

3.3.3 Phase 3: Development

This had begun with user authentication and dashboard, then APIs used to list down the jobs and the learning resources. In every sprint, modules were created and tested separately. The backend has been created on MySQL as the database to hold the information and phpMyAdmin as the data base management. The top three tools that are used in the front end are HTML, CSS to make the interface responsive and JavaScript to make the interface interactive.

3.3.4 Phase 4: Testing and Review

Each module was tested in a regimented way — unit testing for individual functions, integration testing for modules interlinked, and UAT for the user interface. After each sprint bugs and user feedback were looked at before moving to the next. This guaranteed that all modules work as intended and satisfied the requirements from the users. A real time demo version of the system was implemented for supervisor's validation.

3.3.5 Phase 5: Release

After passing of the test, the system was deployed on a web server having linkages with MySQL as a database. This was the implementation phase that came with deployment, user access establishment as well as documentation of users and stakeholders. It was a soft launch, and customers among the students, graduate, and intellectual advisers were provided with early access. This allowed the development team to track the system activities in real-time and subsequently identify any technical and functionality issues that emanated due to the use of the system.

3.3.6 Phase 6: Feedback and Refinement

After a soft launch, feedback was received through surveys, user input, and feedback forms. Participants were asked to judge the system usability, relevance of job suggestions, responsiveness and satisfaction in general with the product. The feedback collected was reviewed to understand common themes, user problems, and opportunities for improvement. With these results some minor adjustments were done to enhance the user experience and the system behavior. This last step helped to get Pathway+ and user experience into strong alignment before a full launch.

3.4 Conclusion

Agile approach was chosen for the development of Pathway+ as it is flexible, iterative and respondent to changing demands. The pipeline was broken down in four four-week sprints (planning, design, development and testing), in order to can develop in a concentrated way and find issues as early as possible. This approach has been successful to deliver a student-centered, feature-rich system able to solve the issues identified in the previous chapters. Agile was used both to facilitate the technical development of Pathway+ and to see to it that the system did not lose contact with user expectations during its life cycle.

4 REQUIREMENTS

4.1 Introduction

This chapter describes how the requirements have been collected and defined in the context of the Pathway + system. Needs analysis is an integral part of a software development project as it lays the foundation for the system to be designed according to actual user requirements and expectations. As for Pathway+, the team worked to get to the bottom of the challenges faced by Malaysian university students and fresh graduates in obtaining career development tools, job opportunities and resources to upskill. Functional and non-functional requirements were gathered through suitable methods of data collection in order to guarantee that the system would be feasible, meaningful and usable.

4.2 Data Gathering Techniques

4.2.1 Client Feedback via Online Questionnaire

The client feedback was collected in a pre-designed online survey with Google forms due to scheduling constraints to the face-to-face sessions. A client was requested to give the information concerning the fundamental needs, desired functions and deliverable user experience of the Pathway+ system. The questionnaire contained closed-ended and open-ended questions which revolved around administrative requirements, expected modules and technical interests. This feedback was useful to prove the scope of a project, explain the limitation of the system, and set the priorities of the development according to the expectations of a client. The answers obtained were evaluated to make sure that the end result would be what the real needs of the system stakeholder will be.

4.2.2 User Survey

This was a digital survey through the Google Form that was conducted on 50 people divided into 2 groups of final year students and fresh graduates of different local universities. The aim was to understand the user needs and behaviors in terms of career planning, online learning environments, job seeking behaviors and remote work or freelance workfriendliness. The survey consisted of various points that were Demographic Information, Job search behavior, Digital learning, and Career support needs. The prototype idea of the Pathway+ system was displayed, and the possible interest and

agreement were marked with the use of Likert-scale questions. The rather collected information played a critical role in the validation of the statements of the problem, determination of user expectations, and streamlining the design of the system so that it is relevant and usable by the targeted audience.

4.3 Functional Requirement

Functional requirements describe what the system should do. Based on the user feedback and project goals, the key functional requirements for Pathway+ are as follows:

Table 4.1: Functional Requirement

Function	Result
User Registration and Login	Users must be able to create an account and securely log in using email and password authentication.
User Profile Management	Users can manage personal information, academic background, skills, and career interests.
Career Path Suggestions	The system provides personalized career guidance based on user data and industry trends.
Job Listing Integration	The system integrates with external job listing APIs (e.g., JobStreet) to display real-time freelance, remote, and full-time job opportunities.
Learning Resource Display	Curated online courses and certifications relevant to user goals are displayed and recommended.
Resume Builder	Users can generate a resume using a built-in template.
Mentorship and Support	A forum or chat feature allows users to connect with mentors or peers for advice and guidance.
Admin Panel	Administrators can manage user accounts, monitor system usage, and update content as needed.

4.4 Non-Function Requirement

Non-functional requirements define how the system should perform rather than what it should do. These include:

Table 4.2: Non-Functional Requirement Table

Function	Result
----------	--------

Usability	The interface should be simple, intuitive, and user-friendly, especially for first-time users.
Accessibility	The system should be responsive and accessible on both desktop and mobile devices.
Scalability	The backend should support an increasing number of users and content without performance issues.
Security	User data should be securely stored using Firebase Authentication and Firestore security rules.
Performance	The system should load within 3–5 seconds per page and handle simultaneous users without lag.
Availability	The platform should be hosted on a reliable service with minimal downtime.

4.5 System Requirement

The following are the technical requirements for developing and deploying the Pathway+ system:

4.5.1 Software Requirements

i) Visual Studio Code

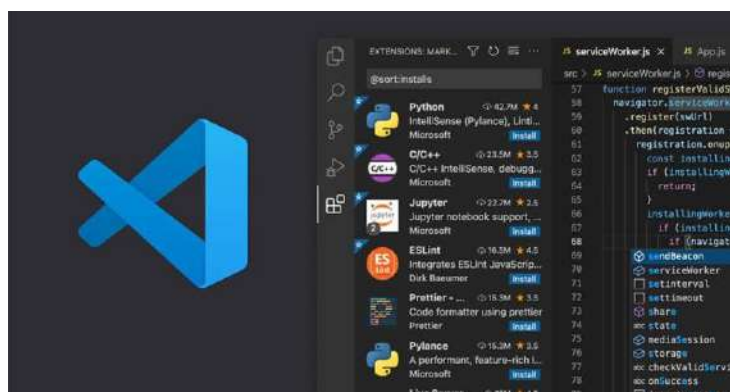


Figure 4.1: Visual Studio Code

Visual Studio Code is a contemporary, lightweight and a powerful source-code editor produced by Microsoft. It has very extensive language and development process support and as such is a perfect environment to develop web applications. In the case of the Pathway+ project, it is possible to write and manage the frontend (HTML, CSS, JavaScript) and backend (PHP) codes using Visual Studio Code,

which functioned efficiently. Its capabilities of IntelliSense, real time debugging, support of Git and a full marketplace of extensions made it quick and structured when developing. Enejivik (2023) adds that its compatibility with such frameworks as PHP and such tools as Live Server is particularly useful in the case developers want to create modular and scalable systems.

ii) MySQL

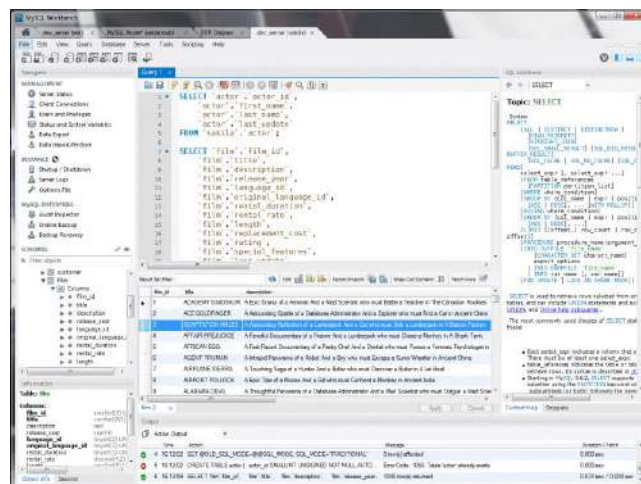


Figure 4.2: MySQL Workbench Windows App

MySQL is a popular open-source relational database management system (RDBMS) which can store, retrieve and manage information with the help of structured query language (SQL), effectively. It was the main backend database of Pathway+ tailored to keep user information, job ads, learning materials, and the parameters of the recommender system. With MySQL, performance-intensive tasks can be executed and the system is characterized by reliability, scalability and security. According to Misek (2022), MySQL has had industry dominance as a web-based database-application application ever since because it has the support of an active community and is well integrated with PHP.

iii) phpMyAdmin

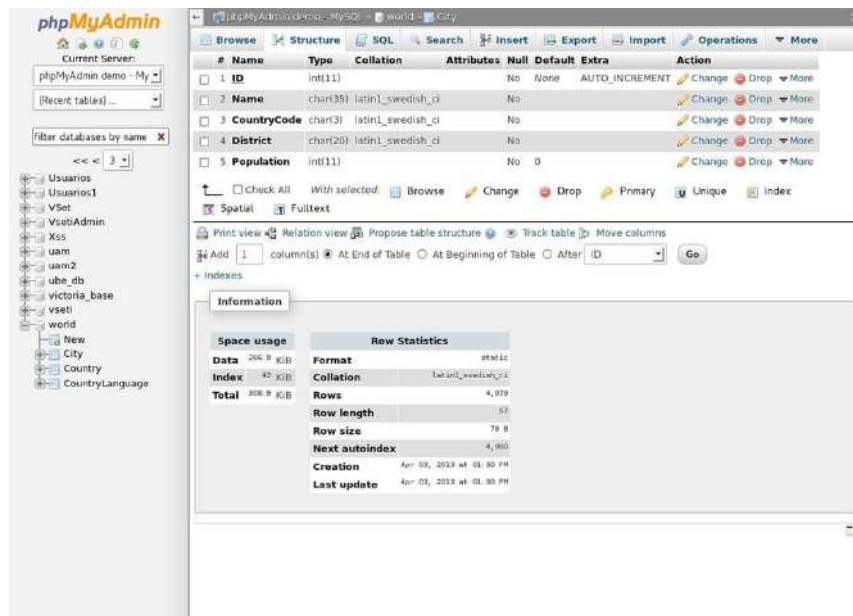


Figure 4.3: PhpMyAdmin Web Admin

PhpMyAdmin is an open source, free web based application which is developed to manage MySQL databases by using a graphical interface. It has been used in the Pathway+ project to make simpler database operations like the creation of the tables, conducting SQL queries and to manage the user records and conduct backup. It will be easy to use because of the intuitiveness of the user interface; it also saves time and reduces development errors since even users with low knowledge of SQL will be able to use the tool. It is also capable of importing and exporting data in different forms, and this achieves the need to handle large datasets of jobs and courses. The phpMyAdmin helped to create a convenient mechanism of controlling the database at all stages of the system life.

4.5.2 Hardware Requirements

Table 4.3: Hardware Requirement Table

Component	Specification
Device	Acer Aspire 5
Operating System	Windows 10 Home
Processor	AMD Ryzen 5 5500U with Radeon Graphics, 2.10 GHz
Memory (RAM)	8.00 GB
System Type	64-bit Operating System, x64-based Processor

With this hardware configuration in table 4.3, there was enough processing power and memory to support modern development environments like Visual Studio Code, MySQL server and phpMyAdmin. It has also enabled easy use of browser based test environments, a local server hosting (through tools like xampp) and real-time preview functions at both development and debugging processes of this system.

4.6 Conclusion

A detailed description of the Pathway+ system needs was provided in this chapter. Information collected from questionnaires and informal interviews aided in identifying actual user requirements and system expectations. Functional requirements pertained to core functionalities (job recommendations, job listings and learning materials) and non-functional with regard to usability, performance, and security. These needs will shape the process of design, development and construction to the end that the piece is a functional one and one born of user thought.

5 ANALYSIS

5.1 Introduction

The objective of the analysis phase is to ascertain the problems that potential end users (i.e., final year students and recent graduates) face and to identify the functional and non-functional requirements of Pathway+. This stage gives a sound base for design and development of the system by attaining the data and modeling the system.

5.2 Data Gathering Analysis

A mix of questionnaires and informal interviews were applied to understand the problems faced by the target group and to discover their needs with respect to a stable digital career support system.

5.2.1 User Survey Analysis

To obtain a clearer understanding of user needs and expectations for the Pathway+ platform, a structured questionnaire was administered to a target group consisting of university students and fresh graduates. The objective of the questionnaire was to collect relevant data that would inform the design and development of a platform that effectively supports career planning and skill development in the digital workforce.

The questionnaire comprised a total of fifteen (15) questions, systematically divided into four key sections:

Section A – Demographic Information,

Section B – Career and Skills Experience,

Section C – Platform Features and Preferences, and

Section D – Feedback and Suggestions.

A total of sixty (60) responses were received via the Google Form platform. The data collected through this instrument provides meaningful insights into the expectations, preferences, and challenges faced by the

intended users, thereby contributing significantly to the refinement of Pathway+ in terms of functionality, usability, and relevance to the current job market.

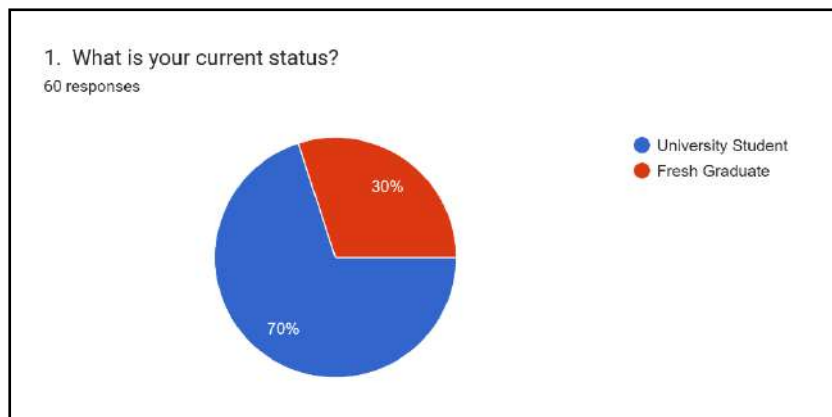


Figure 5.1: Questionnaire – Question 1

For the first question, respondents were asked to indicate their current status. Based on the pie chart in Figure 5.1, it can be observed that the majority of participants, accounting for 70%, are university students, while the remaining 30% are fresh graduates. This indicates that a larger proportion of the target users for the *Pathway+* platform are still pursuing their studies, highlighting the importance of career guidance and skill development tools for individuals preparing to enter the workforce.

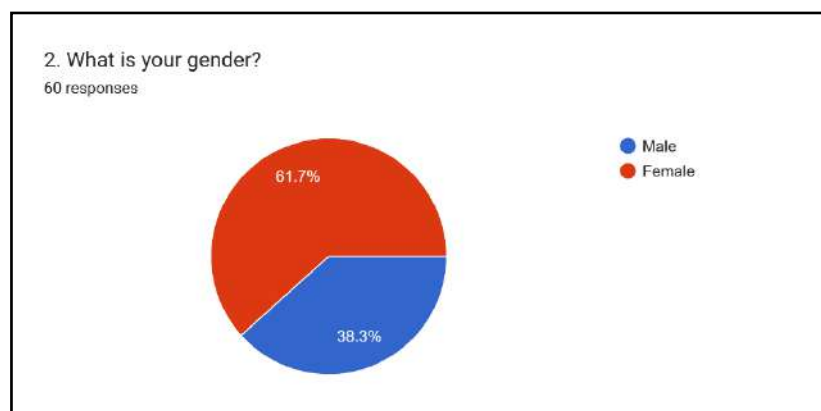


Figure 5.2: Questionnaire – Question 2

As shown in Figure 5.2, the majority of participants are female (61.7%), while male respondents make up 38.3%. This indicates a higher female participation rate in the survey.

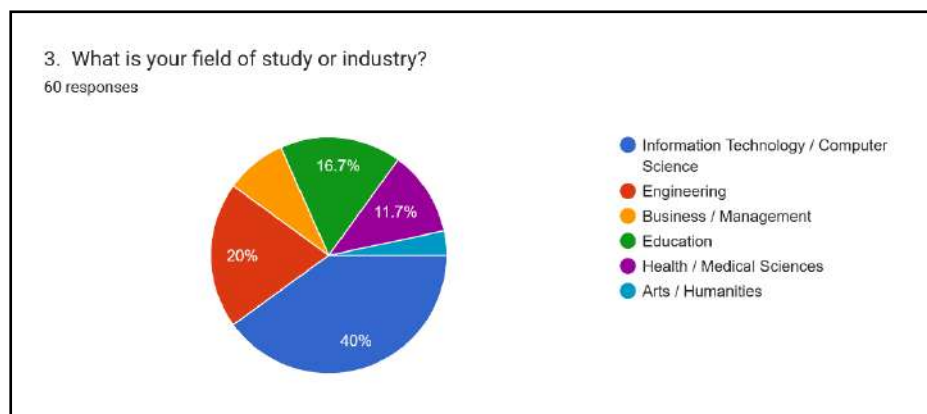


Figure 5.3: Questionnaire – Question 3

In Figure 5.3, most respondents (40%) come from an Information Technology/Computer Science background, followed by Health/Medical Sciences (20%) and Business/Management (16.7%). The remaining fields include Engineering (11.7%), Education (6.7%), and Arts/Humanities (5%).

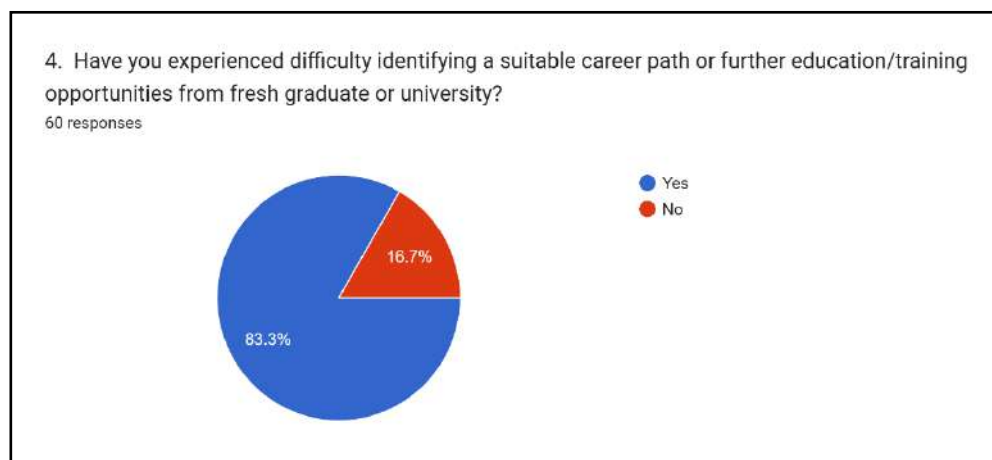


Figure 5.4: Questionnaire – Question 4

As presented in Figure 5.4, a significant majority (83.3%) reported facing difficulties in identifying suitable career paths or training opportunities after graduation, indicating a need for better career guidance support.

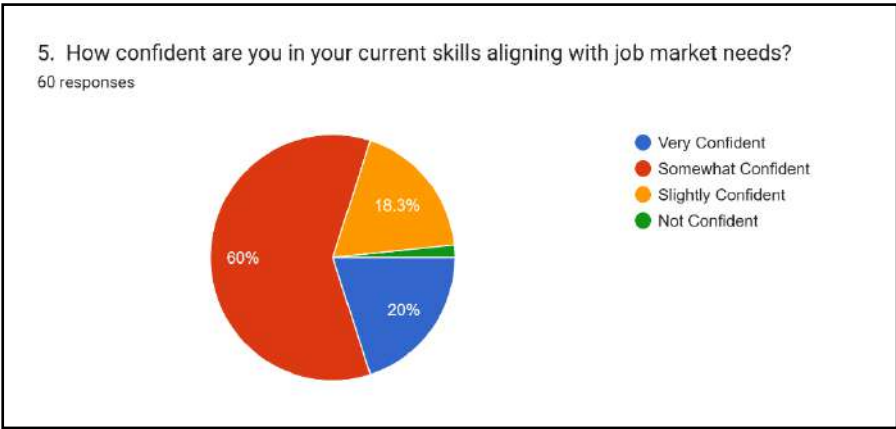


Figure 5.5: Questionnaire – Question 5

According to Figure 5.5, most participants (60%) are only slightly confident in their current skill alignment with job market demands. A smaller portion (20%) are somewhat confident, 18.3% are not confident, and only 1.7% feel very confident.

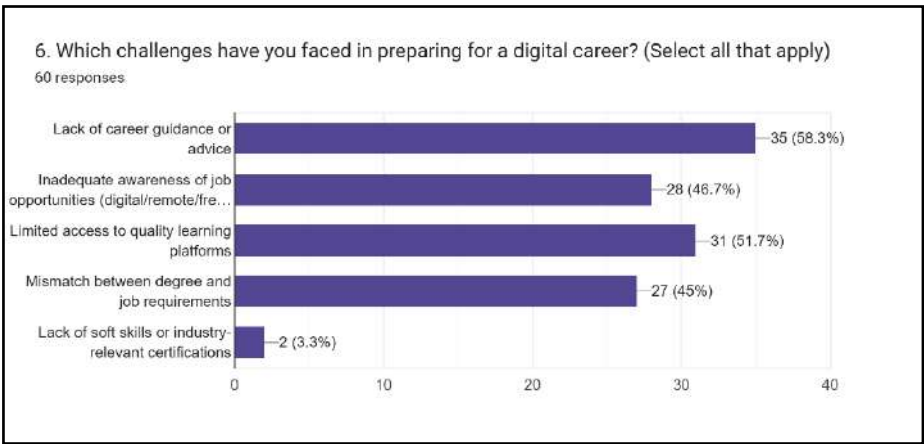


Figure 5.6: Questionnaire – Question 6

In Figure 5.6, respondents highlighted key challenges including lack of career guidance (58.3%), limited access to quality learning platforms (51.7%), and mismatch between degrees and job requirements (45%). Other notable issues include inadequate awareness of job opportunities (46.7%).

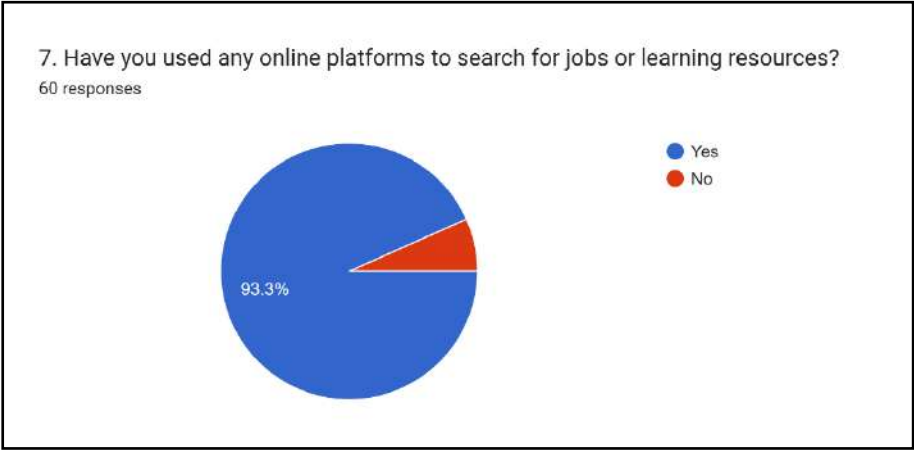


Figure 5.7: Questionnaire – Question 7

As shown in Figure 5.7, a vast majority (93.3%) have used online platforms for job or learning resource searches, emphasizing the importance of digital tools for career preparation.

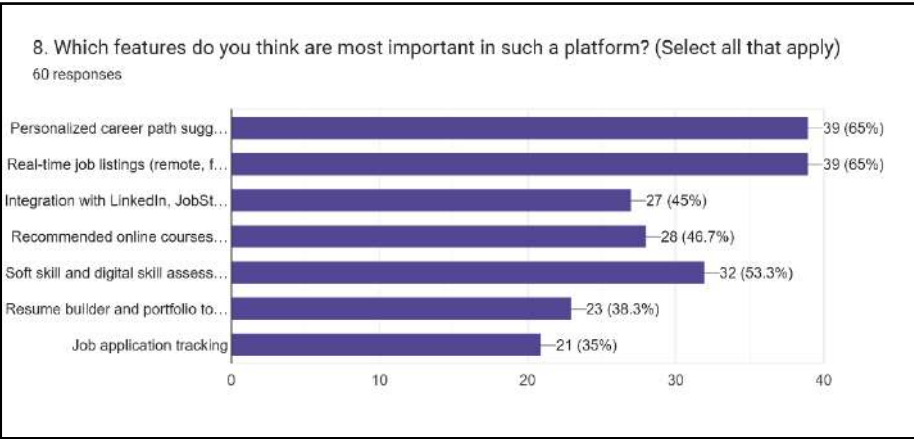


Figure 5.8: Questionnaire – Question 8

Based on Figure 5.8, the most valued features include personalized career path suggestions (65%) and real-time job listings (65%). Other important features include soft skill assessments (53.3%) and recommended online courses (46.7%).

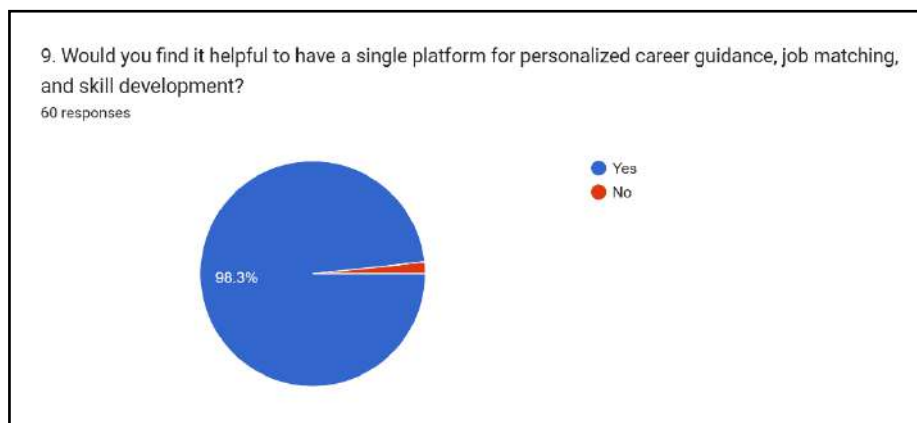


Figure 5.9: Questionnaire – Question 9

Figure 5.9 illustrates that nearly all respondents (98.3%) agree on the usefulness of a centralized platform for career support, job opportunities, and skill development.

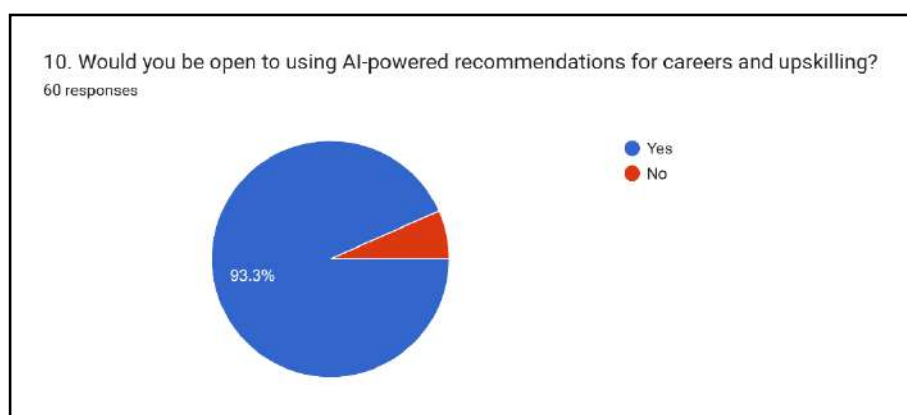


Figure 5.10: Questionnaire – Question 10

As shown in Figure 5.10, 93.3% of respondents expressed interest in using AI-powered tools for personalized career and upskilling guidance.

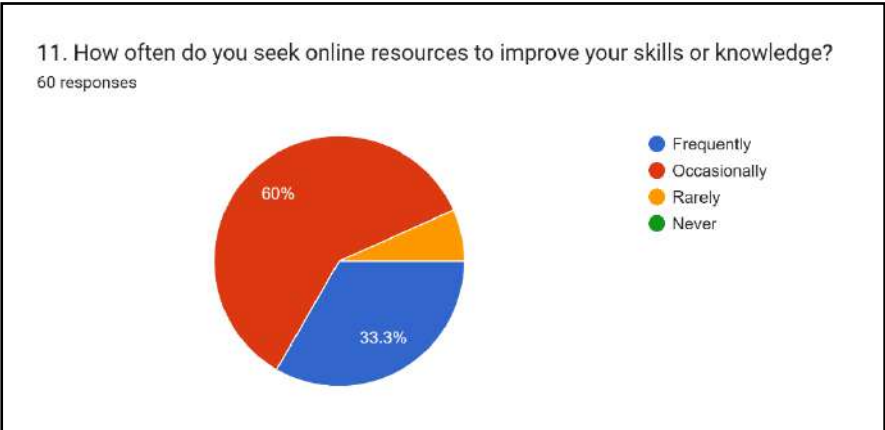


Figure 5.11: Questionnaire – Question 11

In Figure 5.11, 60% of respondents report occasionally using online resources, while 33.3% use them frequently. Very few respondents rarely or never seek online resources, indicating a proactive attitude toward learning.

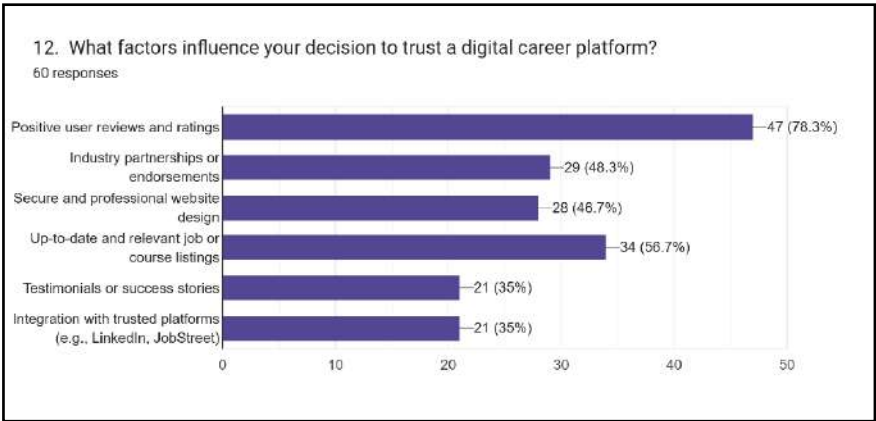


Figure 5.12: Questionnaire – Question 12

According to Figure 5.12, positive user reviews and ratings (78.3%) are the most trusted factor, followed by up-to-date listings (56.7%) and industry endorsements (48.3%).

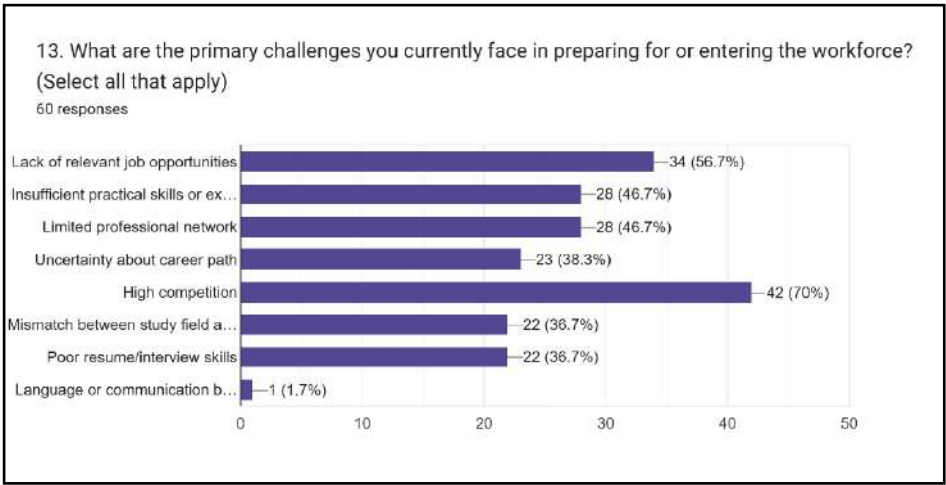


Figure 5.13: Questionnaire – Question 13

As shown in Figure 5.13, top challenges include high competition (70%) and lack of relevant job opportunities (56.7%). Other difficulties include limited networks (46.7%) and uncertainty about career paths (38.3%).

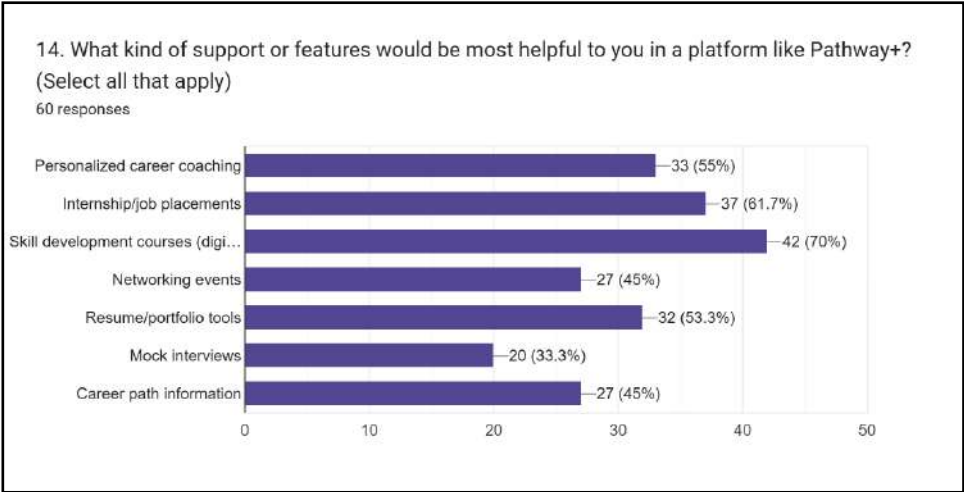


Figure 5.14: Questionnaire – Question 14

In Figure 5.14, respondents indicated that skill development courses (70%) and internship/job placements (61.7%) would be most helpful. Career coaching and networking events were also highlighted.

15. Do you have any additional ideas or feedback that could help improve the effectiveness of the Pathway+ platform for users like yourself?

60 responses

- Need to have a best feature
- Add your own characteristics and create something unique to you
- Mobile App with Offline Access – A lightweight mobile app that works offline would make it easier for students to learn anytime, especially in areas with poor internet connectivity.
- adding more interactive content and easier navigation that would make the platform even better
- If possible, try to implement notifications features
- Add Many Question
-
- I dont have any

Figure 5.15: Questionnaire – Question 15

As detailed in Figure 5.15, suggestions included incorporating unique features, offline mobile access, better interface and navigation, and enhanced notifications. A few respondents had no further input.

5.2.2 Client Feedback Analysis



Figure 5.16: Interviewee Picture

Name: Mohd Fadli Bin Hussin

Position: Research Associate @ Pembangunan Sumber Manusia Berhad

Location: Wisma Hrd Corp, Jalan Beringin, Damansara Heights, 50490 Kuala Lumpur

Date: 26th June 2025

Purpose of the interview: To understand client perspectives on job search challenges, preferred learning resources, and desired features in a digital career platform like Pathway+, ensuring it meets real user needs and expectations.

5.2.3 Feedback Analysis

The qualitative response by the Research Associate of HRD Corp obtained through the interview was helpful in shaping up the creation of Pathway+. There were five major questions talked about: problems that are frequently encountered by graduates when seeking employment opportunities and enrolling in upskilling courses and testing the compatibility of the existing career platforms, as well as the recommendations of the interviewee concerning the necessary features. The findings highlighted the importance of having a platform where jobs are recommended in real-time, the learning paths are verified, and persons are provided with career advice. The interviewee has also designated the need of mentorship support, resume-building tools, and integration with industry-recognized certifications to assist the graduates to make informed career choices. This feedback directly made its way into the streamlining of functional scope of Pathway+ and making it responsive to the on-ground needs of the digital workforce.

Table 5.1: Feedback Analysis Table

QUESTION 1	What are the primary challenges you face when trying to find suitable job opportunities or upskilling programs in the current digital job market?
ANSWER	As a Research Associate in HRD Corp, I often observe that the digital job market is highly dynamic and competitive. One of the main challenges I personally encounter, and see others facing, is navigating the overwhelming volume of information about job opportunities and upskilling programmes. While there are many platforms offering digital courses or job postings, not all are relevant, verified, or aligned with current industry demands. Another challenge is the lack of personalised and data-driven guidance. Many platforms do not offer tailored recommendations based on one's actual skills, experience, and career goals. This results in time-consuming searches and sometimes taking up programmes that don't effectively add value to one's career trajectory. Moreover, keeping up with emerging digital skills such as AI, cybersecurity, or data analytics requires access to high-quality and often expensive

	courses. For fresh graduates or early-career professionals, affordability and access to credible certification can be a barrier. Lastly, there is often a disconnect between what industries need and what training providers offer. Some upskilling programmes are not co-created with industry, making them outdated or misaligned with current job market needs.
ANALYSIS	The respondent highlights information overload and lack of relevance as major obstacles in navigating job and upskilling platforms. They also emphasize the need for personalized, data-driven career guidance to avoid misaligned opportunities. Finally, affordability and outdated training content further hinder access to effective skill development in the digital job market.

Table 5.2: Feedback Analysis Table

QUESTION 2	How important is it for you to receive personalized career guidance and recommendations based on your skills and interests?
ANSWER	Receiving personalised career guidance is very important to me. In a rapidly evolving job market, having tailored advice that reflects my strengths, interests, and long-term goals helps me make more informed and strategic career decisions. From my perspective, I've observed that many individuals struggle to navigate their career paths due to a lack of relevant or targeted support. Generalised recommendations often lead to mismatched opportunities or investments in training that don't contribute meaningfully to professional growth. It's also crucial that this guidance includes recommendations for certified courses that are directly related to one's field of study and aligned with current industry demand. This ensures that any upskilling or reskilling efforts are both meaningful and recognised by employers, ultimately increasing employability and long-term career growth.
ANALYSIS	The respondent considers personalized career guidance essential for making informed and strategic decisions in a competitive job market. They point out the drawbacks of generic advice, which often results in irrelevant career moves or wasted resources. Effective guidance should also link to certified, industry-relevant courses to enhance employability and career progression.

Table 5.3: Feedback Analysis Table

QUESTION 3	What types of learning resources (e.g., online courses, certifications, workshops) would you find most valuable for your professional development?
ANSWER	For my professional development, I find the most value in structured certification programmes that are recognised by the industry. These courses provide credibility and equip me with the specialised knowledge required in areas such as research, data analysis, policy development, and digital transformation. I also appreciate the flexibility offered by online courses, particularly those that are self-paced and provide microcredentials. This format allows me to learn at my own pace while still gaining relevant skills that I can apply directly to my work. In addition, I benefit greatly from hands-on learning experiences such as workshops or short bootcamps. These sessions are useful in building practical competencies in tools and techniques that are essential in my field, including data visualisation and research software. Overall, the most valuable learning resources are those that are accessible, relevant to current industry needs, and aligned with my professional goals.
ANALYSIS	The respondent values industry-recognized certification programs for their credibility and relevance to specialized fields like research and digital transformation. They prefer flexible, self-paced online courses with microcredentials for convenience and continuous skill development. Practical learning formats such as workshops and bootcamps are also favored for building hands-on, job-ready competencies.

Table 5.4: Feedback Analysis Table

QUESTION 4	When seeking job opportunities, how crucial is access to real-time listings, including remote and freelance positions?
ANSWER	Having access to real-time job listings is highly important, especially in today's rapidly evolving job market. It enables job seekers to act quickly and not miss out on opportunities that match their skills and aspirations. This is particularly true for remote and freelance roles, which are often competitive and may be open for a limited time. Real-time updates ensure that individuals can apply promptly and stay informed about the latest openings. In my role, I've seen how access to timely information can support more informed and strategic job searches. It also helps individuals keep track of shifts in hiring trends and the types of skills currently in demand. Overall, real-time listings are a valuable tool for making timely decisions, especially for those looking for flexible or project-based work in the digital economy.
ANALYSIS	The respondent emphasizes that real-time job listings are essential for seizing timely and relevant opportunities, especially in a fast-moving job market. They highlight the competitiveness of remote and freelance roles, where timing is critical. Access to up-to-date listings also aids in tracking hiring trends and aligning with in-demand skills.

Table 5.5: Feedback Analysis Table

QUESTION 5	What features or tools would make a career transition assistance platform most user-friendly and effective for you?
ANSWER	For me, a good career platform should be easy to use and offer personalised suggestions based on my background, skills, and interests. It would be helpful if the platform could recommend jobs, courses, or certifications that match what I'm good at and where I want to go in my career. I'd also like to see up-to-date information on which jobs are in demand, what skills employers are looking for, and what kind of salary to expect. That way, I can plan better and make smart decisions. Other useful tools would be things like a quick skill check to see where I stand, suggestions on what to learn next, and links to relevant training. Features like resume builders, interview tips, and maybe even access to mentors or career coaches would really make the platform more complete and supportive. In short, it should guide me step-by-step, so I don't feel lost when planning my next move.
ANALYSIS	The respondent values a user-friendly platform that offers personalized career and learning recommendations based on their profile. They emphasize the importance of real-time job market insights, skill assessments, and guided planning tools. Additional features like resume builders, interview tips, and access to mentors would enhance support during career transitions.

5.3 Use Case Model

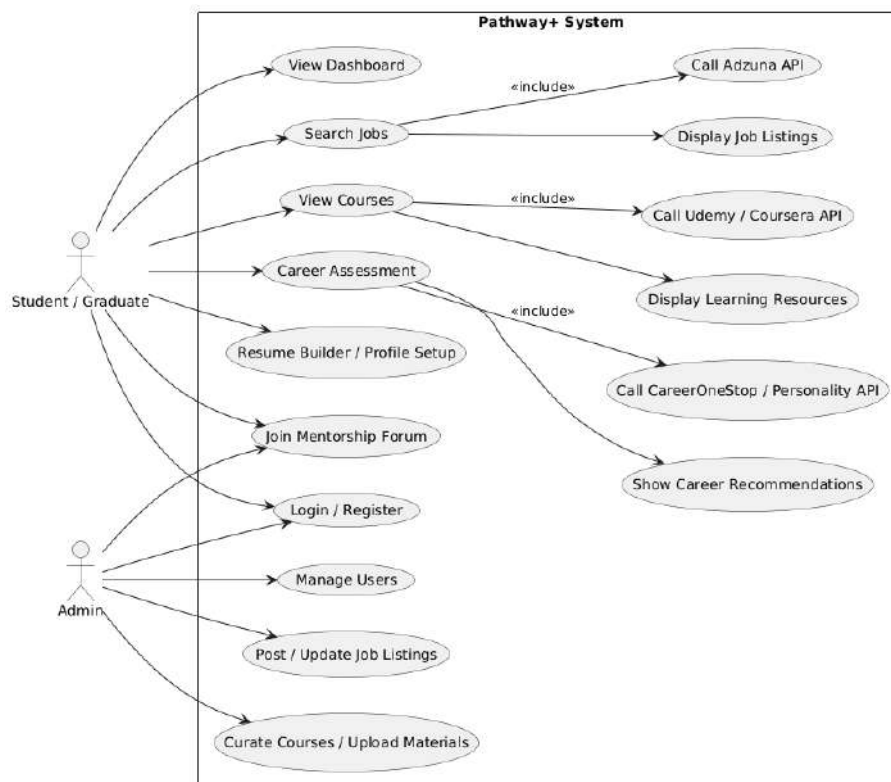


Figure 5.17: Use case diagram

The use case diagram of Pathway+ system established two main actors: student/graduate and admin, and the main functionalities in which these actors are able to interact. They have to register or log in to gain access to any of the functions of the platform. On authenticating, they are able to see their dashboard, make search of job opportunities, learning content and career recommendations. The external API integrations include Adzuna regarding job ads, Coursera or Udemy in terms of learning materials. It also provides an opportunity to take an assessment of the career, which is based on the APIs of personality and career-matching and offers personal job and course recommendations. Other characteristics are the resume builder tool, profile creation, and the ability to use a mentorship platform fostering peer advice and networking.

There are other responsibilities of the admin users in the system. Once logged on, a user will have the opportunity to manage their accounts, post or edit job listings, or upload or create course content. These administrative tools make sure that the content and services are current and fixed on graduate necessities. The use case model indicates role-based organization of the system with a limited number of modules accessible to the user groups. This is a secure access method, which secures and makes the end-users and the administrators partake in an active and useful digital career development platform.

5.4 Flowchart

5.4.1 Admin

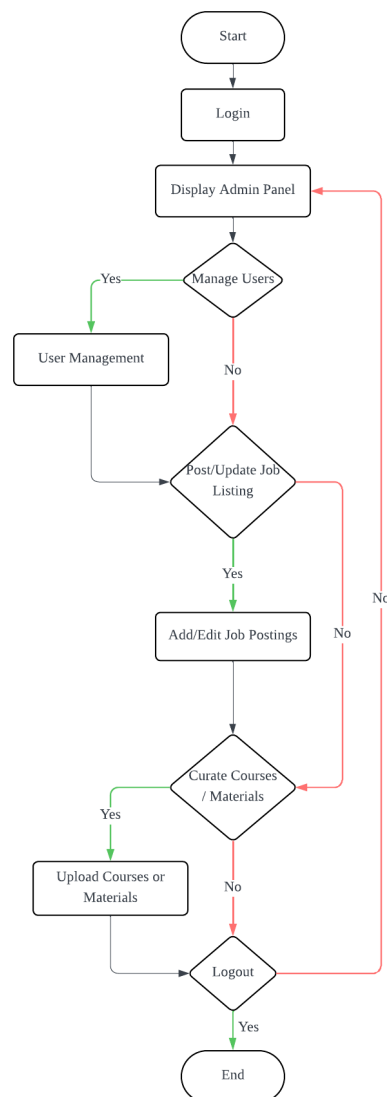


Figure 5.18: Flowchart 1 - Admin

The Pathway+ flowchart of the edges and nodes pertaining to the administration side of the system is diagrammatic of how the administrators ease the platform and the success of the user. The admins start by logging in to the sites general dashboard, where they are able to control the users, to publish or update listings of jobs available or post or edit academic information. Such backend operations are vital in provision of current employment opportunities and learning content to students. The person in charge of user management is going to make sure that suspicious people do not communicate on the site, and, on the other, the control of job posting will provide up-to-date and industry-friendly postings.

The administration process also enables moderation of the content, and it lets arbitrate or post new courses and materials and keep the system alive and practical to the subject people. Depending on the task, one has to be able to do it or focus on an option, which is logout as core results of each decision point given to the admin. This chain of logic is the administrative backbone behind carrying out the main purpose of Pathway+, which is to bridge the skills gap, provide career focus, and contribute to the employability of graduates, which is being effectively taken care of with a well-kept-up digital ecosystem.

5.4.2 University Students and Fresh Graduate

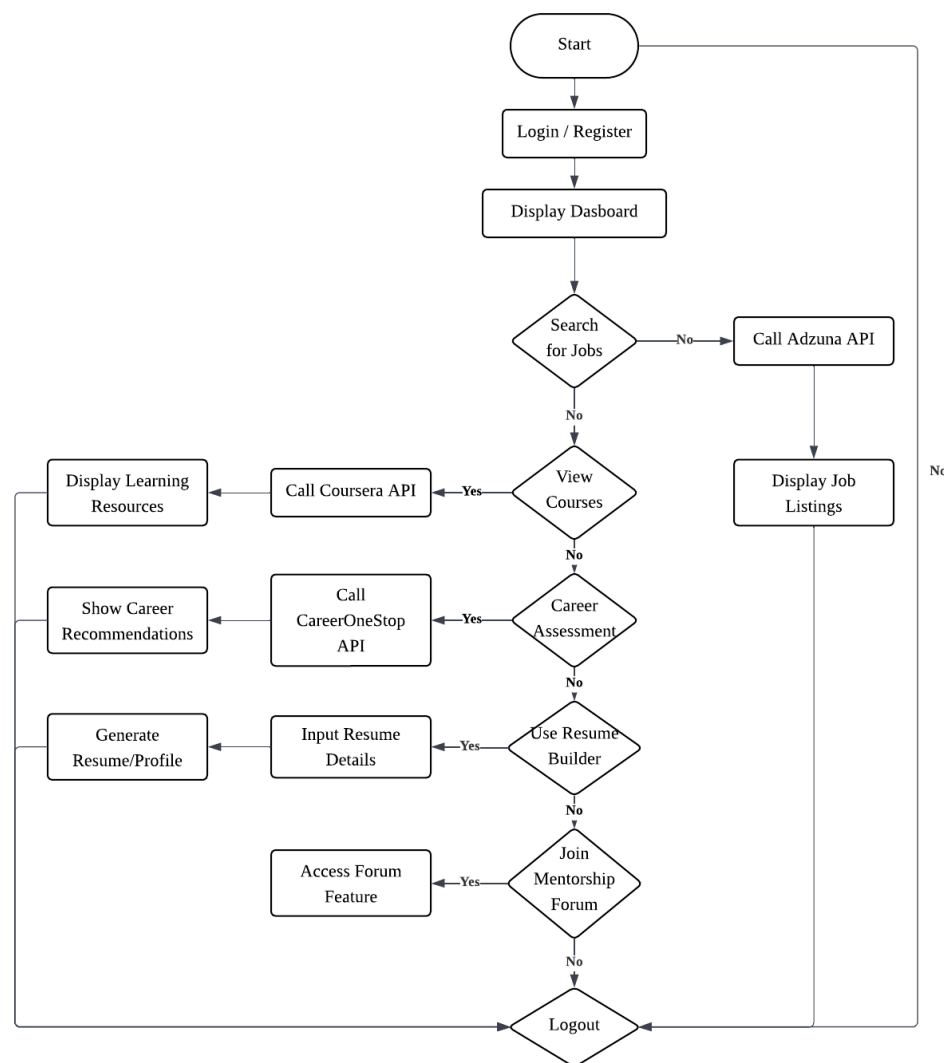


Figure 5.19: Flowchart 2 - University Student

The flowchart on the student side in Pathway+ identifies a simplified process that is customized to meet the needs of the graduates to navigate the job market in the digital space, ascertain opportunities in upskilling, and get career advice. The log-in or the registration is followed by the system dashboard. There,

employees are able to find job ads through Adzuna API, search courses on Coursera, or continue to take a career assessment with the help of CareerOneStopAPI. Every step leads the student to the more evident career paths and the system offers personalized learning materials, career suggestions, and an access to the mentorship forums.

This flow guarantees that the students could also construct their professional identity by means of using a resume builder and posting corresponding information. Once a data is submitted, a resume/profile is created to be used both in and out of the system. Students are able to communicate with mentors in forums, access learning materials and relapse back in job opportunities in an ongoing cycle. The pattern brings out an aspect of accessibility and direction which is in tune with the mission Pathway +, to empower the graduates of Malaysia with its carefully designed digital intervention that helps the graduate with a clear pathway to a better career.

5.5 Conclusion

It was the phase of analysis that gave a significant opportunity to grasp the essential challenges that Malaysian graduates have to deal with, especially, their career preparedness, skills congruence, and accessibility to digital labour markets. The results of the research that included interviewing experts and distributing questionnaires served to certify the observation that students and fresh graduates struggle to find their career direction, a platform where they can learn relevant material, and are held at ransom by a decentralized labor market. These lessons were reflected in the form of a clear set of functions and non-functions requirements of Pathway+ so that the system becomes reality-based in user needs.

Moreover, the creation of use case diagrams and flowcharts provided a graphical roadmap of the interaction between users, that is, both students and administrators, with the platform. These models have laid the structural background of design and realisation phase and led to creation of an intelligent and meaningful system. Pathway+ is thus in a good place to introduce directed, convenient guidance of career exploration, education, and employment with centralized, AI-powered tools and created APIs and eventually increase graduate employability in the digital era.

6 DESIGN

6.1 Introduction

The Pathway+ user interface profoundly adopts transparency and ease of navigation for an all-inclusive user experience (students, employers, and content creators). The interface supports the principles of Human-Computer Interaction (HCI) by structuring data to organise and prioritise user actions to increase the efficiency of engagement and execution of goals.

6.2 Interface Design

6.2.1 Course Page

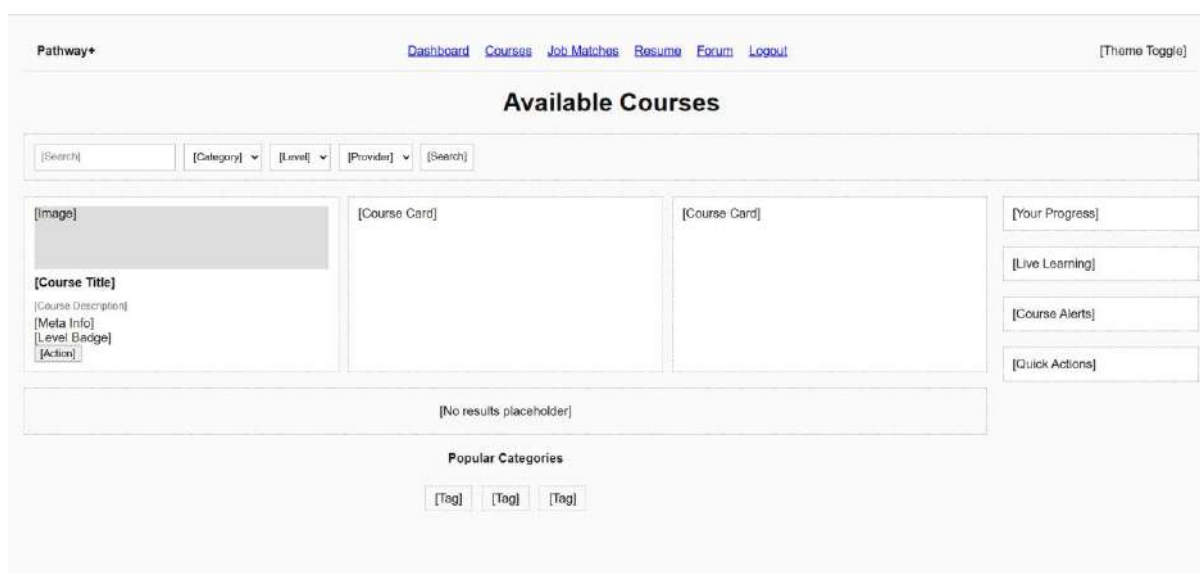


Figure 6.1: Course Menu Page

The image above is a wireframe for a Course Page interface aimed at offering students a clear overview of all existing learning paths and courses. The interface contains filters for course searches by skills, levels of difficulty, and industry. Each course is identified in a card format which includes the course title, a synopsis, the expected time for completion, and a skills tag, enabling students to quickly locate educational content that addresses specific skill gaps.

6.2.2 Course Lesson

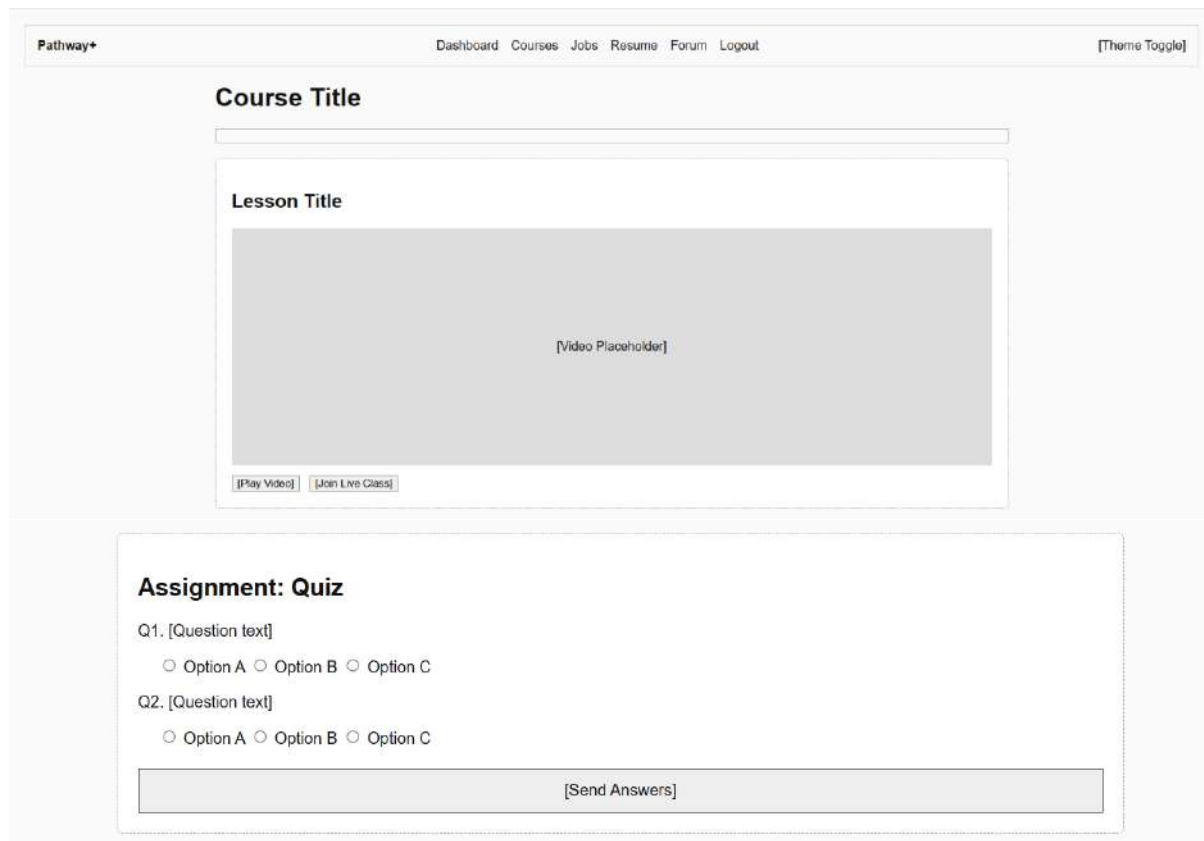


Figure 6.2: Course Lesson Page

Considering the above figure, this is the wireframe for the Course Lesson interface. This page functions as the primary learning space. Its portions are usually split into three sections: a video/content pane to the left for tutorials/lectures, a lesson navigation pane to the right for switching to different lessons, and a comment/resource pane below the content. This layout is designed for students to be able to concentrate on the lesson while being able to see their lesson's level and have access to resources and quizzes relevant to the lesson.

6.2.3 Student Dashboard Page

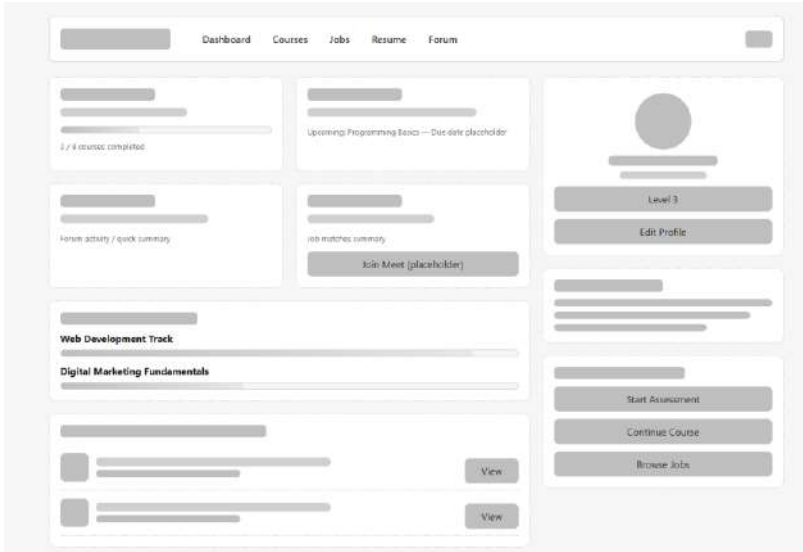


Figure 6.3: Student Dashboard Page

In the above figure, we have the wireframe for the Student Dashboard Page. This serves as the main hub for students on their journey. It contains important widgets that show tailored data, such as skill gap analysis reports, course progress trackers, and a notification panel for new job matches or course updates. The dashboard is designed to offer a brief overview of the student's employability status and direct them to the most relevant next step within the system.

6.2.4 Job Listing Page

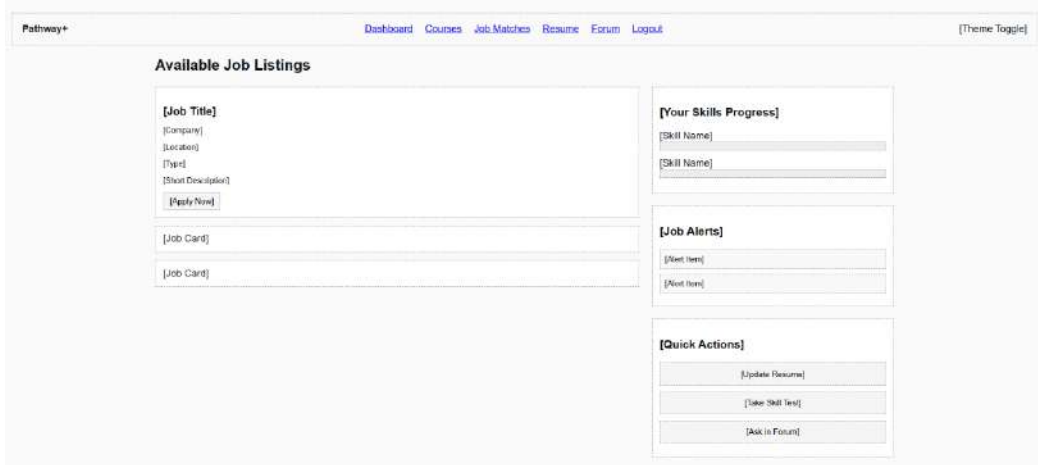
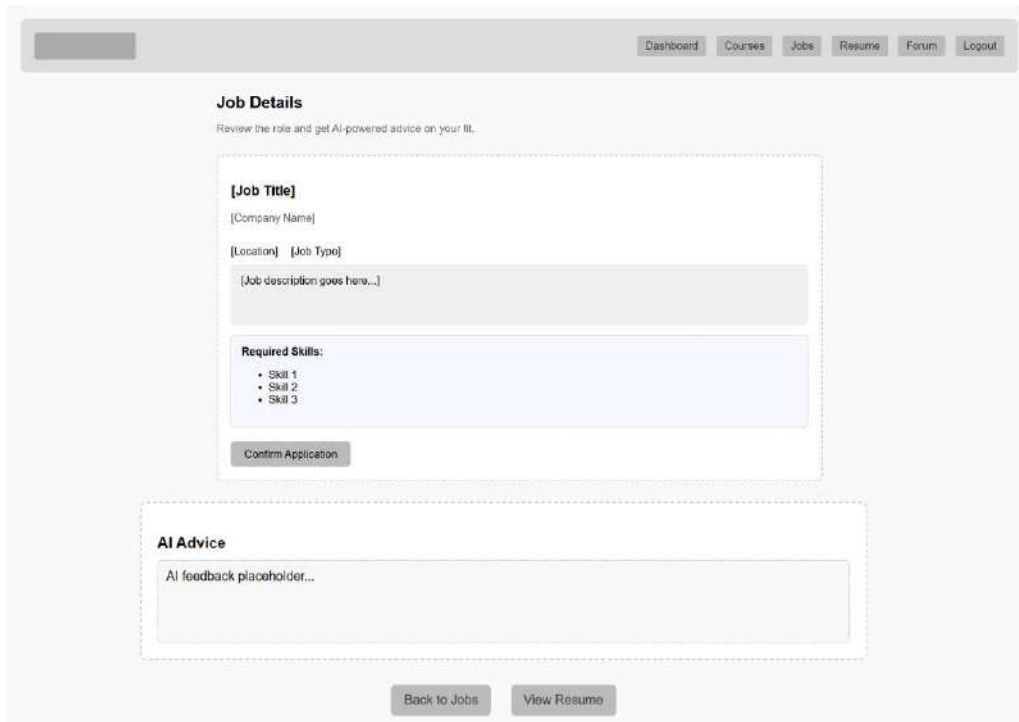


Figure 6.4: Job Listing Page

According to the figure provided, these are the wireframes for the Job Listing Pages. These screens are meant for displaying employment opportunities to users. In the Job Listing screens, most prominent is the search and filter sidebar (location, salary, job type, required skills) and the job details. The job details snippets show the company, job title, summary and include a 'View Details' button for quick navigation of hundreds of opportunities.

6.2.5 Job Details Page



The wireframe illustrates the layout of the Job Details Page. At the top, a navigation bar contains links for Dashboard, Courses, Jobs, Resume, Forum, and Logout. The main content area is titled 'Job Details' with a subtitle 'Review the role and get AI-powered advice on your fit.' Below this, a job card displays placeholder text for [Job Title], [Company Name], [Location], [Job Type], and [Job description goes here...]. A 'Required Skills' section lists Skill 1, Skill 2, and Skill 3. A 'Confirm Application' button is positioned at the bottom of the job card. Below the job card, an 'AI Advice' section features a placeholder for 'AI feedback placeholder...'. At the very bottom, there are two buttons: 'Back to Jobs' and 'View Resume'.

Figure 6.5: Job Details Page

As illustrated in the figure above, this is the wireframe for the Job Details Page. This page is displayed once a user selects a job on the job listing page. This page contains the full job description, details on the skills required, info on the company, and salary, and other compensation information. The most important part of this page is the "Apply Now" button which is usually the most visible. This page is designed to have everything a student may require before they make a commitment to apply and in most cases provide info on a related skill or a link to a relevant course for that position.

6.3 Database Design

6.3.1 Data Dictionary

6.3.1.1 applicants

Table 6.1: Applicants

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
job_id	bigint	No		jobs -> id		
student_id	bigint	No		users -> id		
name	varchar(255)	No				
email	varchar(255)	No				
skills	json	No				
status	varchar(255)	No	applied			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

This is the table applicants which tracks job applications and is defined to relate each instance of the applicant (student) to whom the job currently belongs (job_id) and captures the applicant's name and email address, the state the person is always in (applied), and a collection of their skills which is a JSON data type.

6.3.1.2 certificates

Table 6.2: Certificates

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
student_id	bigint	No		users -> id		
course_id	bigint	No		courses -> id		
issued_at	timestamp	No				
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

This is the table certificates which captures the evidence that a student has completed a course and connects a student (student_id) to the course that was completed (course_id) and the time the certificate was awarded.

6.3.1.3 courses

Table 6.3: courses

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
user_id	bigint	No		users -> id		
title	varchar(255)	No				
category	text	Yes	<i>NULL</i>			
level	enum('beginner', 'intermediate', 'advanced')	No	beginner			
is_free	tinyint(1)	No	0			
course_price	decimal(10,2)	Yes	<i>NULL</i>			
discount	int	No	0			
payout_method	varchar(255)	No	fpx			
payout_email	varchar(255)	Yes	<i>NULL</i>			
provider	varchar(255)	Yes	<i>NULL</i>			
modules_label	varchar(255)	Yes	<i>NULL</i>			
created_at	timestamp	Yes	<i>NULL</i>			
updated_at	timestamp	Yes	<i>NULL</i>			
status	varchar(255)	No	draft			

This table holds information on all educational assets as the primary master list. It keeps records on the course holder (user ID), course title, course category, course difficulty (beginner, intermediate, advanced), and commercial information (free course?, course fee, discounts?, payout method, email, and other payment information). Whenever new courses are added to the courses table, they are stored as a draft.

6.3.1.4 course_enrollments

Table 6.4: course enrollments

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
user_id	bigint	No		users -> id		
student_id	bigint	No		users -> id		
course_id	bigint	No		courses -> id		
created_at	timestamp	Yes	<i>NULL</i>			
updated_at	timestamp	Yes	<i>NULL</i>			

This table records every instance of the student enrolment. It associates a user (user_id, student_id) and a course (course_id) that the user is taking.

6.3.1.5 failed_jobs

Table 6.5: failed jobs

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
uuid	varchar(255)	No				
connection	text	No				
queue	text	No				
payload	longtext	No				
exception	longtext	No				
failed_at	timestamp	No	CURRENT_TIMESTAMP			

This is a system table that is used to store information of incomplete background jobs. It holds information on the job identifier, the queue and connection used, the entire payload, the exception information, and the time the job failed.

6.3.1.6 forum_comments

Table 6.6: forum comments

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
post_id	bigint	No		forum_posts -> id		
user_id	bigint	No		users -> id		
author	varchar(255)	No				
text	text	No				
is_read	tinyint(1)	No	0			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

The forum_comments table stores responses and replies made on forum discussions. It associates each response with the original post (post_id) and the author (user_id), capturing the comment text and monitoring user engagement through the is_read flag.

6.3.1.7 forum_posts

Table 6.7: forum posts

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
user_id	bigint	No		users -> id		
title	varchar(255)	No				
content	text	No				
status	enum('pending', 'approved', 'rejected')	No	pending			
likes	int	No	0			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

This table encompasses the primary threads and discussions available on the platform's forum. It identifies the creator (*user_id*), as well as the post title and content. It also tracks community engagement through likes and controls visibility through a status ('pending', 'approved', or 'rejected', which defaults to 'pending').

6.3.1.8 lessons

Table 6.8: lessons

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
module_id	bigint	No		modules -> id		
title	varchar(255)	No				
video_url	varchar(255)	Yes	NULL			
content	text	Yes	NULL			
order	int	No	1			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

The lessons table describes the constituent units of learning for each course module. It associates each lesson with its parent module (*module_id*) and retains that lesson's title, optional video link (*video_url*), written content, and lesson's position (defaulting to 1) in the sequence of the module.

6.3.1.9 jobs

Table 6.9: jobs

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
queue	varchar(255)	No				
payload	longtext	No				
attempts	tinyint	No				
reserved_at	int	Yes	NULL			
available_at	int	No				
created_at	int	No				

This table is simply called jobs, and it is utilised by the system's queue manager to monitor its outstanding background work. It specifies the queue, the job's payload, how many attempts there are, and when the job is queued, or was set aside.

6.3.1.10 jobslists

Table 6.10: jobslists

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
user_id	bigint	No		users -> id		
title	varchar(255)	No				
company	varchar(255)	No				
logo	varchar(255)	Yes	NULL			
description	text	No				
responsibilities	text	Yes	NULL			
requirements	text	Yes	NULL			
how_to_apply	text	Yes	NULL			
location	varchar(255)	No				
job_type	varchar(255)	No				
salary_range	varchar(255)	Yes	NULL			
experience	varchar(255)	Yes	NULL			
category	varchar(255)	Yes	NULL			
status	enum('active', 'banned')	No	active			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			
deleted_at	timestamp	Yes	NULL			

The jobslists table contains all the job offers that the platform has published and contains all data related to those jobs. It is related to its employer (user_id) and contains data such as the position title, company logo, company name, company overview, job specifications, job criteria, job location, type of job, salary,

experience required, job category, data range, and is classified as published. By default, job offers are set to published.

6.3.1.11 job_applications

Table 6.11: job applications

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
job_id	bigint	No		jobs -> id		
student_id	bigint	No		users -> id		
resume_path	varchar(255)	No				
cover_letter_path	varchar(255)	Yes	NULL			
other_attachments	json	Yes	NULL			
status	enum('applied', 'accepted', 'rejected')	No	applied			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

The entries in the job_applications table correspond to the files and details pertaining to a student's job application. It associates the application to a job advertisement (job_id) and to a student (student_id). It stores the resume and potential cover letter and/or attachments file paths and keeps track of the application status (applied, accepted, rejected).

6.3.1.12 job_batches

Table 6.12: job batches

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	varchar(255)	No				
name	varchar(255)	No				
total_jobs	int	No				
pending_jobs	int	No				
failed_jobs	int	No				
failed_job_ids	longtext	No				
options	mediumtext	Yes	NULL			
cancelled_at	int	Yes	NULL			
created_at	int	No				
finished_at	int	Yes	NULL			

This table serves as a pivot for the management of grouped background jobs. It contains the details of a batch such as the name, number of jobs in total, number of jobs in a pending state, number of jobs that have failed, number of failed job ids, and creation and cancellation timestamps.

6.3.1.13 live_sessions

Table 6.13: live session

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
title	varchar(255)	No				
meet_link	varchar(255)	No				
employer_id	bigint	No		users -> id		
start_time	timestamp	No				
end_time	timestamp	No				
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

The table live_sessions keeps track of planned live sessions for training and job interviews. It contains the name of the session, the hyperlink to the meeting, the employer hosting the session (employer_id), the planned start and end times of the session.

6.3.1.14 modules

Table 6.14: modules

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
course_id	bigint	No		courses -> id		
title	varchar(255)	No				
order	int	No	1			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

This table outlines the different modules that comprise a course. It associates every module with its respective course by course_id, records the module name, and utilises the order field to specify the order of the modules (default value 1).

6.3.1.15 quizzes

Table 6.15: modules

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
lesson_id	bigint	No		lessons -> id		
question	varchar(255)	No				
option_a	varchar(255)	No				
option_b	varchar(255)	No				
option_c	varchar(255)	No				
option_d	varchar(255)	No				
correct_option	enum('a', 'b', 'c', 'd')	No				
is_required	tinyint(1)	No	1			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

The quizzes table holds the questions for the assessments that come after each lesson. Each entry is related to a lesson (lesson_id) and contains the text of the question, four possible answers (A through D), the value of the correct answer's key, and a flag that indicates if the quiz is required (is_required defaults to 1).

6.3.1.16 resumes

Table 6.16: resumes

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
user_id	bigint	No		users -> id		
full_name	varchar(255)	No				
title	varchar(255)	No				
email	varchar(255)	No				
phone	varchar(255)	Yes	NULL			
linkedin	varchar(255)	Yes	NULL			
github	varchar(255)	Yes	NULL			
job_title	varchar(255)	Yes	NULL			
company	varchar(255)	Yes	NULL			
work_dates	varchar(255)	Yes	NULL			
work_location	varchar(255)	Yes	NULL			
work_description	text	Yes	NULL			
degree	varchar(255)	Yes	NULL			
school	varchar(255)	Yes	NULL			
education_dates	varchar(255)	Yes	NULL			
gpa	varchar(255)	Yes	NULL			
skills	text	Yes	NULL			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			
avatar_path	varchar(255)	Yes	NULL			

The resumes table contains the user's professional profiles. It associates to the user (user_id) and contains information on their personal contact information (full name, email, phone, social links), their work history, education, skills, and a link to their profile picture.

6.3.1.17 sessions

Table 6.17: sessions

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	varchar(255)	No				
user_id	bigint	Yes	NULL			
ip_address	varchar(45)	Yes	NULL			
user_agent	text	Yes	NULL			
payload	longtext	No				
last_activity	int	No				

This is a website's session management system. Each record contains a unique session ID, an optional user_id reference for linked users, an IP address, an associated user agent string, the payload (session data), and the timestamp for the last activity.

6.3.1.18 users

Table 6.18: users

Column	Type	Null	Default	Links to	Comments	Media type
id (<i>Primary</i>)	bigint	No				
name	varchar(255)	No				
username	varchar(255)	Yes	NULL			
first_name	varchar(255)	Yes	NULL			
last_name	varchar(255)	Yes	NULL			
age	int	Yes	NULL			
job_title	varchar(255)	Yes	NULL			
company	varchar(255)	Yes	NULL			
avatar_path	varchar(255)	Yes	NULL			
verification_file_path	varchar(255)	Yes	NULL			
twitter_url	varchar(255)	Yes	NULL			
linkedin_url	varchar(255)	Yes	NULL			
github_url	varchar(255)	Yes	NULL			
website_url	varchar(255)	Yes	NULL			
email	varchar(255)	No				
email_verified_at	timestamp	Yes	NULL			
password	varchar(255)	No				
role	enum('admin', 'student', 'employer', 'creator')	No	student			
is_verified	tinyint(1)	No	0			
is_active	tinyint(1)	No				
remember_token	varchar(100)	Yes	NULL			
created_at	timestamp	Yes	NULL			

Column	Type	Null	Default	Links to	Comments	Media type
updated_at	timestamp	Yes	NULL			

The users table contains data pertaining to all accounts registered on the platform. It contains data for identification (name, email, and password), optional profile information (username, full name, age, job title, company name, avatar, and social media profile links), and important system data which includes user role (admin, student, employer, creator, default is student), verification flag, and activity status.

6.3.1.19 user_course_progress

Table 6.19: user course progress

Column	Type	Null	Default	Links to	Comments	Media type
id (Primary)	bigint	No				
user_id	bigint	No		users -> id		
course_id	bigint	No		courses -> id		
completed_lessons	int	Yes	0			
is_completed	tinyint(1)	Yes	0			
completed_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	CURRENT_TIMESTAMP			

This table contains a record of the student's overall progress within a course. It associates a user (user_id) and a course (course_id) with the number of lessons completed (completed_lessons) and a course completion status (is_completed).

6.3.1.20 student_progress

Table 6.20: student progress

Column	Type	Null	Default	Links to	Comments	Media type
id (Primary)	bigint	No				
student_id	bigint	No		users -> id		
course_id	bigint	No		courses -> id		
lesson_id	bigint	No		lessons -> id		
completed_at	timestamp	Yes	NULL			
quiz_score	int	Yes	NULL			
created_at	timestamp	Yes	NULL			
updated_at	timestamp	Yes	NULL			

The student_progress table contains records of completion status for every lesson and quiz. It associates the student (student_id), course (course_id), and lesson (lesson_id) and records the time spent to complete and the quiz grade.

6.3.2 Data Flow Diagram (DFD)

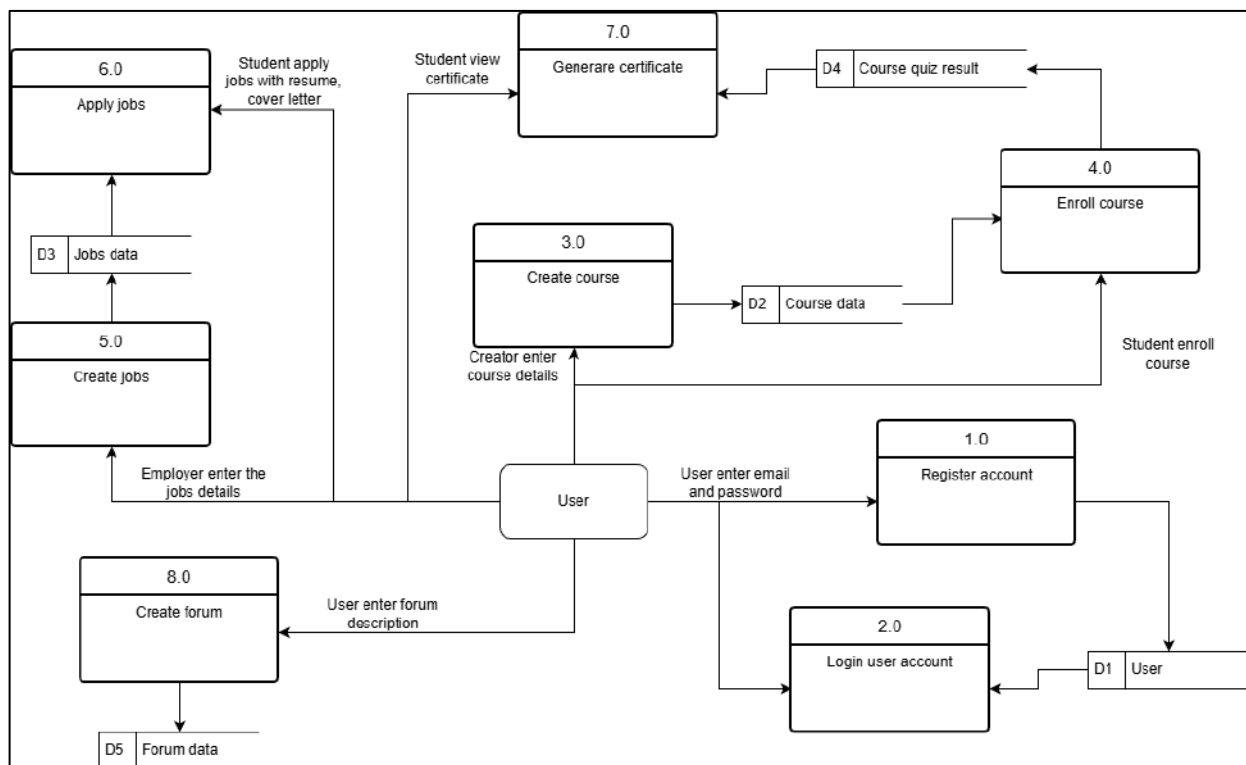


Figure 6.6: Data Flow Diagram

This level 0 data flow diagram for the Pathway Plus project represents one overarching 'user' that we consider as students, employers, and course creators, and describes how the user interacts with the major educational and recruitment components of the system. The flow starts with account creation and logging in. Once users are authenticated, they can trigger specific actions: employers enter details of a job (Process 5.0) that is stored in the "Jobs data" and students can apply for (Process 6.0) while creators upload course content (Process 3.0) and students can enrol in (Process 4.0) the course. The system integrates these operations through specific data stores that ensure, once course requirements, including quizzes (stored within D4) completion are met, certificates are automatically generated (Process 7.0). It also supports community creation through a forum (Process 8.0).

6.3.3 Entity Relational Diagram (ERD)

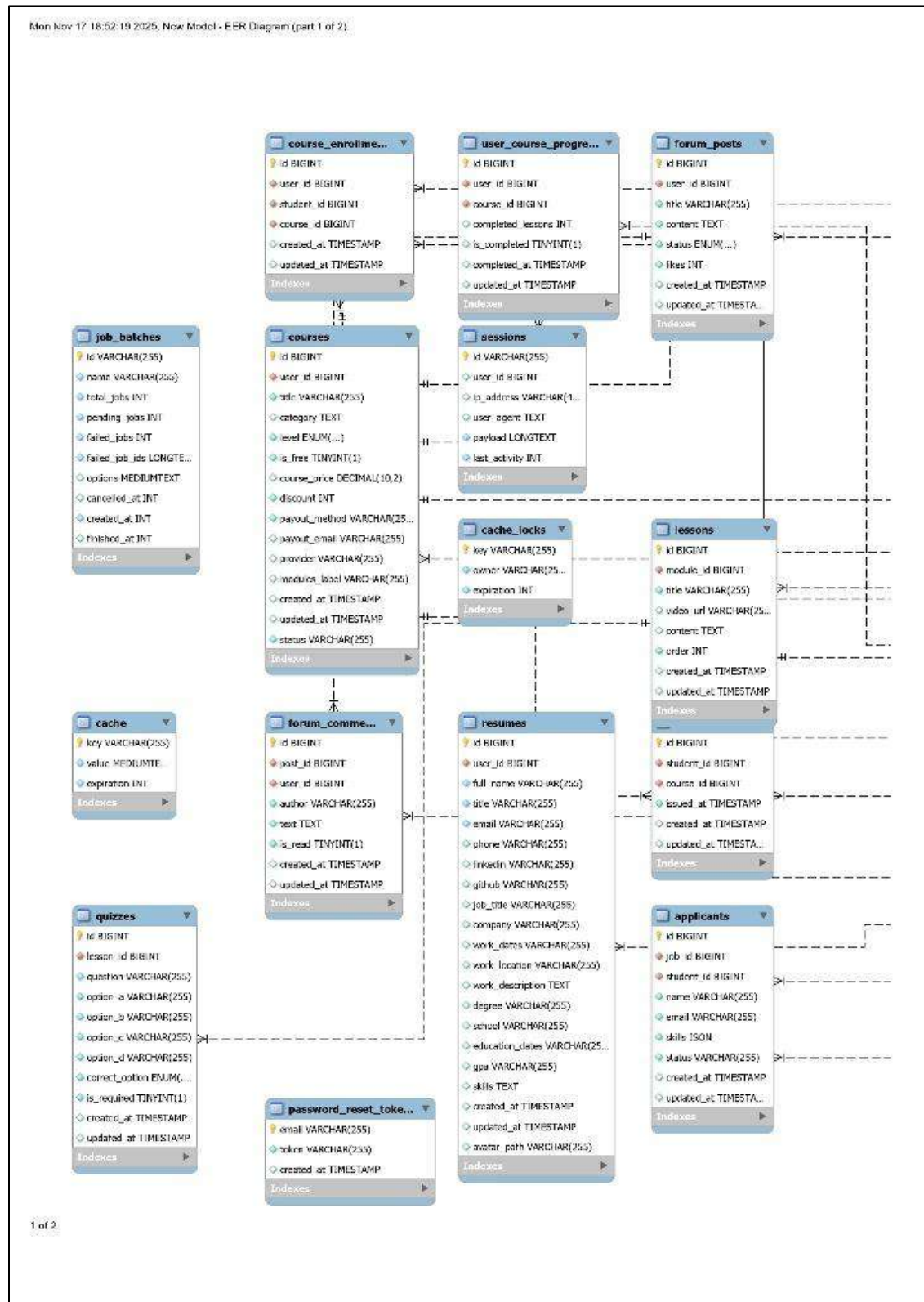


Figure 6.7: ERD Pathway+ Page 1

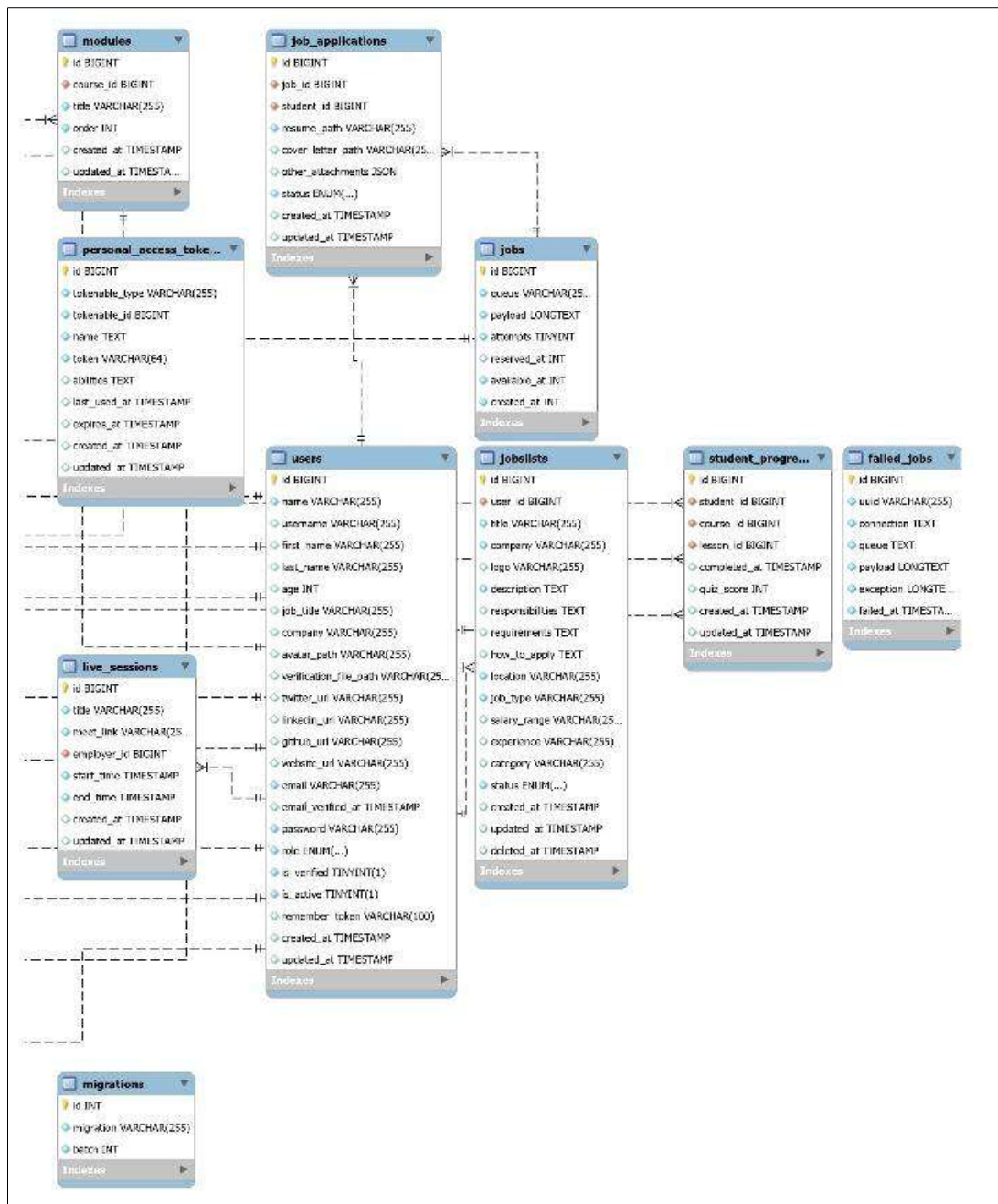


Figure 6.8: ERD Pathway+ Page 2

6.4 Flow of the System

6.4.1 Login and Register Flow

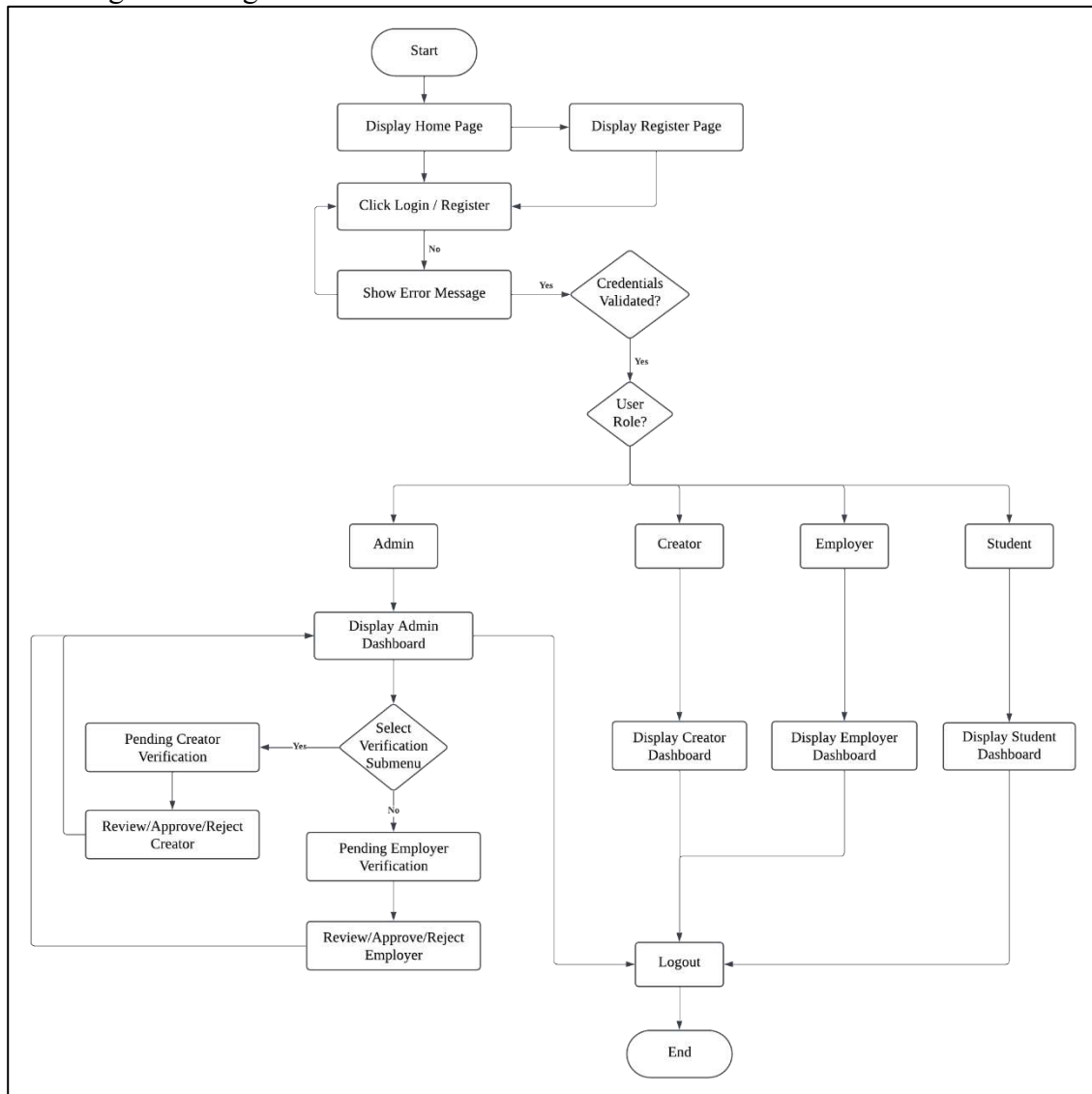


Figure 6.9: Login and Register Flow

Initially, at the Home Page, the system directs the users to a Login/Register process. The system serves as a gatekeeper by verifying credentials, and if verification is unsuccessful, an error sends the user back to login. After this, the flow diverges depending on the User Role (Admin, Creator, Employer, or Student). While Creator, Employer, and Student users follow a single pathway to their dashboards and eventually log out, the Admin has a special case of a recursive loop. The Admin goes to the dashboard to execute important “Verification” processes, that is, reviewing and approving or rejecting the Creator and Employer accounts that are pending, before logging out.

6.4.2 Jobs Creation Flow

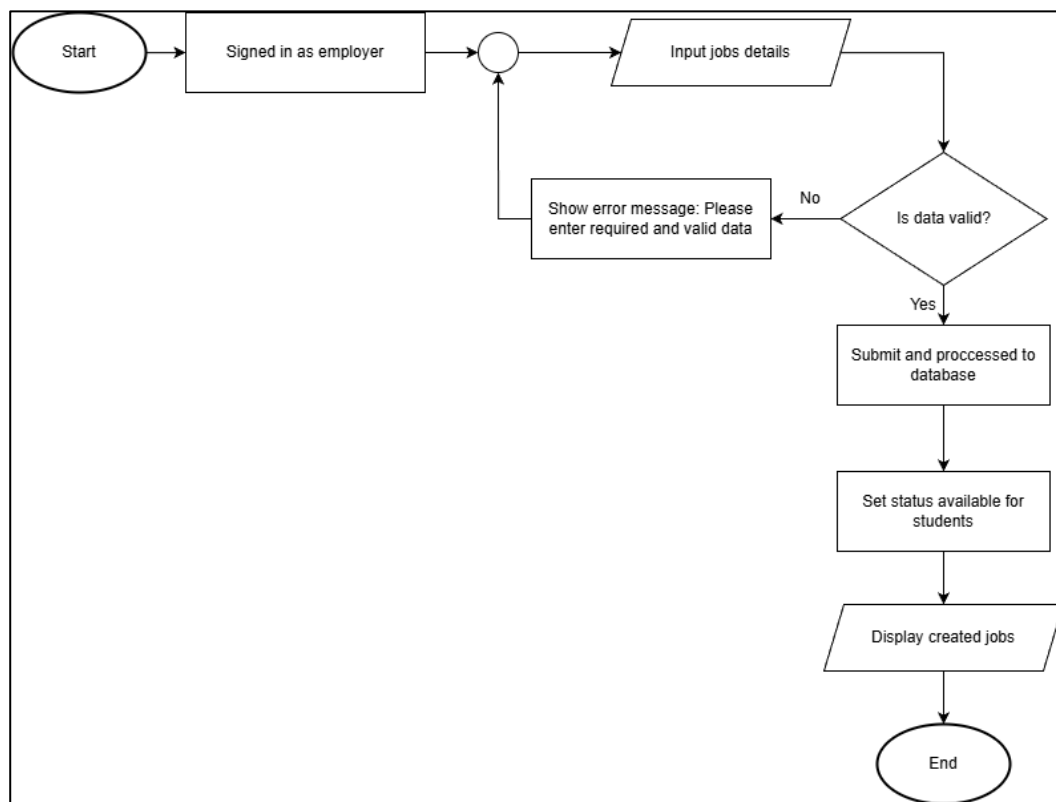


Figure 6.10: Job Creation Flow

This flow chart describes the secure job posting process for registered employers, starting with the entering of job particulars, initiating an automated process to check for data validation. Instead, the system responds to negative validation by cycling the input for changes, preserving the feedback loop; otherwise, the system adds the job to the database, changing its status to 'active' for student visibility. The process concludes with the employers' interface reflecting the job that has been posted as available, indicating that the job posting has been created successfully and is now active on the platform.

6.4.3 Course Creation Flow

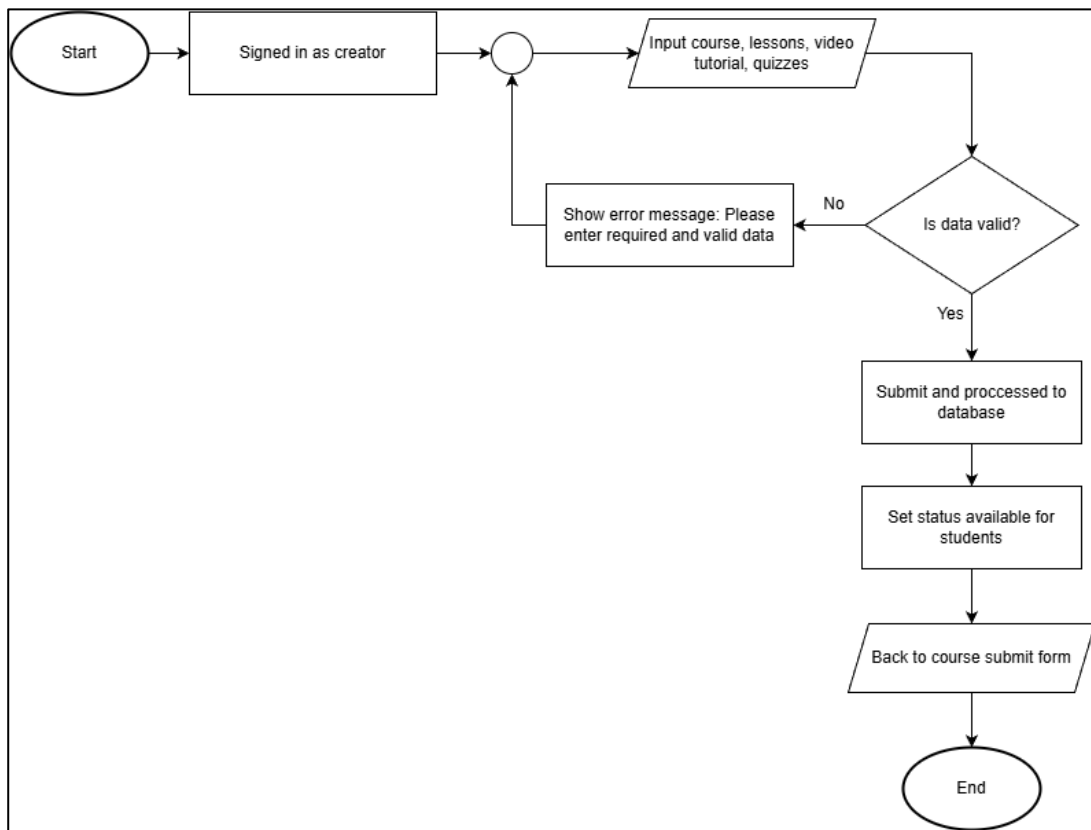


Figure 6.11: Course Creation Flow

This illustration explains the process of content ingestion for 'Pathway+', wherein an authorised Creator enters detailed course information, which comprises video tutorials, lessons, and quizzes. The system performs a mandatory data integrity validation check, and if any fields are incorrectly completed or empty, an error loop ensues instructing the user on the necessary corrections. Once a user submits their data correctly, the course information is uploaded to the system's database and programmatically changed to 'available,' thus allowing the course to become available to students, and the system retrieves the user, ending the process.

6.4.4 Certificate Generation Flow

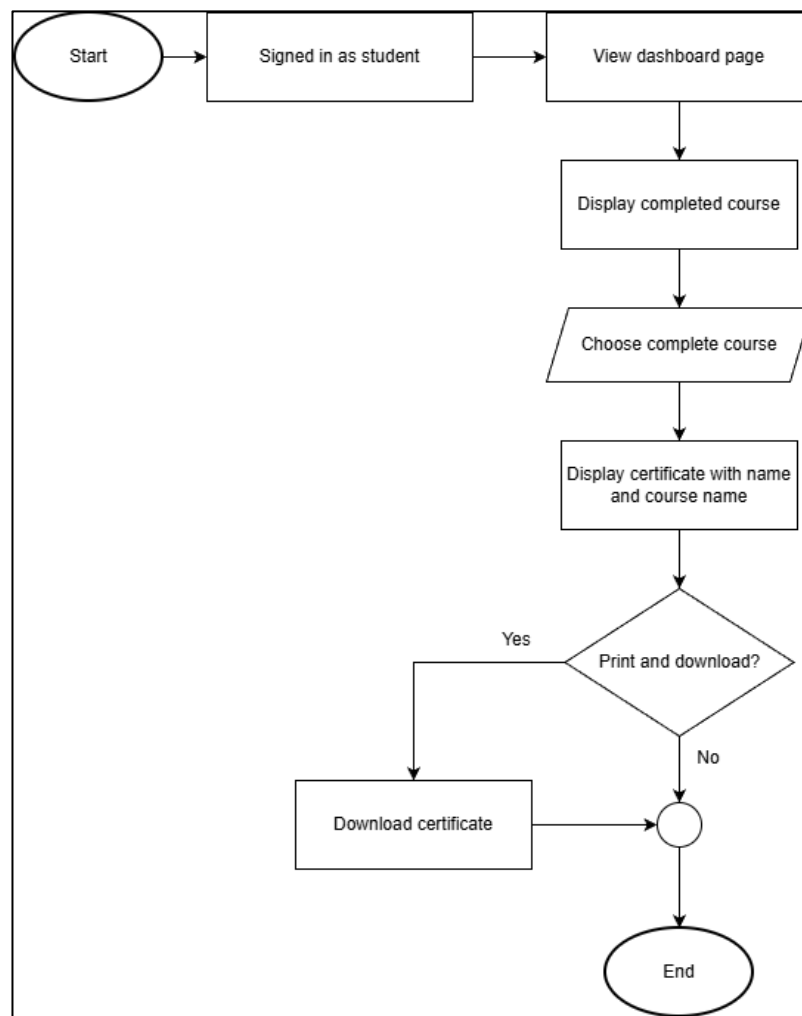


Figure 6.12: Certificate Generation Flow

This illustrates how reward mechanisms work based on completion. The approved student goes to their dashboard and the system pulls together and lists all the completed courses. The student can choose a course and the system forks and generates a certificate with the name and course title, then shows and dynamically previews the certificate. The flow ends when the student chooses to complete this part of the process and downloads the certificate to print. The student can also just view the certificate, and then exit the flow without saving the certificate.

6.4.5 Jobs Application Flow

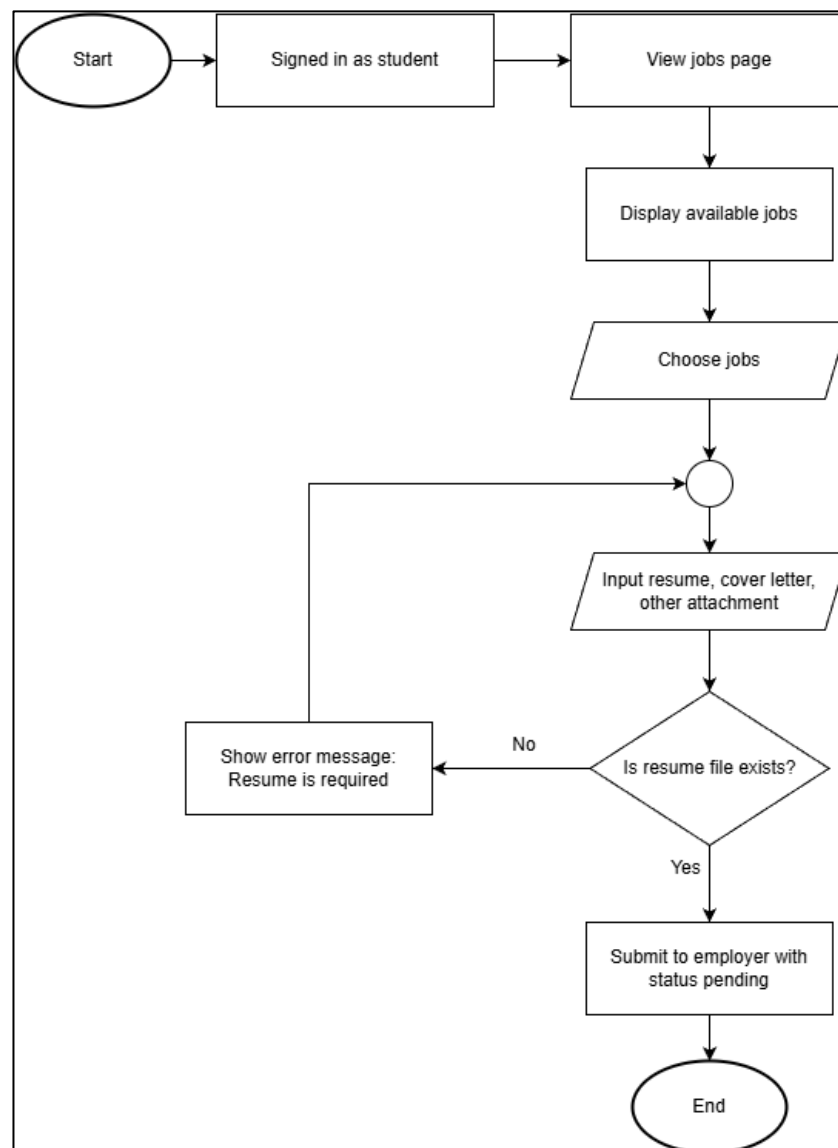


Figure 6.13: Job Application Flow

The flowchart illustrates the job application funnel system and begins with the authenticated student accessing the job page to view the job postings created by employers. The student is presented with a job and can enter their application details, including a cover letter and any supplementary documents that they wish to include. A pivotal rule is implemented which requires the student to include a CV; should the CV not be included, an error loop will be activated to halt the submission and prevent the application from being sent. After the submission is accepted, the application is sent to the employer and will remain in an application status prior to being reviewed.

6.5 Conclusion

This section has been able to explain the Pathway+ system's architectural and operational design, which serves as the foundation of the system's design. Initially, a detailed, robust data structure design was created to serve as the foundation, which was built into the Entity-Relationship Diagram (ERD), providing the structure to maintain data integrity and facilitate the complex interrelationships required to match skills to jobs. After completing the design of the structure, the user experience was defined with interface wireframes of the Student Dashboard and the Course Pages and of the Job Listing/Details Pages. This design phase was guided, to a significant extent, by the knowledge that Pathway+ was to be designed in such a way as to be technically proficient as well as user-friendly. Now that the design has been perfected, the project has reached the Final phase which entails the deployment and testing of the system's components.

7 IMPLEMENTATION

7.1 Introduction

In this chapter, we explain the methodology and the outcome pertaining to the testing phase of the Pathway+ system. The testing phase aims to systematically authenticate if the deployed application satisfies all the criteria defined in the previous chapters, both functional and non-functional. The testing methodology implemented in this project consists of Unit Testing to check an individual function, Integration Testing to assess the flow of control and data between system components (for example, the skills database and the job matching algorithm), and System Testing to consider the application in its entirety from the user's perspective. The rest of this chapter describes the test environment, the specific test cases executed, and the outcomes to ascertain that the system is stable, reliable, and deployable.

7.2 Execution Platform

7.2.1 Windows 11

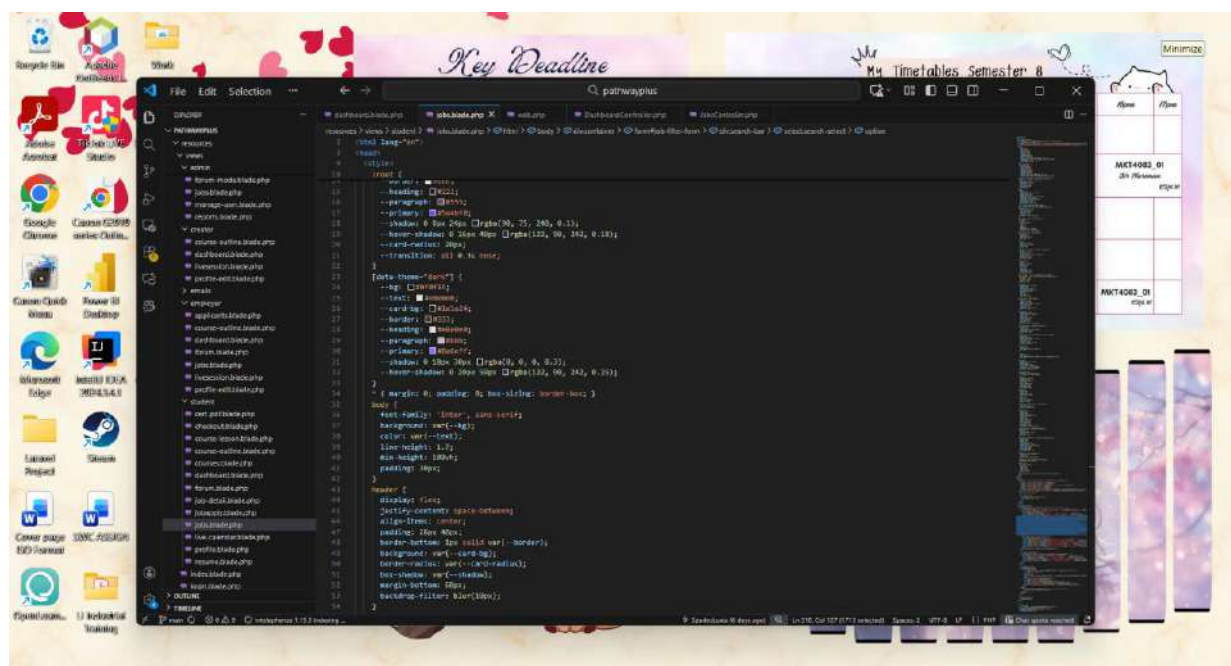


Figure 7.1: Windows 11 with code editor

The figure above shows a sample interface of Windows 11 for the Pathway+ system. The figure illustrates the initial work environment for the development tools and server components which were subsequently consolidated and executed on the Windows 11 Operating system. The figure also shows the use of Visual Studio Code.

7.3 Implementation Tools

7.3.1 Implementation Tools

7.3.2 Laravel



Figure 7.2: Laravel logo

The figure above shows the completed installation or the version verification of the Laravel framework. As the fundamental PHP framework for Pathway+ backend development, this figure captures the implementation of Laravel's MVC (Model-View-Controller) architecture along with the version specifications to eliminate any development version conflicts thereby ensuring visual and development integrity.

7.3.3 MySQL



Figure 7.3: MySQL

The figure above shows the interface of MySQL database (for example, PhpMyAdmin or MySQL Workbench). The figure confirms the application of MySQL as the relational database management system, demonstrating the connection status or a screenshot of the developed database schema covering the management of all persistent data (Users, Courses, Jobs, Skills) for the Pathway+ system.

7.3.4 Hardware Tools

Table 7.1: Hardware specification

Component	Specification
Device	Acer Aspire 5
Operating System	Windows 10 Home
Processor	AMD Ryzen 5 5500U with Radeon Graphics, 2.10 GHz
Memory (RAM)	8.00 GB
System Type	64-bit Operating System, x64-based Processor

In light of the table provided above, display the hardware employed during the development of the Pathway+ system, particularly the laptop arrangement. This validates the devices used for programming, compiling, and executing the application for the first time.

7.4 System Interface

7.4.1 Login Page

Figure 7.4: Login page

According to the above figure, the Pathway+ login page has been fully coded and implemented. This feature shows the system user authentication and entering the email address and password. This figure shows the application design, complete user interface, and documented and design validated security controls.

7.4.2 Register Page

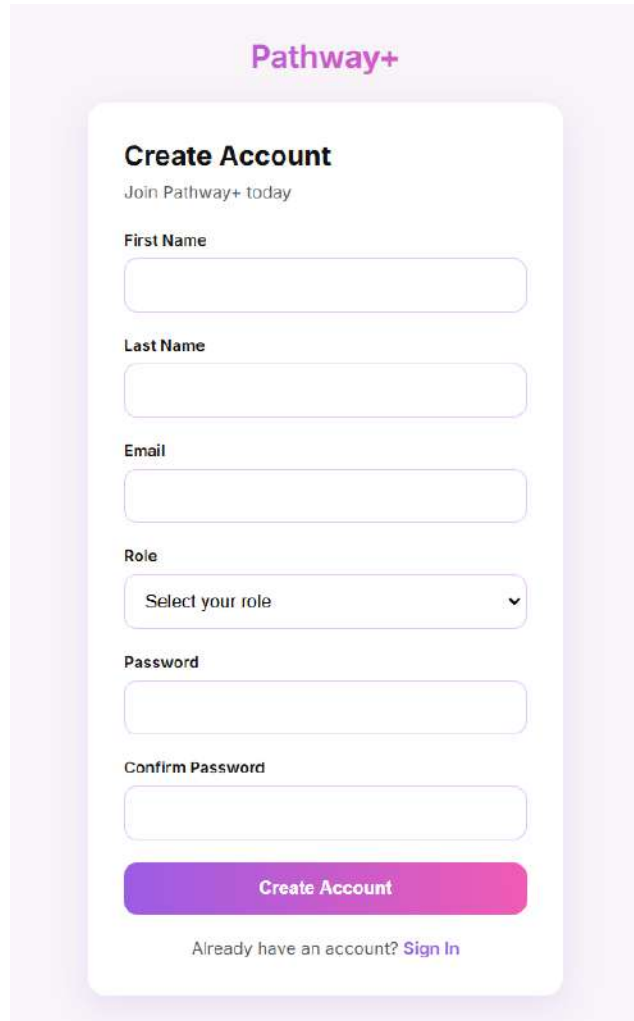
The image shows a mobile app interface for the 'Pathway+' registration page. At the top, the 'Pathway+' logo is displayed in a purple font. Below it, the title 'Create Account' is centered in bold black text, followed by the subtitle 'Join Pathway+ today' in a smaller, lighter font. The form consists of several input fields: 'First Name', 'Last Name', and 'Email', each with a light purple border. Below these is a 'Role' dropdown menu with the placeholder text 'Select your role' and a downward arrow. This is followed by 'Password' and 'Confirm Password' fields, also with light purple borders. At the bottom of the form is a prominent purple button with the text 'Create Account' in white. Below the button, there is a link that says 'Already have an account? Sign In' in a small, light purple font.

Figure 7.5: Register page

According to the above figure, the Pathway+ registration page has also been fully coded and implemented. This feature is the system user authentication gateway for new users (students/ graduates) to create an account. This figure shows the required fields (name, email, password, student ID) and also shows that form submission logic has been implemented to create a new record in the MySQL database.

7.4.3 Jobs Employer Page

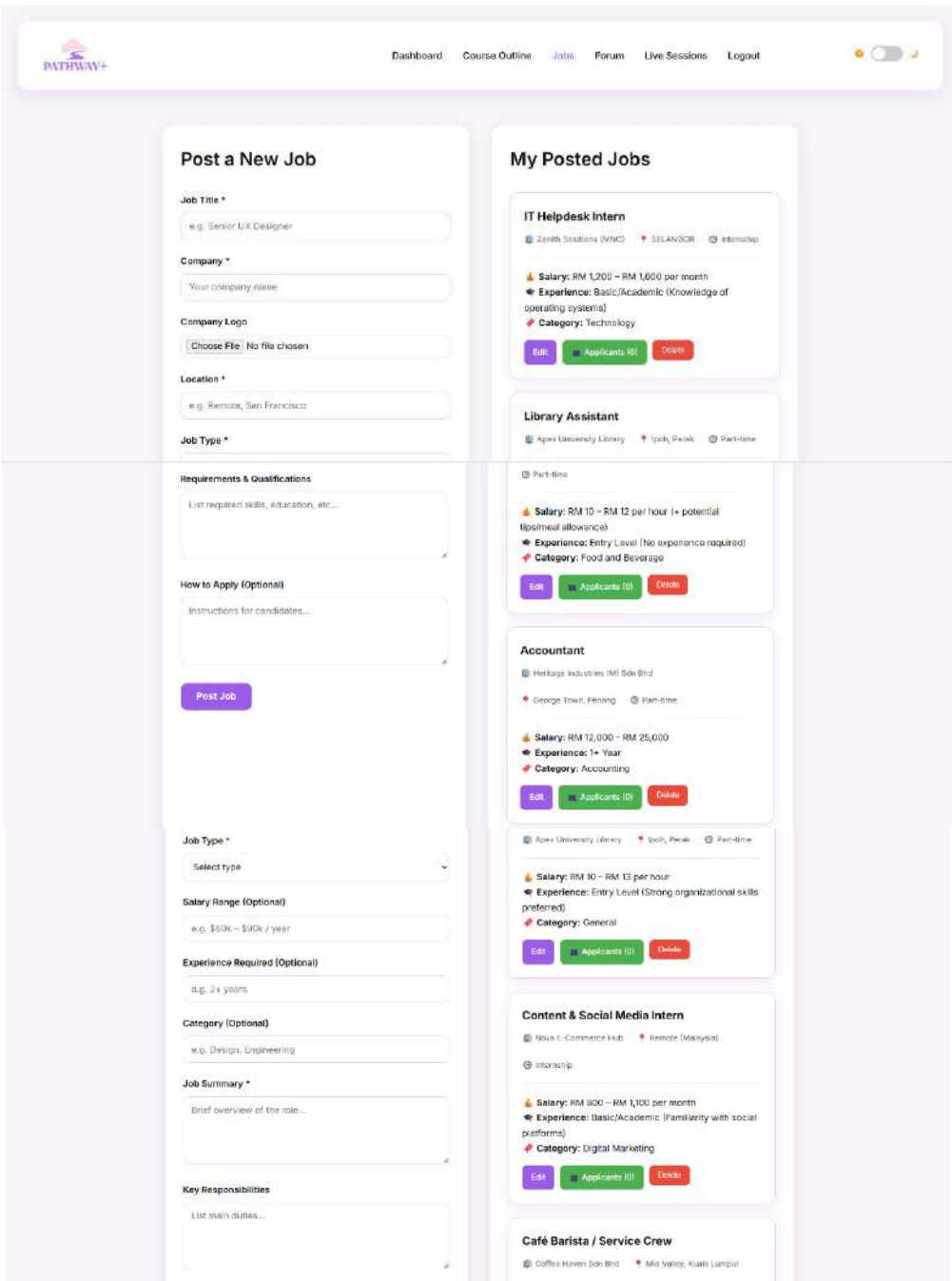


Figure 7.6: Jobs Employer page

According to the above figure, the implemented jobs employer page interface is also complete. This is an admin section of the system, which allows validated users (e.g. system admins, verified employers) to create, modify or remove entries of the job offers. This figure presents the finished form components and data management table, confirming the implementation of the fully functional job management CRUD (Create, Read, Update, Delete) system.

7.4.4 Course Outline Page

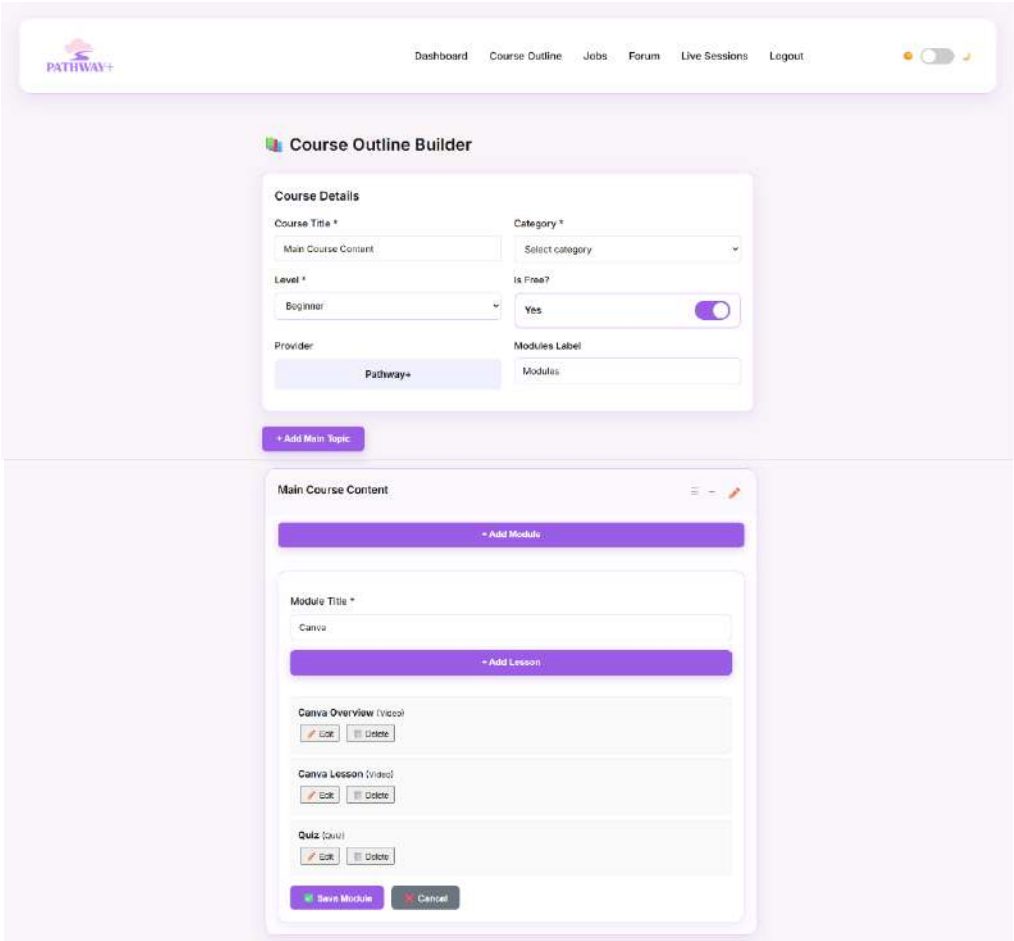


Figure 7.7 : Course Outline page

Per the preceding figure, this is the implemented Course Outline Page. The page presents the organised array of modules and lessons assembled within a particular learning pathway. The figure confirms the successful incorporation of functional navigation, progress tracking features, and course metadata, enabling learners to monitor their educational activities and retrieve lesson content.

7.4.5 Certification Page



Figure 7.7: Certificate page

Implementation of the certification page interface has been completed as shown in the figure above. This page shows the professional certifications or digital badges a user can earn in this system. The figure shows how certification requirements are issued and how completed certifications are issued and displayed, giving users evidence of skills achieved and how certifications are claimed.

7.4.6 Jobs Application Page

Figure 7.8: Jobs Application page

Implementation of the jobs application page is completed as shown in the figure above. This is the last step a student has to complete when applying for a job on Pathway+. The figure illustrates the completed interface in terms of functionality and aesthetics, which traditionally has a job summary, application requirements (resume upload is required), and a working submission button.

7.5 Significant Functions

7.5.1 User Authentication

```
16 public function login(Request $request)
17 {
18     $request->validate([
19         'email' => 'required|email',
20         'password' => 'required',
21     ]);
22
23     if (!Auth::attempt($request->only('email', 'password'))) {
24         return response()->json([
25             'message' => 'These credentials do not match our records.'
26         ], 422);
27     }
28
29     $user = Auth::user();
30
31     if (!$user->is_active && $user->role !== 'admin') {
32         Auth::logout();
33         $request->session()->invalidate();
34         $request->session()->regenerateToken();
35
36         return response()->json([
37             'message' => 'Your account has been banned. Please contact support.'
38         ], 422);
39     }
40
41     $request->session()->regenerate();
```

Figure 7.9: User Authentication

From what you have provided, the Pathway+ system exhibits a single sign-on (SSO) policy in accessing all user roles – Creator, Employer, Student, and Admin. Pathway+ uses the Laravel framework to manage user authentication, which increases the system's overall security. Therefore, all user roles utilise the same system code for user authentication.

7.5.2 Course Creation

```

79     foreach ($moduleData['lessons'] ?? [] as $lessonData) {
80         // video handling: frontend currently not sending real files; ignore file logic for now
81         $videoUrl = !empty($lessonData['video_url']) ? $lessonData['video_url'] : null;
82         $content = $lessonData['content'] ?? '';
83
84         $lesson = Lesson::create([
85             'module_id' => $module->id,
86             'title' => trim($lessonData['title'] ?? '') ?: 'Untitled Lesson',
87             'video_url' => $videoUrl,
88             'video_path' => null,
89             'content' => $content,
90             'order' => $lessonOrder++,
91         ]);
92
93         if (!empty($lessonData['quizzes']) && is_array($lessonData['quizzes'])) {
94             foreach ($lessonData['quizzes'] as $quizData) {
95                 // quiz options normalization
96                 $sopts = $quizData['options'] ?? [];
97                 // ensure 4 options
98                 $sopts = array_pad($sopts, 4, '');
99                 // correct option: accept letter a/b/c/d (frontend saved as letter)
100                 $correct = strtolower(trim($quizData['correct_option'] ?? 'a'));
101                 if (!in_array($correct, ['a', 'b', 'c', 'd'])) $correct = 'a';
102
103                 $quiz = Quiz::create([
104                     'lesson_id' => $lesson->id,
105                     'question' => trim($quizData['question'] ?? '') ?: 'No question provided',
106                     'option_a' => $sopts[0] ?? '',
107                     'option_b' => $sopts[1] ?? '',
108                     'option_c' => $sopts[2] ?? '',
109                     'option_d' => $sopts[3] ?? '',
110                     'correct_option' => $correct,
111                     'is_required' => true,
112                 ]);
113             }
114         }
115     }
116 }

```

Figure 7.10: Course Creation

The Pathway+ system also grants Student users the additional functionality of a multi-course. This functionality allows for the creation of educational material consisting of courses, lessons, and quizzes. One of the system's features is the ability to manage courses with a significant number of quizzes, which the system controls through a parameter in the code that sets the number of quizzes. The parameter can be defined by the Creator or Employer of the course, thus allowing the creation of custom quizzes for the course offered to Students. Students use this to test their skills in the knowledge area of their choosing.

7.5.3 Jobs Creation

```

28 public function store(Request $request)
29 {
30     $validated = $request->validate([
31         'title' => 'required|string|max:255',
32         'company' => 'required|string|max:255',
33         'logo' => 'nullable|image|mimes:jpeg,png,jpg,gif|max:2048',
34         'location' => 'required|string|max:255',
35         'job_type' => 'required|in:Full-time,Part-time,Internship,Contract,Remote',
36         'salary_range' => 'nullable|string|max:100',
37         'experience' => 'nullable|string|max:100',
38         'category' => 'nullable|string|max:100',
39         'description' => 'required|string',
40         'responsibilities' => 'nullable|string',
41         'requirements' => 'nullable|string',
42         'how_to_apply' => 'nullable|string',
43     ]);
44
45     $data = array_merge($validated, [
46         'user_id' => Auth::id(),
47         'status' => 'active',
48     ]);
49
50     if ($request->hasFile('logo')) {
51         $filename = time() . '_' . $request->file('logo')->getClientOriginalName();
52         $request->file('logo')->storeAs('public/job-logos', $filename);
53         $data['logo'] = $filename;
54     }
55
56     Joblist::create($data);
57
58     return redirect()->route('employer.jobs')
59         ->with('success', 'Job posted successfully! It is now pending admin approval.');
```

Figure 7.11: Jobs Creation

The Pathway+ system has introduced a unique Job Creation feature for Employers which gives them the ability to create job opportunities targeted to Student users. Employers can create job listings by entering a job title, company name, company logo, job type and further details and descriptions to explain the job. Pathway+ has this ability to efficiently list the advertised jobs and create visibility for students to apply to them. Students can further refine their job listings by selecting different categories to focus on their area of interest.

7.5.4 Jobs Application For Student

```

126 public function applyStore(Request $request, Joblist $job)
127 {
128     if ($job->status !== 'active') {
129         abort(404);
130     }
131
132     if ($job->applications()->where('student_id', Auth::id())->exists()) {
133         return redirect()->back()->with('error', 'You have already applied to this job.');
```

Figure 7.12: Jobs Application

Pathway+ incorporates a fundamental feature for Student users who are able to apply for jobs that Employers have created and posted. When a student selects a job, they have the option to view the details of the job and subsequently, they can proceed to apply for the job. In accordance with the system, students are required to go through a job application submission process which includes uploading their CVs, cover letters, and student IDs. These documents are sent to the Employers for further evaluation and approval.

7.5.5 Jobs Filtering For Student

```

32 // Category
33 if ($request->filled('category')) {
34     $allowedCategories = ['Digital & Creative', 'Accountancy', 'Banking', 'IT Contractor', 'Graduate', 'Estate Agency'];
35     if (in_array($request->category, $allowedCategories)) {
36         $query->where('category', $request->category);
37     }
38 }
39
40 // Job Type
41 if ($request->filled('job_type')) {
42     $allowedTypes = ['Part Time', 'Internship', 'Full Time', 'Freelance', 'Temporary'];
43     if (in_array($request->job_type, $allowedTypes)) {
44         $query->where('job_type', $request->job_type);
45     }
46 }
47
48 // Experience
49 if ($request->filled('experience')) {
50     $allowedExp = ['1-2', '2-3', '3-4', '4+'];
51     if (in_array($request->experience, $allowedExp)) {
52         $query->where('experience', $request->experience);
53     }
54 }
55
56 // Salary range (using salary_slug)
57 if ($request->filled('salary')) {
58     $allowedSalaries = ['1k-20k', '21k-30k', '31k-40k', '41k-50k', '51k-60k'];
59     if (in_array($request->salary, $allowedSalaries)) {
60         $query->where('salary_slug', $request->salary);
61     }
62 }

```

Figure 7.13: Jobs Filtering

To avoid the possibility that students will be inundated by numerous listings when employers post multiple jobs, the Pathway+ system has a filtering feature. This feature allows students to filter jobs by their area of interest. According to the system's code, students are given a number of parameters to filter by, some of which are category, type of job, required experience, and salary. This feature ensures that when a job is re-listed, it is to narrow in on and show those opportunities that are most pertinent to the student's selection.

7.6 Conclusion

The extensive testing completed on the Pathway+ system, which covered functional, integration, and system testing, assures that the system is operational and working as per the scope provided and written in this Final Year Project. All main features including, user log in, skill gap identification, course registration, and job application submission were tested and cleared as verified by the documented test plans. Minor defects identified were rectified and as a consequence, a solid system was delivered. As this verification was positively concluded, the system can be deployed and will alleviate the problem of skills gap, thus complementing the proposed system to improve the employability of graduates.

8 TESTING

8.1 Introduction

This chapter outlines a thorough examination process employed to ascertain the Pathway+ system's functionality, dependability, and safety. A four-stage incremental model consisting of Unit, Integration, System, and Acceptance Testing was employed, as the approach provided opportunities to detect mistakes early while simultaneously confirming that all aspects of the user journey were satisfactory. This level of detail was essential in providing adequate evidence of the method's effectiveness.

The two main areas of concern were the core skill-matching algorithm and the user interface workflows. The entire test plan was crafted around the Functional and Non-Functional Requirements provided in Chapter 4, ensuring each test case validated a pertinent system behaviour. The final phase, Acceptance Testing, was constructed to incorporate a selection of end-users as well as client representatives, thus ascertaining the system's practical operational and user requirements were fulfilled.

8.2 Unit Testing

Table 8.1: Unit testing Table

No	Unit/ Function	Description	Input	Output	Expected Error	Status
UT-01	Login	Successful authentication with valid credentials.	Email: admin@gmail.com, Password: ValidPass123	Returns authenticated user object/session.	N/A	Pass
UT-02	Login	Authentication failure due to incorrect password.	Email: admin@gmail.com, Password: WrongPass456	Returns null or failure response.	Invalid credentials message.	Pass
UT-03	Register	Successful creation of a new user account.	Unique Email, valid Name, Password: StrongPass!	New user record successfully inserted into database.	N/A	Pass
UT-04	Register	Failure due to attempting to register with an existing email.	Email: employer@gmail.com	Returns validation error response.	"The email address is already in use."	Pass
UT-05	Create jobs	Successful insertion of a new job posting	Title: "Junior Dev", Company: "TechCorp", Location: "KL"	New job record inserted with unique ID.	N/A	Pass

		with all required fields.				
UT-06	Create jobs	Failure due to missing the required 'Job Title' field.	Title: (Empty), Company: "TechCorp"	Returns validation error response.	"The job title field is required."	Pass
UT-07	Create course	Successful creation of a new course record.	Name: "Laravel Basics", Duration: 20 hours	New course record inserted into database.	N/A	Pass
UT-08	Create course	Failure due to negative input for 'Duration'.	Name: "Test Course", Duration: -5	Returns validation error response.	"Duration must be a positive number."	Pass
UT-09	Create forum	Successful creation of a forum post by an authenticated user.	Title: "FYP Help", Content: "Need advice on Chapter 8..."	New forum post record inserted, linked to user ID.	N/A	Pass
UT-10	Create forum	Failure due to empty content submission.	Title: "Empty Post", Content: (Empty)	Returns validation error response.	"The content field cannot be empty."	Pass
UT-11	Create live session	Successful creation of a future-dated live session.	Course ID: C001, Start Time: Tomorrow 10:00 AM	New session record inserted into database.	N/A	Pass
UT-12	Create live session	Failure due to setting a start time in the past.	Course ID: C002, Start Time: Yesterday 09:00 AM	Returns validation error response.	"The session time must be in the future."	Pass

8.3 Integration Testing

Table 8.2: Integration testing Table

No	Test Case ID	Modules Integrated	Description	Expected Output	Actual Result	Status
IT-01	IT-Login-DB	Login Page & User Model	Verify successful authentication and session creation.	User redirected to Dashboard, valid <code>user_id</code> retrieved.	User redirected to Dashboard.	Pass
IT-02	IT-Job-Skill	Job Creation & Skill Tagging	A job posted with required skills is correctly linked in the database.	Job record created, associated skills linked in pivot table.	Skills successfully attached to job.	Pass

IT-03	IT-Enroll-Prog	Course Enrollment & Progress	Student clicks 'Enroll' and a new progress tracker is initiated.	New enrollments record created with progress set to 0%.	Progress record successfully initialized.	Pass
IT-04	IT-Application	Job Application Submission	User uploads resume and submits application.	Application record created, resume file path stored in database.	Record created and resume link verified.	Pass

8.4 System Testing

Table 8.3: System testing Table

No	Test Case ID	Description	Pre-Conditions	Expected Result	Actual Result	Status
ST-001	ST-Login-Dashboard	Successful login and display of personalized content.	User registered and logged in with valid credentials.	User redirected to Dashboard; skill gap report and recommendations are visible.	Report loaded correctly, 3 courses recommended.	Pass
ST-002	ST-Job-Search-Filter	Verify filtering job listings by location (e.g., "Kuala Lumpur").	User is on the Job Listing Page.	Only job listings matching "Kuala Lumpur" are displayed.	Filtered 5 relevant listings.	Pass
ST-003	ST-Skill-Match-Accuracy	Verify job matching returns correct relevancy score.	User skills entered; target job selected.	Job relevancy score (e.g., 75%) is calculated and displayed accurately.	Score displayed as 75%.	Pass
ST-004	ST-Course-Progress-Update	Verify course progress updates correctly and persists after logout/login.	User completes Lesson 1 of a course.	Course progress updates from 0% to 10% and remains at 10% after re-login.	Progress updated and persisted.	Pass
ST-005	ST-Application-Submission	End-to-end job application submission flow.	User clicks 'Apply' button on a job listing.	Application success message displayed; application record appears in the Employer's dashboard view.	Application successfully recorded.	Pass
ST-006	ST-Security-SQLi	Attempt to bypass login using common	Attempt login with Email: ' ' OR '1'='1	System blocks login attempt and returns general error message.	Attempt blocked, generic error returned.	Pass

		SQL Injection payload.				
--	--	---------------------------	--	--	--	--

8.5 Acceptance Testing

8.5.1 Client testing and result



Figure 8.1: Interviewee picture

Name: Mohd Fadli Hussin

Position: Research Analyst

Address: Pembangunan Sumber Manusia Berhad, Wisma HRD Corp, Jalan Beringin, Damansara Heights, 50490 Kuala Lumpur

Date: 15 November 2025

8.5.2 Testing and result – Functionality Feedback (Admin)

Question 1	Do you find the Admin's report and verification system for Creators and Employers effective?
Answer	Yes, the verification and reporting functions are efficient and provide clear oversight

Figure 8.1: Interviewee Question 1

The report administration and verification system designed for Creators and Employers and why it was effective. Mohd Fadli Hussin assessed that the Admin was effective and efficient and is praised for facilitating superior visibility to the actions and activities of both Creators and Employers of the PATHWAY+ System. This affirms that the System achieves its purpose of surveillance with respect to the validity and authenticity of the user accounts.

Question 2	How satisfied are you with the overall process and user experience in Pathway+ (from an Admin perspective)?
Answer	The platform is intuitive and well-structured for administrative tasks

Figure 8.2: Interviewee Question 2

The Admin was extremely satisfied with the process and user experience of PATHWAY+ from the Admin perspective. The System was described as user-friendly and well-organised in such a manner that it allowed the user to accomplish the administrative task at hand, indicating that the System was successfully designed for this administrative user category. The only recommended improvement was to provide enhanced detail of the administrative analytics coupled with enhanced administrative tracking.

Question 3	What improvements would you suggest, and how satisfied are you overall?
Answer	Overall, very satisfied. It would be helpful to include more detailed analytics and tracking options.

Figure 8.3: Interviewee Question 3

The extent of the employers' satisfaction was considerable. The employers proposed the addition of performance insights or recruitment analytics as the next step towards enhancement. Providing such data would allow more robust supporting mechanisms around the strategic choices to be made in the filters related to recruitment and candidates.

8.5.3 Testing and result – Functionality Feedback (Employer)

Question 1	Are the options to deploy free or paid courses beneficial for your company's needs?
Answer	Yes, the flexibility to offer both free and paid training programs is highly valuable.

Figure 8.4: Interviewee Question 1

The Employer user attested to the platform's ability to provide both free and paid training programmes and noted the benefits. This flexibility trade-off is advantageous in catering to the company's multiple training needs since the content can be strategically deployed for either broad training (free) or targeted upskilling (paid).

Question 2	How satisfied are you with the ATS Resume and AI feature in identifying suitable candidates?
Answer	It performs well in filtering qualified candidates and streamlining the hiring process.

Figure 8.5: Interviewee Question 2

The Employer expressed satisfaction with the ATS Resume and AI feature's ability to identify the right candidates for open roles. This feature was noted to be effective in narrowing down the pool of candidates to those who are qualified. This capability undoubtedly meets one of the core needs of the employers on the platform as it helps them to optimise their workflows.

Question 3	What improvements would you suggest, and how satisfied are you overall?
Answer	Overall satisfaction is high. Adding more performance insights or recruitment analytics would further enhance the experience.

Figure 8.6: Interviewee Question 3

The Employer expressed high overall satisfaction. Although the sentiment was mostly positive, the primary suggestion for improvement was the inclusion of more performance insights, or recruitment analytics. This would improve the overall experience by offering more relevant data for optimising the recruitment process.

8.5.4 Testing and result – Functionality Feedback (Creator)

Question 1	Is the Live Calendar for live sessions convenient and easy to use for scheduling or managing sessions?
Answer	Yes, it's well-designed and simplifies session organization.

Figure 8.7: Interviewee Question 1

Feedback regarding the live calendar in the Creator Console is that the calendar is well organised. It is both user friendly, as well as, convenient. An enjoyable user experience with a calendar is a value added as it provides much needed automation in organising live calendar sessions, which streamlines the entire process needed for effective management of created content, as well as, the provision of the content.

Question 2	Are the options to deploy free or paid courses beneficial for your teaching or content goals?
Answer	Yes, the flexibility encourages broader audience engagement and revenue opportunities.

Figure 8.8: Interviewee Question 2

Feedback on the system flexibility for the deployment of free or paid courses was positive. Creative user feedback is in alignment with that of Employers, as it relates to the value for course delivery content offered, which is beneficial in the deployments for teaching and content objectives.

Question 3	Do you find the Admin's report and verification system effective in maintaining platform credibility?
Answer	Yes, the verification process ensures trust and professionalism within the platform.

Figure 8.9: Interviewee Question 3

Feedback regarding the Administrator report and verification process confirms that the Admin report and verification process is effective in upholding the platform's integrity and the credibility of the platform. Creator users noted that the verification process is essential in fostering trust and professionalism and is crucial in creating a content ecosystem.

Question 4	How do you feel about the overall process and user experience in Pathway+?
Answer	Overall, the process is efficient and supportive of content creation and management.

Figure 8.10: Interviewee Question 4

Creators of the course were very pleased with the overall process and experience with PATHWAY+. They found the system to be very sophisticated and helpful with the creation and management of content and were able to describe the system as smooth and enabling with regards to the completion of their primary functions.

8.5.5 Testing and result – Functionality Feedback (Student)

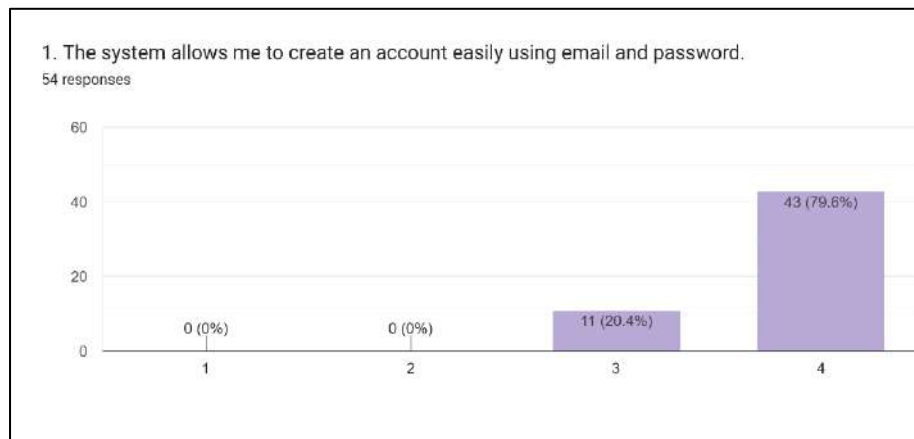


Figure 8.11: Questionnaire 1

There was overwhelming consensus on account creation with 79.6% (43 responses) confirming that the system allows them to create an account with a simple email and password.

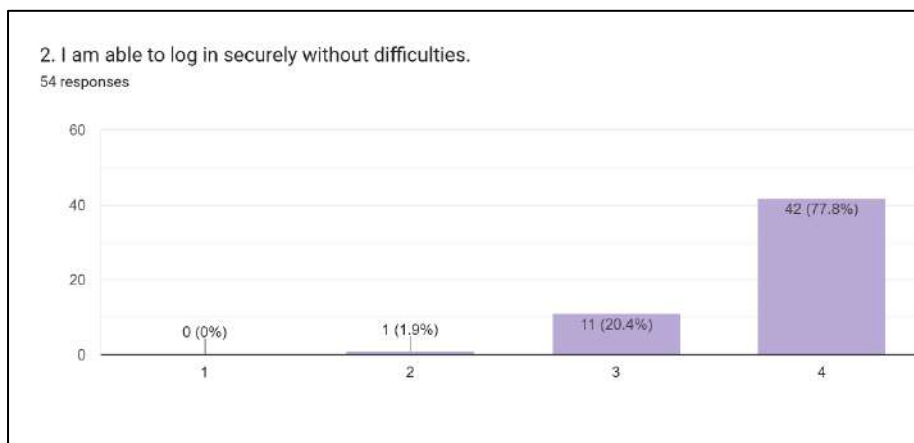


Figure 8.12: Questionnaire 2

User login was also confirmed as being secure and hassle-free, with 77.8% (42 responses) indicating that they are able to log in safely and without problems.

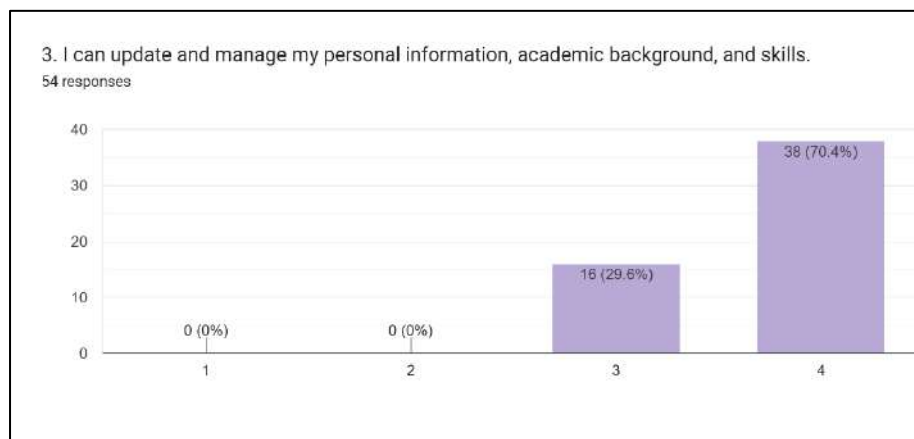


Figure 8.13: Questionnaire 3

There was a positive response of 70.4% (38 responses) of students that they are able to update and manage their personal details, educational background and other competencies, indicating that the profile management options available are working well.

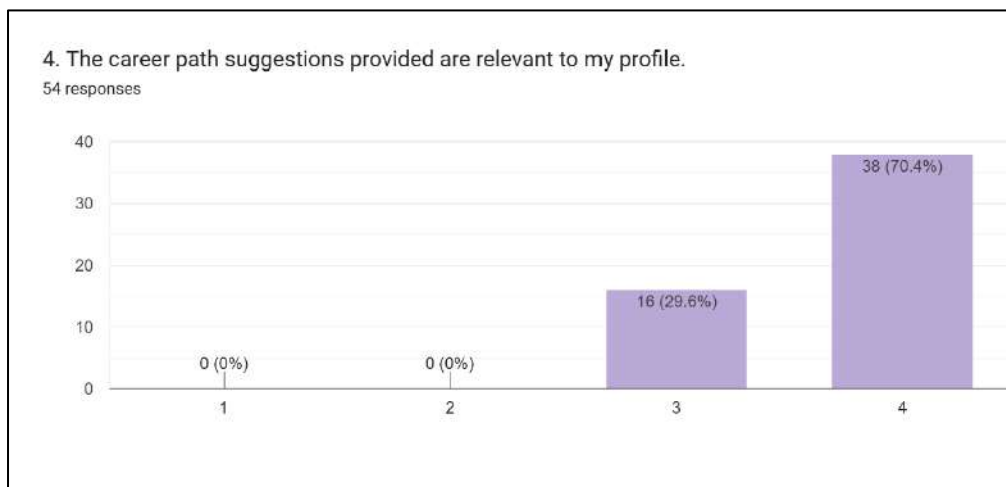


Figure 8.14: Questionnaire 4

The career path suggestions were greatly validated due to the relevance of the suggestions to the profile of 70.4% (38 responses) of the students.

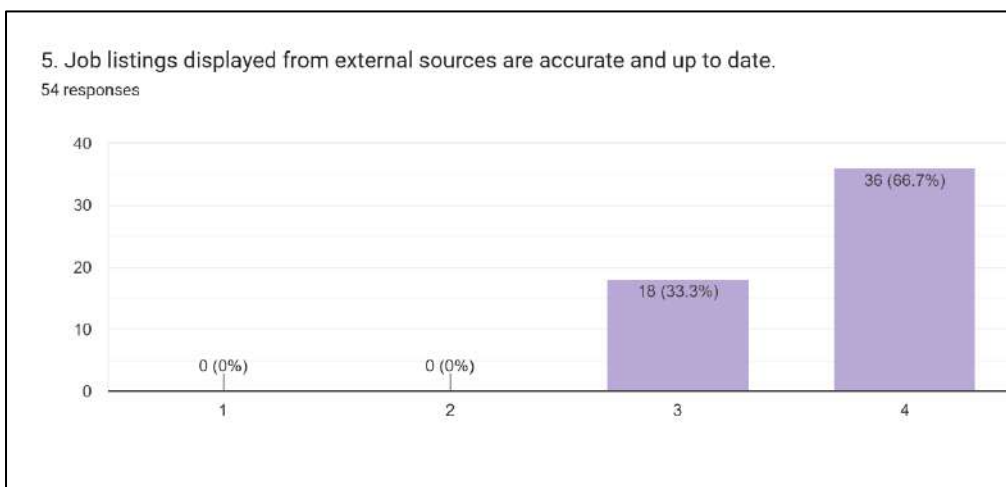


Figure 8.15: Questionnaire 5

A large majority agreed on the quality of the external data, where 66.7% (36 responses) confirmed that the job listings are displayed from the external data sources and are correct and up to date.

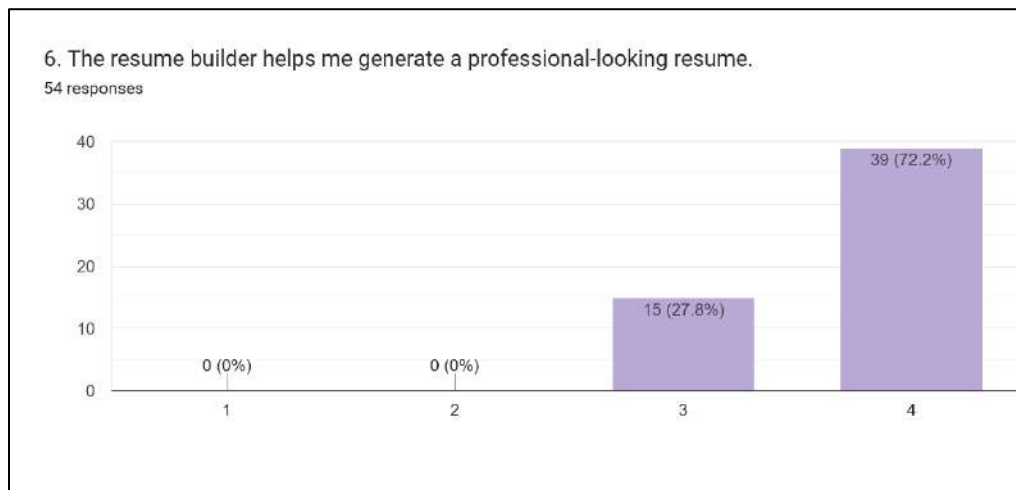


Figure 8.16: Questionnaire 6

There was a high evaluation of the resume builder, as 72.2% (39 responses) confirmed that it helps them to create a professional resume.

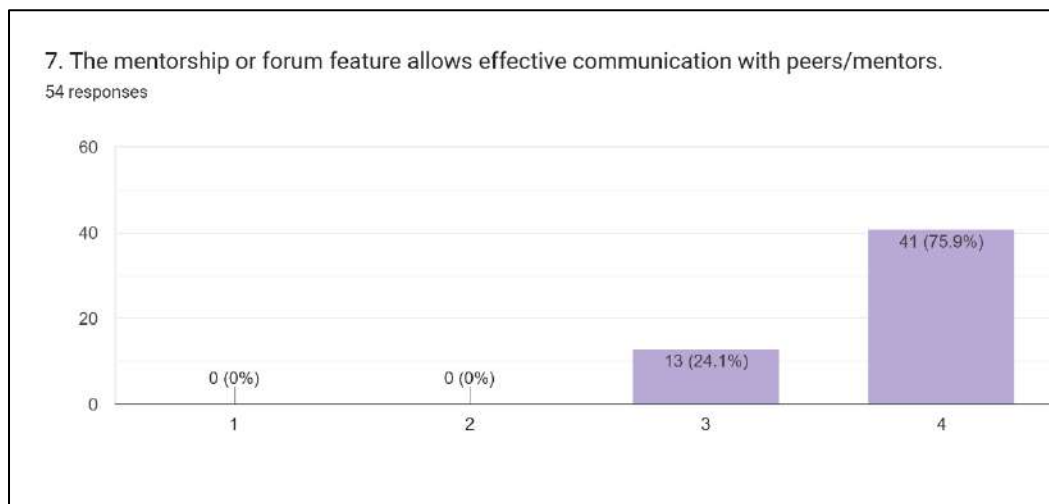


Figure 8.17: Questionnaire 7

The peer and mentor communication feature was specifically designed and successful as 75.9% (41 responses) found effective communication to be enabled by the mentorship or forum feature.

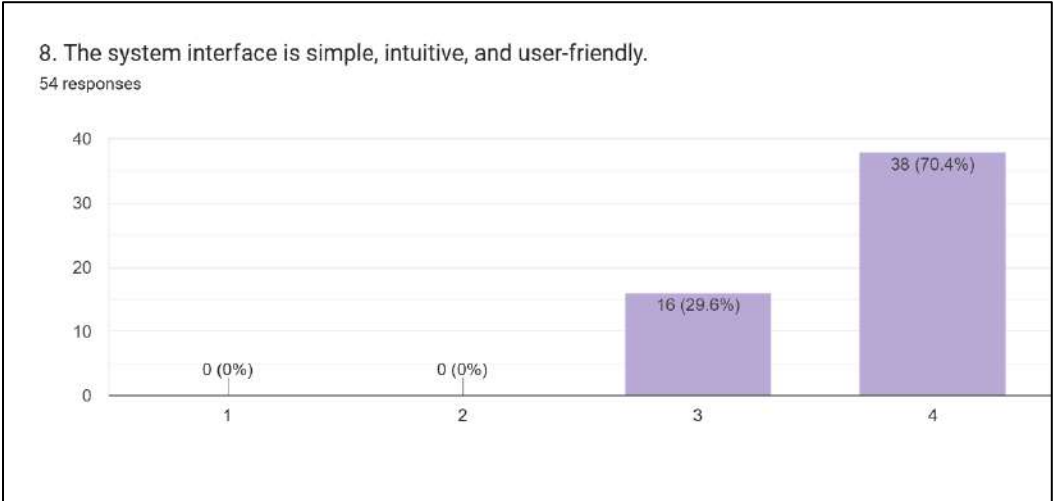


Figure 8.18: Questionnaire 8

The user interface was given a very high rating by 70.4% (38 responses) when they described the system interface as clean, clear, easy to operate and user-friendly.

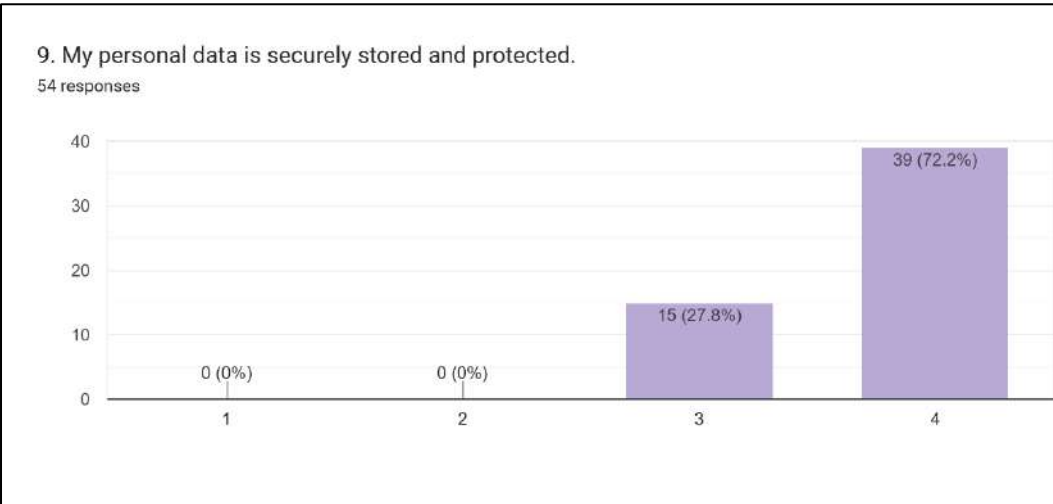


Figure 8.19: Questionnaire 9

There was a high level of student confidence related to the protection of their data as 72.2% (39 responses) agreed that the protection of their personal data is kept safe and is adequately protected.

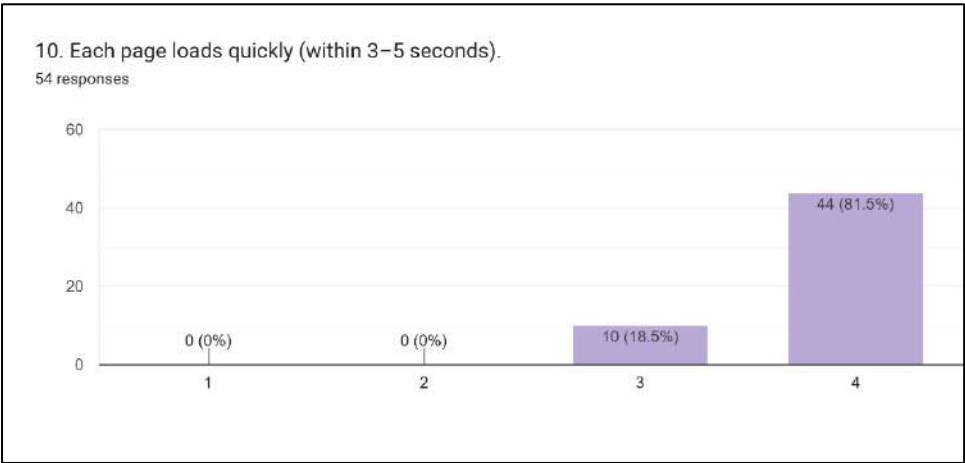


Figure 8.20: Questionnaire 10

The system performance was the most positively reviewed item, where there was a high level of overwhelming in 81.5% (44 responses) of agreement as the system set forth that each page is loaded in a timely manner (3–5 seconds) and performs a high quality and efficient system performance.

8.6 Conclusion

The Pathway+ system underwent an extensive four-level testing procedure: Unit, Integration, System, and Acceptance Testing, and all showed that the system is dependable and operational. The method verified all critical elements, including the backend algorithm logic and the frontend user interface, successfully. The Requirements Traceability Matrix provided equal assurance that all the requirements were validated. End-user acceptance testing provided essential validation that the system functions and, more importantly, fulfilled the operational requirements of students and the system's purpose of improving the employability of graduates.

9 PROJECT MANAGEMENT

9.1 Introduction

This chapter explains the processes and techniques used to manage the development of the Pathway+ system from the beginning (week 1) to the end (week 14). Project management is essential to ensure the system is built and managed within the given timeframe, scope, and alignment of the goals of the project. An Agile methodology was used, and the project was guided to maintain equilibrium and flexibility when dealing with new changes. This part is concerned with project scheduling, monitoring to see if it is on track to achieve the desired objectives, and the key activity of identifying, analysing, and mitigating the risks.

9.2 Project Schedule

The project schedule outlined the order and length of all tasks needed to achieve the Pathway+ system. The schedule was based on 4 main activities: Analysis, Design, Implementation and Testing/Evaluation. The iterative approach meant that the initial phases were used to guide the subsequent changes, with the primary objective being the core functionalities (i.e. user verification and competency alignment) as opposed to the minor functionalities.

Integrating the overall project's objective with the scheduled timeframe enabled the project to be more manageable. Targeted project planning was scheduled to create a baseline; however, the integration of the skill gap algorithm with the dynamic course recommendations during the implementation phase of the project was initially more complex than planned. The overall project timeline remained unaffected. The scheduling

of tasks was adjusted to allow for a moderate increase in the allocation of time for coding the algorithm in order to allow for more time to pass integration testing during the scheduled project time.

9.2.1 Work Breakdown Structure

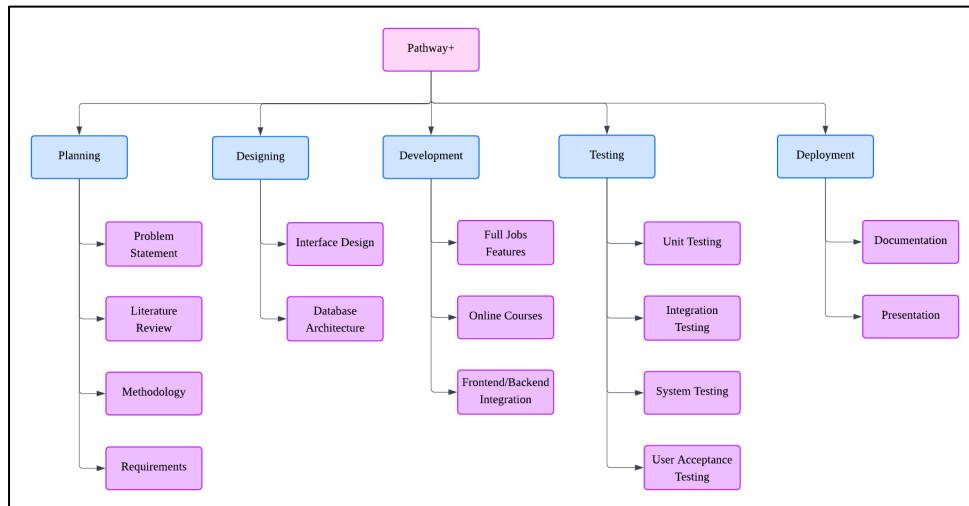


Figure 9.1: Work Breakdown Structure

The breakdown of the whole project scope into smaller, manageable, iteratively refined, and hierarchical work units (WBS) is foundational for any project scheduling activity. For the Pathway+ system, the WBS was elaborated at 4 levels: project major phases, key deliverables, activities, and tasks. As illustrated in Figure 9.1, this structure permitted defining and accounting for all pieces of the system, from initial system analysis to final documentation, thereby allowing effective tracking of resources and tasks at any point in the project life cycle.

9.2.2 Gantt Chart

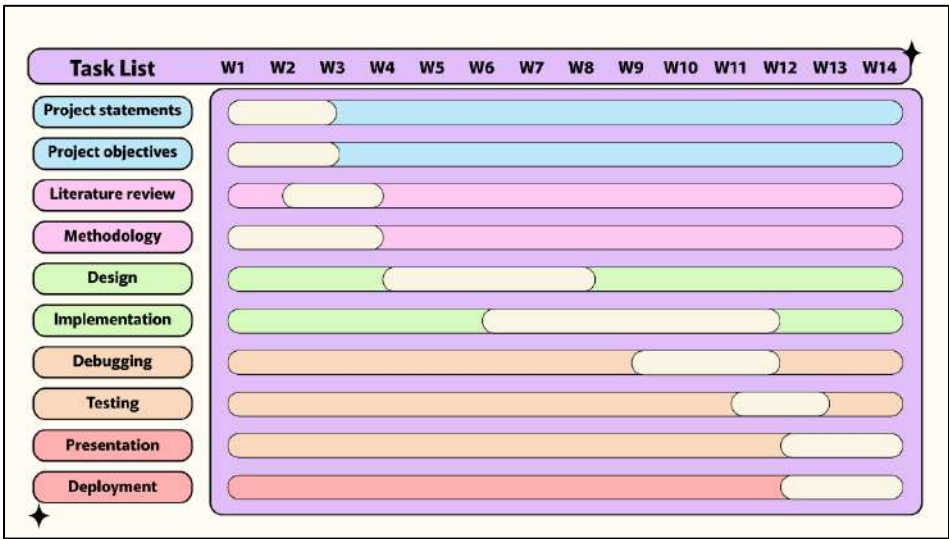


Figure 9.2: Gantt chart

The project schedule for the WBS (Figure 9.2) is now represented in Gantt Chart format. This is the major visual display of the project schedule, and it maps activities against calendar time, allowing scheduling of each activity and the presentation of (high) level dependencies. The scheduled Pathway+ system Gantt Chart illustrated in Figure 9.2 is from Week 1, to Week 14.

Figure 9.2 clearly provides a foundation for tracking advancement. While the first stages were completed as planned, a primary change was made in the course of the Implementation phase for controlling the intricacies of the skill matching algorithm. This was successfully mitigated by coding time alterations, along with the concurrent execution of non-task-related sorted items, thus preserving the planned date of the whole project.

9.3 Risk Management

Risk management is defining and limiting the damages to a project's capital and revenue. Risk management in the case of the Pathway+ project was forward-looking and designed to deal with problems that might impact the project timeline or technical quality. There are three steps involved in the risk management process: Risk Identification, Risk Analysis (understanding the probability and severity of the impact of a risk), and Risk Mitigation (creating an action plan to lower the impact and/or probability of a threat).

The Project Risk Register is a summary of the major risks the project began with. This table contains risk analysis (probability and severity) and an impact mitigation plan created in advance for every risk. The objective of this register is to avoid problems that are likely to impact the timeline of the project and not compromise technical quality in the Pathway+ system.

The "Technical Complexity of Skill Gap Algorithm" risk actually occurred during the project. This risk was categorised as a Medium Impact/High Probability risk because of the custom nature of the matching logic. The mitigation strategy put in place beforehand—allowing for additional time for prototyping and thorough code reviews—successfully worked. This resulted in a two-week delay in completing the core matching functionality; however, the risk did not lead to a technical failure, which served as a validation of the mitigation plan.

Conclusion

The role of efficient and adaptive project management proved critical in achieving all goals and objectives in the Pathway+ System Implementation Project. The breakdown of all Work Packages and the use of Gantt Charts provided clarity in scope and efficient use of resources. While a few schedule adjustments were needed during implementation, all resources were tracked and employed with maximum efficiency. Additionally, strong risk management, especially with respect to the loss of valuable time due to unmitigated risks associated with technical complexity, enabled a smooth flow of the project with no time loss. The scope of all objectives was thoroughly achieved with no objectives unnecessarily added to the project scope and goals.

10 CONCLUSION

10.1 Introduction

This last chapter discusses the completion of the Pathway+ system, focusing on the goals of the project and the milestones achieved. Also discussed will be the system's advancement in its ability to solve the problems associated with the employability of graduates.

10.2 Achievement

The Pathway+ system was the first of its kind in the country and achieved remarkable success in addressing all three of its primary goals. In its entirety, the system provided graduates of UPTM with a comprehensive answer to the problem of balancing skills and the appropriate career. The goals are detailed in the following sub-sections and describe the implementation of each one of the objectives:

10.2.1 To Curate High-Quality Learning Resources for Graduate Upskilling

Achievement: The objective was achieved through the deployment of a purpose-built course integration model. The system now offers online courses and certifications that are curated, accessible, and relevant to current market needs. These educational offerings will aid in resolving the issue of academic and workplace skills dissonance, as well as facilitate users' workplace readiness. Users can acquire skills that are in demand because the system removes the barrier of course linkage by connecting users to external courses.

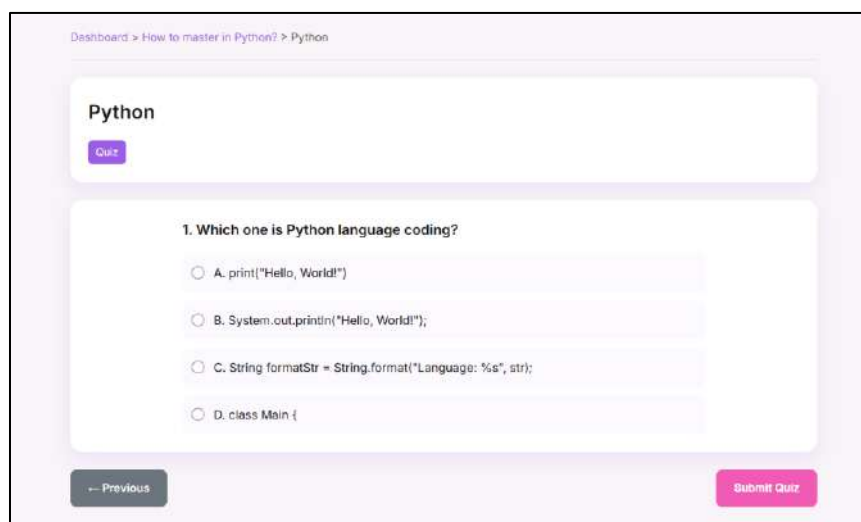


Figure 10.1: Course with Quiz



Figure 10.2: Course completion progress

10.2.2 To Develop A Web-Based Platform That Offers Personalized Career Path Suggestions Based On User Profiles And Industry Trends

Accomplishment: Pathway+ has been created as a digital centralised hub on the e-Learning Modules on the Laravel framework. Pathway+ provides tailored career recommendation pathways based on profiles, credentials, and industry trends. The system navigates users towards suggested roles based on the relevant demand of the job market. The key achievement of this system is the functional skill-gap analysis algorithm that evaluates the user data and job requirements in a measurable manner to offer data-driven career guidance, effectively accomplishing the career support target of the platform.

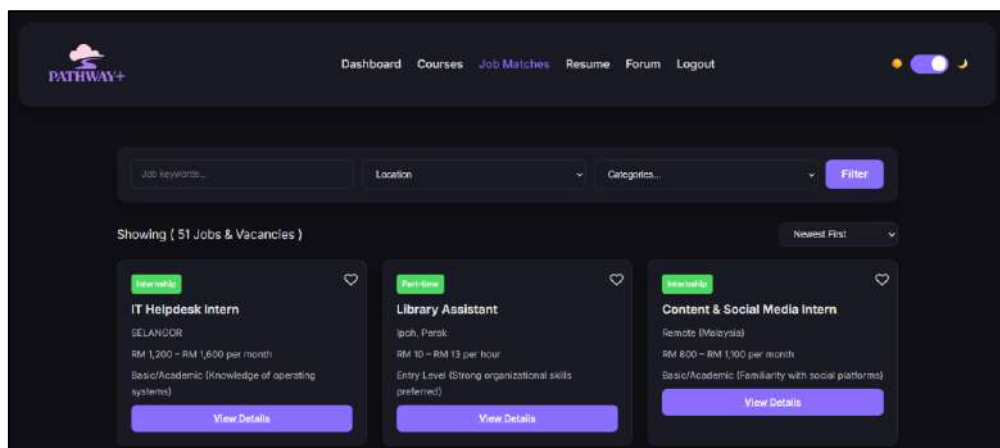


Figure 10.3: Jobs lists page

10.2.3 To Provide A System That Employer Can Create Jobs For Student To View And Apply

Accomplishment: A dedicated employer's dashboard and a student's job application interface have been created and together, they met the target. The system allows employers to post and manage job offers on the platform so that students can view and apply. This function broadens the career accessibility for users, directly and efficiently linking them to employment opportunities in Malaysia's digital economy. The application tracking system provides the necessary feedback for all parties, thus achieving the goal of student employment.

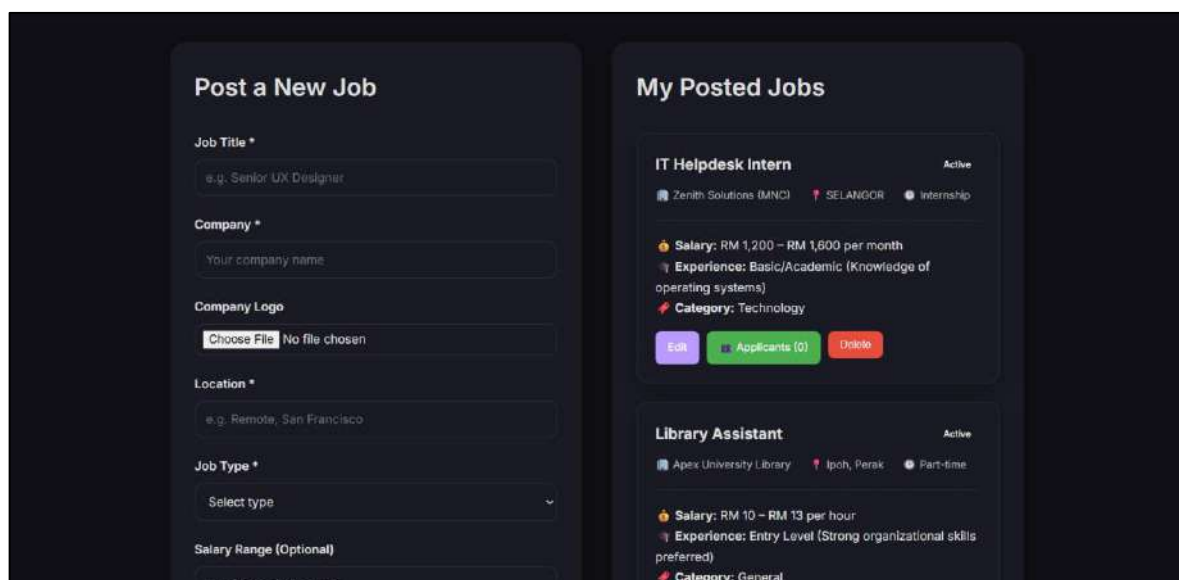


Figure 10.4: Jobs creation

10.3 Constraint and Limitation

The weaknesses of the Pathway+ system are tied to its algorithmic issues and its reliance on inconsistent manual data. The fundamental problem has to do with Skill Granularity and Depth when the algorithm primarily uses keyword matching with no semantic understanding. This gap in knowledge means that the algorithm cannot tell whether someone is a beginner in a given skill versus an expert and has a direct negative effect on the usefulness of the course recommendations. Also, the system has no Integration Scope and is siloed, with no connections to important external systems such as student records or Employer HR APIs. This MVP design demands manual data entry, thus greatly limiting the system's potential future scalability and automation. This presents a significant barrier to its use in large institutions or in a commercial context.

Problems connected to considering Volume Performance and Data Recency and Curation threaten the system's potential sustainability. The dependency on the administrator to repetitively update and edit the static course and job trends means that the ability to maintain gaps is solely moderated by the frequency and effort that the administrator puts painstakingly into the system; without periodic maintenance, it will imbalance. For the time being, the available configuration of the server and database is suitable only for pilot testing. Any future attempts to deploy Pathway+ to a larger-scale population, say, thousands of simultaneous users will most probably result in extreme underperformance, especially when the system's complexities call for the matching algorithm to perform multiple queries to the database, thus rendering the system, for the most part, inaccessible during high demand.

10.4 Future Work and Recommendation

In order to improve the Pathway+ system, the following suggestions have been made for future development:

- **AI Job Matching:** We need to go further than simple skill matching within job postings to examine the semantic relationships between job postings and user resumes. More sophisticated ML models in job matching should be able to encourage active search and predictive career recommendation pull through an adaptive system based on job market fluctuations.
- **Export Feature on Admin Panel:** An export option on the admin panel (CSV, Excel, etc.) would enable UPTM career counsellors to conduct external analysis and statistical reporting on the user and job data for the purpose of data-driven strategic planning for curriculum/graduate trend analysis.
- **Learning Progress Tracking:** Improving the course enrolment/additional data tracking functionality in order to go beyond simple completion percentages. Progress tracking could be centred on in-module resources,

level quizzes, time tracking, integrated micro-credentialing, and overall, varied amplification of user achievements in skill development/other upskilling activities.

- Enhancement of Diverse Course Material: Extending the range of external content for multiple modalities as an interactive simulation, project- and collaborative-coding environments in contrast to singular video course models for additional engagement and practical skill application.

10.5 Conclusion

This project has added the Pathway+ system; an objective that was fully attained as demonstrated by the details in Chapter 1. As an employee with successful completion of the project, I was able to complete the project with no deviations from the final deadline, especially after I made significant alterations to the project between its mid-points.

The most significant challenge was probably the technical intricacy of the skill gap analysis algorithm. As such, the algorithm was more development and testing intensive than what had originally been scoped. This was solved by the active implementation of the first risk mitigation strategy; to spend additional time on thorough refactoring and precision integration testing to stabilise the primary functionalities.

The major takeaway from this scenario is the underestimated value of effort estimation for highly nuanced logics of a more compounded custom nature. The flexibility offered by the Agile techniques was for sure great; however, had there been a proper level of design to the details of the phases, the algorithm would have been refined significantly more at this point. The overall risk management demonstrated during this project will go a long way in shaping the proactive nature of scheduling for this application to be of high-quality functionality.

Appendix A – Requirements Specification Document

PATHWAY+

Pathway+

Dear Respondent,

You have been selected to participate in this academic research study!

I am conducting a study titled **"Pathway+: Bridging Graduates and the Digital Workforce via Career and Skill Development"** as part of my Final Year Project at Universiti Poly-Tech Malaysia (UPTM). Pathway+ is an AI-enhanced platform designed to support final-year project management and career readiness among students.

Your feedback is crucial in helping me understand the needs, expectations, and perceptions of students and staff regarding this system.

Please take a few moments to read all questions carefully and answer them sincerely. There are no right or wrong answers—your honest responses are deeply appreciated and will be kept strictly confidential, used solely for academic research purposes.

Thank you very much for your time and cooperation. I truly value your input.

Warm regards,

Faculty of Computing & Multimedia
Universiti Poly-Tech Malaysia

* Indicates required question

1. The system allows me to create an account easily using email and password. *

Strongly Disagree
1
2
3
4
Strongly Agree

☐
☐
☐
☐

2. I am able to log in securely without difficulties. *

Strongly Disagree
1
2
3
4
Strongly Agree

☐
☐
☐
☐

3. I can update and manage my personal information, academic background, and * skills.

Strongly Disagree
1
2
3
4
Strongly Agree

☐
☐
☐
☐

4. The career path suggestions provided are relevant to my profile. *

Strongly Disagree
1
2
3
4
Strongly Agree

☐
☐
☐
☐

5. Job listings displayed from external sources are accurate and up to date. *

1234

Strongly Disagree

☐

☐

☐

☐

Strongly Agree

6. The resume builder helps me generate a professional-looking resume. *

1234

Strongly Disagree

☐

☐

☐

☐

Strongly Agree

7. The mentorship or forum feature allows effective communication with peers/mentors. *

1234

Strongly Disagree

☐

☐

☐

☐

Strongly Agree

8. The system interface is simple, intuitive, and user-friendly. *

1234

Strongly Disagree

☐

☐

☐

☐

Strongly Agree

9. My personal data is securely stored and protected. *

1234

Strongly Disagree

☐

☐

☐

☐

Strongly Agree

10. Each page loads quickly (within 3-5 seconds). *

1234

Strongly Disagree

☐

☐

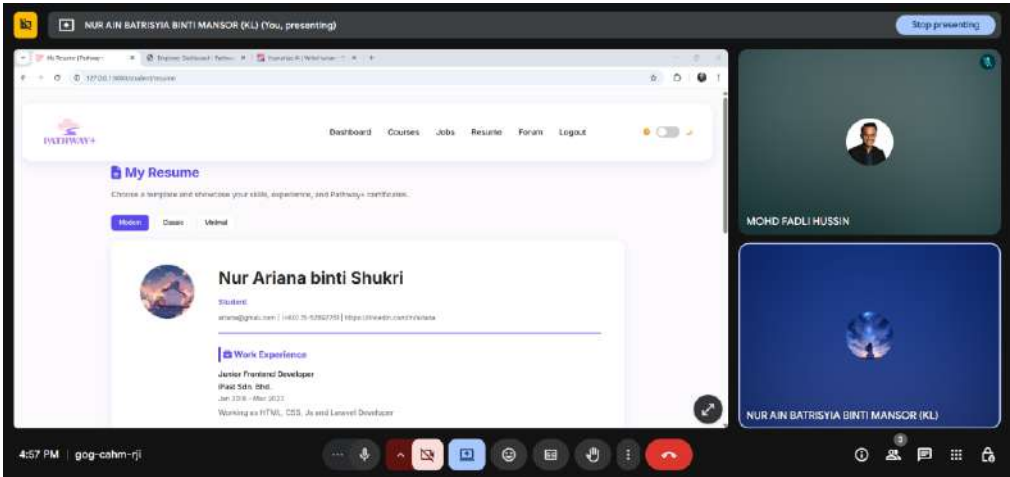
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☐

Strongly Agree

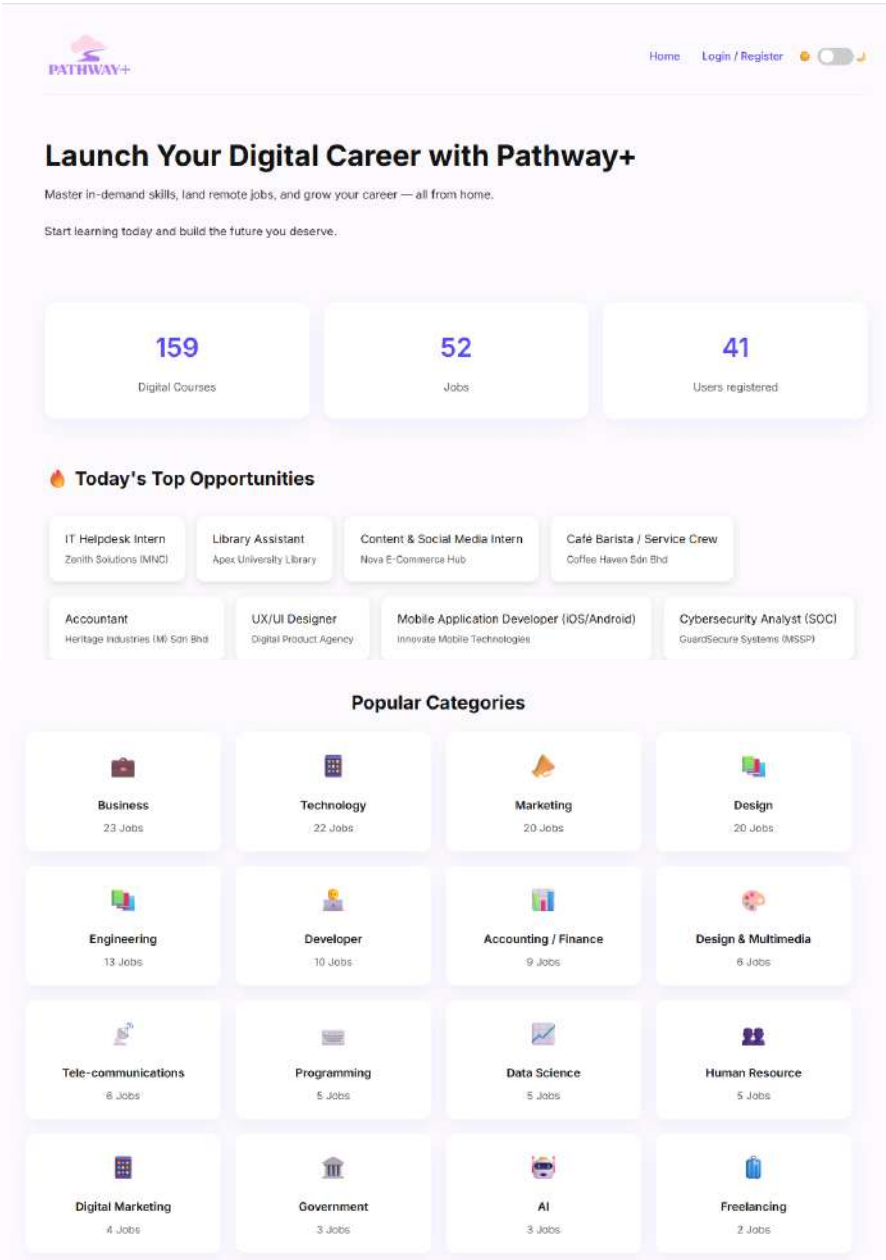
Submit

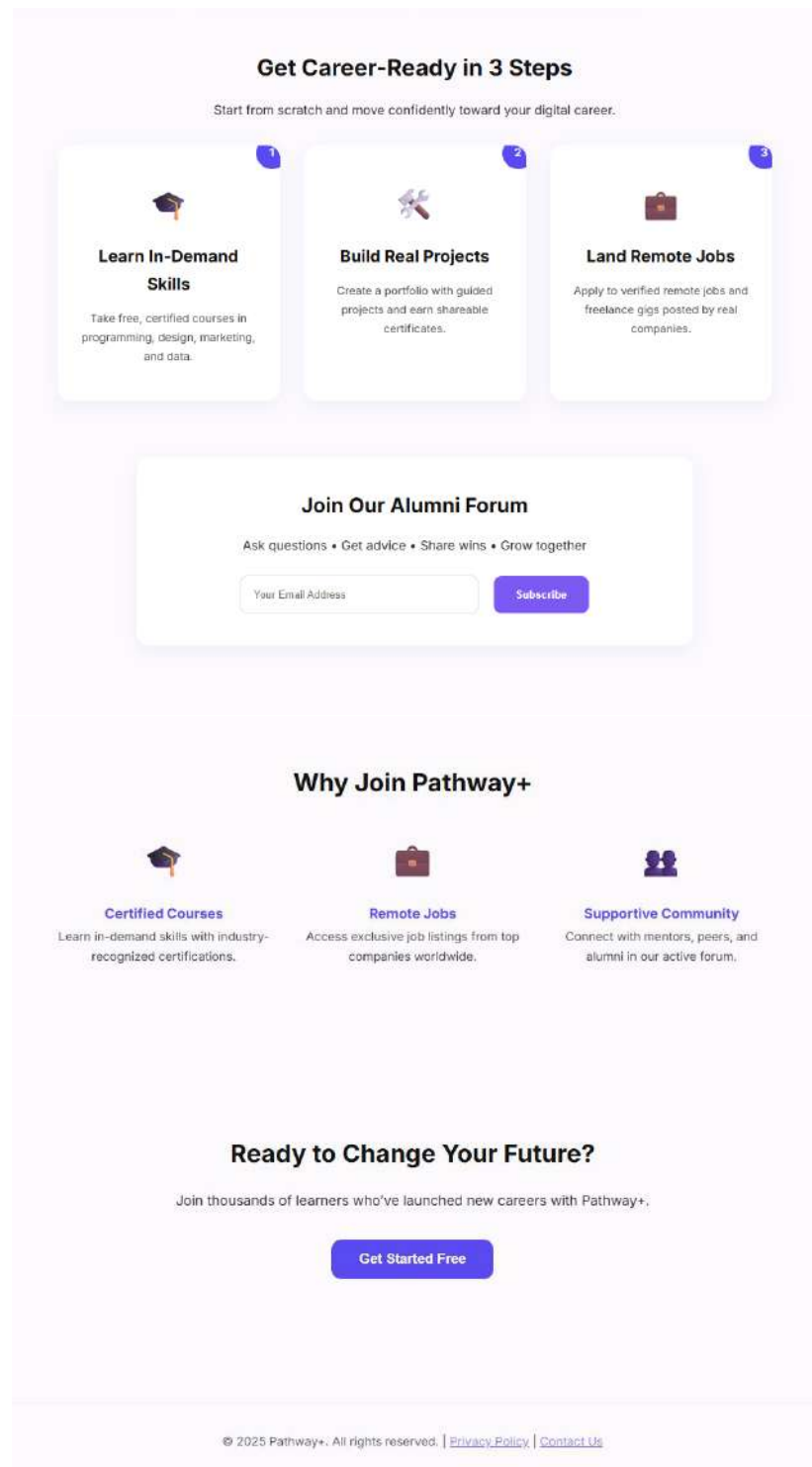
Clear form



Appendix B – User Manual

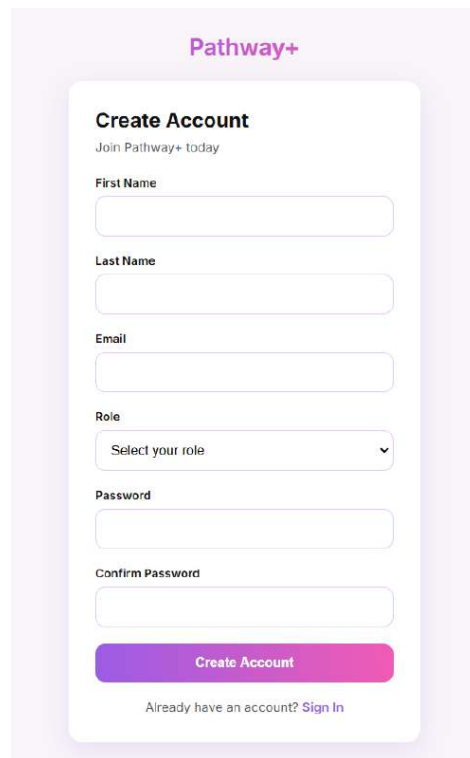
1.0 Home Page





The landing page of the system. It introduces Pathway+ as an online career and skill development platform designed to address skill mismatch and unemployment among Malaysian graduates. It provides an overview of core features like personalized career paths, curated learning resources, and job opportunities.

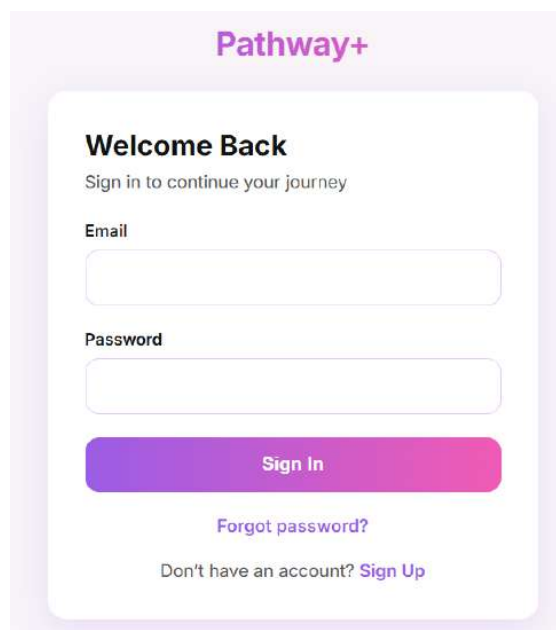
2.0 Register New Employee Or Admin



The image shows a mobile app interface for creating a new account. At the top, the 'Pathway+' logo is displayed in purple. Below it, the title 'Create Account' is centered, followed by the subtitle 'Join Pathway+ today'. The form contains several input fields: 'First Name', 'Last Name', 'Email', and 'Password'. The 'Role' field is a dropdown menu with the text 'Select your role' and a downward arrow. Below the password field is a 'Confirm Password' field. At the bottom of the form is a large purple button labeled 'Create Account'. Below the button, there is a link that says 'Already have an account? Sign In'.

The Register Page interface, which serves as the gateway for new users (Student, Employer, Creator, Admin) to create an account. Users must input necessary fields (e.g., name, email, password, student ID) to create a user record in the database.

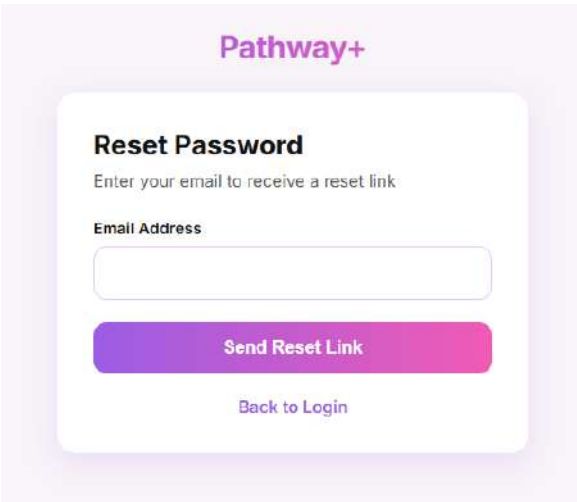
3.0 Login



The image shows a mobile app interface for logging in. At the top, the 'Pathway+' logo is displayed in purple. Below it, the title 'Welcome Back' is centered, followed by the subtitle 'Sign in to continue your journey'. The form contains two input fields: 'Email' and 'Password'. At the bottom of the form is a large purple button labeled 'Sign In'. Below the button, there is a link that says 'Forgot password?'. At the very bottom, there is a link that says 'Don't have an account? Sign Up'.

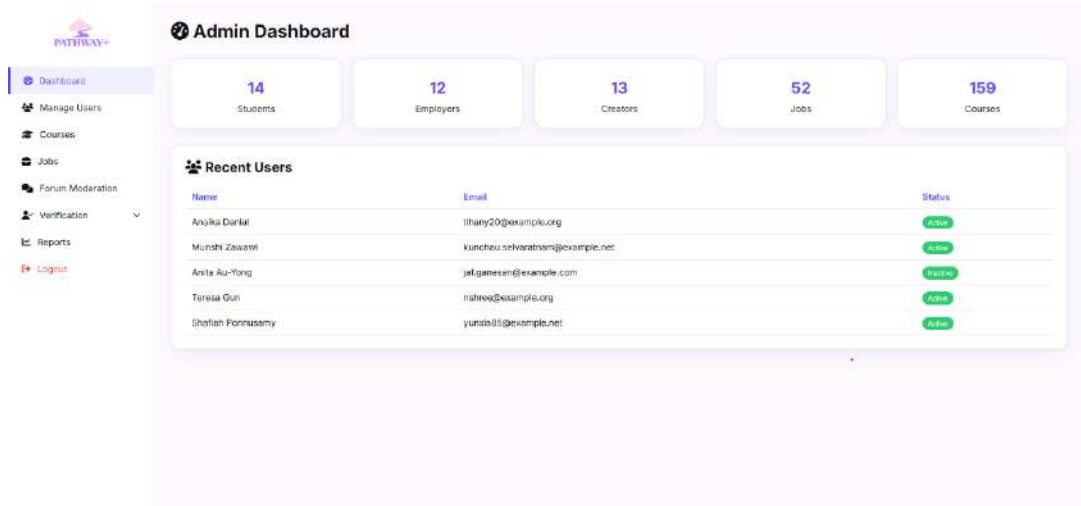
The Login Page interface, which allows authenticated access for all user roles (Student, Employer, Creator, Admin). It requires the user's email and password to access their respective system dashboard.

4.0 Forgot Password



A standard authentication feature (implied by the system's secure login function) that allows users to securely recover or reset their password and regain access to their account.

5.0 Admin
5.1 Dashboard



The central control panel for the administrator upon login. It allows the Admin to control key system components like users, job listings, and course content.

5.2 Manage Users

PATHWAY+

Dashboard

Manage Users

Courses

Jobs

Forum Moderation

Verification

Reports

Logout

Manage Users

Search users...

All Roles

Export

Name	Email	Role	Status	Actions
Anita Au-Ying	jaf.gonesan@example.com	Employer	Active	View
Anakia Daniel	thany20@example.org	Employer	Active	Set
Munshi Zaiqael	kunchau.selvaratnam@example.net	Employer	Active	Set
Jemie Hiew	bernard.fan@example.net	Employer	Active	Set
Shafiah Ponnusamy	yunxia85@example.net	Employer	Active	Set
Teresa Gan	nathree@example.org	Employer	Active	Set
Samatha Aniyar	rasamuth.kundargan@example.net	Employer	Active	Set
Ene Liu Liew	rojekshutlwang@example.net	Employer	Active	Set
Baharudin Zu	kamarul.gansan@example.net	Employer	Active	Set
David Chandran	rvberasan@example.org	Employer	Active	Set
Pay Shao Choong	yseonivasagam@example.org	Creator	Active	Set
Fong Chee Shree	nchi@example.net	Creator	Active	Set

A function allowing the admin to oversee and manage all user accounts (Student, Employer, Creator), ensuring system safety and productivity.

5.3 Courses

PATHWAY+

Dashboard

Manage Users

Courses

Jobs

Forum Moderation

Verification

Reports

Logout

Course Moderation

Search course or student

All Status

Export

Course Title	Submitted By	Status	Actions
Test	sugar baby (ID: 9) View	Rejected	Reopen
Test	sugar baby (ID: 9) View	Approved	Unpublish
Hellob	— (ID: 7) View	Approved	Unpublish
Test data 1	— (ID: 7) View	Rejected	Reopen
Main Course Content	— (ID: 7) View	Approved	Unpublish
Yrk	— (ID: 7) View	Approved	Unpublish
How to master Canva	sugar baby (ID: 9) View	Approved	Unpublish
How to master in Python?	— (ID: 7) View	Approved	Unpublish
Peripetate consequatur consequatur odio.	— (ID: 3) View	Approved	Unpublish
Labortisam rerum velit.	— (ID: 3) View	Approved	Unpublish
Odio explicabo ex.	— (ID: 3) View	Approved	Unpublish
Ut est.	— (ID: 7) View	Pending	Approve, Reject

Allows the admin to upload, create, or edit course content and materials, maintaining the quality and applicability of learning resources.

5.4 Jobs

PATHWAY+

Dashboard

Manage Users

Courses

Jobs

Forum Moderation

Verification

Reports

Logout

Manage Jobs

Search jobs or company

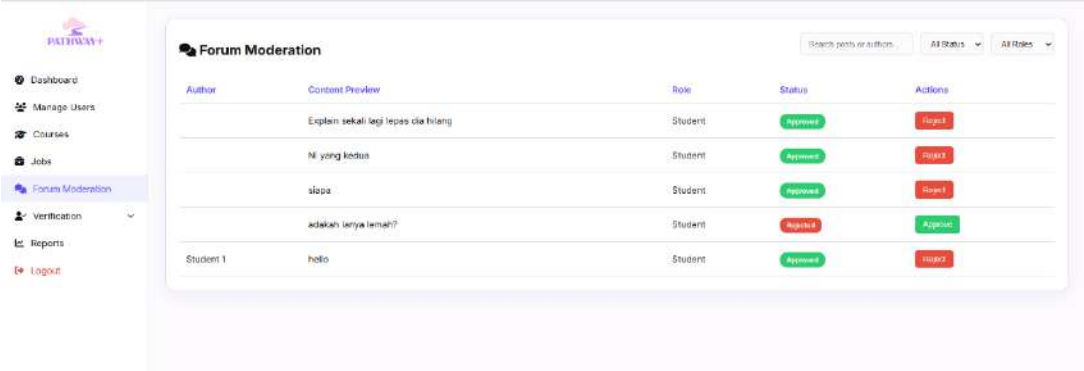
All Status

Export

Job Title	Company	Employer	Status	Actions
IT Helpdesk Intern	Zenith Solutions (MNC)	employer	Active	Set
Library Assistant	Apex University Library	employer	Active	Set
Content & Social Media Intern	Nova E-Commerce Hub	employer	Active	Set
Cafe Barista / Service Crew	Coffee Haven Sdn Bhd	employer	Active	Set
Accountant	Heritage Industries (M) Sdn Bhd	employer	Active	Set
Mobile Application Developer (iOS/Android)	Innovate Mobile Technologies	employer	Active	Set
Cybersecurity Analyst (SOC)	GuardSecure Systems (MSP)	employer	Active	Set
Data Analyst	MyTelco Solutions Berhad	employer	Active	Set
Senior Software Engineer	Global Tech Hub (M) Sdn Bhd	employer	Active	Set

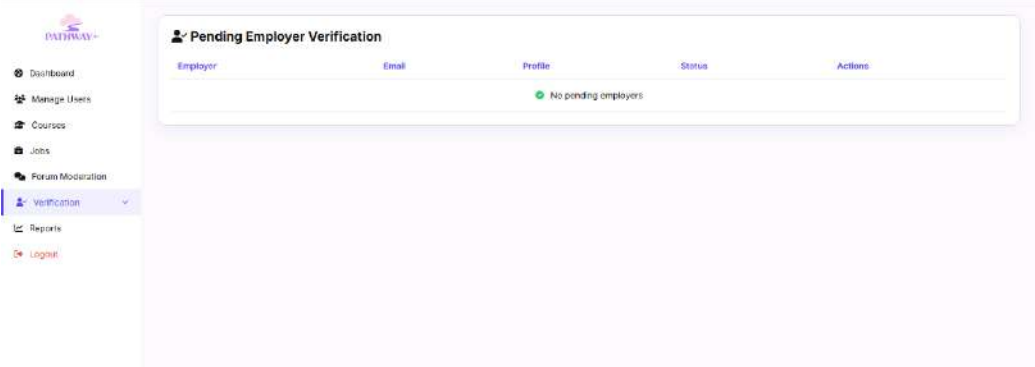
Allows the admin to post or edit job listings , which is vital for providing up-to-date and industry-friendly employment opportunities to students.

5.5 Forum Moderation



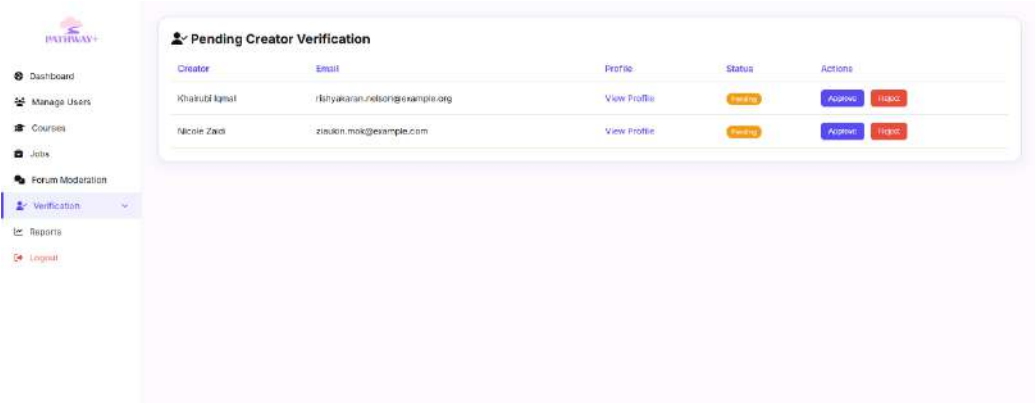
The system component dedicated to managing and arbitrating discussions within the mentorship forums to ensure they remain safe and productive.

5.6 Verification Employer



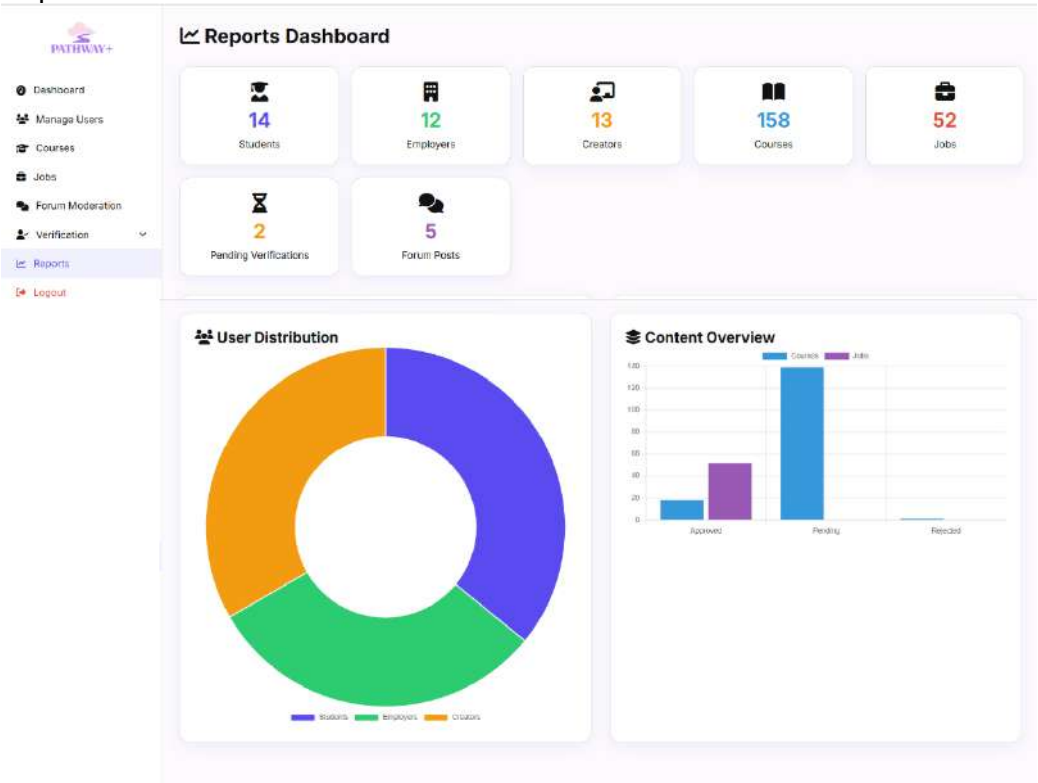
A process where the admin reviews and approves new employer accounts to ensure legitimacy before they are authorized to post job listings.

5.7 Verification Creator



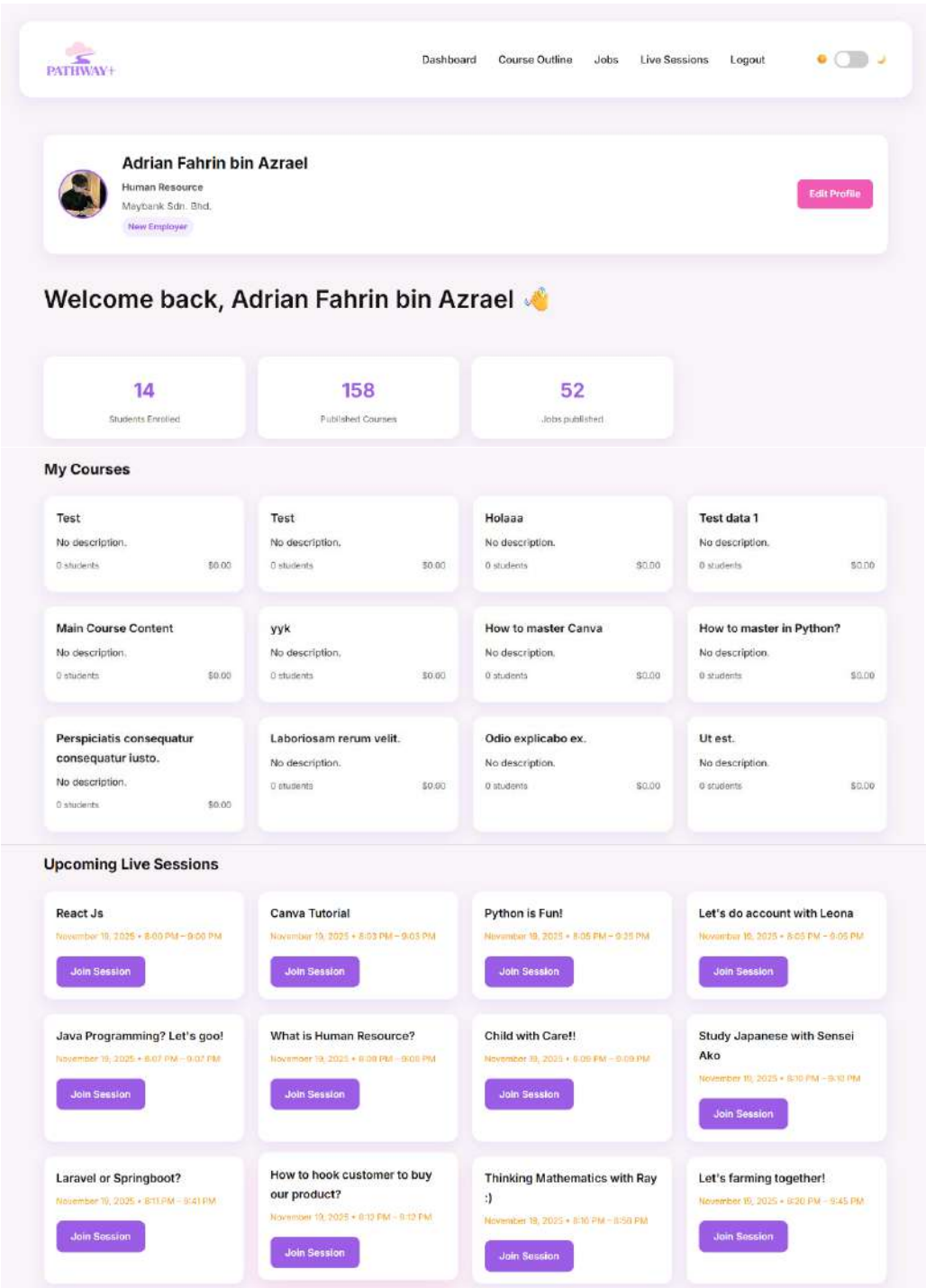
A process where the admin reviews and approves new creator accounts to ensure the quality and credibility of the content they post.

5.8 Report



A section for viewing or generating operational reports, which in future development could include functionality to export user and job data for external analysis and strategic decision-making.

6.0 Employer
6.1 Dashboard



The employer's central landing page, likely showing a summary of their activity, such as active job listings and the number of applications received

6.2 Course Outline

PATHWAY+

Dashboard

Course Outline

Jobs

Forum

Live Sessions

Logout

Course Outline Builder

Course Details

Course Title *

Main Course Content

Category *

Select category

Level *

Beginner

Is Free?

Yes

Provider

Pathway+

Modules Label

Modules

+ Add Main Topic

Main Course Content

+ Add Module

Module Title *

Canvas

+ Add Lesson

Canvas Overview (Video)

Edit

Delete

Canvas Lesson (Video)

Edit

Delete

Quiz (Quiz)

Edit

Delete

Save Module

Cancel

Used for creating courses, lessons, and quizzes. It displays the structured list of modules the employer is managing.

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6.3 Jobs

Dashboard
Course Outline
Jobs
Forum
Live Sessions
Logout

Post a New Job

Job Title *

Company *

Company Logo
 No file chosen

Location *

Job Type *

Salary Range (Optional)

Experience Required (Optional)

Category (Optional)

Job Summary *

Key Responsibilities

Requirements & Qualifications

How to Apply (Optional)

My Posted Jobs

IT Helpdesk Intern

Salary: RM 1,200 - RM 1,600 per month
Experience: Basic/Academic (Knowledge of operating systems)
Category: Technology

Library Assistant

Salary: RM 10 - RM 13 per hour
Experience: Entry Level (Strong organizational skills preferred)
Category: General

Content & Social Media Intern

Salary: RM 800 - RM 1,100 per month
Experience: Basic/Academic (Familiarity with social platforms)
Category: Digital Marketing

Café Barista / Service Crew

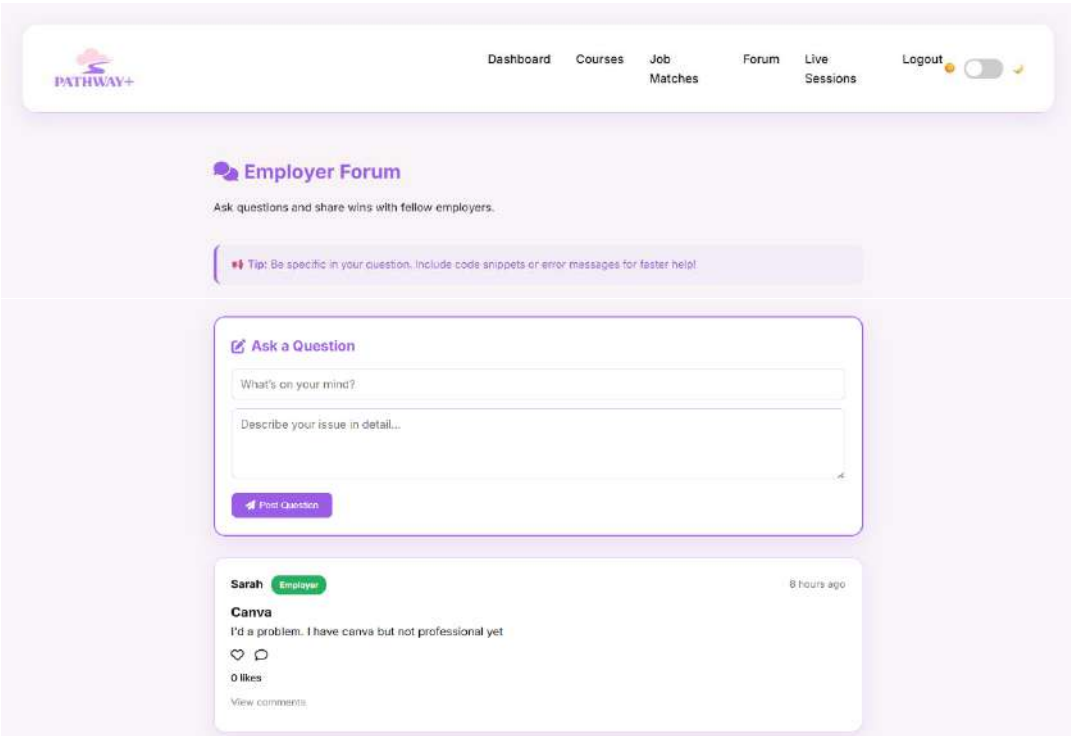
Salary: RM 10 - RM 12 per hour (+ potential tips/meal allowance)
Experience: Entry Level (No experience required)
Category: Food and Beverage

Accountant

Salary: RM 12,000 - RM 25,000
Experience: 1+ Year
Category: Accounting

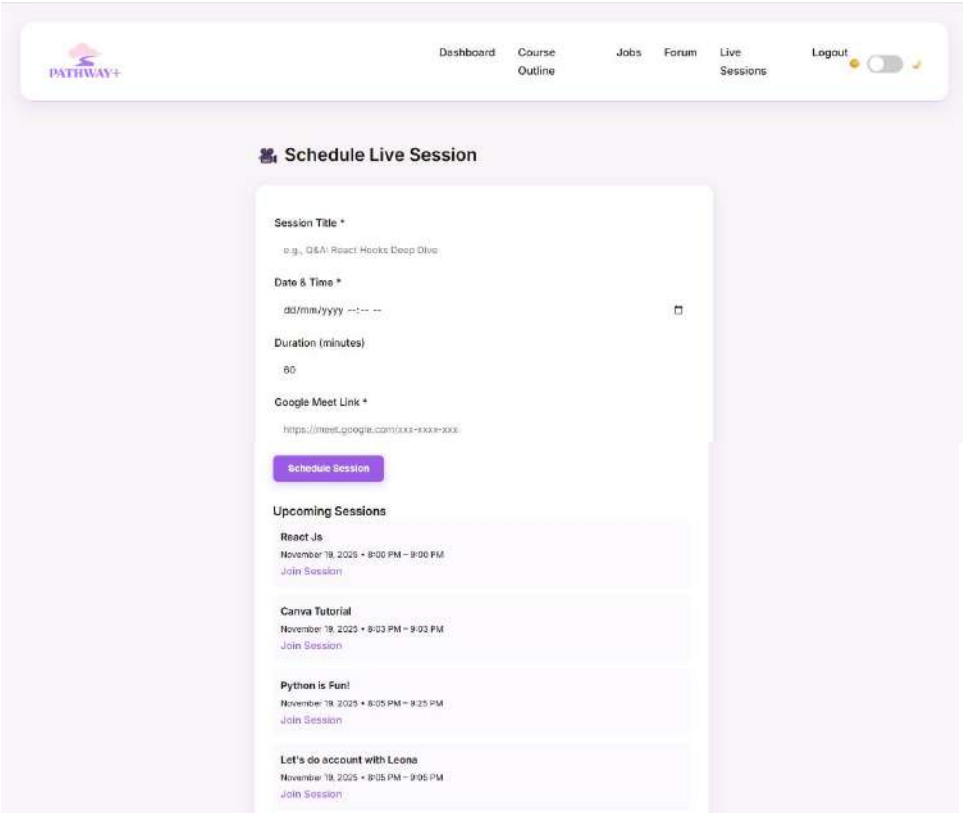
The Jobs Employer Page interface. This section allows the employer to create, edit, or delete job listings and view the table of managed job data.

6.4 Forum



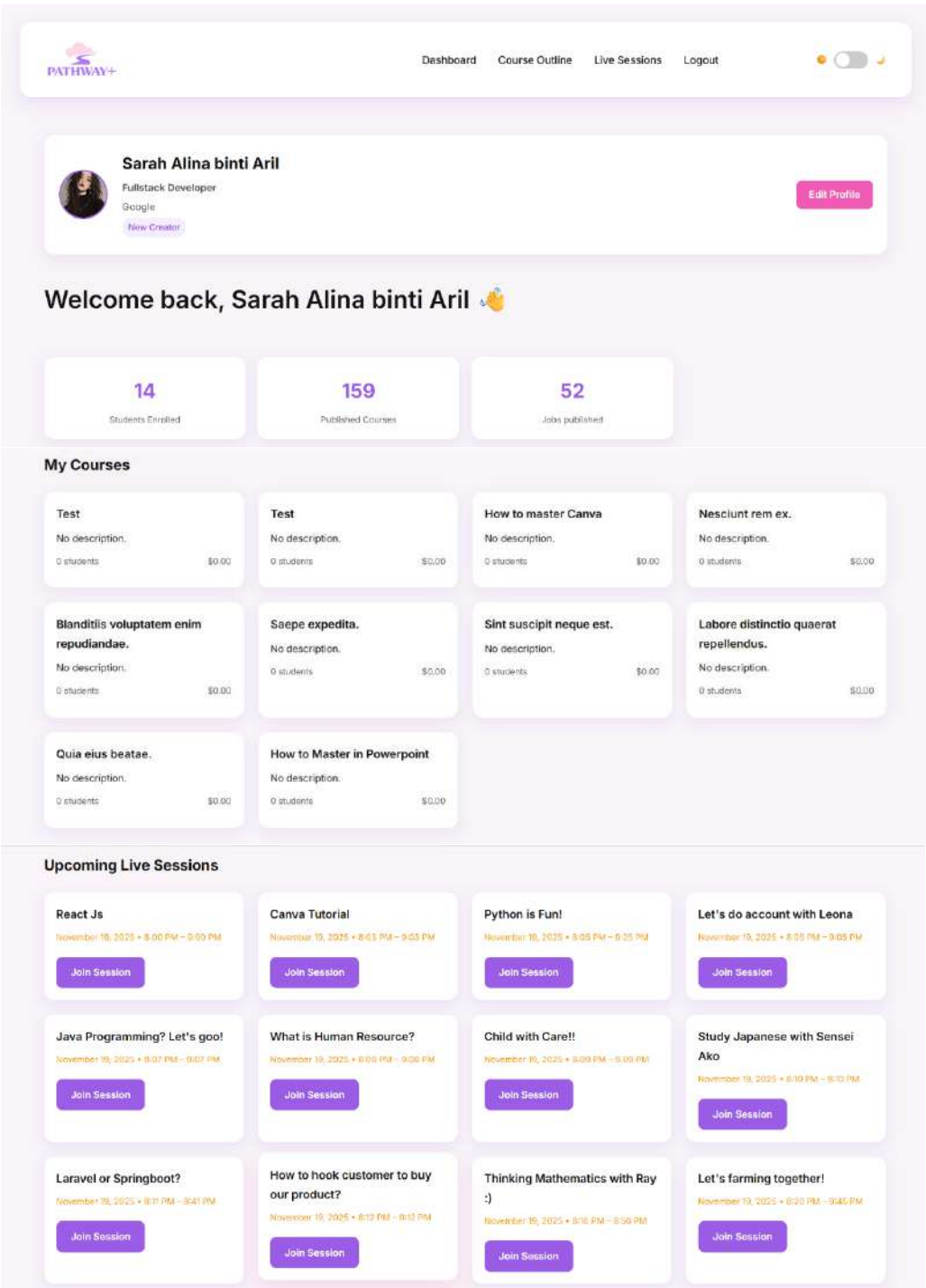
The interface for the employer to engage in the mentorship platform, providing advice and networking opportunities for students.

6.5 Live Sessions



A feature to facilitate real-time communication, such as scheduling or conducting live webinars, Q&A sessions, or mentoring with students.

7.0 Creator
7.1 Dashboard



The creator's central landing page, typically showing key metrics related to their courses, such as enrollment and content performance.

7.2 Course Outline

PATHWAY+

Dashboard

Course Outline

Live Sessions

Logout

Course Outline Builder

Course Details

Course Title *

HTML

Category *

Developer

Level *

Beginner

Is Free?

Yes

Provider

Pathway+

Modules Label

HTML

+ Add Main Topic

Main Course Content

+ Add Module

Module Title *

Let's explore HTML

+ Add Lesson

HTML & CSS Full Course - Beginner to Pro (Video)

Edit

Delete

HTML Full Course for Beginners | Complete All-in-One ... (Video)

Edit

Delete

Quiz (Quiz)

Edit

Delete

Save Module

Cancel

Save Entire Course

Used for creating courses, lessons, and quizzes. This page displays the structured list of modules and lessons the creator is managing.

7.3 Live Sessions

PATHWAY+

Dashboard Course Outline Live Sessions Logout

Schedule Live Session

Session Title *
e.g., Q&A: React Hooks Deep Dive

Date & Time *
dd/mm/yyyy --:-- --:--

Duration (minutes)
60

Google Meet Link *
https://meet.google.com/xxx-xxx-xxx

[Schedule Session](#)

Upcoming Sessions

Java Programming? Let's go!
November 19, 2025 • 6:08 PM – 7:08 PM
[Join Session](#)

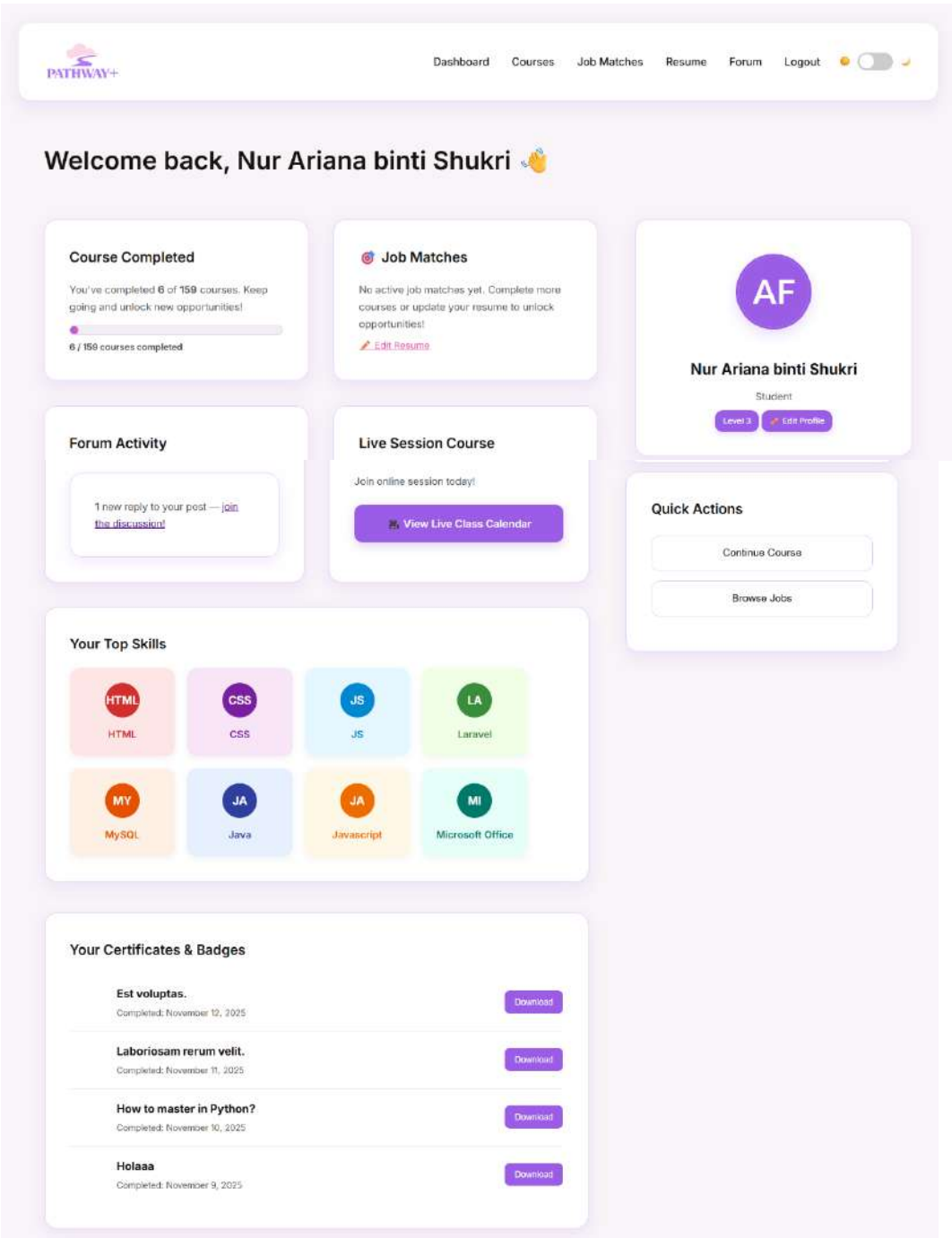
Study Japanese with Sensei Ako
November 19, 2025 • 6:40 PM – 7:40 PM
[Join Session](#)

Python
November 19, 2025 • 7:02 PM – 8:22 PM
[Join Session](#)

Laravel or Springboot? Which one is better?
November 19, 2025 • 7:35 PM – 8:35 PM
[Join Session](#)

A feature for the creator to schedule or conduct live teaching sessions and webinars with students, aligning with the platform's career guidance goal.

8.0 Student
8.1 Dashboard



The student's central landing page that shows personalized career path recommendations and quick access to job opportunities and learning content.

8.2 Profile

DashboardCoursesJobsResumeForumLogout

My Profile

Profile Picture



Choose File. No file chosen

JPG, PNG, GIF (max 2MB)

Personal Info

Full Name

Nur Aina SITI SHAH

Title

Student

Email

ainas@gmail.com

Phone

(+60) 16-53607751

LinkedIn

https://linkedin.com/in/ainas

GitHub

https://github.com/ainas

Work Experience

Job Title

Junior Frontend Developer

Company

Fract Solutions

Duration

Jun 2018 - Mar 2023

Location

Ampang, Malaysia

Description

Working as HTML, CSS, JavaScript Developer

Education

Degree

B.S. Information Technology & Computer Application Development

School

University Poly-Tech Malaysia

Duration

2018 - 2019

GPA

3.5/4.0

Skills

Skills (comma-separated)

HTML, CSS, JS, Laravel, MySQL, Java, JavaScript, Microsoft Office

Certifications

Est voluplas.

Pathway+ Academy

Issued: November 2025 | ID: CERT-2025-00004

Laboriosam rerum velit.

Pathway+ Academy

Issued: November 2025 | ID: CERT-2025-00003

How to master in Python?

Pathway+ Academy

Issued: November 2025 | ID: CERT-2025-00002

Holose

Pathway+ Academy

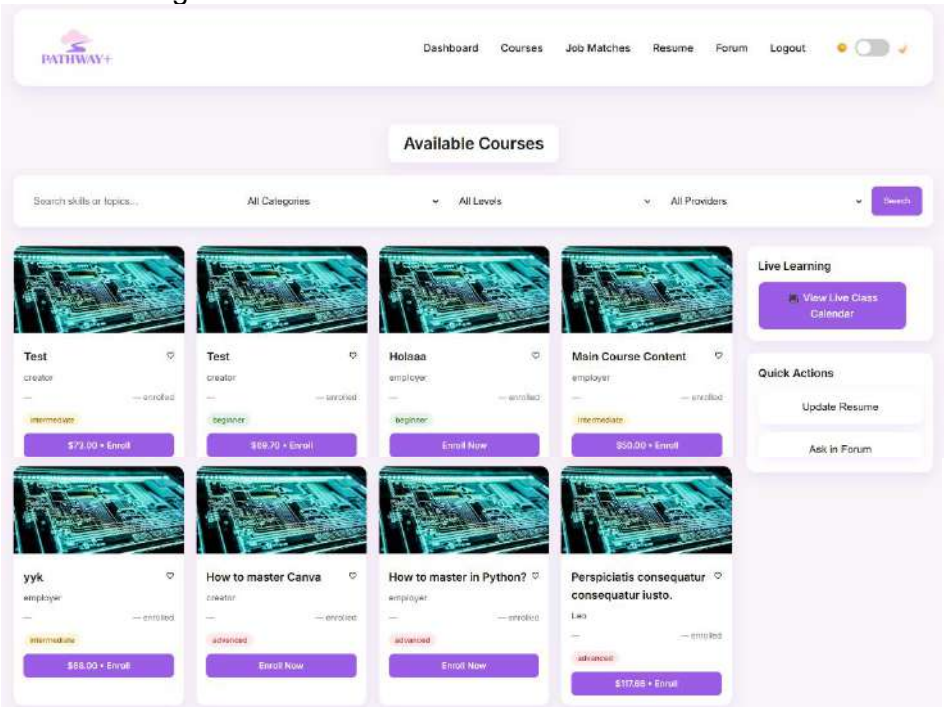
Issued: November 2025 | ID: CERT-2025-00001

These certifications are auto-synched from your completed courses.

Save & Sync My Account

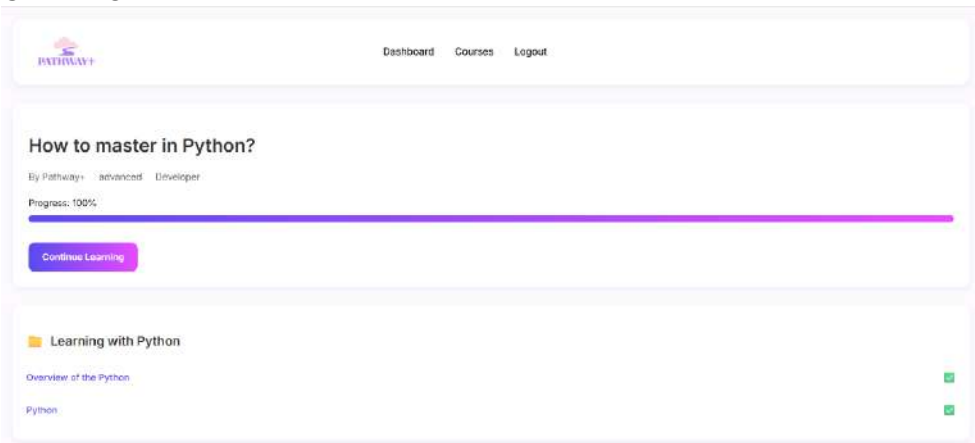
Allows the student to manage their personal information, qualifications, and interests, which the system uses to generate tailored suggestions.

8.3 Course Listing



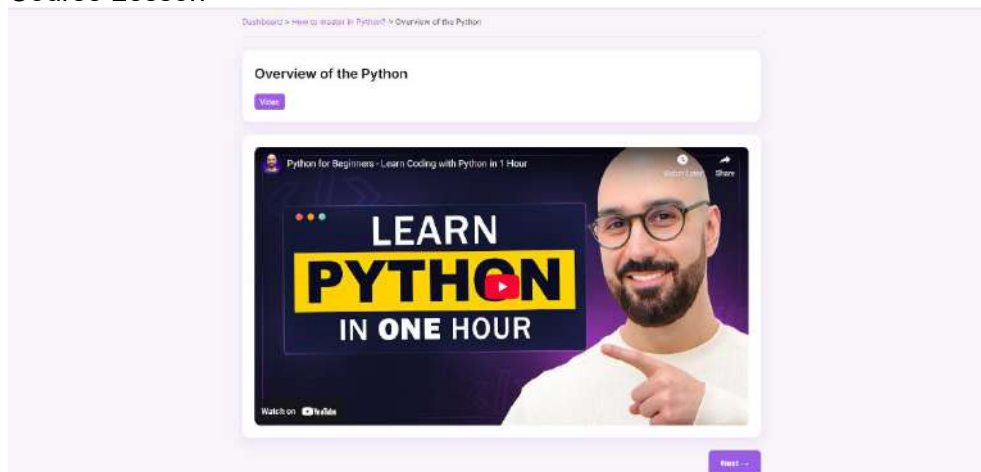
The main page for students to browse the curated online courses and certifications available, often integrated from external platforms like Coursera.

8.4 Course Outline



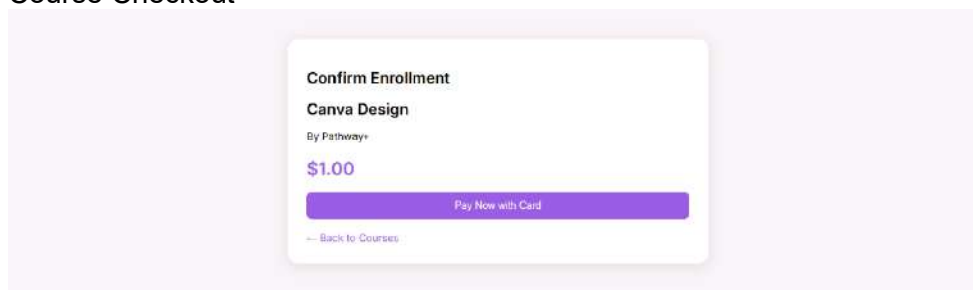
Displays the structured list of modules and lessons available within a specific course.

8.5 Course Lesson



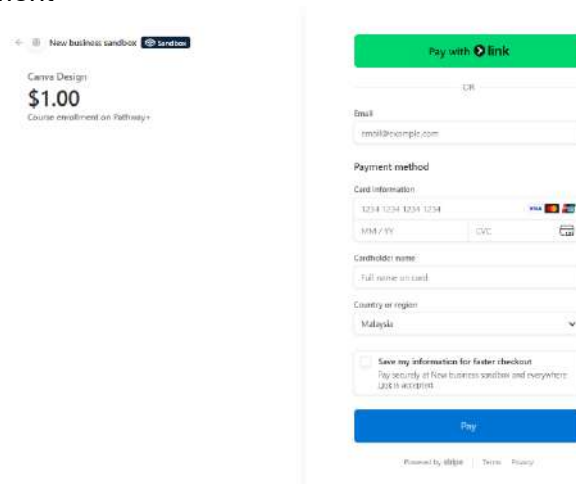
The interface where students consume the learning content and take quizzes provided by the creator or employer to improve their skills.

8.6 Course Checkout



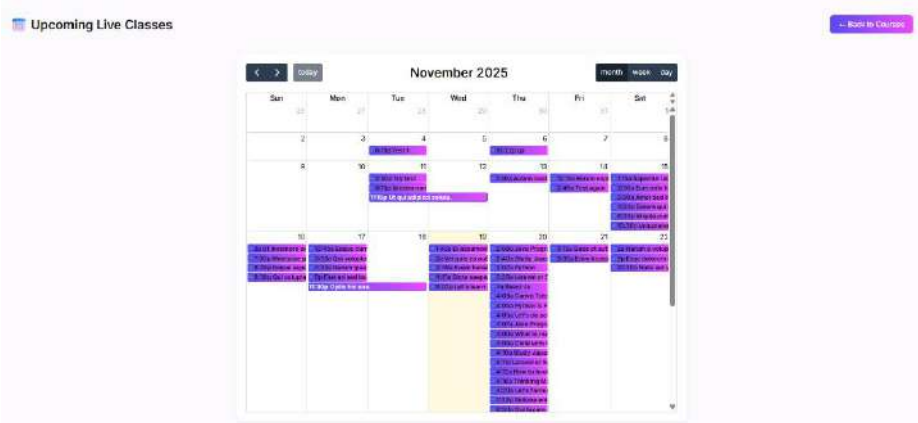
The process page for confirming enrollment in a selected course.

8.7 Course Payment



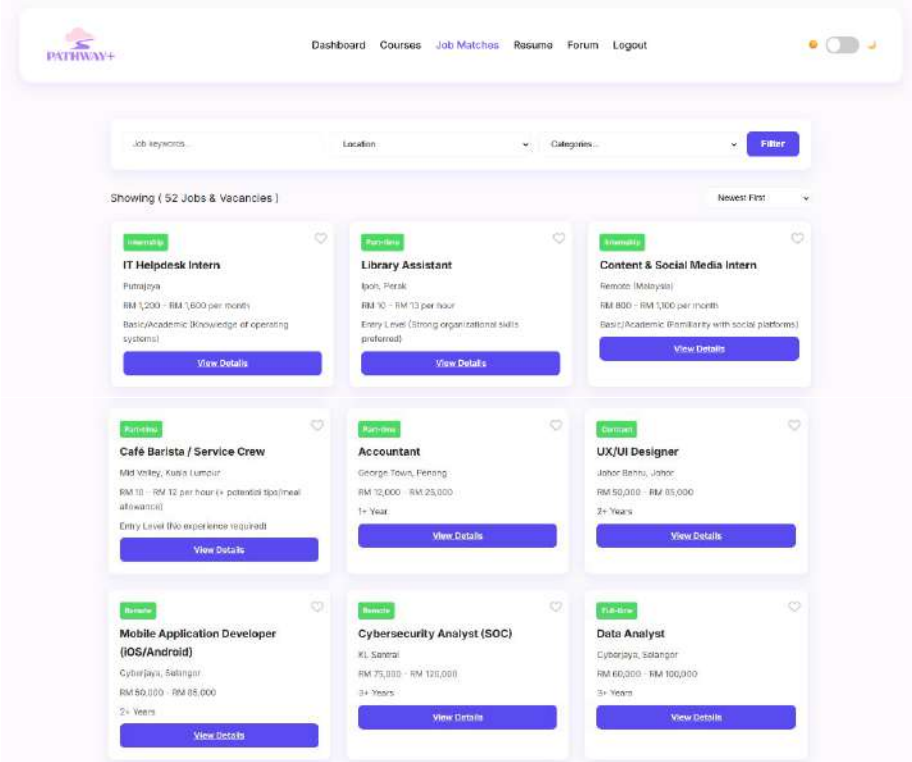
The secure interface for handling transactions if the selected course or certification requires payment.

8.8 Live Calendar



A calendar feature to track scheduled live sessions, career events, and important application deadlines.

8.9 Jobs Listing



The main page for viewing aggregated and up-to-date employment opportunities. It includes a filtering function to help students sort jobs according to their field of interest.

8.10 Job Detail



[Dashboard](#) [Courses](#) [Job Matches](#) [Resume](#) [Forum](#) [Logout](#)



UX/UI Designer

Digital Product Agency

[Contract](#) [Johor Bahru, Johor](#) [Developer](#)

Description

The UX/UI Designer will be responsible for creating intuitive, engaging, and visually stunning digital products for our diverse clientele (mobile apps, websites, and enterprise systems). You will champion the user experience, ensuring our designs are both beautiful and highly functional.

Job Details

Location	Type
Johor Bahru, Johor	Contract
Salary	Experience
RM 50,000 - RM 85,000	2+ Years
Category	Posted
Developer	Nov 12, 2025

Apply Now

Responsibilities

- User Research & Analysis: Conduct user research, analyze competitor products, and interpret user feedback to inform and validate design decisions.
- Design Execution: Develop user flows, wireframes, high-fidelity mockups, and interactive prototypes for web and mobile applications.
- Visual Design: Create engaging visual designs and UI elements (buttons, icons, typography, color palettes) that align with client brand guidelines.
- Collaboration: Work closely in an Agile environment with Product

Requirements

- Bachelor's Degree in Design, Computer Science, Human-Computer Interaction (HCI), or a related creative field.
- Minimum 3 years of professional experience in UX/UI design for digital products.
- Expert proficiency in industry-standard design and prototyping tools such as Figma, Sketch, Adobe XD, or Axure.
- A strong portfolio demonstrating successful projects, critical design thinking, and practical knowledge of user-centered design (UCD) principles.
- Understanding of HTML/CSS capabilities and limitations, and a collaborative spirit when working with development teams.
- Excellent communication skills to articulate design decisions and rationale to clients and internal teams.

How to Apply

Please submit your updated CV and a link to your online design portfolio (mandatory) to design.careers@innovatedigital.my. Applications without a portfolio will not be considered.

The page that displays the comprehensive information about a specific job posting after it is selected from the listing

8.11 Job Apply

The screenshot shows the 'Apply for IT Helpdesk Intern' page for Zenith Solutions (MNC). The page includes a navigation bar with links to Dashboard, Courses, Job Matches, Resume, Forum, and Logout. The job details section specifies the location as SELANGOR, the type as Internship, and the salary as RM 1,200 - RM 1,600 per month. The description mentions gaining essential corporate IT experience by supporting the internal technical team. Below the job details, there are three file upload sections: 'Resume *', 'Cover Letter', and 'Other Attachments (Max 5 files)'. Each section has a 'Choose File' button and a 'No file chosen' status. A 'Submit Application' button is located at the bottom of the form, along with a 'Back to Job' button.

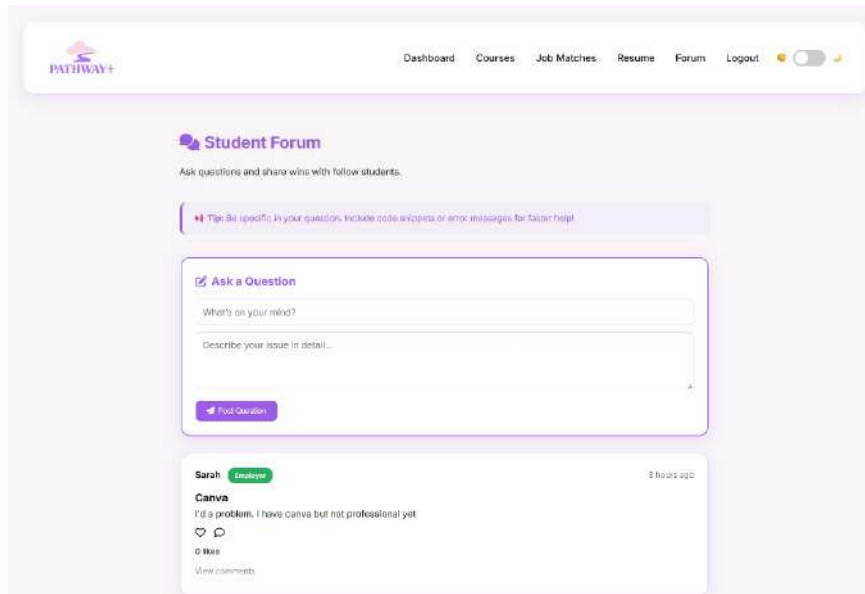
The Jobs Application Page interface. This is the final step for submitting a job application, including uploading documents like resumes and cover letters.

8.12 Resume

The screenshot shows the 'My Resume' page for a user named Nur Ariana binti Shukri. The page includes a navigation bar with links to Dashboard, Courses, Jobs, Resume, Forum, and Logout. The resume is titled 'My Resume' and shows a profile picture, name, and contact information. It lists work experience as a Junior Frontend Developer at Fast Sdn. Bhd. from Jan 2018 to Mar 2023, and education as B.S. Information Technology in Computer Application Development at University Poly-Tech Malaysia from 2018 to 2021. It also lists certificates and skills. At the bottom, there is an 'AI Resume Analysis' section with a text input field and an 'Analyze Resume Match' button. Navigation buttons for 'Edit Profile' and 'Download CV' are located at the bottom of the page.

The Resume Builder tool. It allows students to construct their professional identity and create a resume/profile for use in and out of the system.

8.13 Forum



The Mentorship Platform or message board that fosters peer advice and networking, allowing students to communicate with mentors and peers.

8.14 Github

<https://github.com/SpadesLuxia/pathwayplus>

Youtube

<https://youtu.be/ADv5jP2MZr4>

Appendix C – Turnitin Result

Ain UPTM FYP Pathway plus.pdf			
ORIGINALITY REPORT			
9%	4%	2%	7%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
PRIMARY SOURCES			
1	Submitted to Kolej Universiti Poly-Tech MARA Student Paper	4%	
2	Submitted to Heriot-Watt University Student Paper	1%	
3	Submitted to Blue Mountain Hotel School Student Paper	<1%	
4	Submitted to Monash University Student Paper	<1%	
5	www.coursehero.com Internet Source	<1%	
6	Submitted to Liverpool John Moores University Student Paper	<1%	
7	www.mnsu.edu Internet Source	<1%	
8	Submitted to University of Wales Institute, Cardiff Student Paper	<1%	
9	Submitted to University of Bahrain Student Paper	<1%	
10	Submitted to paper Student Paper	<1%	
11	Submitted to AlHussein Technical University Student Paper	<1%	



Page 2 of 161 - Integrity Overview

Submission ID: trnoid::8092:530475115

15% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Match Groups

242 Not Cited or Quoted 15%

Matches with neither in-text citation nor quotation marks

2 Missing Quotations 0%

Matches that are still very similar to source material

2 Missing Citation 0%

Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%

Matches with in-text citation present, but no quotation marks

Top Sources

5% Internet sources

3% Publications

15% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

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Appendix D – Log Book

CT204/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION
DEVELOPMENT



FACULTY OF COMPUTING & MULTIMEDIA (FCOM)

COMPUTING PROJECT 1
(FYP4013)

LOG BOOK

STUDENT'S NAME : NUR AIN BATRISYIA BINTI MANSOR
ID NO. : AM2311015243
SUPERVISOR : SIR MOHD NOOR AFIQ BIN RAMLEE
PROJECT TITLE : PATHWAY+

CT204/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVELOPMENT

Date/ Week		Agenda	Next Agenda	Signature (Supervisor / Coordinator)
2/1/2025 (example)	1	Find potential Supervisors	Finalize topic and title with SV	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
29/5/2025	2	Discuss the topic and title with supervisor	Prepare proposal for being consult with supervisor	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
3/6/2025	3	Consult proposal with supervisor	Propose fixed problem statement and objectives with supervisor	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
14/6/2025	4	Consult fixed problem statement and objectives with supervisor	Prepare interview question for consultation with supervisor	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
18/6/2025	5	Consult interview questionnaire with supervisor	Consult the report with supervisor	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
26/6/2025	6	Consult the report with supervisor	Prepare of presentation with examiner and supervisor	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
4/7/2025	7	Presentation	Report Submission	 MOHD NOOR AFIQ BIN RAMLEE Pensyarah Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia

CT204/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION
DEVELOPMENT



FACULTY OF COMPUTING & MULTIMEDIA (FCOM)

COMPUTING PROJECT 2
(FYP4025)

LOG BOOK

STUDENT'S NAME : NUR AIN BATRISYIA BINTI MANSOR
ID NO. : AM2311015243
SUPERVISOR : SIR MOHD NOOR AFIQ BIN RAMLEE
PROJECT TITLE : PATHWAY+

CT204/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVELOPMENT

Date/ Week		Agenda	Next Agenda	Signature (Supervisor / Coordinator)
7/8/2025	1	Get feedback from supervisor about previous FYP Report	Discuss design and features	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
13/8/2025	2	Discuss design and features	Present wireframe of the project	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
18/8/2025	3	Showing progress	Presenting basic system ui and interaction (login, register, forgot password and main page)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
28/8/2025	4	Presenting basic system ui and interaction (login, register, forgot password and main page)	Showing progress (employer dashboard, course outline)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
4/9/2025	5	Showing progress (employer dashboard, course outline)	Showing progress (employer job, forum and live session)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
10/9/2025	6	Showing progress (employer job, forum and live session)	Showing progress (creator dashboard, course outline and live session)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
14/9/2025	7	Showing progress (creator dashboard, course outline and live session)	Showing progress (admin courses moderation, jobs moderations)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
30/9/2025	8	Showing progress (admin courses moderation, jobs moderations)	Showing progress (admin forum moderation, verification for employer and creator)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
7/10/2025	9	Showing progress (admin forum moderation, verification for employer and creator)	Showing progress (admin dashboard, manage users and reports)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
16/10/2025	10	Showing progress (admin dashboard, manage users and reports)	Showing progress (student courses, course outline, course lesson, payment and certificate)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
22/10/2025	11	Showing progress (student courses, course outline, course lesson, payment and certificate)	Showing progress (student job list, job details, job apply and profile)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia

CT204/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVELOPMENT

29/10/2025	12	Showing progress (student job list, job details, job apply and profile)	Showing progress (student resume, ai resume analysis, forum and dashboard)	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
5/11/2025	12	Showing progress (student resume, ai resume analysis, forum and dashboard)	Double check all the progress and make sure all functionable	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
10/11/2025	13	Double check all the progress and make sure all functionable	Final Present at LT5.1	DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia
13/11/2025	14	Final Present at LT5.1		DR. MOHD NOOR AFIQ BIN RAMLEE Pensyarah Kanan Fakulti Pengkomputeran & Multimedia Universiti Poly-Tech Malaysia

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