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E-LOGBOOK SYSTEM FOR POSTGRADUATE RESEARCH STUDENTS(ESPRES)

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BACHELOR OF INFORMATION SYSTEM (HONS.) BUSINESS COMPUTING

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E-Logbook System for Postgraduate Research Students (ESPRES)

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SUPERVISOR APPROVAL

E-LOGBOOK SYSTEM FOR POSTGRADUATE RESEARCH STUDENTS

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This thesis was prepared under the supervision of the project supervisor, Ts. Dr. Rashidah Mokhtar. It was submitted to the Faculty of Computer and Mathematical Sciences and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Information Systems (Hons.) Business Computing.

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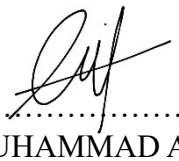
Ts. Dr. Rashidah Mokhtar
Project Supervisor

FEBRUARY 12, 2023

STUDENT DECLARATION

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



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ABSTRACT

The E-Logbook System for Postgraduate Research Students (ESPRES) is a digital platform designed to streamline and improve the process of recording and reporting meetings between postgraduate research students and their supervisors. The current manual process of using Microsoft Word to record these meetings is prone to problems such as loss of records, leading to the need to recreate the logbook and re-record meetings. ESPRES aims to resolve these issues by providing a secure, organized and efficient method of recording and reporting meetings. By utilizing ESPRES, postgraduate research students will have a centralized platform to record and store their meeting details, reducing the risk of losing records and improving the overall process of monitoring and evaluation by the postgraduate studies management. ESPRES was developed using the Adapted Waterfall Model where six stages were included which are planning, requirement analysis, design, development, testing and documentation. Besides, the eight golden rules of interface design is used as the theory for this project. It has been the guideline to develop this system. The system has passed all the requirements in the test plan. Expert evaluations were used in evaluating the system and all the feedbacks have been taken into consideration. In the future, there are many enhancements that will be made to improve E-Logbook System for Postgraduate Research Students.

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LIST OF ABBREVIATIONS

IT	Information Technology
HTML	Hypertext Markup Language
CSS	Cascading Style Sheets
PHP	Hypertext Preprocessor
CD	Context Diagram
ERD	Entity Relationship Diagram
DFD	Data Flow Diagram
MIS	Management Information System
PK	Primary Key
FK	Foreign Key
HCI	Human Computer Interface

CHAPTER 1

INTRODUCTION

This chapter provides the background and rationale of the study. It also provides details about the electronic logbook, the current process used in the logbook manual by postgraduate research students, and the problems in the logbook manual. This chapter also discusses the objective, scope, and significance of the E-Logbook System for Postgraduate Research Students (ESPRES).

1.1 Background of Study

In recent years, there has been undeniable growth in information technology (IT), which continues to grow. IT industries that are constantly rising, providing a wide range of opportunities, and supplying new goods are also crucial in this development. Technology's rapid progress has altered the environment in numerous areas, including business, management, and education. An information system consists of components used to collect, store, and process data to offer information, knowledge, and digital products. Information systems are used by businesses and other organizations to carry out and manage operations, engage with consumers and suppliers, and compete in the marketplace (Vladimir Zwass, 2021). Computer hardware and software, telecommunications, databases and data warehouses, human resources, and procedures are the primary components of information systems. Information technology (IT) comprises hardware, software, and telecommunications, and it is increasingly interwoven in the operations and management of organizations.

Accords with the viewpoint of Vladimir Zwass, who asserted that information systems are frequently utilized to ensure the efficient operation of a process. This is the same notion as switching from a paper logbook to an electronic logbook, which was done to ensure that this change can improve the existing system, allowing it to produce the best possible results. Because of the availability of technology such as this, a process

can be sped up, improving productivity. One of the motivations behind developing this technology nowadays is to reduce time and cost while producing the best results.

A logbook is an essential part of any research project, whether you are a research scientist or a student conducting research. Logbooks are used to record daily activities or meetings with supervisors from the first thing you do in starting a project to completion, including final results. Supervisors will monitor all student activities through this logbook to ensure their progress runs smoothly. The logbook will help you organize your thoughts and procedures. The logbook will be submitted with the project upon completion and will be graded with the project. A logbook usually serves as an official summary of a piece of research, and the official report will present a formal summary of the experimental findings. The logbook will be your primary source of documentation about what you did in the lab and your thought processes during data analysis and experiment planning.

The electronic logbook or eLogbook is a digital version of the traditional logbook that serves the same purpose as data recording. Previously, the user would manually record data in a logbook and generate a paper report. However, with the availability of eLogbook, they need only enter data into the system since the system will automatically compile a monthly report based on the data entered. Additionally, eLogbook can produce more precise computation results than traditional logbooks requiring users to calculate their data. Consequently, it can be observed that the existence of eLogbook can overcome the problems encountered in traditional logbooks and enhance the functionality already present.

The E-Logbook System for Postgraduate Research Students (ESPRES) was designed for postgraduate research students at UiTM. The ESPRES is a web-based system that allows students to record all of their activities. This system will record all student meetings with supervisors and the number of hours spent in meetings. E-Logbook System for Postgraduate Research Students will provide a report for the number of meeting hours of students with the supervisor every month. It will notify students if

the number of meeting hours is insufficient. This system will assist supervisors in more thoroughly monitoring students' progress.

1.2 Current Process

Currently, postgraduate research students still use the manual process to record their research activities. Usually, they will use Microsoft word as a platform for them to record every meeting done with the supervisor. Figure 1.1 below shows the current process that students will implement during their study period. Firstly, students will meet with the supervisor at least once a week to discuss research activities or progress. The medium used during the meeting is free, either physically or online. After that, students need to record each meeting detail in a logbook, including activities and the number of hours.

Next, students must calculate the total number of meeting hours with the supervisor. This is because each student must complete the meeting time set by the postgraduate studies. If the number of hours is not enough, then the student must suffice the number of hours. Afterwards, students submit their logbook reports to the supervisor for review and verification. Lastly, after the supervisor confirms the information, it will be submitted to management of postgraduate studies via google form to assess student progress.

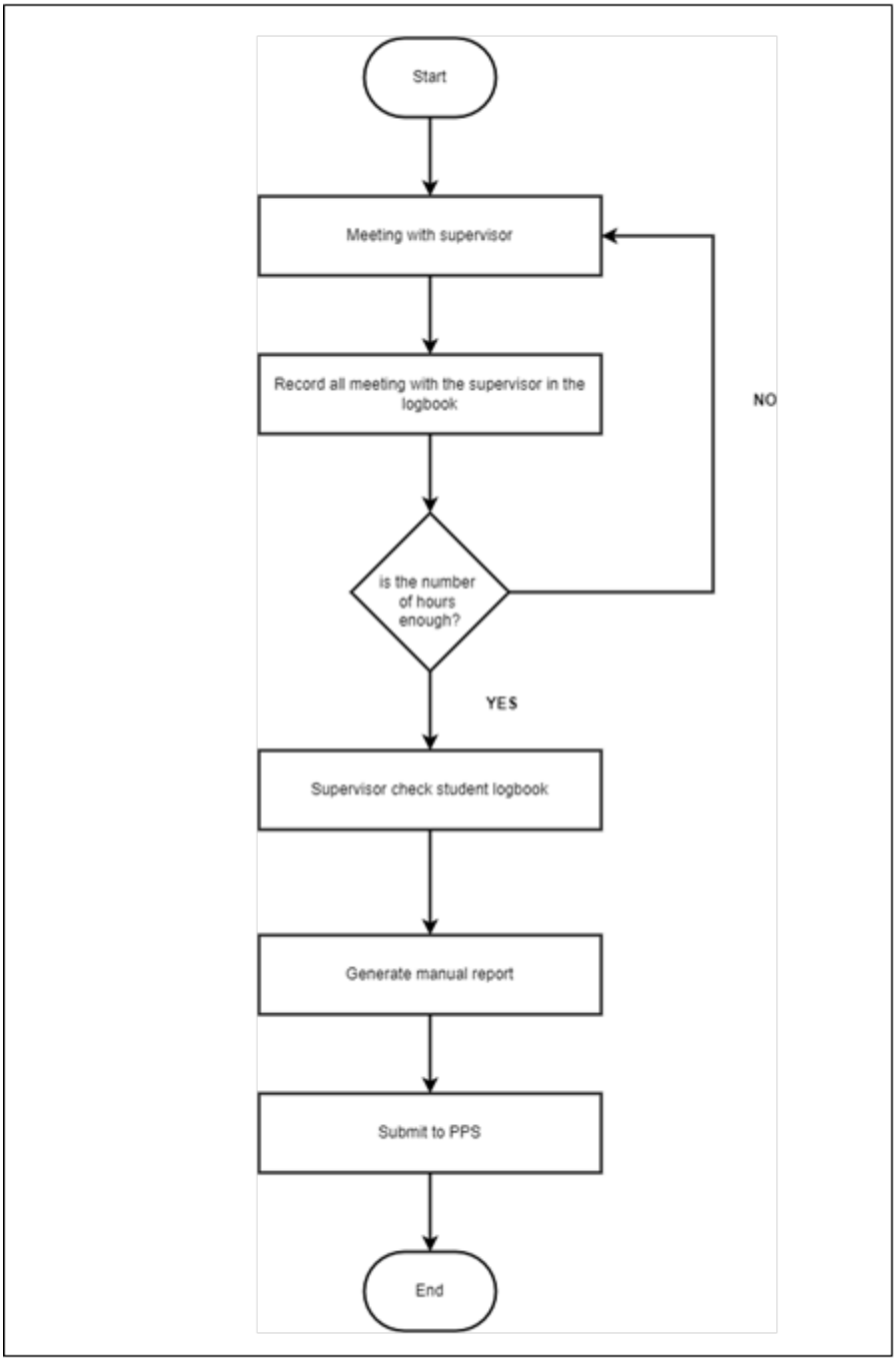


Figure 1.1 Flowchart of the current process

1.3 Problem Statement

Based on the current process, the method used by UiTM postgraduate students in recording all their meetings with the supervisor in the logbook, there are some problems. The first problem is that postgraduate students at UiTM still record all their

meetings with supervisors manually. Students will record all the details such as the date, time, activity and duration of the meeting in Microsoft word. They have to keep the document for quite some time before it is submitted to the supervisor. It can lead to other problems where if students do not back up the file and lose the document due to certain factors, this situation will give problems to students because they need to re-create the logbook and re-record all the meetings they have done.

The next problem is that there is no systematic monitoring mechanism to see the progress of postgraduate students. This makes it difficult for supervisors to monitor every progress that students have made because supervisors need to keep in touch with students to know the latest developments of students. The supervisor will monitor each student's progress in terms of activities and the number of hours that students spend meeting with them. This is because ensuring that students conduct their research activities well can produce excellent results. Therefore, to solve this problem, a systematic monitoring system is needed in order to monitor the progress of postgraduate students in a more systematic and orderly manner.

1.4 Objective

Three objectives have been made:

i) To Identify current process and problems faced by postgraduate research students in UiTM by using logbooks to record all research activities.
ii) To design and develop the E-Logbook System for Postgraduate Research Students
iii) To evaluate the functionality and usability of the proposed system.

1.5 Scope

The scope of users for this system involves students, supervisors, and postgraduate studies officer. E-Logbook System for Postgraduate Students that will be developed for postgraduate research students at UiTM is expected to help monitor each student's progress in their research. Through this system, all data related to student data,

meetings with supervisors, and progress will be stored in the system so that the process of evaluating student progress can be carried out properly. Processes in the system include recording meetings, notification of total meeting time with supervisors, updating progress or new findings in research and generating reports.

i. Student

In this system, students can record meetings with supervisors and update the latest progress in their research activities by attaching files as evidence. Further, if the number of meeting hours with the supervisor is insufficient, then they will receive a notification as a reminder to suffice the number of hours. In addition, they can also view their details and report their progress every month.

ii. Supervisor

Supervisors can view information about students under their supervision, including their names, id numbers, and courses. In addition, supervisors can keep an eye on their students' progress by viewing the files that students have entered into the system. Finally, the supervisor can assess and validate the students' findings once students attach their most recent research to the system.

iii. Postgraduate Studies Officer

For Postgraduate Studies Officer, they have access to the student list and information regarding the supervisor and students. In addition, they have access to recordings of meetings between postgraduate research students and their supervisors, as well as any items that students attached. After that, they will assess every student's progress based on the meetings' records and the attached documents.

1.6Project Significance

The proposed system will benefit students, supervisors, and the management of postgraduate studies at UiTM. Among the benefits include providing a more organized system to students. Moreover, students no longer have to worry about losing records stored in the logbook as students will keep everything in the database securely. Also,

by recording all research activities and progress into the eLogbook system, the students can see all the progress they have made more systematically.

In addition, this E-Logbook System for Postgraduate Research Students can provide facilities to supervisors and management of postgraduate studies by providing a system that can monitor all student research activities. Through this system, all monitoring of student progress will be easier and save time. Also, the supervisor and management of postgraduate studies can observe each student's research progress more clearly and systematically.

Therefore, this system will benefit postgraduate research students in completing their research. In addition, supervisors and management of postgraduate studies will also benefit from this system that will be developed where the work of monitoring students' research progress will be easier and more organized. This clearly shows that the E-Logbook System for Postgraduate Research Students can benefit many parties, including students, supervisors, and the management of postgraduate studies.

1.7 Conclusion

In conclusion, this chapter describes an overview of the project. It includes identifying current management processes and problems faced by postgraduate research students. In addition, the primary purpose of this project is to provide a system that can monitor the research activity of postgraduate students. The objective of this project is to ensure the requirement to meet user expectations. Finally, this E-Logbook System for Postgraduate Research Students will benefit many parties, including students, supervisors, and the management of postgraduate studies, where it is an efficient and organized system.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will go through previous e-logbook system research that has been conducted. Reading, analyzing, evaluating, and writing are the components of this subject. Journals, books, papers, current systems, and online resources are all used as reference sources for the knowledge that will be gathered to build this system in the future. Additionally, the primary goal of this study is to evaluate the project's development approach.

All of the system development models that will be applied in system development are also described in this study. The comparison with similar current systems and the implications of a literature review on the suggested system will also be included. Additionally, the approach used throughout the development phase will be examined along with the appropriate qualities. The study on the e-logbook system and the design that will be used in its development is also included in this chapter.

2.2 Management Information System

A computer-based information system used for decision-making is known as a management information system (MIS) (Okeke, 2021). A management information system (MIS) is a technology that integrates information collection, processing, classification, storing, and distribution (Marathe, 2017). Information systems also play a crucial role in contemporary life. In a broad sense, the term "information systems" refers to hardware, digital applications, storage, communication systems, internet utilities, and almost any other element of the technological infrastructure of a company,

organization, government, school, or other groups that contribute to the concept of big data structure and management (Berdik et al., 2021).

Giving management a view of how his staff and department are functioning is the primary goal of MIS (Soni et al. 2020). |The management may instantly take the appropriate action if the data indicate any deviations from the specified objectives. It is possible to define a management information system as a system that employs defined procedures based on data from internal and external sources to help decision-makers plan, direct and carry out the tasks for which they were hired. The management information system is crucial to the operations of the business, particularly in the administrative department, where the suggestion is to make everyday tasks easier and support efficient information processing to prevent errors in the process.

An information system is made up of information and various sorts of components that aid in the processing and administration of information, according to a journal article titled "Information system and its types: Emphasizing territory, establishments and domain-specific" (Paul et al., 2020). These elements refer to the procedures and methods used for information-related tasks such as data gathering, processing, management, and distribution. According to Hasan et al. (2018), the management information system (MIS) is broken down into four levels, starting at the top level with executive information systems, moving down to the middle level with management information systems and decision support systems, and finishing at the bottom level with transaction processing systems. Additionally, the management information system (MIS) is made up of three crucial parts: management, information, and system. These parts will all be linked together to serve the entire firm.

To conclude, a management information system is crucial for a company to make decisions that will help it reach its goal. MIS is a crucial component of companies because it offers timely and reliable information that aids in decision-making (Marathe et al., 2017).

2.3 Electronic Logbook System

A logbook is a document used to systematically record all significant information, such as events, task progress, or activities. The acquisition of the necessary information, abilities, attitude and competencies is documented in a logbook (India., 2019). A logbook is a tool that may be used to keep track of progress or activities and ensure consistency in quality. Svendsen et al. (2019) claim that logbooks are frequently used for assessing and tracking student development. Individual trainees keep logbooks that describe each activity process they complete and their involvement throughout the procedure to be able to track their progress through the programme. The logbook's function is to keep track of training and experience to accomplish goals (Hee et al., 2020).

The Electronic Logbook System (E-logbook) is a digital logbook that has been upgraded with several advantages over the classic logbook, including the ability to be accessed from anywhere to make it simpler for users. The Electronic Logbook System (E-logbook) is a platform that enables users to enter all pertinent data, including dates, events, and actions, to be saved for evaluation or future use. Logbooks are a practical tool for giving feedback to students or workers, keeping track of their performance, and helping them plan their activities (Gondal et al., 2017). When there is proof that there is a problem, the electronic logbook system (E-logbook) enables monitoring progress, tracking, and identifying any possible weaknesses, so that the problem may be fixed (Chung et al., 2018).

Improvement of small-scale tuna fisheries data quality through the application of an e-logbook system, according to (Raup et al., 2021) state that the manual logbook requires a lot of investment, particularly in human resources, because it must pay employee salaries; this is where e-logbook can be the solution. In addition to being inexpensive, the electronic logbook system (E-logbook) is an excellent approach to increasing data quality. The electronic logbook system (E-logbook), according to Ghelmani S et al. (2019), has greatly simplified all operations. The E-logbook is easier to access, retrieve, and engage with during the review process compared to the manual version.

2.4 Human-Computer Interaction (HCI) Theory

Human-computer interaction is the process of a human and a system interacting. Systems come in various forms, from physical machinery to software and computer systems. Multiple developing technologies are continuously improving how human-computer interaction is conducted as an extension of ubiquitous computing. Machine language commands were manually entered in the early phases of human-computer interaction. As a result, computer languages serve as the medium for conducting conversations (Shi et al., 2020).

3.4.1 Eight Golden Rules of Interface Design

Eight Golden Rules of Interface Design provides rules regarding a user interface design. Eight Golden Rules gave rules drawn heuristically from experience and applicable in practically all interactive systems once they had been appropriately improved, expanded, and understood. The usefulness of a system is greatly influenced by its user interface. To produce a good design, defining the Eight Golden Rules of Interface Design is very important so that the system can be produced well (Marston et al., 2017).

Table 2.1 Eight Golden Rules of Interface Design

Rules	Description
Strive for consistency	Consistent sequences of actions are required in similar situations, and identical terminology should be used whenever possible.
Cater to universal usability	The needs of diverse users, including novices, experts, users of all age ranges, and users with disabilities, need to be recognized.
Offer informative feedback	For frequent and minor user actions, there should be modest system feedback, whereas for infrequent and major actions, the response should be more substantial.
Design dialog to yield closure	Sequences of actions should be organized into groups with a beginning, middle, and end, with informative feedback at the completion of a group of actions.
Prevent errors	The system should be designed such that users cannot make serious errors, and if a user makes an error, the interface should detect the error and offer simple, constructive, and specific instructions for recovery.
Permit easy reversal of actions	As much as possible, actions should be reversible.

Support internal locus of control	Experienced users need to feel they are in charge of the interface and that the interface responds to their actions.
Reduce short-term memory load	Interfaces in which users must remember information from one screen and then use that information on another screen should be avoided.

2.5 Web-based Application

A network-based extranet is a system that functions outside of a company's intranet. It is accessible to pertinent third parties via an Internet connection, which is often tunnelled through a VPN or another secure network connection system. A company's intranet is frequently connected to an extranet, which is akin to a "DMZ," which offers various services, data, catalogues, EDI (Electronic Data Interchange), and login portals to outside parties while staying separate from the intranet.

Extranets were originally used to define a secure VPN-based intranet sharing arrangement between two or more businesses. Even today, extranets frequently signify sharing of an organization's intranet or its indicated data resources with outside parties to aid in cooperation and exchange of essential intranet-only material with pertinent parties. Sharing such data makes it possible to provide necessary and crucial business services to third parties while yet keeping them separate from the company's intranet for security concerns. Data interchange, project cooperation, and communication with relevant parties are the main uses of extranets. Collaborative platforms have taken the role of email because while email is necessary for information dissemination, it is not appropriate for tasks or interactions that call for engagement. Contrarily, extranets serve as a more capable collaborative network-based system that gives outside parties' access to crucial information that is often housed within the company's intranet (Wardynski, 2020).

Extranets were first used to define a secure VPN-based intranet sharing arrangement between two or more businesses. Even today, extranets frequently refer to sharing an organization's intranet or its implicit data resources with external parties to aid in cooperation and sharing essential intranet-only data with pertinent parties. By sharing this information, essential business services may be made available to third parties

while, for security reasons, staying separate from the company's intranet. Data interchange, project cooperation, and communication with relevant parties are the three main uses of extranets. Collaborative platforms have taken the role of email because while email is necessary for information dissemination, it is inappropriate for tasks or interactions that call for engagement. Contrarily, extranets serve as a more capable collaborative network-based system that gives outside parties' access to crucial information that is often housed within the company's intranet (Senior, 2022).

According to Wardynski (2020) within this extranet of the network, which is divided from the company intranet by a firewall, there may be portals for suppliers, vendors, and even customers to access their pertinent data, such as worksheets, invoices, plans, and blueprints, as well as communications between relevant parties and web services requiring a login. The capacity to transfer enormous volumes of data with EDI, or Electronic Data Interchange, is one of the most important advantages of having a business extranet. Collaborative extranets allow businesses to share data with select partners in addition to exchanging critical information with all relevant parties, as opposed to depending on outdated email systems that are difficult to collaborate on for big datasets. Everyone may obtain essential knowledge through interactions across communications of large datasets, which can progress projects rather than cause them to stop.

Extranets enable a firm to share crucial intranet-based datasets without granting other parties access to the intranet when making decisions that need significant data sharing and relationships with other enterprises for joint growth efforts. Extranets enable critical services to be externally hosted and publicly accessible to the appropriate parties while safely and securely separating such services from the company intranet and its critical data. These services can be effectively streamlined and managed through extranets, which allow critical services to be externally hosted and publicly accessible to the appropriate parties.

2.5.1 Web Browser

A web browser application is used to view a local or global website. The web browser obtains the necessary information from a web server and displays the page on the user's device when a user requests a web page from a certain website. A web browser is a tool for accessing the Internet that enables users to search for information, send and receive emails, interact on social networks and instant messenger, and purchase online stores (Umar et al., 2018).

2.5.2 HTML

HyperText Markup Language, sometimes known as HTML, is the industry-standard markup language for texts intended to be viewed in a web browser. Tabarés (2021) claims that since the inception of the Web, Hypertext Markup Language (HTML) has been the recognized hypertext standard. By creating a language that can connect various websites, Tim Berners-Lee is credited as being the first to suggest the notion of transferring files across computers via hyperlinks.

2.5.3 CSS

Cascading Style Sheets is a language for creating style sheets that describe how a document is presented in a markup language like HTML. In order to improve comprehension or memorization, multimedia typically combine more than one sort of media, such as text (alphabetic or numeric), symbols, graphics, photographs, audio, video, and animations (Guan et al., 2018).

2.5.4 JavaScript

JavaScript is a dynamic programming language that's used for web development, web applications, game development, and lots more. JavaScript is massively used on the client-side of web applications to achieve high responsiveness and user-friendliness (Gyimesi et al., 2019).

2.5.5 PHP

PHP is a server scripting language and a powerful tool for making dynamic and interactive Web pages. PHP is a general-purpose scripting language geared toward web development. PHP is an acronym for "PHP: Hypertext Preprocessor" and is a widely used, open-source scripting language.

2.5.6 MySQL

MySQL is an open-source relational database management system. According to (Ohyver et al., 2019) state that MySql is a rational database server that supports the well-known SQL (Structured Query Language) database language. MySql is an open-source database which reliable and compatible with the major hosting provider.

2.6 System Development Models

Software Development Life Cycle is the application of standard business practices to building software applications. It was accomplished using various models, including Agile and Waterfall. There are advantages and disadvantages in each SDLC model depending on different kinds of situations. Every development model includes activities like requirements gathering and analysis, system analysis, system design, coding, testing, and implementation. The main challenge is to select the best suitable model (Modi et al., 2017).

2.6.1 Waterfall Model

In the waterfall model, we can only go on to the next step after finishing the previous one. A baseline is established after the completion of specific phases, freezing the development's results at that time. If there is a need to change these products, a formal change process is followed to make the change. A waterfall flows downhill when these stages are represented graphically. The waterfall paradigm should not be employed for large-scale projects, claim Modi et al. (2017).

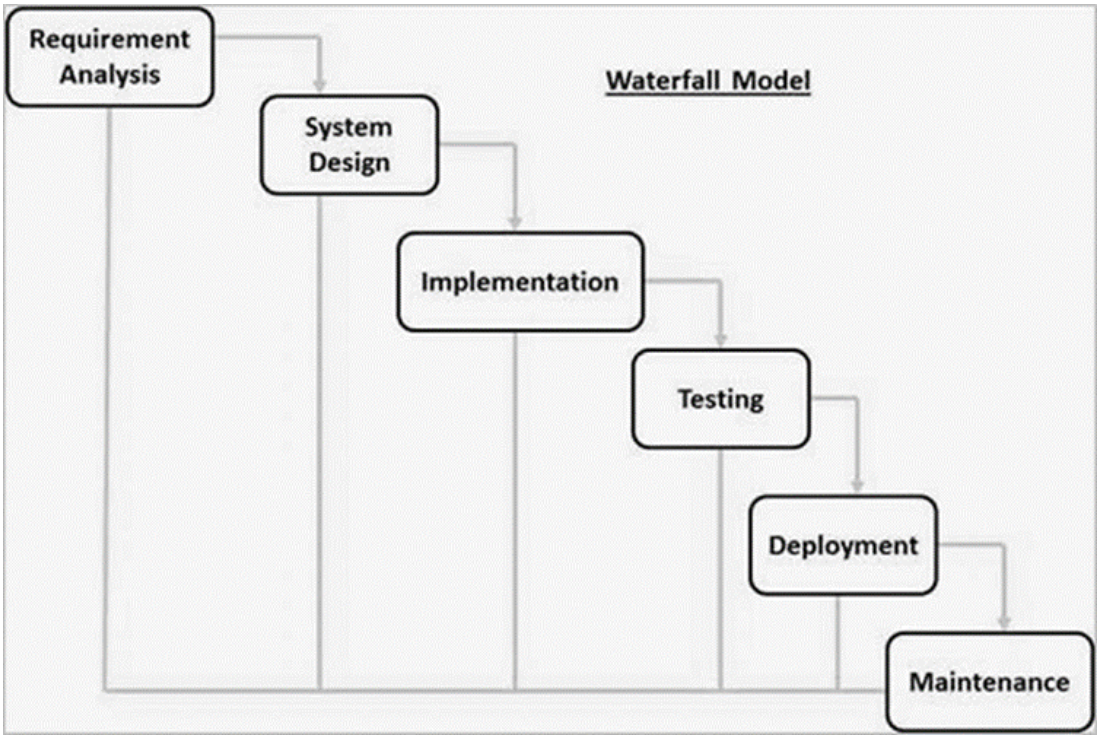


Figure 2.1 waterfall model (Modi et al., 2017)

Requirements gathering and analysis, systems development, systems implementation and coding, testing, deployment, and maintenance are the six stages of the systems development lifecycle, according to Kramer et al. (2018) in the journal "Best practices in systems development lifecycle: an analysis based on the waterfall model".

i. Requirements Gathering and Analysis

Requirements gathering and analysis make up the initial stage. Project planning is started by the project manager. In order to identify the project's methodology, deliverables, and expected outcomes, the organization's requirements both functional and non-functional are obtained, and analysis of those needs starts. To ascertain who would use the system and how business requirements are obtained. Users are currently contributing best practices, as well as their needs and desires.

ii. Systems Development

Systems development is the second step. The comprehensive requirements are transformed into a finished detailed systems design at this level. The main

elements and their interaction are described in this design. It focuses on how to provide the system with the necessary functionality (must-haves and wish-list items). The first stage's criteria are used by the business architects to create a number of product designs. This stage's outcome is a description of how the application must be developed.

iii. Systems Implementation and Coding

Systems implementation and coding make up the third step. Convert the collection and analysis of requirements into system development, system implementation, and system coding. In order for the developers to apply the design and create the application, thorough and precise documentation and mapping are required. The Systems Development Lifecycle process's stage might be the longest. The developers write the code in this step using information from the previous two phases and the approved design.

iv. Testing

Testing is the fourth step. Testing may start after the application has been created. To confirm that the code complies with the requirements, the application will be tested using the specs. To ensure that the application performs as intended, integration testing is required. Another great practice that has to be used is this one. Verification of the modifications to the application should be performed by the Business Architect or Analyst who provided the design specifications. It must be returned to the developer if expectations have not been reached so that any problems may be fixed.

v. Deployment

The deployment step is the sixth. After going through testing, the application is now prepared for deployment after being thoroughly validated and confirmed. A smart practice is to load the program on a test machine before deploying it. As a result, a backup plan is required in the event that the application or data translation fails. Other systems may suffer problems as a result of this. Be able to back out the program or have a backup. The final consumer must confirm that the product

truly satisfies their demands and that the original specs were accurate. In other words, show that the product works as intended when used in the appropriate setting.

vi. System Operations and Maintenance

System operations and maintenance are the final phases. At this point, the application is complete, and the process improvement is complete. The end users will have questions, therefore be prepared to have technical and procedural specialists ready to address any further inquiries. Maintain an open issues log for any pending problems. This is the moment to fix any non-critical flaws that may still exist. Make sure these problems aren't upgrades that the project owner must approve.

2.6.2 Agile Model

According to (Venkatesh et al., 2020), the Agile method is a very important approach for developing small to medium-scale systems where Agile can improve the quality of a product. Agile is an iterative approach to project management and software development that helps developers deliver value to their customers faster. Needs, plans and decisions are evaluated on an ongoing basis so that developers have a natural mechanism to respond to change quickly. Agility is not defined by a set of rituals or special development techniques. Conversely, Agile is a group of methodologies that demonstrate a commitment to a rigorous feedback cycle and continuous improvement. Agile selections are taken so that they can respond to changes in the market or feedback from customers quickly without compromising a year's worth of plans. Planning and delivery in small and frequent increments allow developers to gather feedback on each change and integrate it into future plans at a minimal cost. Each developer sets their own standards for quality, usability and perfection.

Agile methodologies are approaches to product development that are aligned with the values and principles described in the Agile Manifesto for software development. Agile methodologies aim to deliver the right product, with incremental and frequent

delivery of small chunks of functionality, through small cross-functional self-organizing teams, enabling frequent customer feedback and course correction as needed.

In doing so, Agile aims to right the challenges faced by the traditional "waterfall" approaches of delivering large products in long periods of time, during which customer requirements frequently change, resulting in the wrong products being delivered.

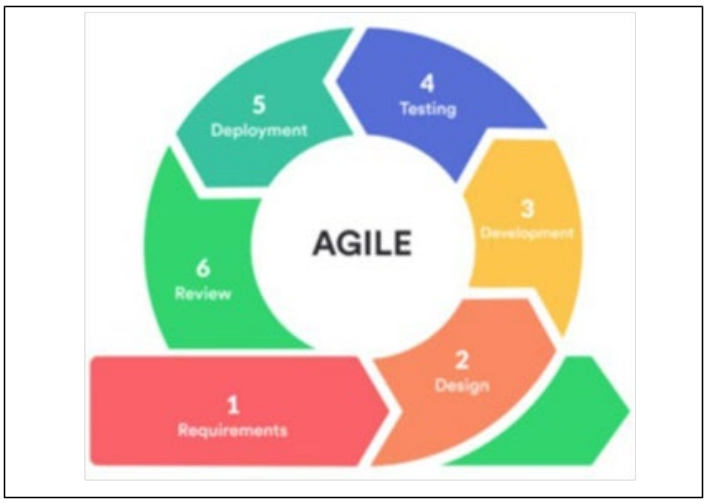


Figure 2.2 Agile model

2.6.3 Comparison between Waterfall and Agile

Agile and Waterfall are two well-known project management methodologies. Both of them are popular in software development, but each is best suited for different types of projects. The main difference is that Waterfall is a linear system of working that requires the team to complete each project phase before moving on to the next one, while Agile encourages the team to work simultaneously on different phases of the project.

Agile and Waterfall models are two different methods for the software development process. Though they are different in their approach, both methods are useful at times, depending on the requirement and the type of the project.

Table 2.2 Comparison between Waterfall and Agile

Agile	Waterfall
Agile is open to adaptation, encourages experimentation and welcomes changes of direction, even in later phases of the project. Because of this, the budget tends to be more flexible.	The budget for projects using the Waterfall methodology is generally fixed. Because the project is determined from start to finish, there is less room to change the budget mid-project.
The development process is iterative, and projects are implemented in a short period of time.	The development process is phased, and the phase is much bigger than the iteration.
An error can be fixed in the middle of the project.	Only at the end the whole product is tested. If the requirement error is found or any changes have to be made, the project has to start from the beginning.

2.7 Similar Existing System

In this section, researchers will analyze, diagnose, and discuss existing systems similar to the E-logbook system for postgraduate research students. Similar existing systems are intended to help researchers to complete the proposed system. Some of the existing similar systems include RIMS and UAEU-iWIL, which have similar features to the system to be developed.

2.7.1 Research Integrated Management System (RIMS)

Research Integrated Management System is a system for monitoring the activities of postgraduate research students used by Universiti Pendidikan Sultan Idris (UPSI). RIMS is used by two important users, namely students who will record each research activity while the supervisor will monitor through this system. Figure 2.3 shows the homepage for the Research Integrated Management System (RIMS), where the user must log into the system before using it. This system requires students to enter the details of their research activities then the supervisor will verify the details. RIMS is a real-time system where every information that students enter, the supervisor will see at that time as well. In addition, in this system, students can also generate their research activity reports.

Figure 2.3 RIMS homepage

2.7.2 United Arab Emirates University Internship and Work Integrated Learning System (UAEU-iWIL)

UAEU-iWIL is an online system that simplifies the training process for students. Students can register for their internships and fill out their weekly reports. The academic advisor will monitor student progress through an online system and evaluate weekly progress reports. In addition, it also facilitates the preparation of faculty visits and coordination of visits, as well as industry registration and job posting. Figure 2.4 shows the UAEU-iWIL homepage.

Figure 2.4 UAEU-iWIL homepage

2.8 Implication

After doing the literature review to acquire the data that can potentially be useful for the project, this part addresses the implications of the review. The literature study has a number of consequences, nevertheless, that have an impact on how the project is developed. Journals, books, papers, websites, and other online materials provide the foundation of the research study.

The eight golden laws of interface design have been chosen as theories supporting the proposed system. Five of the eight golden rules will be used in the proposed system, and they can help with system design and development. In addition, research efforts are guided by system development models. The E-logbook system has been designed using an Agile model, and it fulfils the intended goal of enabling postgraduate students to follow the flow of the process from needs analysis to the maintenance phase.

For a similar existing system, several qualities or characteristics are used for similar existing research. Important features of the existing system will be used in the proposed system. Among them are the functions of recording, reporting, and monitoring. Through these functions will make the eLogbook system for postgraduate research students as a good system.

2.9 Conclusion

To conclude, a literature review is an assessment of information that has been published based on earlier investigations by academics in the field of study. For a better understanding of the motivations for and strategies for developing the proposed system, research on E-logbooks has been conducted. Additionally, this project will make use of the eight golden rules of interface design theory. This project will use the Waterfall methodology to ensure that it can be finished on time. Finally, the features obtained from the relevant existing system analysis will be used to construct the proposed system.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discusses the method or technique that is relevant to adapt in the development of the E-Logbook System for Postgraduate Research Students (ESPRES). By implementing research methodology, the researcher knows how to be conducted, the main ideas and method used, and why the research was conducted. The Adapted Waterfall model is selected as the guidelines for developing Postgraduate E-Logbook System. The phases of the development process also were illustrated in this chapter.

3.2 Project Development Methodology

The Project Development Methodology describes a collection of approaches, strategies, guidelines, procedures, and activities used in a project. The methodology works as a guideline for the developer to develop the proposed system. It is also used to enhance, monitor as well as standardize the development process by specifying the activities to be carried out and the method to be used.

The project development methodology in developing the system will apply the adapted Waterfall Model. The Waterfall Model is a sequential software development process, where progress is seen as flowing downwards like a waterfall, through the phases of requirements gathering, analysis, design, implementation, testing, and maintenance. Unlike the Agile Model, the Waterfall Model follows a linear and sequential approach with limited feedback loops between the different phases of development. The focus of the Waterfall Model is to complete one phase before moving on to the next phase.

There are six phases in the development of the proposed system, which includes requirement analysis, design, development, testing, and documentation. Figure 3.1 shows the process flow of the Waterfall Model.

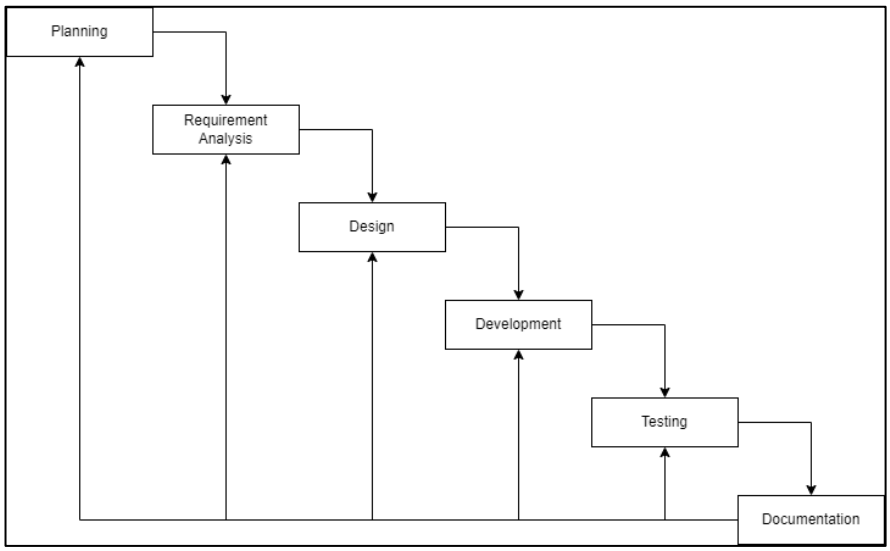


Figure 3.1 Adapted Waterfall model

The project framework of the ESPRES in Waterfall comprises six phases: planning, requirement analysis, design, development, testing, and documentation. One stage's outcome is the input for the next phase means that any development process can only be started once the previous stage has been completed. Activities in each stage need to be systematic and well planned before the research can be conducted. The project framework for this whole project contains planning, analysis, design, development, testing and evaluation and documentation phases. Table 3.1 shows the project framework.

Table 3.1 Project framework

No	Phase	Activities	Outcome
1	Planning	• Discuss the project title. • Identify the flow of the process of current logbook process. • Conduct an interview with postgraduate research student and supervisor. • Identify the problem based on the current business process.	• The project title is ESPRES. • The flow of the current business process. • The business problem statement. • Chapter 1

2	Requirement Analysis	• Literature review • Define user requirements for ESPRES. • Define system requirements for ESPRES.	• User requirement. • System requirement. • Chapter 2
3	Design	• Design Context Diagram for ESPRES. • Design Data Flow Diagram for ESPRES. • Design Entity Relationship Diagram for ESPRES.	• Context Diagram • Data Flow Diagram • Entity Relationship Diagram • Site Map • Chapter 3
4	Development	• Develop an e-logbook system for postgraduate research students.	• Complete system
5	Testing	• Test system functionality and usability of ESPRES.	• Functionality result • Chapter 4
6	Documentation	• Compiling and refining a complete research report	• Final research report

3.3 Planning

The first step in the planning process is to discuss names for the system. The discussion then shifts to problem-solving, choosing an objective, and defining the project scope, importance, and framework, which clarifies the Waterfall model process, after settling on the project's title and theoretical approach. To have a better understanding, existing systems are examined, inspected, and their restrictions and limits are gathered. The information is gathered, and the project's name is decided after discussing with the project supervisor.

3.3.1 Gantt Chart

The flow of the activities is scheduled in the Gantt chart to make sure this project is to be able to complete within the period. This project takes about 12 months beginning in April 2022 and expected to end in February 2023. The figure below depicts the project planning activities for this project, and it is simple to handle planning and scheduling with the Gantt chart. The visual form of these charts also makes it easier to define mutually agreed-upon goals and work together to attain them. There are six

phases, planning, analysis, design, development, testing, and documentation, that need to be highlighted and followed as a guideline to complete the project.

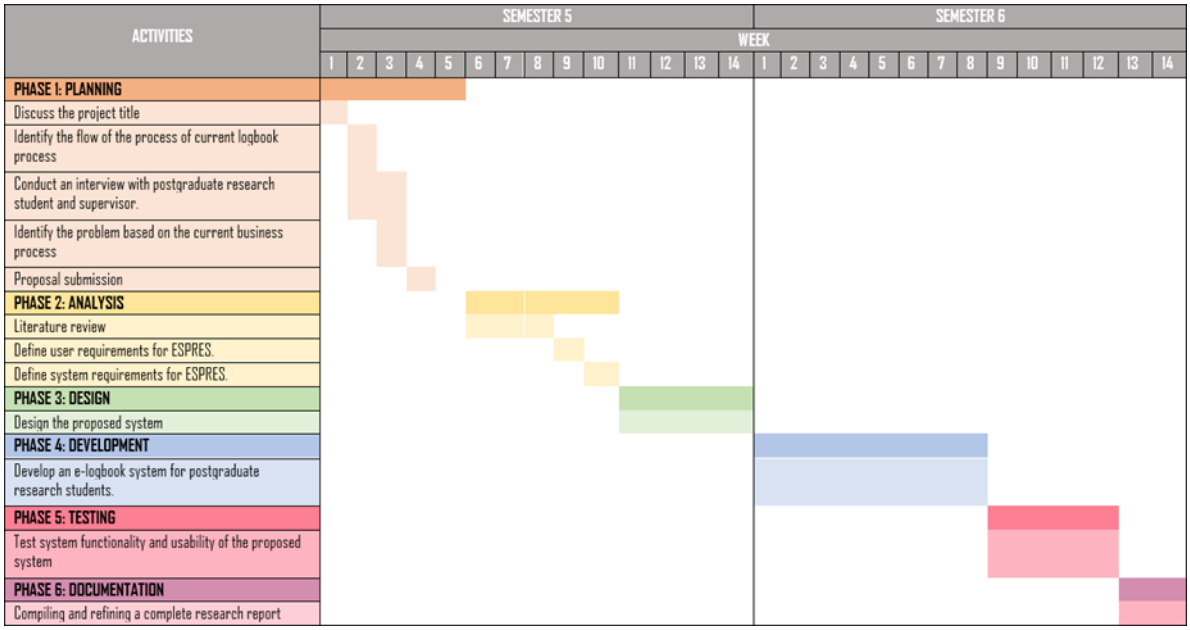


Figure 3.2 Gantt Chart

3.4 Requirement Analysis

The outcome of the Requirements Analysis phase is a comprehensive and detailed requirements specification document that serves as the basis for the rest of the development process. This phase is used to guide the design, development, testing, and evaluation of the project. It's important that the Requirements Analysis phase sets the foundation for the entire project and its success. If the requirements are not well-defined, the risk of misunderstandings, delays, and rework increases, leading to increased costs and a longer development time.

3.4.1 Analysis

The analysis phase involves identifying the functional and non-functional requirements and user requirements. These requirements are usually defined during the interview session, observation from the similar existing system and online journals or materials from articles. Table 3.2 until 3.5 shows the functional and non- functional

requirements and user requirements for student, supervisor, and postgraduate studies officer.

Table 3.2 Functional and Non-Functional Requirements

Functional Requirement	Non-functional Requirement
1. Students and supervisors can access the system. 2. The system allows the student to view the personal detail. 3. The system will send a notification to students if the total of meeting hours is insufficient. 4. The system will allow adding a new user 5. The system will enable the supervisor to verify the student's progress. 6. The system will calculate the total of meeting hours. 7. The system will allow the student to update the latest progress. 8. The system will allow the supervisor to view student information. 9. The system will generate the report.	1. Security requirement (users can log in to system by using ID) 2. Reliability requirement (the system is available 24 hours a day) 3. Usability requirement (good internet connection is required to access the system)

Table 3.3 User Requirement for Student

No	User Requirement
1	The system allows the student to login to the system by using an ID and password.
2	The system enables the student to view and manage personal data such as password, name, address, and telephone numbers.
3	The system allows the student to insert the information meeting into the system.
4	The system will calculate the total of meeting hour.
5	The system allows student to attach file for research progress.
6	The system will send a notification to students if the total of meeting hours is insufficient.
7	The system allows student to generate the report.

Table 3.4 User Requirement for Supervisor

No	User Requirement
1	The system allows the supervisor to login to the system by using an ID and password.
2	The system will allow the supervisor to view student information.
3	The system will enable supervisor to verify the student progress.
4	The system allows to view the student report.

Table 3.5 User Requirement for Postgraduate Studies Officer

No	User Requirement
1	The system allows to login to the system by using an ID and password.
2	The system will allow to view student information.
3	The system will enable to view student logbook.
4	The system allows to view the student report.

3.5 Design

After gathering all the requirements for the proposed system, move on to the design step. Several diagrams, including the context diagram, data flow diagram (DFD), entity relationship diagram (ERD), site map, and user interface design, are included in this phase. The design phase's goals are to give a clear picture of how the proposed system will function at the end of a project.

3.5.1 Context Diagram (CD)

Context diagrams are the highest level for data flow diagrams. The context diagram presents the scope and boundaries of the system. This is the first diagram that needs to be drawn in the process of preparing a data flow diagram for the system. There are three entities involved in the E-Logbook System for Postgraduate Research Students. The first is a student who is a postgraduate research student, who will use this system for the purpose of recording their meetings with the supervisor. Next, the supervisor will use this system to monitor the progress of their students. The third is postgraduate studies officer, where they will use this system to assess and monitor the progress of postgraduate research students.

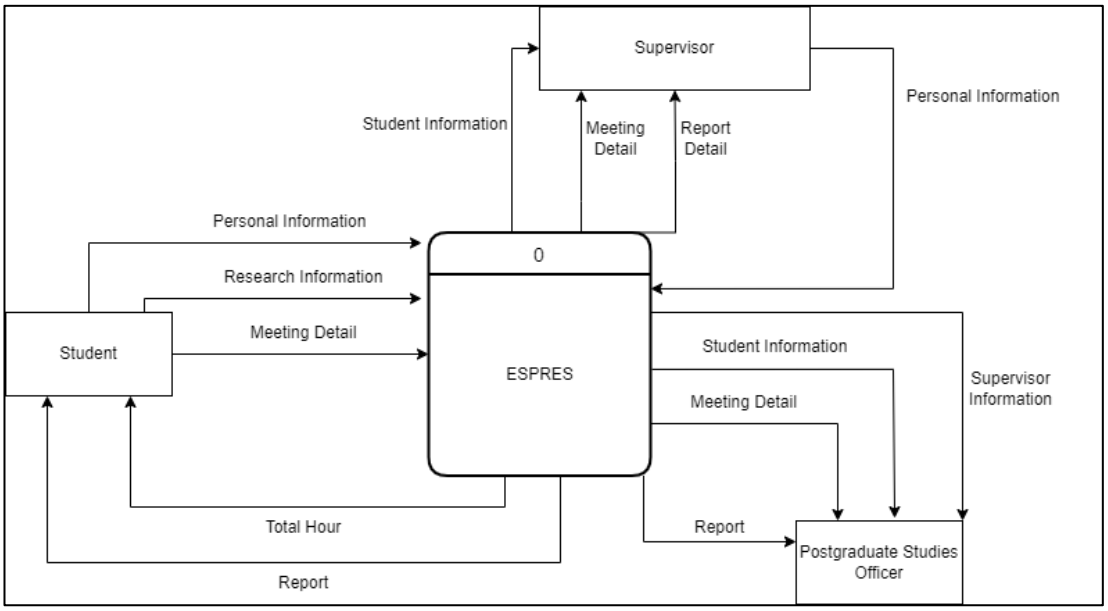


Figure 3.3 Context Diagram of E-Logbook System for Postgraduate Research Students.

3.5.2 Data Flow Diagram (DFD)

Data Flow Diagrams (DFDs) are useful as a sketch that explore how a system and its elements can be exploited. Its simplicity makes it possible for different people with different levels of expertise to contribute to system security analysis as it evolves. DFD is used to graphically illustrate data flow in a business information system. DFD describes the processes involved in a system to transfer data from input to file storage and generate a report.

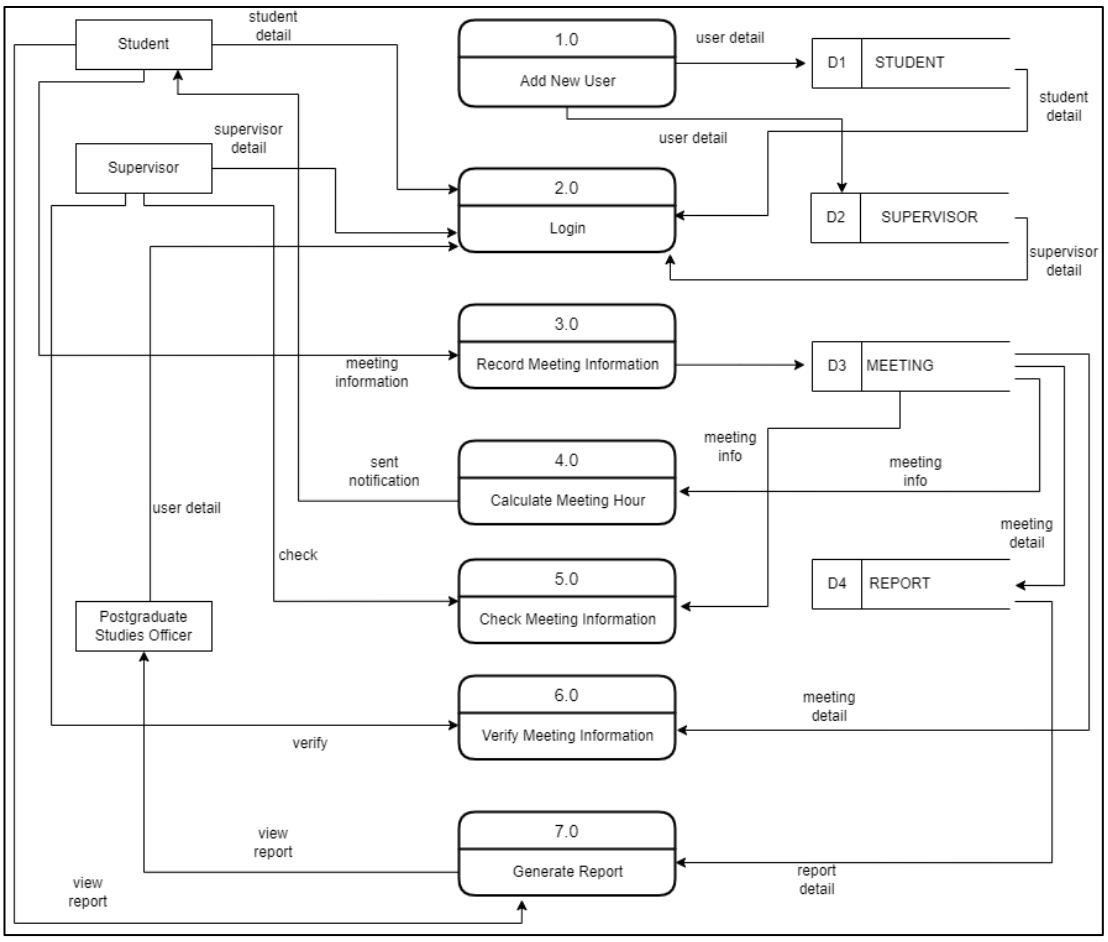


Figure 3.4 Data Flow Diagram of E-Logbook System for Postgraduate Research Students

3.5.3 Entity Relationship Diagram (ERD)

The Entity Relationship Diagram (ERD) describe how the entities are related to each other through the relationship type. The ERD for the E-Logbook System for Postgraduate Research Students has already been designed, as the Figure below. Based

on the ERD diagram below, there are five tables that involve in the system, which are student, supervisor, meeting, report, and postgraduate studies officer. Figure 3.5 below shows the ERD for Postgraduate e-logbook system.

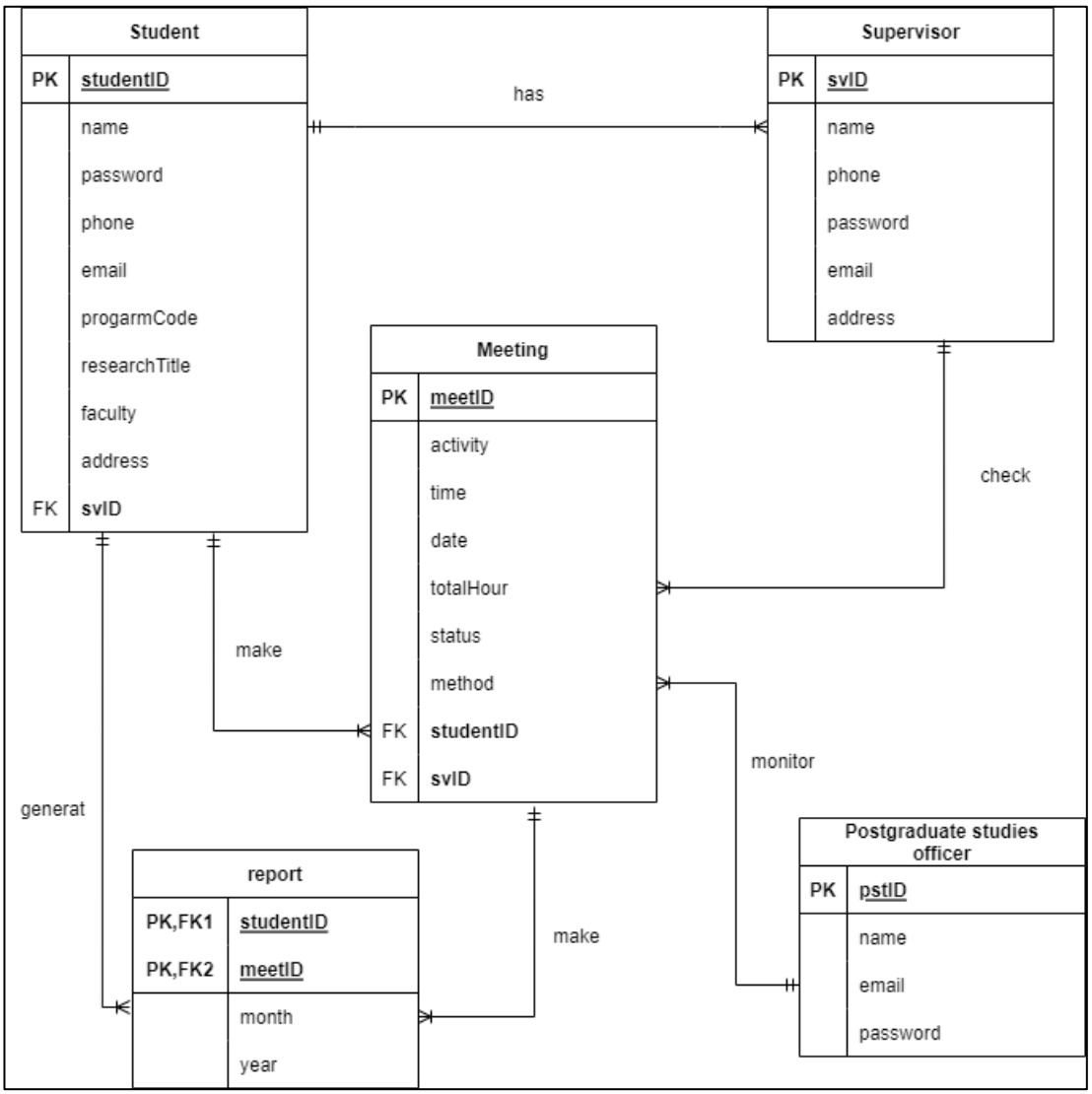


Figure 3.5 Entity Relationship Diagram of E-Logbook System for Postgraduate Research Students

Furthermore, the information of each table is created to explain the attributes of the entities in ERD. The table information of each table gives a clear explanation of the information or data that can be stored in the database structure. Table 3.6 below shows the example information for entities and attributes. The table contains the attribute names, the description of the attribute, the data type that has been used to declare the attributes and the data sample in the database.

Table 3.6 Table of entities and attributes information for student

Field	Description	Data Type	Sample of Data
student_id	Student ID number	Integer (11)	2022189765
name	Student full name	Varchar (50)	Ahmad Faisal
password	Student password	Varchar (10)	Abc123
phone	Student phone number	Varchar (11)	0123456789
address	Student address	Varchar (50)	Kuala Terengganu
faculty	Student faculty	Varchar (20)	FSKM
email	Student email	Varchar (20)	ahmad@gmail.com
program code	Student program code	Varchar (20)	CS264
research title	Research title	Varchar (20)	ESPRES

3.5.4 Site Map

The site map is a diagram that represents all the functions each of the users can perform in the proposed system. Each level in the hierarchy indicates the different tasks or functionalities of the project. Figure 3.6 below shows the Site Map for the user of E-Logbook System for Postgraduate Research Students, which is Student, Supervisor and Postgraduate studies officer.

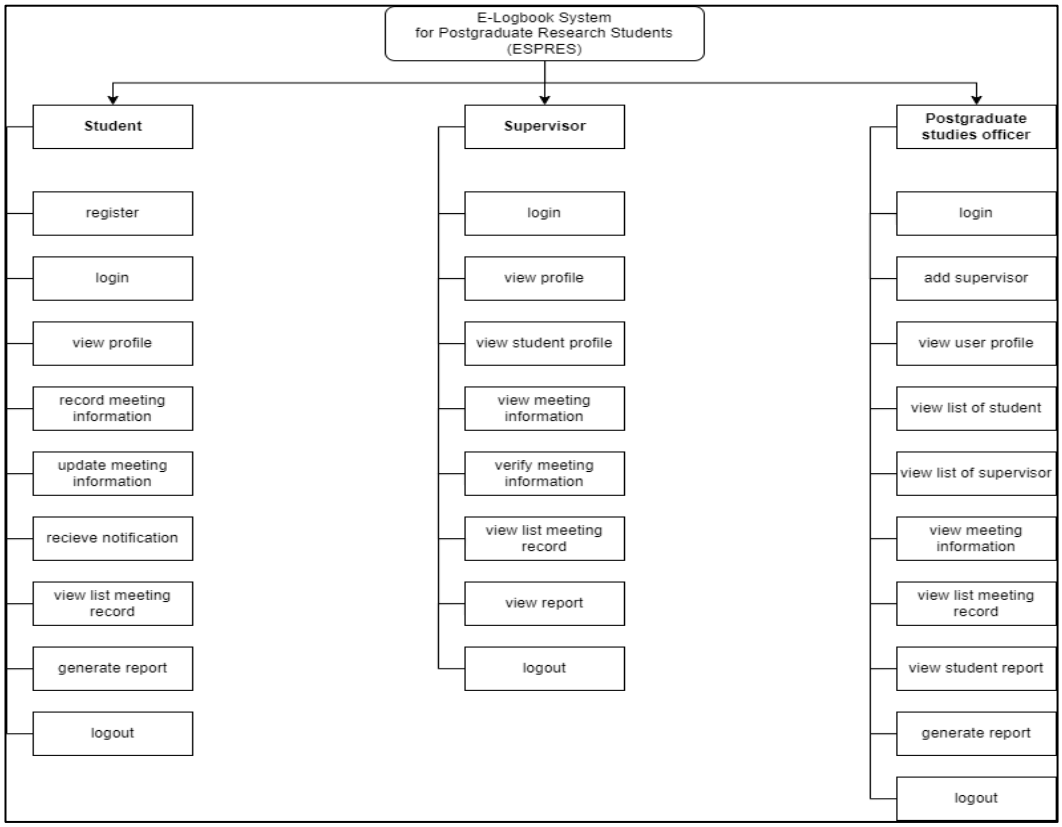


Figure 3.6 Site map Diagram of E-Logbook System for Postgraduate Research Students.

3.5.5 Interface design

The system interface is the relationship between users and information. The theme that was proposed initially consisted of a minimalist design in order to balance aesthetic design with functionality. The figure below shows an example of a user's interface after they log in to the system.

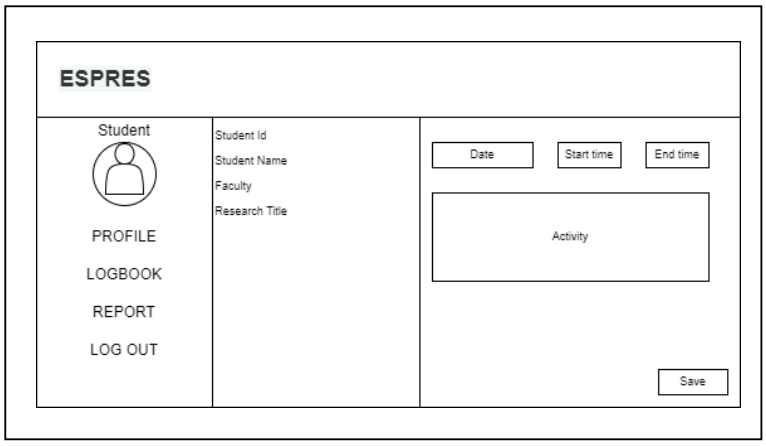


Figure 3.7 interface for student.

Figure 3.7 above shows a sample user interface for students. On the sidebar on the left, there is navigation that allows users to link to the desired page, such as profile, logbook, report and log out. In addition, at the top of the sidebar, there is also a picture, name and user ID number. In the middle of the page is a space for students to fill in meeting information, and then the information can be saved into the system by clicking on the save button.

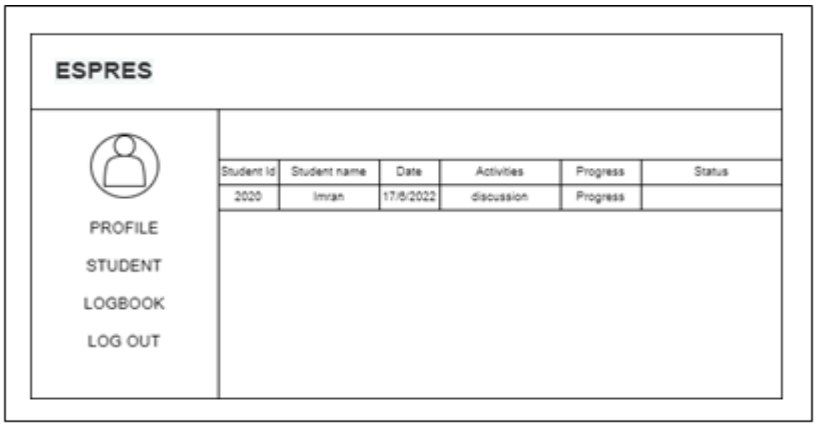


Figure 3.8 interface for supervisor.

Figure 3.8 shows an example of a user interface for a supervisor. On the left, there are four menus, namely profile, student, logbook, and logout. For the supervisor interface, there are two important functions, namely, students view, student details and a logbook where supervisors can monitor the progress of their students. If supervisors want to see student details, they can go to the student section, and all student details will come out. For supervisors to see the progress of students just need to go to the logbook, and the system will display the progress of their students and to verify them, just click the verify button on the action section.

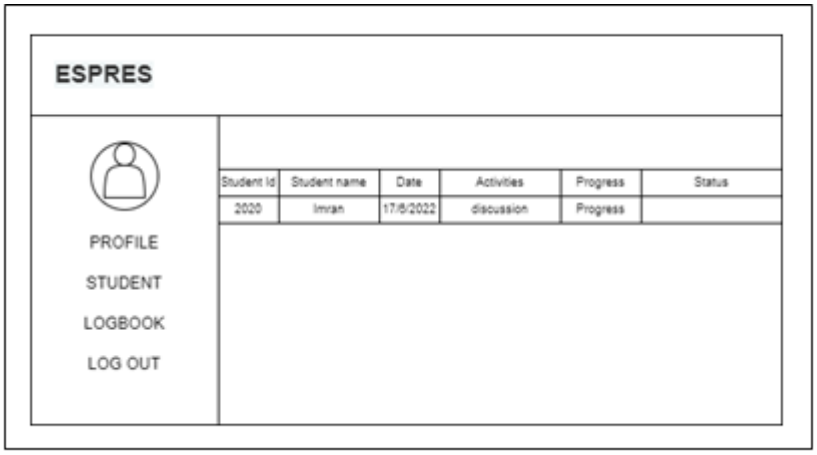


Figure 3.9 interface for Postgraduate Studies Officer.

Figure 3.9 shows an example of a user interface for postgraduate studies officer. The postgraduate studies officer interface has a similar design to the supervisor but has different main functions. For postgraduate studies officer, they have a function to view student details. In addition, they also have the same function as the supervisor, which is to see the progress of students. Through this function, postgraduate studies officer can evaluate the performance of students by looking at all the progress that has been achieved throughout their research.

3.6 System Development

The development phase is the longest phase of the Waterfall model. In this phase, the code is produced, and it is the main focus of the developer to produce a well-

functioning system. All the information is collected in the planning phase and used to develop the actual system according to the design phase. The hardware and software requirements for developing E-Logbook System for Postgraduate Research Students are essential at this stage.

Hardware specification has an important role in this project development. This is because the hardware or the devices were used during the development phase. Computer and Laptop hardware was used in the development process. Table 3.7 below shows the hardware specification needed to develop the Postgraduate e- logbook system.

Table 3.7 Hardware Specification for develop system.

No.	Hardware	Specification
1	Laptop	Hp
2	Processor	Intel(R) Core(TM) i5-6200U CPU @ 2.30GHz 2.40 GHz
3	RAM	8GB
4	Operating System	Microsoft Windows 10

In the software requirements specification, the E-Logbook System for Postgraduate Research Students used Microsoft Word, Draw.io, PhpMyAdmin, and Visual Studio Code to develop this project. The coding language used to develop this project in PHP, HTML, CSS and JavaScript. Visual Studio Code is the software that is used as a platform to write the coding and the programming language of the proposed system. Table 3.8 shows the description of software specifications for Postgraduate e-logbook system.

Table 3.8 Software Specification for develop system.

No.	Software	Description
1	PhpMyAdmin	To manage the database of the system
2	Visual Studio Code	To develop the code of the system
3	Draw.io	To design a figure for Postgraduate E-Logbook System
4	Microsoft Word	To make documentation for the project

3.7 Testing and Evaluation

This step is very important to ensure that the E-Logbook System for Postgraduate Research Students functions well in the future without any problems. The developer will initially test the system using the test plan for the student and supervisor to record the findings. Furthermore, user evaluation is also included in this phase which consists of an expert user and other user evaluations. The testing and evaluation phase focuses on the functionality and usability of the proposed system. This testing phase will use Test Plan.

3.6.1 Test Plan

Testing has always been one of the most important activities in system development to ensure the quality, functionality and reliability of the software developed. According to (Bozic et al., 2019), the main objective of the tests performed is to ensure that the software meets the specifications. Specifications are made prior to software development based on software requirements. Among the things that will be tested is the function of the system developed. For this developed system, the researcher will give the user to test in terms of the functions available in this system. The table below shows the test plan for the user.

Table 3.9 Test Plan for Student

No	System Requirement	Developer	Tester
1	Sign up		
2	Log in to the system		
3	View profile		
4	View menu		
5	Fill meeting detail		
6	Get notification of the total meeting hour.		
7	Attach file		
8	View report		
9	View total hour		
10	View total logbook		
11	Log out		

Table 3.10 Test Plan for Supervisor

No	System Requirement	Developer	Tester
1	Log in to the system		
2	View Profile		
3	View student profile		
4	View menu		
5	View meeting detail		
6	View student progress		
7	View student report		
8	Verify the progress		
9	Log out		

Table 3.11 Test Plan for Postgraduate Studies Officer

No	System Requirement	Developer	Tester
1	Log in to the system		
2	View list of students		
3	View list of supervisors		
4	View users' profile		
5	Add new supervisor		
6	Add new student		
7	Delete users		
8	View student detail		
9	View meeting detail		
10	View student progress		
11	View student report		
12	View total student		
13	View total supervisor		
14	Log out		

3.8 System Documentation

The final phase of system development is documentation. This stage was a process where all the information in the system would be combined into one report after the project was completed. Besides, system documentation provides the flow of the project and references to the user about the eLogbook system for postgraduate research student. Therefore, the documentation needs to create for an explicit purpose and can be understood by those who will read it in future use. The documentation is produced

to ensure all the important information is not missing, and it is easy for the developer to track down an error that needs to be improved in the future.

3.9 Conclusion

To conclude, this chapter has explained the overall process of research methodology. The methodology selected to develop the E-Logbook System for Postgraduate Research Students (ESPRES) is the adapted Waterfall model. The development model consists of six phases: planning, requirement analysis, design, development, testing, and documentation. Each phase has activities, tools or techniques, and outcomes for every action carried out. Thus, the design for the system is shown in the form of a diagram which is a Context Diagram, Data Flow Diagram, and Entity Relationship Diagram. Overall, to ensure successful and well-functioning system development, test plans need to be carried out to be implemented.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

The results and findings from the evaluation phase of the E-Logbook System for Postgraduate Research Students are presented in this chapter in detail. This chapter aims to thoroughly assess whether ESPRES meets the needs and expectations of the users and the project objectives. The developer conducted the testing process using comprehensive test cases that covered all the system's functions. The testing was carried out to ensure that the system performs as expected and meets the requirements specified in the project. The chapter's primary goal is to achieve the project's third objective, which is to evaluate the functionality of ESPRES and determine if it can deliver the desired results.

4.2 Result for Objective 1

Objective 1: To Identify current process and problems faced by postgraduate research students in UiTM by using logbooks to record all research activities.

The current method of recording research activities by postgraduate students is a manual process that usually uses Microsoft word. This manual process requires students to manually track each meeting with their supervisor, documenting the discussions and decisions made during these meetings in a word document. However, this method of monitoring research activities is often time-consuming and can lead to inconsistencies or inaccuracies in the information recorded. Additionally, it may be challenging for students to easily access and review their previous meetings and progress, as some of this information is stored in separate documents. The manual

process of recording research activities needs improvement to streamline the process and ensure that all relevant information is captured accurately and on time. To achieve objective 1, the current process needs to be analyzed, and this has been done through an interview with Nor Azila Binti Mohd Johari one of the postgraduate research students.

Table 4.1 interview question

Respondent's Name: Nor Azila Binti Mohd Johari	
Question	**Answer**
Did you use a logbook when you did your research?	Yes, I will usually record all the meeting details in the logbook, such as activities, dates, times, and comments given by the supervisor.
How many times a week do you meet with the supervisor?	The number of meetings is uncertain, depending on the situation, but usually, meetings will be held once a week.
Can you tell me about your study process?	Each postgraduate research student will be guided by a supervisor, and they will often hold joint meetings to discuss research conducted by students. Afterwards, students will record the details of the meeting, including comments given by the supervisor into a logbook. Each student must meet the meeting times set by the management of postgraduate studies. After that, students will submit a meeting report to the management of postgraduate studies for monitoring and evaluation.
Where do you usually record meeting details?	For meeting records, I will usually use Microsoft word because for now I don't think there is any other platform that is suitable for me to use.
Do you feel the way now there is a weakness?	I think it has a weakness in terms of the meeting records I keep, and it would be a problem for me if those records were lost because I only kept them on the computer, and it was hard for me to refer back to them. I think it needs a platform where we can store all the details securely. Also, I think there is no systematic platform for supervisors to monitor students' progress because supervisors can monitor their students' progress only through meetings to see the latest developments of their students.

During the interview sessions conducted, it was revealed that postgraduate research students face several challenges in recording their meeting logbooks with supervisors. The current approach is inadequate and lacks standardization, making it difficult for students to keep track of their meeting records in an organized manner. This manual

process often leads to inefficiencies, such as loss of information, mismanagement of records, and limited accessibility to past meeting logbook. These issues highlight the need for a systematic and streamlined solution to help students manage their meeting logbooks in a more effective and efficient manner.

During the interview session, the requirements necessary for the implementation of the E-Logbook System for Postgraduate Research Students (ESPRES) were also identified. This system aims to provide a more streamlined and efficient method for postgraduate research students to record the meetings they have with their supervisors. The ESPRES system will serve as a central repository for all logbook entries, allowing students to safely store and manage their meeting records without the need for manual processes. With the ESPRES system, the concerns related to missing or lost logbook records can be alleviated, and the postgraduate research students can have peace of mind knowing that all their meeting information is stored securely in the system.

To fulfill user requirements, the E-Logbook System for Postgraduate Research Students (ESPRES) has the capability to automate the calculation of meeting hours and provide notifications to students if the number of hours recorded in a given month falls below the required minimum. This streamlines the process of tracking student progress and ensures that they are meeting the necessary requirements for their research program. The automation of this process also eliminates the risk of human error and provides a more accurate record of student activity, which is crucial for the assessment and evaluation of their research progress.

Lastly, the interview process enables the identification of all the user requirements and needs. This information is crucial in ensuring that the development of the E-Logbook System for Postgraduate Research Students (ESPRES) aligns with the expectations and requirements of its end-users, the postgraduate research students. The outcome of the interview session helps to streamline the development process and ensures that the final product meets the needs of the intended users effectively and efficiently.

4.2.1 Current Process Improvement

In this section, the current manual process of recording logbooks for postgraduate research students at UiTM will be discussed and the problems faced by students will be explained. The improvement that can be achieved through the implementation of the E-Logbook System for Postgraduate Research Students (ESPRES) will also be compared. ESPRES aims to overcome the current problem by providing a centralized and automated system for students, supervisor, and postgraduate studies management.

The current process of recording all details related to postgraduate research can be improved with the implementation of the E-Logbook System for Postgraduate Research Students (ESPRES). Under the current manual process, students typically use Microsoft Word to record all details of their meetings with supervisors. However, his method is prone to inefficiencies and can lead to a number of problems, including the risk of losing important information if the document is not properly backed up. The ESPRES system, on the other hand, offers a more organized and efficient approach to the record process for postgraduate research students. With ESPRES, students will have a secure digital platform to record all details of their meetings with supervisors and other relevant information, ensuring that important details are not lost and can be easily retrieved when needed. The implementation of ESPRES will streamline the record process for postgraduate research students, making it more efficient and reducing the risk of losing important information.

Every student has to submit a report of their meeting with the supervisor every month. The current manual process of submitting meeting reports to the postgraduate studies management and supervisors at the end of each month can be time-consuming and prone to errors. With the E-Logbook System for Postgraduate Research Students (ESPRES), this task can be made more organized and efficient. ESPRES will provide a systematic way for students to compile and submit their meeting reports, allowing the postgraduate studies management and supervisors to easily access and review the reports. This can help streamline the evaluation and monitoring process, as well as improve communication between students, postgraduate studies management, and supervisors.

The current process of recording the details of meetings between postgraduate research students and their supervisors using platforms such as Microsoft Word can lead to several issues, one of which is the risk of losing the records. This is a concerning problem as these records are vital for submission as proof of the meetings. If the records are lost, students are required to recreate and re-record all the details of their meetings, leading to a loss of time and effort. The implementation of the E-Logbook System for Postgraduate Research Students (ESPRES) would provide a solution to this problem by providing a centralized, organized, and secure platform for recording these details, reducing the risk of losing the records and improving the overall efficiency of the process.

Table 4.2 the current process improvement of ESPRES.

Process	Before	After
Record process	• Students need to record their meeting details in a logbook for monitoring purposes. • Students will often use something like Microsoft Word as a place where they save meeting details with supervisors.	• Students can record all meeting details in the system. • Students can view their record history. • Students can edit meeting details that have been saved.
Monitoring process	• At the end of each month, students must send their reports for monitoring purposes. • The report will usually contain the meeting hours with the supervisor, activity, and date. • Each student must meet the set number of hours.	• Supervisors and postgraduate studies management can directly see students' progress without having to wait for them to submit reports. • The supervisor can see the details that the student in the system has recorded.
Data safety	• Meeting information is stored on a laptop or PC. • There is no guarantee of data safety if it is lost.	• All data is stored in the system safely. • Can avoid losing stored data.

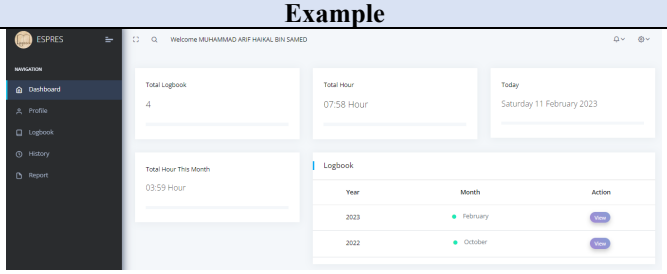
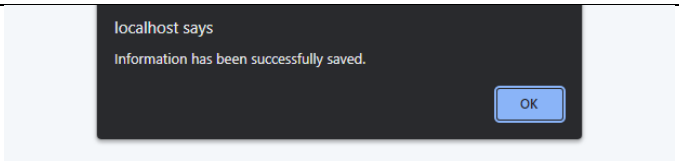
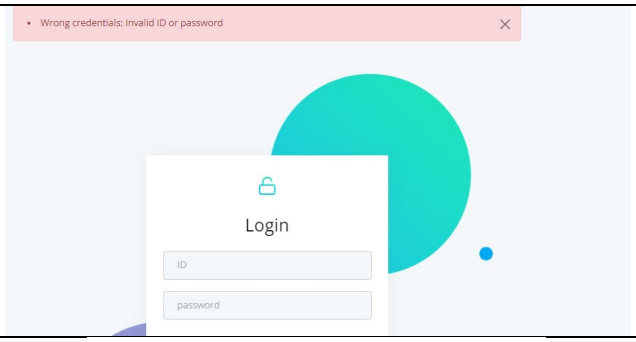
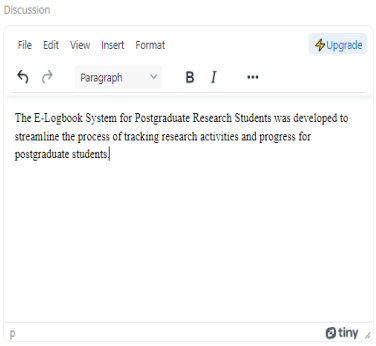
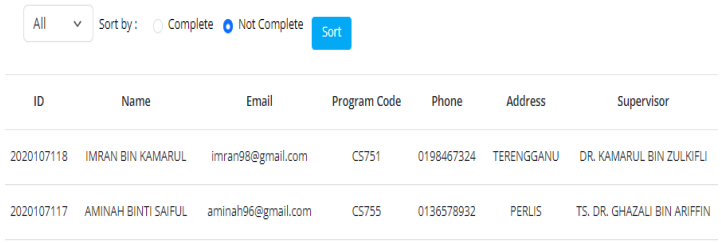
4.3 Result for Objective 2

Objective 2: To design and develop the E-Logbook System for Postgraduate Research Students.

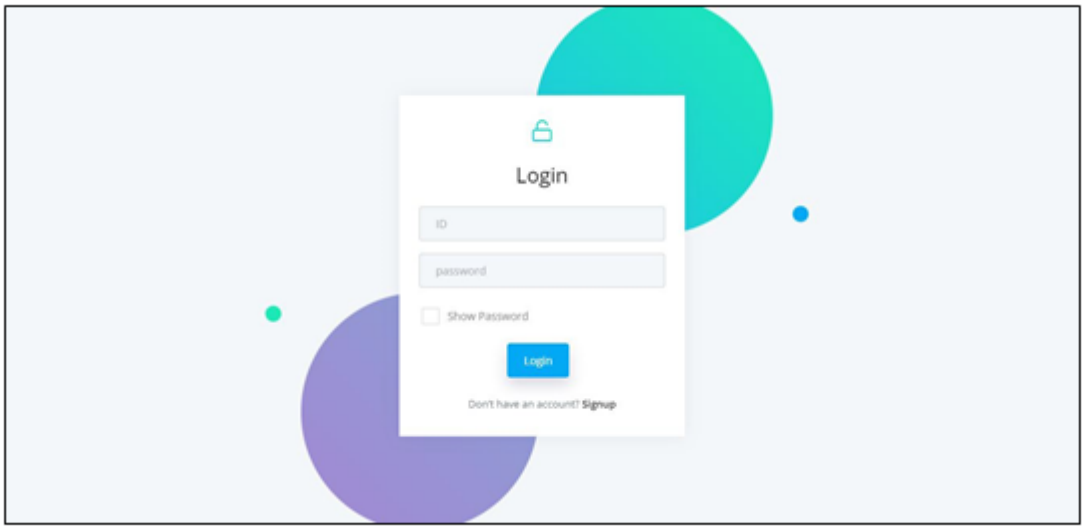
The design and development of the E-Logbook System for Postgraduate Research Students (ESPRES) have been thoroughly discussed in Chapter 3. The choice of using the waterfall model as the development model has been made based on its sequential and linear approach that allows for a clear and organized development process. The waterfall model enables the ESPRES development to proceed step-by-step, ensuring that each phase of the development process is completed before proceeding to the next one. This method helps ensure that the system is built to meet the requirements of postgraduate research students as described in the requirement elicitation and analysis phase. The sequential approach also provides a clear visual representation of the development progress, which helps keep the project on track and on schedule.

Eight Golden Rules of Interface Design is used as the theory for this project. However, only five of the theory will be applied to develop this of E-Logbook System for Postgraduate Research Students. This theory helps the process of developing the system become easier as it provides the guidelines for the developer to follow throughout the development process. Table 4.3 shows the implementation of the theory in the ESPRES.

Table 4.3 Implementation of Theory

Rules	Example	Description
Strive for Consistency		The system interface uses consistent language, icons, and navigation elements throughout.
Design Dialog to Yield Closure		The interface guides users through a task and provides a clear conclusion or next step.
Offer Simple Error Handling		The interface helps users recover from errors and provide simple error messages.
Enable Frequent Users to Use Shortcuts		The system allow users to perform tasks quickly and efficiently through keyboard shortcuts or other means.
Support Internal Locus of Control		The interface gives users control over their experience and the pace of the interaction.

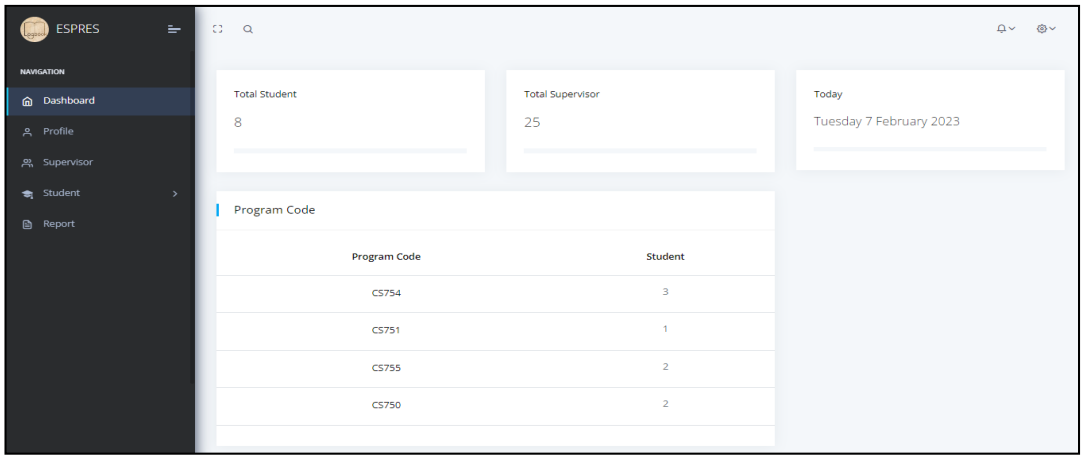
The E-Logbook System for Postgraduate Research Students was developed to streamline the process of tracking research activities and progress for postgraduate students. With a focus on organization and efficiency, the system was created using an adapted waterfall model and includes measures to secure stored records. ESPRES also makes it easier for supervisors and management to monitor student progress, ensuring that they are consistently making progress in their research. This system is a valuable addition to the field of postgraduate research and has the potential to impact postgraduate students positively. Figures 4.1 below show the login page.



Figures 4.1 login page.

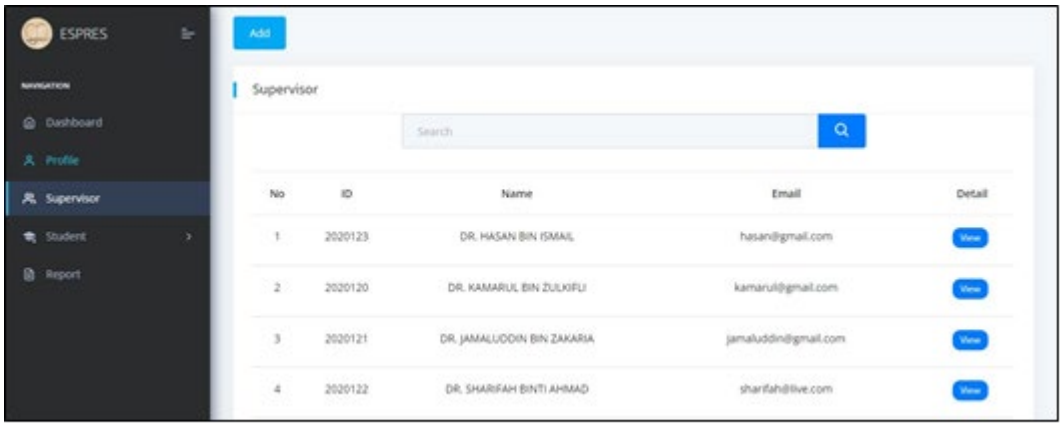
4.4.1 Postgraduate Studies Officer

The figure 4.2 displays the dashboard that the postgraduate studies officer will see upon accessing the system. This dashboard provides the postgraduate studies officer with access to several sections that they can manage, including those for supervisors and students. Additionally, the dashboard displays the total number of users currently using the system. The main purpose of the dashboard is to give the postgraduate studies officer a comprehensive overview of the system, enabling them to effectively manage various parts of the system. The dashboard is designed to be user-friendly and easy to navigate, making it simple for the postgraduate studies officer to efficiently carry out their responsibilities.



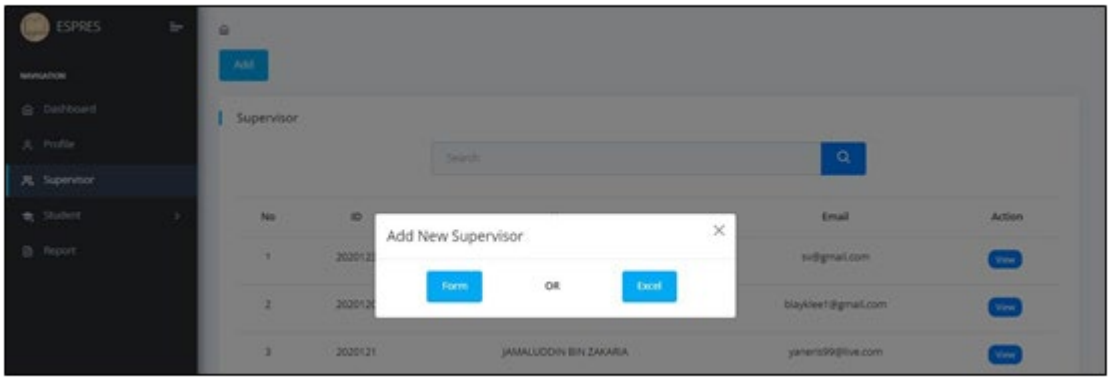
Figures 4.2 Dashboard Postgraduate Studies Officer.

The figure 4.3 below displays the supervisor list page, which is accessible to the postgraduate studies officer. This page provides an overview of all the supervisors that are currently available in the system. The postgraduate studies officer can easily navigate through the list of supervisors to find the one they need. The search bar at the top of the page provides the added convenience of being able to search for the desired supervisor by simply entering their name or ID. This feature ensures that the postgraduate studies officer can access the information they need quickly and efficiently, streamlining the process of managing and overseeing the supervision process.

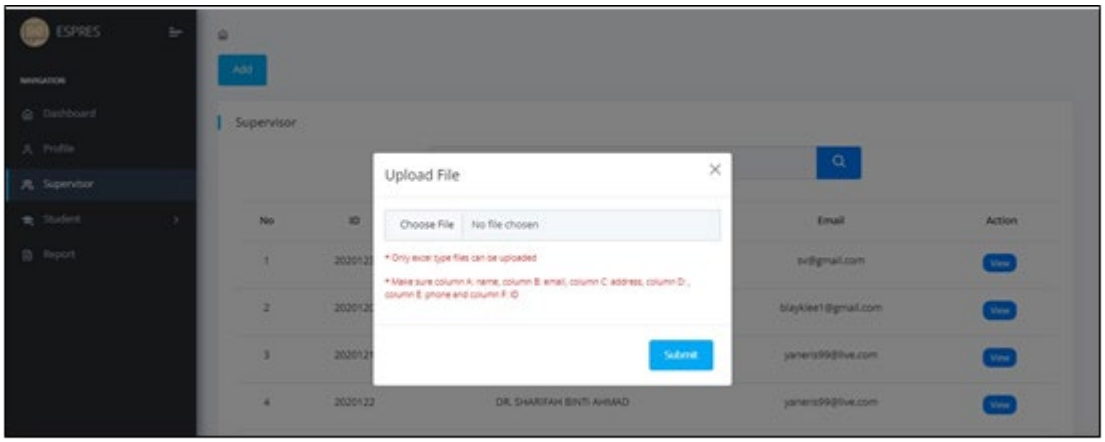


Figures 4.3 Supervisor List Page.

Figure 4.4 below shows the popup where the postgraduate studies officer can add a new supervisor to the system. There are two methods to add a new supervisor: by uploading an excel file or by filling out a form. Figure 4.5 shows the option to upload an excel file to add a supervisor, which allows the postgraduate studies officer to easily add multiple supervisors in one go. Meanwhile, Figure 4.6 shows a form that needs to be filled in with the details of the new supervisor, such as their name, email, and contact information. Once the form is filled in, the postgraduate studies officer can then add the new supervisor to the system by clicking the submit button. With these options, the postgraduate studies officer can efficiently and effectively manage the list of supervisors in the system.



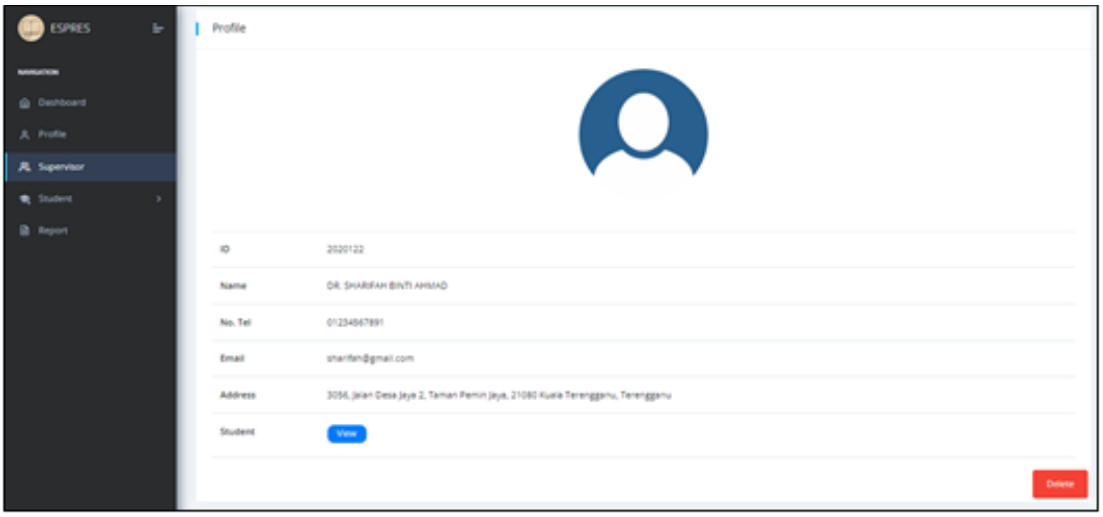
Figures 4.4 popup to add a new supervisor.



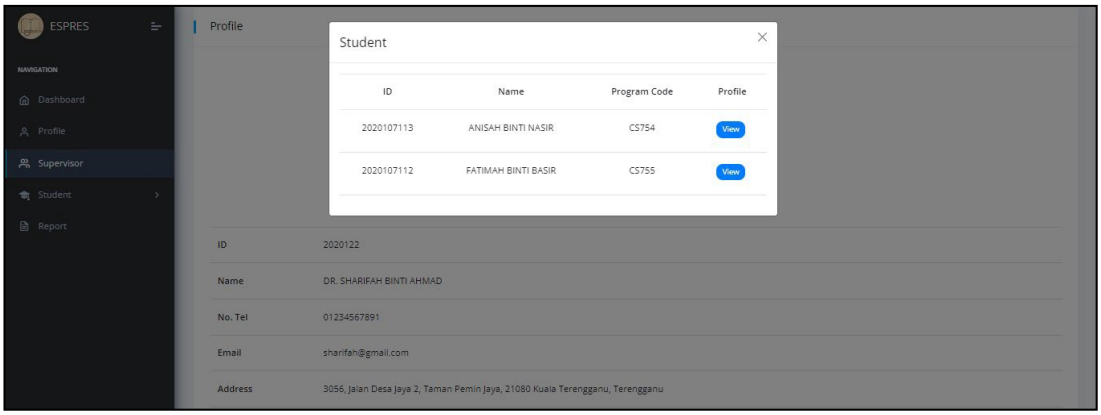
Figures 4.5 upload an excel file.

Figures 4.6 form to add new supervisor.

The Figure 4.7 below shows the profile page of the supervisor. This page provides a detailed view of the supervisor's information and is accessible to the postgraduate studies officer. The postgraduate studies officer has the ability to delete the supervisor from the system by clicking the delete button provided on this page. Besides, to see the students under the supervision of the supervisor, the postgraduate studies officer can click the view button in the student section. After clicking the view button, a pop-up window will display the list of students, as in figure 4.8.

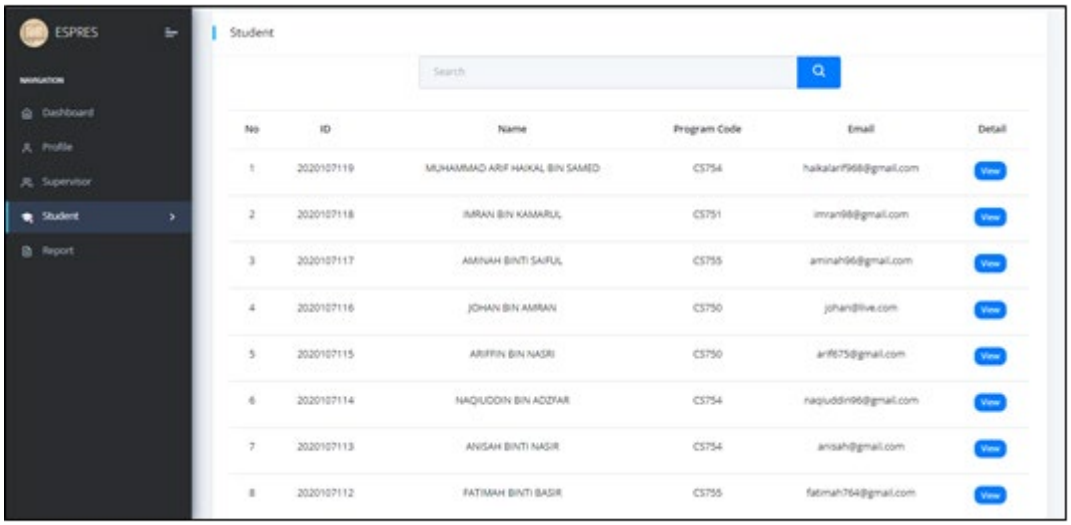


Figures 4.7 supervisor profile



Figures 4.8 list of students

The Figure 4.9 displays the student list page that can be easily accessed by the postgraduate studies officer. This page allows the postgraduate studies officer to view all the lists of students that are available in the system. The information displayed on this page includes the student's ID, name, program code, and email. To make it easier for the postgraduate studies officer to find a specific student, there is a search bar at the top of the page. This search bar enables the postgraduate studies officer to search for students by their name, ID, program code, or email.



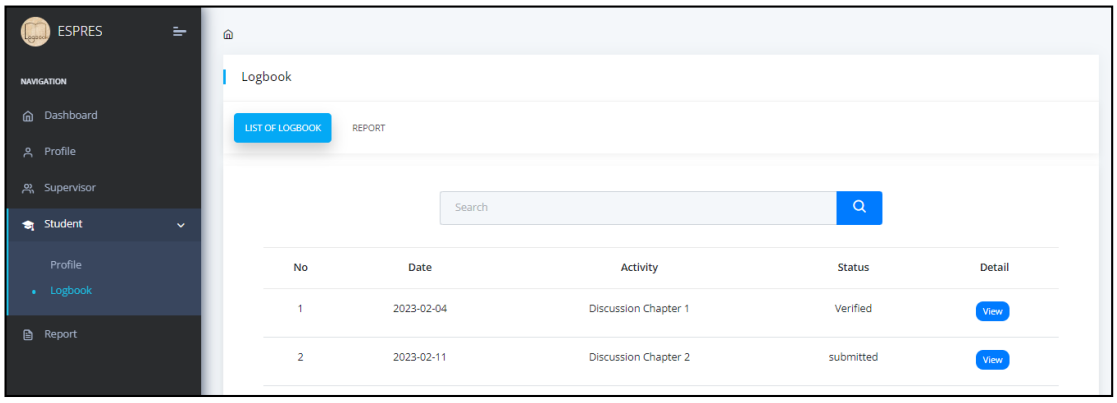
Figures 4.9 list of students.

The profile page for students, as depicted in Figure 4.10, provides postgraduate studies officers with comprehensive information about each individual student. This includes details such as the student's name, ID, phone number, email, program code, research

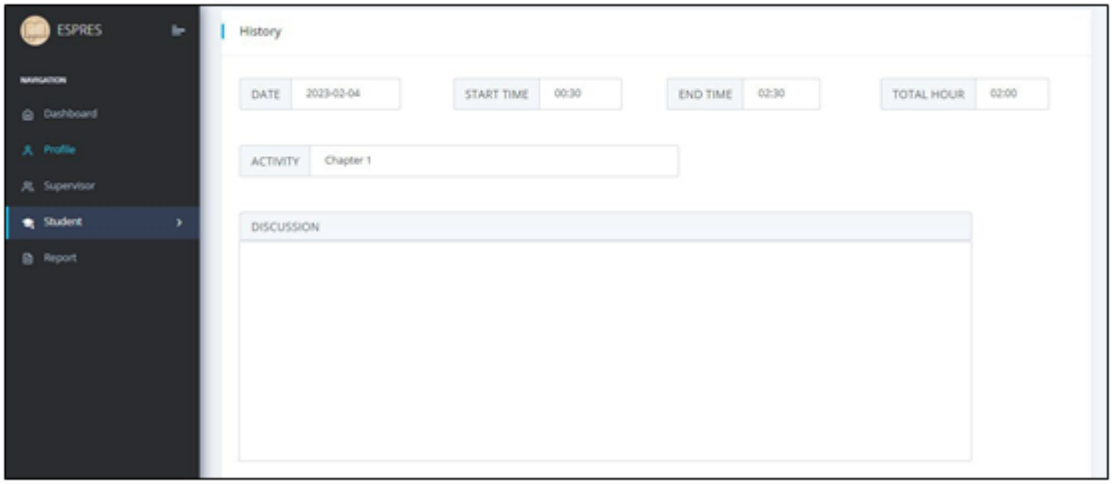
title, supervisor and co-supervisor name, and address. In addition to viewing student profiles, postgraduate studies officers also have the ability to delete students from the system if necessary. This is done by clicking on the delete button, which will remove the student's profile from the system.

Figures 4.10 profile page for students

The Figure 4.11 shows the logbook list interface accessible to the postgraduate studies officer. This page grants the officer a complete view of the logbooks generated by students, providing them with a convenient way to monitor student activities. The logbook detail page, as shown in Figure 4.12, offers a more in-depth understanding of a specific logbook, allowing the postgraduate studies officer to examine all the information entered by the student, including the date, start and end time, activity description, meeting method, discussion details, and any attached files.

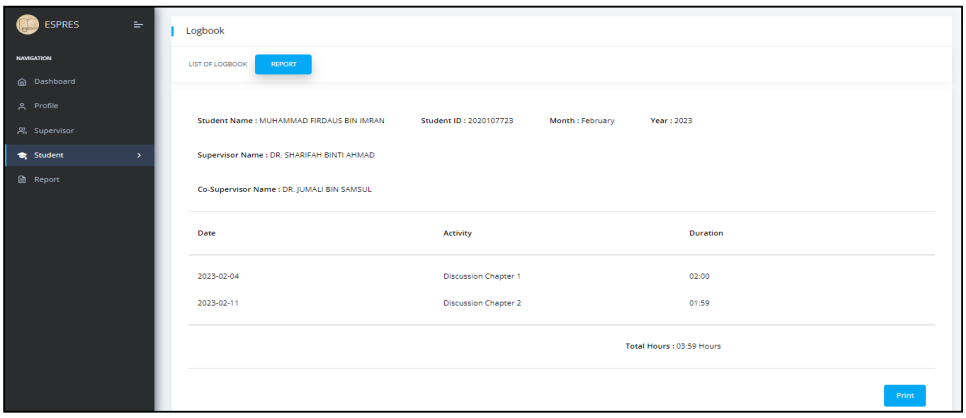


Figures 4.11 list of student logbook



Figures 4.12 logbook detail page

Figure 4.13 show the monthly report generated by students. This page provides a comprehensive overview of the logbook made by students for a specific month. The postgraduate studies officer can view all the details of the logbook on this page. This feature allows the postgraduate studies officer to easily monitor the progress of students and ensure that they are following the guidelines and meeting the requirements set by the program.

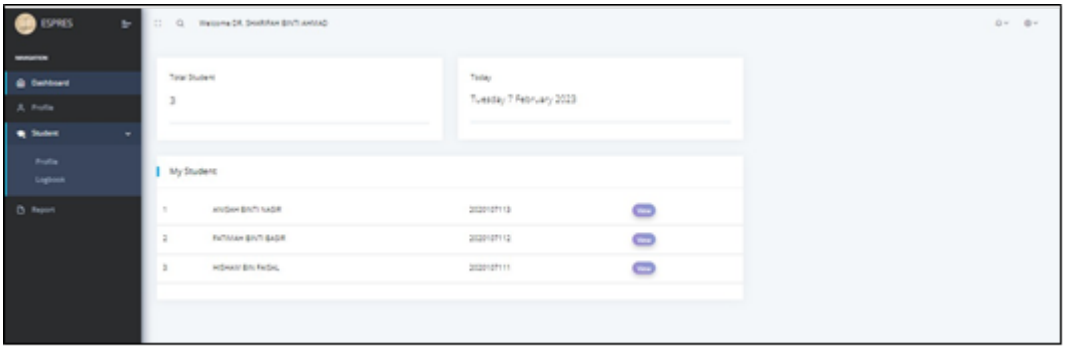


Figures 4.13 student monthly report

4.4.2 Supervisor

The dashboard page serves as the main interface for supervisors in the E-Logbook System for Postgraduate Research Students. It displays important information such as the current date, the number of students being supervised, and a list of student names and IDs. This information is presented in a user-friendly and intuitive manner, allowing

supervisors to easily navigate the system and access the information they need. On this page, supervisors can quickly view the number of students under their supervision, as well as the names and IDs of each student. Figure 4.14 below shows the dashboard page where supervisors will be taken to this page after they have successfully logged into the system.



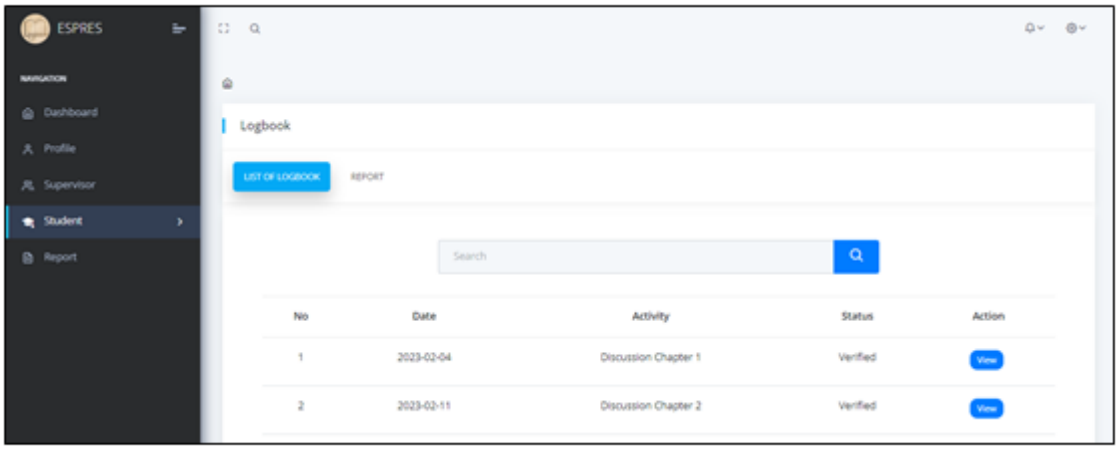
Figures 4.14 dashboard for supervisors

The Student List page, shown in Figure 4.15, is an important component of the E-Logbook System for Postgraduate Research Students. This page allows supervisors to easily access and view a list of all students they are responsible for supervising. The information displayed on this page includes the student's ID, name, program code, and email address. The supervisor is able to filter the list of students based on the program code, making it easier to see their students. By pressing the "view" button, the supervisor can access more their profile information.

Figures 4.15 list of students

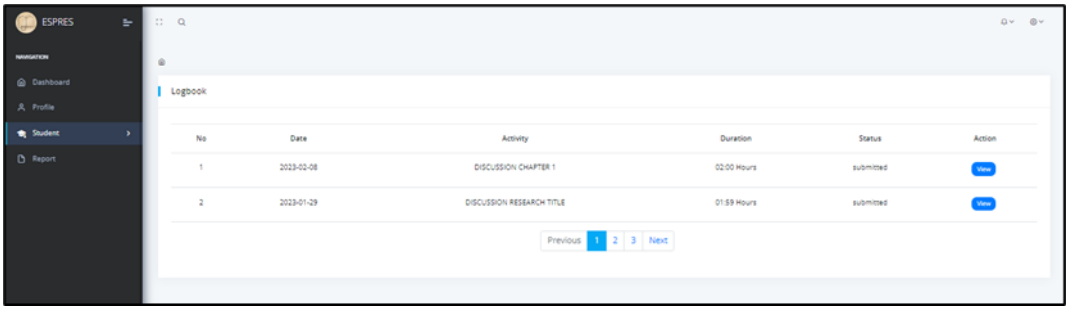
Figure 4.16 shows the student logbook page in the E-Logbook System for Postgraduate Research Students. This page displays a list of logbooks recorded by students in the

system, including the date, activity, duration, and status of each meeting. The supervisor can quickly see an overview of all the logbooks recorded by the students under their supervision. By pressing the view button, the supervisor can access the detailed information about each logbook and check the discussions and results of each meeting. This feature allows the supervisor to keep track of their students' progress and provide guidance as needed. The student logbook page is a crucial part of the E-Logbook System and provides valuable information for both the students and supervisors.



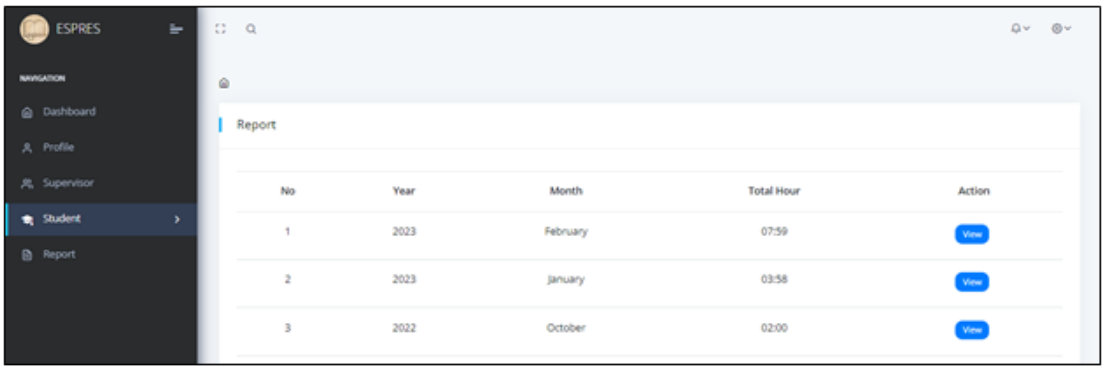
Figures 4.16 list of student logbook

Figure 4.17 below displays the logbook detail page where the supervisor can view all the information recorded by the student including date, start time, end time, activity, meeting method, discussion, and attached files. The duration of the meeting is automatically calculated based on the start and end time. The supervisor can verify the information by clicking the verify button at the bottom of the page.



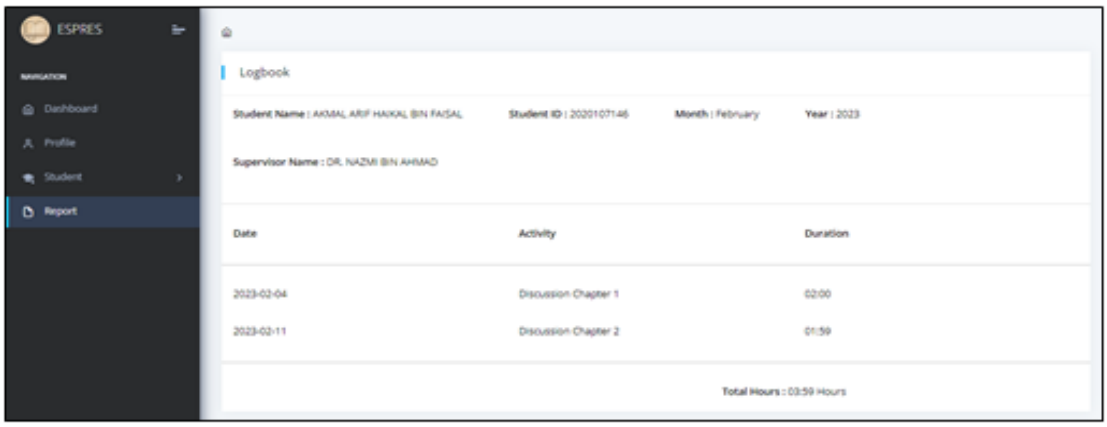
Figures 4.17 logbook detail page

The Figure 4.18 represents the report list page which is designed to provide supervisors with a comprehensive and organized view of the reports generated by the students based on their logbook records. The page displays a list of reports according to the year and month, enabling supervisors to quickly access the reports they need to review. To see the details of a specific report, the supervisor simply has to click the view button. This feature makes it convenient for supervisors to keep track of the meeting reports generated by student.



Figures 4.18 list of student report

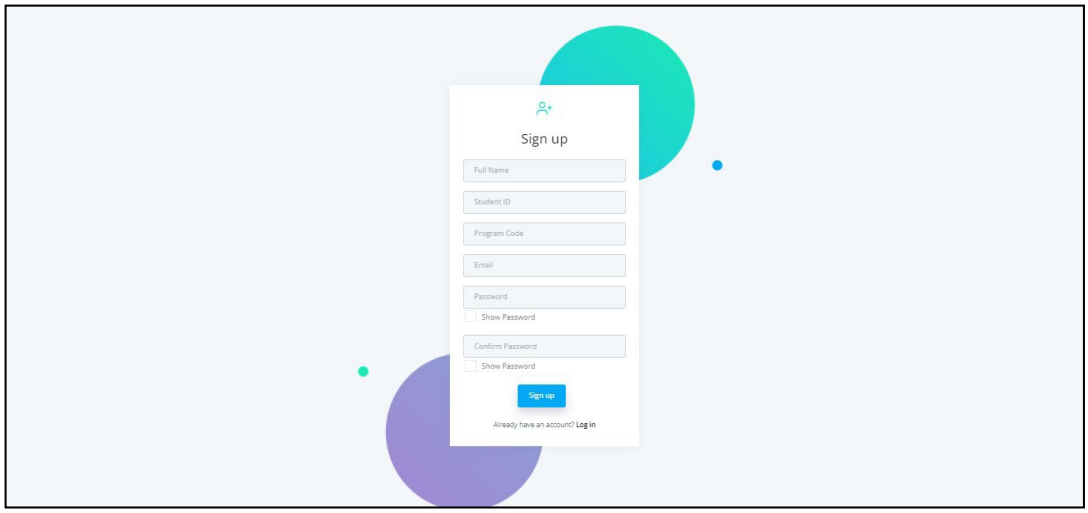
The report page, as shown in Figure 4.19 below, provides an in-depth view of the information contained in the report. All the details included in the report are displayed in this page, providing the supervisor with a comprehensive overview of the meetings held with their students. This page serves as a summary of the information recorded in the logbook by the students, allowing the supervisor to review and assess the progress of the students.



Figures 4.19 student report

4.4.3 Student

Before a postgraduate research student can use the E-Logbook System (ESPRES), they must first complete the registration process. During this process, they will be required to provide important information in the designated fields. This information is necessary for the system to accurately track their research activities and progress. To ensure the accuracy of the records, it is important that the student provides accurate and up-to-date information during the registration process. Once the registration process is complete and the information is verified, the student will be granted access to the ESPRES system and be able to start record their research progress. Figure 4.20 shows the registration form that needs to be filled out by students.



Figures 4.20 registration form for student

Once a student has successfully completed the registration process and logged into the E-Logbook System, they will be directed to the dashboard. The dashboard serves as the home page and provides a quick overview of the student's research progress. On the dashboard, the current date will be displayed, as well as the number of logbooks the student has created, the total number of meeting hours they have recorded, and the number of meeting hours for the current month. On the left-hand side of the page, there is a navigation bar that gives the student quick access to all the different pages within the system. This bar provides a convenient way for the student to move between

different sections of the system, ensuring they can find what they need quickly and efficiently. Figure 4.21 shows the student dashboard.

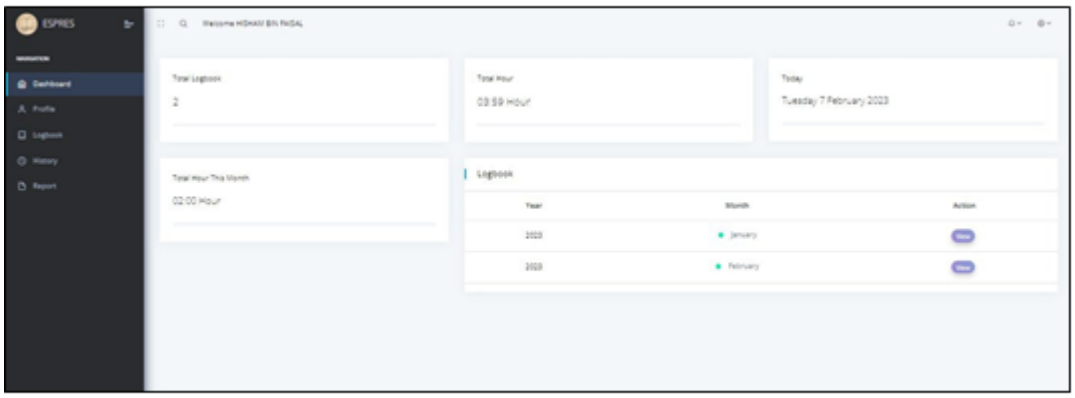
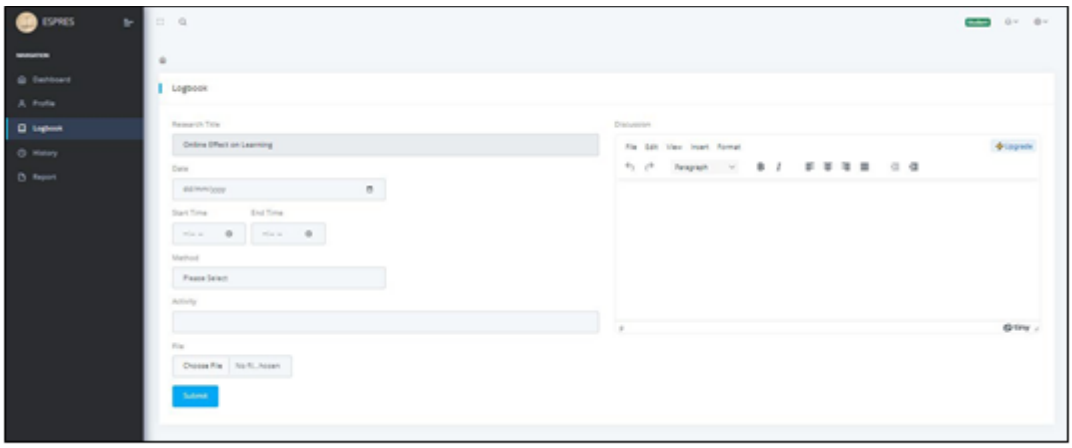


Figure 4.21 student dashboard

The student profile page is an important aspect of the E-Logbook System for Postgraduate Research Students (ESPRES) as it serves as the hub for all important information related to the student. The figure 4.22 shows the student profile page, which displays various details such as the student's ID, name, email, phone number, and address. Additionally, this page will also display the title of the student's research project and the names of the supervisor and co-supervisor. This page helps in ensuring that all relevant information about the student is always readily available. To make sure that the information is up-to-date and accurate, ESPRES has also provided an option for students to edit their details as and when required. With this feature, students can ensure that their profile information is accurate and up to date at all times, helping in the smooth functioning of the system.

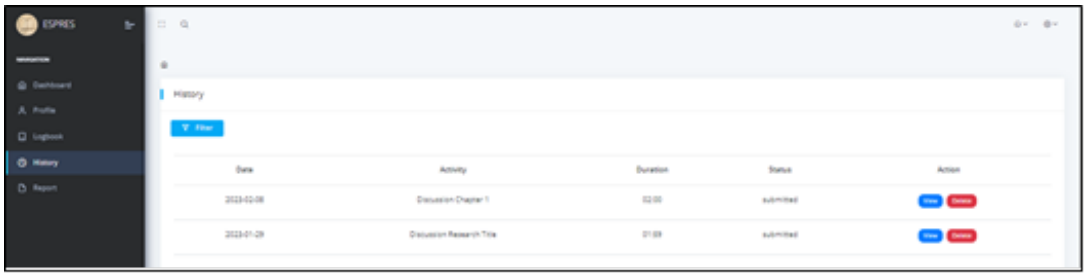
Figures 4.22 student profile

Figure 4.23 below shows the Logbook Page in the E-Logbook System for Postgraduate Research Students. On this page, students can record all the details of their meeting with their supervisor. This includes the date, time, activities discussed during the meeting, and the method used, whether online or face-to-face. The logbook page provides students with a platform to fill in all relevant information to track their research progress. In addition to filling in the details, students can also record the results of their discussion with the supervisor in the discussion room. This information will be stored securely in the system and can be accessed by postgraduate studies management and supervisors when required.



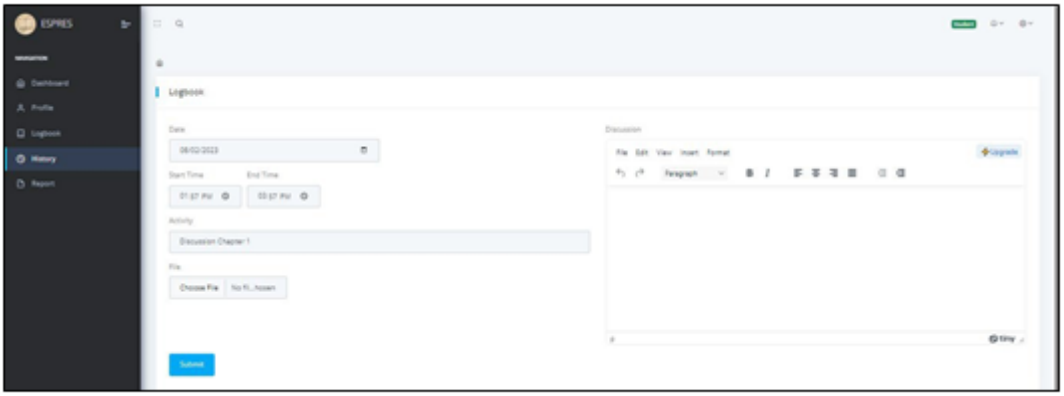
Figures 4.23 logbook page

The history page, as depicted in Figure 4.24, allows students to view the record of all the meetings they have had with their supervisors. The page displays the date, activity, and duration of the meeting, along with the status of the record. If the supervisor verifies the record, the status will change from "submitted" to "verified." Students can view the details of each meeting by clicking the "view" button and they also have the option to delete the meeting record if needed. This page serves as a comprehensive and accessible archive of all meeting information, enabling students to easily track their research activities and progress.



Figures 4.24 history page

The "Edit Meeting Record" page allows students to make changes to their previously recorded meeting information. This page provides a user-friendly interface where students can easily navigate to the specific meeting record, they wish to edit and make the necessary modifications. All the details of the meeting such as date, time, activity, and method used will be displayed and can be edited by the students. Once the changes are made, students will have to click the "Submit" button in order to save the updated information. Figure 4.25 below shows the layout and design of this page and its various elements, including the fields for editing the meeting information and the "Submit" button for saving the changes.



Figures 4.25 Edit Meeting Record

4.4 Result for Objective 3

Objective 3: To evaluate the functionality of the E-Logbook System for Postgraduate Research Students (ESPRES).

The purpose of Objective 3 is to validate the functionality of the E-Logbook System for Postgraduate Research Students (ESPRES) to ensure that it operates as expected. System testing is a critical step in the web development process and plays a crucial role in ensuring that the system meets its requirements and specifications. The testing process involves executing tests on the system to evaluate its functionality, performance, and overall quality. The objective of system testing is to identify any defects or issues in the system before it is released to users. This process is essential to deliver a high-quality and reliable system to users and prevent any potential problems that may arise in the future. By conducting thorough system testing, developers can gain confidence in the system's ability to meet user requirements and deliver a seamless user experience.

4.4.1 System Testing

The system testing phase for the E-Logbook System for Postgraduate Research Students (ESPRES) was carried out once development was completed. The aim of the testing was to verify that all features were functioning correctly and to ensure that the system met functionality requirement. A test plan served as the guide for the system

testing. Table 4.4 until table 4.6 will show the test plan for all student, supervisor and postgraduate studies officer.

Table 4.4 Test Plan for Student

No	System Requirement	Developer	Tester
1	Sign up	/	/
2	Log in to the system	/	/
3	View profile	/	/
4	View menu	/	/
5	Fill meeting detail	/	/
6	Get notification of the total meeting hour.	/	/
7	Attach file	/	/
8	View report	/	/
9	View total hour	/	/
10	View total logbook	/	/
11	Log out	/	/

Table 4.5 Test Plan for Supervisor

No	System Requirement	Developer	Tester
1	Log in to the system	/	/
2	View Profile	/	/
3	View student profile	/	/
4	View menu	/	/
5	View meeting detail	/	/
6	View student progress	/	/
7	View student report	/	/
8	Verify the progress	/	/
9	Log out	/	/

Table 4.6 Test Plan for Postgraduate studies officer

No	System Requirement	Developer	Tester
1	Log in to the system	/	/
2	View list of students	/	/
3	View list of supervisors	/	/
4	View users' profile	/	/
5	Add new supervisor	/	/
6	Add new student	/	/
7	Delete users	/	/
8	View student detail	/	/
9	View meeting detail	/	/

10	View student progress	/	/
11	View student report	/	/
12	View total student	/	/
13	View total supervisor	/	/
14	Log out	/	/

The E-Logbook System for Postgraduate Research Students (ESPRES) was thoroughly evaluated and tested by the developer and lecturer at UiTM Kuala Terengganu using a test plan. The test plan was created to ensure that the system's functionality met the requirements specified and worked as intended. The purpose of functional testing was to identify any potential bugs or errors in the system before it was released to the end-users. The functional testing process was crucial in ensuring that the ESPRES system was ready for use and provided an optimal user experience for the postgraduate research students, supervisor and the postgraduate studies officers.

4.4.2 Expert Evaluation

To improve the flow of the system, E-Logbook System for Postgraduate Research Students has been through the expert evaluation where two experts from information technology science computing background have been involved in the evaluation process. The purpose of this evaluation is to obtain feedback and comment from users with high qualification background to produce the best system. The evaluation was conducted face-to-face with all the evaluators. All comments and suggestions from the expert have been recorded in the table according to the criteria involved. The expert evaluators are the lecturers from UiTM Kuala Terengganu. Figure 4.7 until 4.18 show the expert evaluation based on the evaluation categories according to the expert evaluators.

1) Expert evaluator 1

Table 4.7 Expert evaluation 1 on Strive for consistency.

SECTION A: STRIVE FOR CONSISTENCY		
No.	Description	Result (Yes/No)
1	can consistency in this system design help improve the user experience?	YES
2	Is the system interface easy to understand?	YES
3	Overall, do you think the colour theme and arrangement of information and pictures in this system are appropriate?	YES
Comment	Solution	
Returning to previous page is not quite good. Overall is good.	Make a back button to make browsing easier.	

Table 4.8 Expert evaluation 1 on enable frequent users to use shortcuts.

SECTION B: ENABLE FREQUENT USERS TO USE SHORTCUTS		
No.	Description	Result (Yes/No)
1	Is there a shortcut to the user, such as tooltips, keyboard shortcuts or menu options in this system?	NO
2	In your opinion, can the system navigate properly?	YES
3	Is the system navigation intuitive and easy to use, without causing confusion for users who are not familiar with it?	YES
Comment	Solution	
Need to improve tooltips to help beginner to accelerate learn to use system.	Make tooltips or help page or FAQ.	

Table 4.9 Expert evaluation 1 on offer simple error handling.

SECTION C: OFFER SIMPLE ERROR HANDLING		
No.	Description	Result (Yes/No)
1	Does the system use visual design elements, such as colour, contrast and typography, to indicate possible errors and provide clear feedback to the user?	YES
2	Can the system balance the need for error prevention with the need for efficiency, so that users can complete tasks quickly and easily without making mistakes?	YES
3	In your opinion the error handling of this system is simple and easy for the user, without adding complexity or confusion to the interface?	YES
Comment	Solution	
Good error handling.		

Table 4.10 Expert evaluation 1 on design dialog to yield closure.

SECTION D: DESIGN DIALOG TO YIELD CLOSURE		
No.	Description	Result (Yes/No)
1	In your opinion does the system provide a clear call to action and does the user know what to do after they have finished interacting with the dialog?	YES
2	Can dialog on this system improve the user experience?	YES
3	Overall, does the system provide clear feedback for users to understand the results of their actions?	YES
Comment		Solution
Overall is good.		

Table 4.11 Expert evaluation 1 on support internal locus of control.

SECTION E: SUPPORT INTERNAL LOCUS OF CONTROL		
No.	Description	Result (Yes/No)
1	Does the system interface empower users and support their sense of control, so that they feel confident and motivated to use the system?	NO
2	Does the system ensure that users have access to the information and tools they need to perform tasks and make decisions, so they don't feel frustrated or limited by the interface?	YES
3	Can the system ensure that the interface is predictable and consistent, so that users can understand how the system works and what to expect?	YES
Comment		Solution
Need to have flow design like window wizard.		Combine menu base with wizard.

Table 4.12 Expert evaluation 1 on implementation eight golden rules.

SECTION F: EXPERT EVALUATION ON EIGHT GOLDEN RULES		
No.	Description	Result (Yes/No)
1	Do you think all the Golden Rules are being applied to the system?	YES
2	Overall, are you satisfied with implementation of Eight Golden Rules of Interface Design by Ben Shneiderman in the system?	YES
3	Overall, are you satisfied with the system?	YES
Comment		Solution
Overall is good.		

2) Expert evaluator 2

Table 4.13 Expert evaluation 2 on Strive for consistency.

SECTION A: STRIVE FOR CONSISTENCY		
No.	Description	Result (Yes/No)
1	can consistency in this system design help improve the user experience?	YES
2	Is the system interface easy to understand?	YES
3	Overall, do you think the colour theme and arrangement of information and pictures in this system are appropriate?	YES
Comment		Solution
None		None

Table 4.14 Expert evaluation 2 on enable frequent users to use shortcuts.

SECTION B: ENABLE FREQUENT USERS TO USE SHORTCUTS		
No.	Description	Result (Yes/No)
1	Is there a shortcut to the user, such as tooltips, keyboard shortcuts or menu options in this system?	YES
2	In your opinion, can the system navigate properly?	YES
3	Is the system navigation intuitive and easy to use, without causing confusion for users who are not familiar with it?	YES
Comment		Solution
None		None

Table 4.15 Expert evaluation 2 on offer simple error handling.

SECTION C: OFFER SIMPLE ERROR HANDLING		
No.	Description	Result (Yes/No)
1	Does the system use visual design elements, such as colour, contrast and typography, to indicate possible errors and provide clear feedback to the user?	YES
2	Can the system balance the need for error prevention with the need for efficiency, so that users can complete tasks quickly and easily without making mistakes?	YES
3	In your opinion the error handling of this system is simple and easy for the user, without adding complexity or confusion to the interface?	YES
Comment		Solution
None		None

Table 4.16 Expert evaluation 2 on design dialog to yield closure.

SECTION D: DESIGN DIALOG TO YIELD CLOSURE		
No.	Description	Result (Yes/No)
1	In your opinion does the system provide a clear call to action and does the user know what to do after they have finished interacting with the dialog?	NO
2	Can dialog on this system improve the user experience?	YES
3	Overall, does the system provide clear feedback for users to understand the results of their actions?	NO
Comment		Solution
Some function does not offer any feedback of messages for the user.		Providing messages after user have click the button.

Table 4.17 Expert evaluation 2 on support internal locus of control.

SECTION E: SUPPORT INTERNAL LOCUS OF CONTROL		
No.	Description	Result (Yes/No)
1	Does the system interface empower users and support their sense of control, so that they feel confident and motivated to use the system?	NO
2	Does the system ensure that users have access to the information and tools they need to perform tasks and make decisions, so they don't feel frustrated or limited by the interface?	NO
3	Can the system ensure that the interface is predictable and consistent, so that users can understand how the system works and what to expect?	YES
Comment		Solution
Quite hard for user to take control over the system.		The flow of the system process need to redefined.

Table 4.18 Expert evaluation 2 on implementation golden rules.

SECTION F: EXPERT EVALUATION ON EIGHT GOLDEN RULES		
No.	Description	Result (Yes/No)
1	Do you think all the Golden Rules are being applied to the system?	YES
2	Overall, are you satisfied with implementation of Eight Golden Rules of Interface Design by Ben Shneiderman in the system?	YES
3	Overall, are you satisfied with the system?	YES
Comment		Solution
None		None

4.5 Conclusion

In conclusion, the E-Logbook System for Postgraduate Research Students has been successfully developed to enhance the tracking of research activities and progress for postgraduate research students. The primary objective of developing this system was to provide students with a more organized and efficient way of recording their research activities. The system offers several key benefits, such as secure storage of records in a database, and easier monitoring of student research by supervisors and postgraduate studies management. This chapter also highlights the system testing that was conducted to ensure that the E-Logbook System meets the necessary requirements and specifications. The successful development of this system represents a significant contribution to the field of postgraduate research and has the potential to have a positive impact on postgraduate research students.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

The final chapter of the E-Logbook System for Postgraduate Research Students (ESPRES) project will provide a comprehensive summary of the entire project. The discussion will cover the summary of the project, the contribution of this E-Logbook System for Postgraduate Research Students, project limitations, and recommendations for future enhancement. The chapter will bring together the findings from the various stages of the project and provide an overall view of the successes, difficulties, and impact of ESPRES. It will serve as a comprehensive summary of the entire project and provide insights into the potential of the E-Logbook System for Postgraduate Research Students.

5.2 Summary of Project

The E-Logbook System for Postgraduate Research Students, or ESPRES, was created to improve the monitoring of students' progress in UiTM. It is a web-based system that allows students to record all of their research activities, including meetings with supervisors and the number of hours spent in these meetings. The system provides a monthly report of meeting hours between students and supervisors, and alerts students if the number of hours is not sufficient. This new system will help supervisors better track students' progress, as prior to its development, students used manual methods such as Microsoft Word to record their research activities. The development of ESPRES aimed to meet three objectives as outlined in the first chapter. The first objective was to identify the current process and challenges faced by postgraduate research students in UiTM in terms of recording their research activities. To gather

information about these issues, the developer conducted an interview with a postgraduate research student named Nor Azila Binti Mohd Johari.

The second objective of the E-Logbook System for Postgraduate Research Students project was to design and develop the system. The project followed the waterfall model, a well-established project development process, to ensure it was completed within the specified timeframe. The user interface of the system was designed based on the principles of the Eight Golden Rules of Interface Design, with the aim of providing an intuitive and user-friendly experience. To support the design process, several diagrams were created, including a context diagram, data flow diagram (DFD), entity relationship diagram (ERD), site map, and user interface design, to provide a clear visual representation of the system and its components. These diagrams serve as a useful reference for the developer in designing the system.

Finally, to test the functionalities of the E-Logbook System for Postgraduate Research Students. This step is essential for ensuring that the E-Logbook System for Postgraduate Research Students functions properly and without problems. The main goal of the performed tests is to ensure that the system conforms to the requirements. The student, supervisor, and postgraduate studies officer are the three users utilized to test the functionality of the test case.

5.3 Project Contribution

The E-Logbook System for Postgraduate Research Students represents a valuable contribution to the field of postgraduate research. This system offers students a more organized and efficient way to track their research activities and progress and stores all records in a secure database to eliminate the risk of losing physical logbook records. Additionally, the system makes it easier for supervisors and management to monitor student research activities and progress, ensuring that they are making consistent and meaningful progress in their research. This E-Logbook System not only supports students in completing their research but also helps improve the overall quality of postgraduate research. The system's contributions to the field of postgraduate research

make it a significant and potentially impactful addition for postgraduate research students.

5.4 Project Limitation

The E-Logbook System for Postgraduate Research Students, while providing many benefits, is not without its limitations. One of the main limitations is that it was designed to be used only on a desktop computer. This means that while students can still access the system on other medium-sized devices such as an iPad or tablet, the user experience may not be optimal. The interface and functionality may not be suited for the smaller screen size of a smartphone, which can be an inconvenience for students who rely on their smartphones for most of their daily tasks.

Another limitation of the E-Logbook System for Postgraduate Research Students is that it does not include a chat box feature for direct communication between students and their supervisors. This means that if students have any questions or concerns about their research, they cannot ask them directly through the system, but rather have to use alternative means of communication such as email or in-person meetings. This can lead to delays in getting answers and make it harder for students to keep track of their progress.

Despite these limitations, the E-Logbook System for Postgraduate Research Students still provides many benefits to students, supervisors, and the management of postgraduate studies, and is a valuable contribution to the field of postgraduate research.

5.5 Recommendation and Future Enhancement

The E-Logbook System for Postgraduate Research Students is a tool that has been designed to help students track their progress in their research studies. However, it has been noted that there are certain areas where the system can be improved. One such area is the current features of the system, which can be updated and modified to

provide a better user experience. Another suggestion is to add a grade system, which would help students to better understand their performance and areas where they can improve.

In addition to these improvements, the E-Logbook System could also benefit from the inclusion of a chat box. This feature would allow students to easily communicate with their supervisor and ask questions about any problems they may be facing with their studies. This type of interaction would provide students with the opportunity to receive timely and accurate answers to their questions, which would in turn allow them to make informed decisions about their research. By having this type of interaction, students will be able to feel more confident and secure in their research, and their supervisors will be able to provide more targeted and effective guidance.

Overall, the suggested changes to the E-Logbook System for Postgraduate Research Students would greatly improve the user experience for students and provide them with the tools and resources they need to succeed in their research.

5.6 Conclusion

The development of the E-Logbook System for Postgraduate Research Students was aimed at providing a more efficient and organized way for postgraduate research students to keep track of their research activities and progress. The system was designed with three primary objectives in mind and this chapter provides a comprehensive overview of the project, including a summary, a discussion of the limitations that have been identified, and suggestions for how to implement the system effectively. Despite some limitations of the ESPRES, the recommendations discussed in this chapter aim to enhance the system's functionality and improve the overall user experience for postgraduate research students in the future. The goal is to make the process of tracking research activities and progress as seamless and efficient as possible for students, supervisors, and the management of postgraduate studies.

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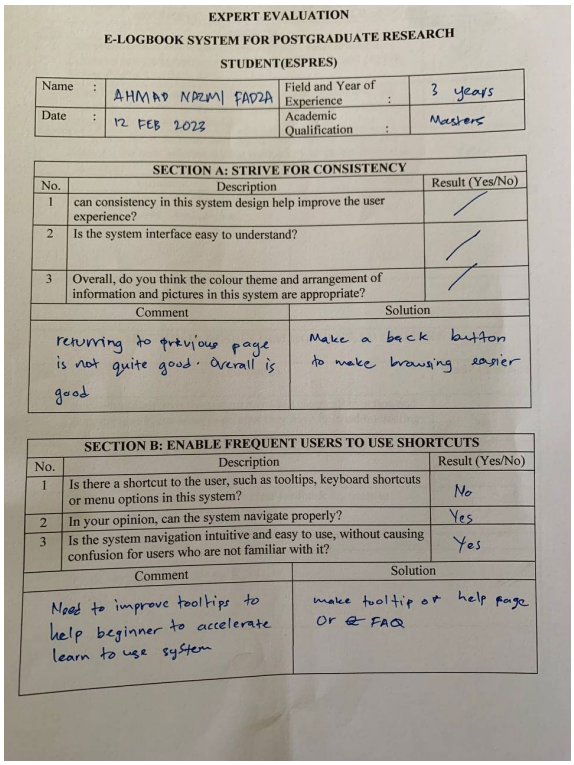
APPENDICES

APPENDIX A: EXPERT EVALUATION RESULT



EXPERT EVALUATION

E-LOGBOOK SYSTEM FOR POSTGRADUATE RESEARCH

STUDENT(ESPRES)

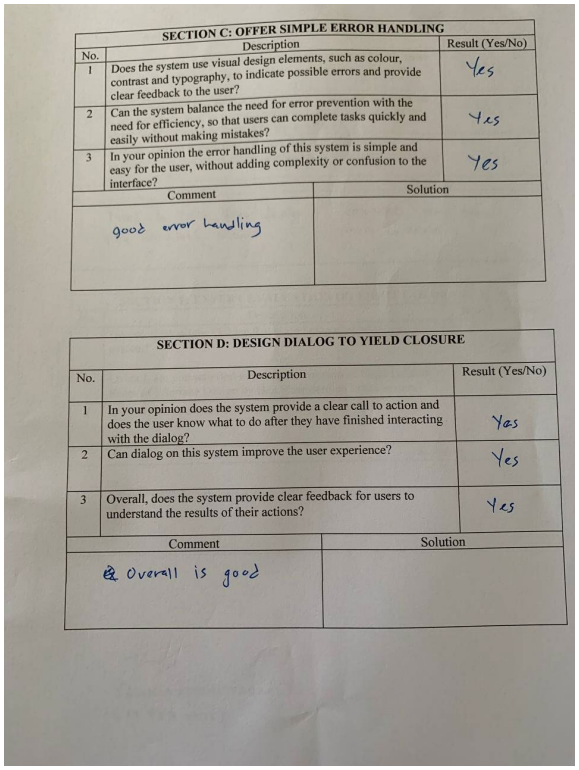
Name :	AHMAD NAZMI FADZA	Field and Year of Experience :	3 years
Date :	12 FEB 2023	Academic Qualification :	Masters

SECTION A: STRIVE FOR CONSISTENCY		
No.	Description	Result (Yes/No)
1	can consistency in this system design help improve the user experience?	✓
2	Is the system interface easy to understand?	✓
3	Overall, do you think the colour theme and arrangement of information and pictures in this system are appropriate?	✓

Comment	Solution
returning to previous page is not quite good. Overall is good	Make a back button to make browsing easier

SECTION B: ENABLE FREQUENT USERS TO USE SHORTCUTS		
No.	Description	Result (Yes/No)
1	Is there a shortcut to the user, such as tooltips, keyboard shortcuts or menu options in this system?	No
2	In your opinion, can the system navigate properly?	Yes
3	Is the system navigation intuitive and easy to use, without causing confusion for users who are not familiar with it?	Yes

Comment	Solution
Need to improve tooltips to help beginner to accelerate learn to use system	make tooltip or help page Or & FAQ

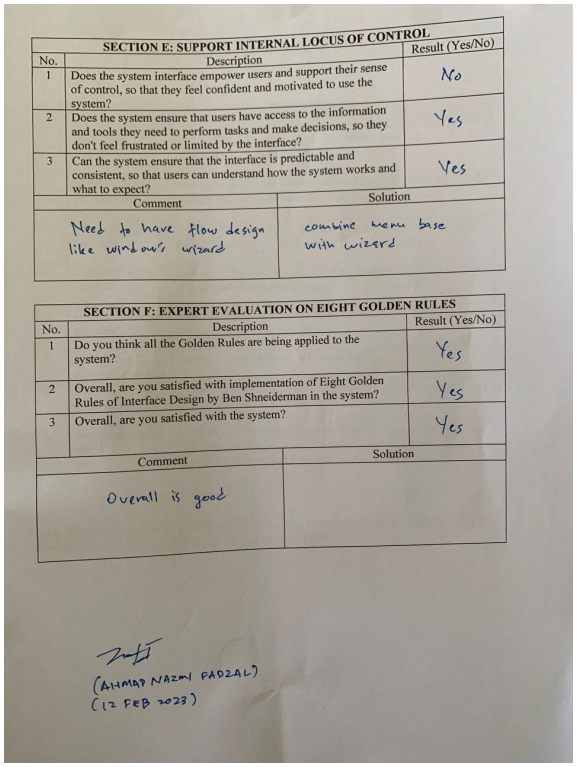


SECTION C: OFFER SIMPLE ERROR HANDLING		
No.	Description	Result (Yes/No)
1	Does the system use visual design elements, such as colour, contrast and typography, to indicate possible errors and provide clear feedback to the user?	Yes
2	Can the system balance the need for error prevention with the need for efficiency, so that users can complete tasks quickly and easily without making mistakes?	Yes
3	In your opinion the error handling of this system is simple and easy for the user, without adding complexity or confusion to the interface?	Yes

Comment	Solution
good error handling	

SECTION D: DESIGN DIALOG TO YIELD CLOSURE		
No.	Description	Result (Yes/No)
1	In your opinion does the system provide a clear call to action and does the user know what to do after they have finished interacting with the dialog?	Yes
2	Can dialog on this system improve the user experience?	Yes
3	Overall, does the system provide clear feedback for users to understand the results of their actions?	Yes

Comment	Solution
Overall is good	



SECTION E: SUPPORT INTERNAL LOCUS OF CONTROL		
No.	Description	Result (Yes/No)
1	Does the system interface empower users and support their sense of control, so that they feel confident and motivated to use the system?	No
2	Does the system ensure that users have access to the information and tools they need to perform tasks and make decisions, so they don't feel frustrated or limited by the interface?	Yes
3	Can the system ensure that the interface is predictable and consistent, so that users can understand how the system works and what to expect?	Yes

Comment	Solution
Need to have flow design like windows wizard	combine menu base with wizard

SECTION F: EXPERT EVALUATION ON EIGHT GOLDEN RULES		
No.	Description	Result (Yes/No)
1	Do you think all the Golden Rules are being applied to the system?	Yes
2	Overall, are you satisfied with implementation of Eight Golden Rules of Interface Design by Ben Shneiderman in the system?	Yes
3	Overall, are you satisfied with the system?	Yes

Comment	Solution
Overall is good	

(AHMAD NAZMI FADZAL)
(12 FEB 2023)

EXPERT EVALUATION

E-LOGBOOK SYSTEM FOR POSTGRADUATE RESEARCH STUDENT(ESPRES)

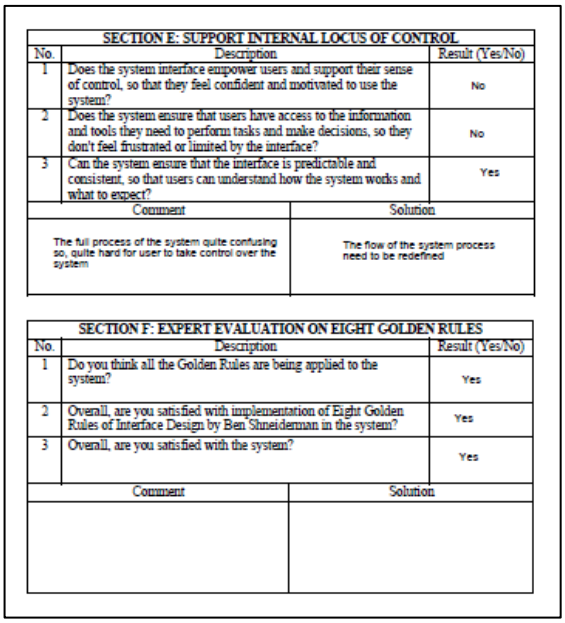
Name	:	NOR HASNUL AZIRAH ABDUL HAMID	Field and Year of Experience	:	5 YEARS
Date	:	13/02/2023	Academic Qualification	:	MASTER

SECTION A: STRIVE FOR CONSISTENCY		
No.	Description	Result (Yes/No)
1	can consistency in this system design help improve the user experience?	Yes
2	Is the system interface easy to understand?	Yes
3	Overall, do you think the colour theme and arrangement of information and pictures in this system are appropriate?	Yes
Comment		Solution

SECTION B: ENABLE FREQUENT USERS TO USE SHORTCUTS		
No.	Description	Result (Yes/No)
1	Is there a shortcut to the user, such as tooltips, keyboard shortcuts or menu options in this system?	Yes
2	In your opinion, can the system navigate properly?	Yes
3	Is the system navigation intuitive and easy to use, without causing confusion for users who are not familiar with it?	Yes
Comment		Solution

SECTION C: OFFER SIMPLE ERROR HANDLING		
No.	Description	Result (Yes/No)
1	Does the system use visual design elements, such as colour, contrast and typography, to indicate possible errors and provide clear feedback to the user?	Yes
2	Can the system balance the need for error prevention with the need for efficiency, so that users can complete tasks quickly and easily without making mistakes?	Yes
3	In your opinion the error handling of this system is simple and easy for the user, without adding complexity or confusion to the interface?	Yes
Comment		Solution

SECTION D: DESIGN DIALOG TO YIELD CLOSURE		
No.	Description	Result (Yes/No)
1	In your opinion does the system provide a clear call to action and does the user know what to do after they have finished interacting with the dialog?	No
2	Can dialog on this system improve the user experience?	Yes
3	Overall, does the system provide clear feedback for users to understand the results of their actions?	No
Comment		Solution
Some functions and buttons does not offer any feedback of messages for the user.		Providing messages after user have click the buttons.



SECTION E: SUPPORT INTERNAL LOCUS OF CONTROL		
No.	Description	Result (Yes/No)
1	Does the system interface empower users and support their sense of control, so that they feel confident and motivated to use the system?	No
2	Does the system ensure that users have access to the information and tools they need to perform tasks and make decisions, so they don't feel frustrated or limited by the interface?	No
3	Can the system ensure that the interface is predictable and consistent, so that users can understand how the system works and what to expect?	Yes

Comment	Solution
The full process of the system quite confusing so, quite hard for user to take control over the system	The flow of the system process need to be redefined

SECTION F: EXPERT EVALUATION ON EIGHT GOLDEN RULES		
No.	Description	Result (Yes/No)
1	Do you think all the Golden Rules are being applied to the system?	Yes
2	Overall, are you satisfied with implementation of Eight Golden Rules of Interface Design by Ben Shneiderman in the system?	Yes
3	Overall, are you satisfied with the system?	Yes

Comment	Solution

APPENDIX B: INTERVIEW QUESTION

INTERVIEW

Respondent's Name: Nor Azila Binti Mohd Johari

Can you tell me your mode of study?

I am a part-time postgraduate research student at UiTM.

Did you use a logbook when you did your research?

Yes, I will usually record all the meeting details in the logbook, such as activities, dates, times, and comments given by the supervisor.

Can you tell me about your study process?

Each postgraduate research student will be guided by a supervisor, and they will often hold joint meetings to discuss research conducted by students. Afterwards, students will record the details of the meeting, including comments given by the supervisor into a logbook. Each student must meet the meeting times set by the management of postgraduate studies. After that, students will submit a meeting report to the management of postgraduate studies for monitoring and evaluation.

How many times a week do you meet with the supervisor?

The number of meetings is uncertain, depending on the situation, but usually, meetings will be held once a week.

Where do you usually record meeting details?

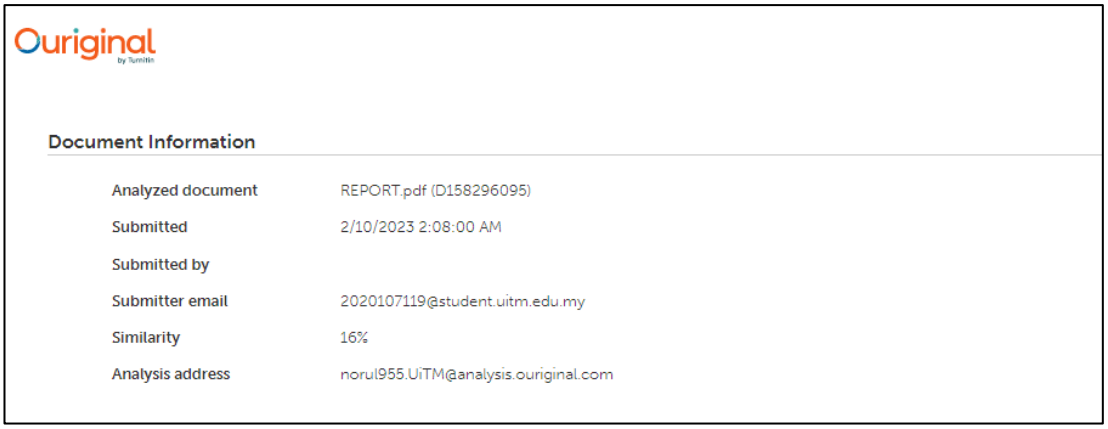
For meeting records, I will usually use Microsoft word because for now I don't think there is any other platform that is suitable for me to use.

Do you feel the way now there is a weakness?

I think it has a weakness in terms of the meeting records I keep, and it would be a problem for me if those records were lost because I only kept them on the computer, and it was hard for me to refer back to them. I think it needs a platform where we can store all the details securely. Also, I think there is no systematic platform for supervisors to monitor students' progress because supervisors can monitor their students' progress only through meetings to see the latest developments of their students.

I think that is all from me. Thank you so much for the cooperation that you have given to us. I obtained a lot of important information from in interview session, and I appreciate it.

APPENDIX C: OURIGINAL REPORT



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