FACULTY OF COMPUTING

اونيۏرسيتـي ملـيسيـا ڤهڠ

UNIVERSITI MALAYSIA PAHANG

PSM 1 REPORT

SUPERVISOR EVALUATION

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Project Title : Final Year Project Management System for Faculty of Computing

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Project management is the process to produce and deliver a valuable and meaningful project or product to be utilized by people. Basically, project management is more focused and prominence technical skills and soft skills (Pant & Baroudi, 2008). Soft skills are more like the ability in communication, organizational, team building and leadership (Pant & Baroudi, 2008). Differently, technical skill is the proficiency of the organization or individual that developing the project either in IT, engineering or pharmaceutical field according to the suitable development project (Demuth, Gold, Mavis, & Wagner, 2018). According to the *"The AMA Handbook of Project Management Third Edition"*, since project management is handled and developed by a professional organization or department hence, project management become the growth profession (PAUL C. DINSMORE & JEANNETTE CABANIS-BREWIN, 2011).

In Malaysia, governments and non-government of institutions are starting to utilize the Project Management systems in their operation and education in achieving the Fourth Industrial Revolution (IR4.0) (Mitrofanova, Burenina, Tukshumskaya, & Popova, 2020). In fact, the Project Management system has a significant role and supports business and education growth. For example, the Project Management system as the virtual assistant in helping the supervisor or lecturer to monitor or viewing the progress of a students' learning and assessment.

In this project, the Project Management system is a system that helps the project operations of the institution become more convenient and systematic. This project will be developed for the final year student in taking and managing their final year project. This Project Management system is mainly focusing on helping the lecturer or known as the supervisor to monitor and view the overall students or supervisee project progress in visualization. The visualization of the supervisee's project progress will be shown according to the submitted task that has been uploaded by the supervisee in this Project Management system platform.

This Project Management system has the specialization in providing the quota for each supervisor every semester. Therefore, this project was able to help the student to find and

approach the respective supervisor that they wanted in a more systematic and convenience. In fact, the supervisor is also able to know about their quota and accept the total of students as their supervisees according to the quota provided. As a result, this Project Management system is able to make the students' final-year projects more efficient, organized and systematic.

1.2 Problem Statement

There have various project management system in the market to make the progress of students' final year projects more efficient and systematic. However, the paid project management system consumes a lot of money. Meanwhile, the open-source project management system has many shortcomings. For instance, the open-source system did not have the functionality to view the supervisor quota and communication platform between the supervisor and supervisee. Hence, it is difficult to find a project management system that fulfils all the requirements and functionality needed at a reasonable price or free.

Furthermore, the Faculty of Computing at the UMP did not have a system to record the supervisees' project progress in a more systematic. The project status and submission that relied on the email or WhatsApp platform is quite difficult for the supervisor to monitor and view the overall of their supervisee's project progress. This is because the supervisor did not have a real-time visualization of the supervisees' project progress and status once the supervisee submitted it through email or WhatsApp platform. Therefore, record in manually is ineffectiveness way and required a lot of time to retrieve and review each supervisee's project progress.

Moreover, the Faculty of Computing at the UMP was utilizing different platforms or applications in order for the supervisor to provide the task to the supervisee, fill in the form for the supervisor application, and review the supervisor quota and supervisor information. For instance, utilizing WhatsApp chat, Google Forms, Google Excel, Google Drive and website Faculty of Computing (FK). Hence, the project management becomes not systematic and need to open all platform in order to perform each task which causes inconvenience. For example, the students need to open Google Excel to review the supervisor quota and at the same time needs to open the FK website to review the supervisor's expertise and group. Only then, the students able to select a suitable supervisor for their final-year project.

In conclusion, the development of a Final Year Project Management for Faculty of Computing system for the final year students and lecturers is able to make project management

becomes more systematic, convenient and efficient. Thus, the supervisor and coordinator also do not need to utilize many platforms or applications in order to easier manage the operation of the final-year project.

1.3 Objective

The Final Year Project Management for Faculty of Computing system has three objectives that need to be achieved which are:

i. To study the functionality and design elements in the existing project management system.

ii. To develop a final year project management system for the Faculty of Computing.

iii. To evaluate the effectiveness and functionality of the project management system.

1.4 Scope

- User
    i. Supervisees that involve final year students in the Faculty of Computing at the UMP.
    ii. Supervisor that involves the lecturers in the Faculty of Computing at the UMP.
- Admin
    i. Coordinators of PTA and PSM in the Faculty of Computing at the UMP.
- System
    i. The system that can be utilised by the final year students and lecturers in the Faculty of Computing at the UMP only.
    ii. The system that covered the process of supervisor approach and application, supervisor approval, the communication between supervisor and supervisee, the overall progression of the supervisee's project task, and the evaluation of the supervisees' project.
- Development
    i. The system that contains the real-time visualization of information.
    ii. The system will be developed using programming languages such as HTML, CSS, PHP and JavaScript.
    iii. The database of the system will be developed using MySQL.

1.5 Thesis Organization

This thesis consists of three chapters. Each chapter has a different discussion. Chapter one discusses the introduction or background of the Final Year Project Management for Faculty of Computing system. Besides, in chapter one also discuss the issues or problem statement that needed to be solved, the objective and scope of the Final Year Project Management for Faculty of Computing system.

Chapter two was about the literature review. The literature review discusses the existing project management system. For example, the process of existing project management system work. In addition, the literature review also includes a comparison of the existing project management systems in order to improve the functionality and design of the Final Year Project Management for Faculty of Computing system that will be developed. At the end of chapter two will discuss the impact or significant gain from the analysis between the developed Final Year Project Management for Faculty of Computing system and the existing project management system including the summary of chapter two.

Lastly, chapter three will discuss the methodology. This chapter will discuss the selected SDLC of the Final Year Project Management for Faculty of Computing system in more detail for each phase. Chapter three also will include the project requirement which contains the project-based requirement and user requirement. Moreover, chapter three will consist the propose design and data design. The proposed design was including the flowchart, context diagram, use case diagram and explanation. Meanwhile, the data design contains the ERD design and database dictionary. At the end of chapter three will include the testing or validation plan, the significance of the Final Year Project Management for Faculty of Computing system development, and the Gantt Chart.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In the era of technologies nowadays, there are many project management systems in the market. However, all the existing project management systems cannot be the perfect system that fulfils all the users' needs and requirements. Each of the existing project management systems in the market has its own specialized features, advantages and disadvantages. Hence, this literature review will contain information and comparison features between three existing project management systems. As the result, the comparison features between the three existing project management systems are able to analyse the pros and cons of that system. In fact, it is able to improve the functionality and feature of the proposed system including solving the problem and disadvantages that be extant in the existing project management system. Based on the study and analysis, the thesis about the Decision Support System for Final Year Project Management, Asana system, and Trello system are suitable and similar related to the proposed project management system.

2.2 Existing Systems/Works

2.2.1 Decision Support System for Final Year Project Management

The Decision Support System for Final Year Project Management is a web-based system or application (Ibukun.T. Afolabi, Ayodele A. Adebiyi, 2019). The Decision Support System for Final Year Project Management is the decision support system that is able to help the final year student in solving the problem and decision-making tasks. For instance, the system is able to determine and make the decision for the final year student in choosing the suitable project title and supervisor.

Basically, the Decision Support System for Final Year Project Management will provide the accurate prediction decision for the final year student based on their Cumulative Grade Point Average (CGPA), results from the courses of Software Engineering, File Processing, Artificial Intelligence and Project Management (Ibukun.T. Afolabi, Ayodele A. Adebiyi, 2019). Moreover, the Decision Support System for Final Year Project Management

also needs the skills and expertise of the supervisor in order to make the accurate decision prediction for the students in selecting a suitable supervisor.

Once the system has obtained all the required data, the system will make the prediction using the Java-Server Pages (JSP) in the NetBeans IDE and the machine learning algorithms which is the Naïve Bayes algorithm (Ibukun.T. Afolabi, Ayodele A. Adebiyi, 2019). Figure 2.1 shows the main page of the Decision Support System for Final Year Project Management.

Figure 2.1 The main page of Decision Support System for Final Year Project Management

2.2.2 Asana system

The Asana system is a web-based and mobile application for project or work management. The Asana system was developed by Asana Inc (*Asana, Inc. 2021 Annual Report (Form 10-K)*, 2022). The Asana system is able to organize, assign and track the work or task in a more systematic ("Understand Asana's core features," 2022). In addition, the Asana system was utilize its own programming language which is Scala (Wentzel, 2021).

Scala language is a strong statically typed language that is compatible with object-oriented programming (OOP) and functional programming (Odersky & Rompf, 2014). The Scala language can be used in various application domains. Basically, Scala language is able to run and compiled on Java and JavaScript platforms (Odersky, 2006).

Besides, the Asana system is also being built using the Amazon Web service and Luna framework for the user interface design and development as shown in Figure 2.2 (Wentzel, 2021). The Luna framework is the in-house framework which is can be used within an Asana

Inc. only (Wentzel, 2021). Apart from that, the Asana system implements MySQL with InnoDB for the database in order to store the work information and so on.

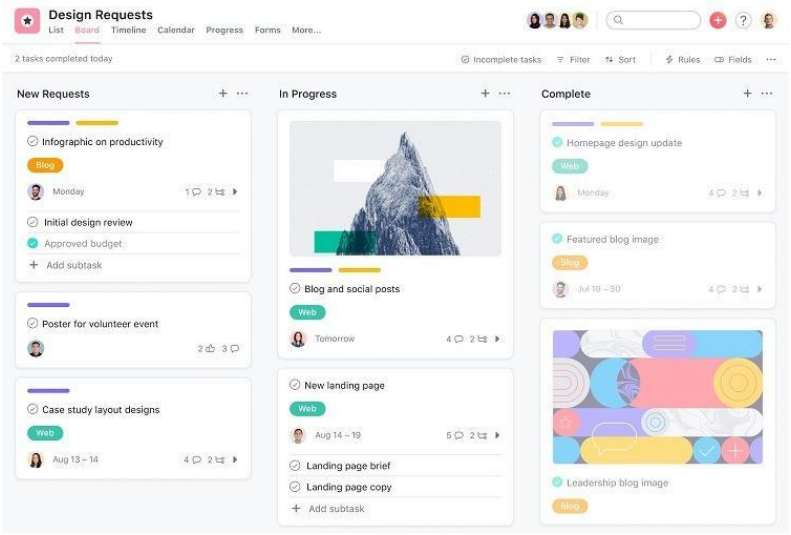

Figure 2.2 The example of Asana system interface

2.2.3 Trello system

The Trello system is a web-based application that has been developed by the Trello Enterprise ("Trello limits teams on free tier to 10 boards, rolls out Enterprise automations and admin controls," 2019). Trello system is able to unify the group members, manage the projects and organize the tasks in one platform using visualization features. The process and workflow of the Trello system is more implementing the Kanban style as shown in Figure 2.3. The Kanban style is applying several stages to represent the progression of the project work or task (Gross & McInnis, 2003).

For example, in the Trello system, there are three stages which are the 'To Do' stage, 'Doing' stage, and 'Done' stage. Each stage has a different process. The 'To Do' stage was used to provide the project task using the Trello cards to the particular team members. Meanwhile, the 'Doing' stage significantly shows the project task in the progression to be completed by that particular team member. Once the project task has been completed, the project task on the Trello card will be moved to the last stage which is the 'Done' stage.

Trello system was developed using CoffeeScript, JavaScript, Backbone.js, HTML5 language and mustache template (Kiefer, 2012). Mostly, the Trello system will utilize CoffeeScript and compiles it with JavaScript (MacCaw & Ashkenas, 2012). Moreover, the Trello system was developing the user interface using the mustache template.

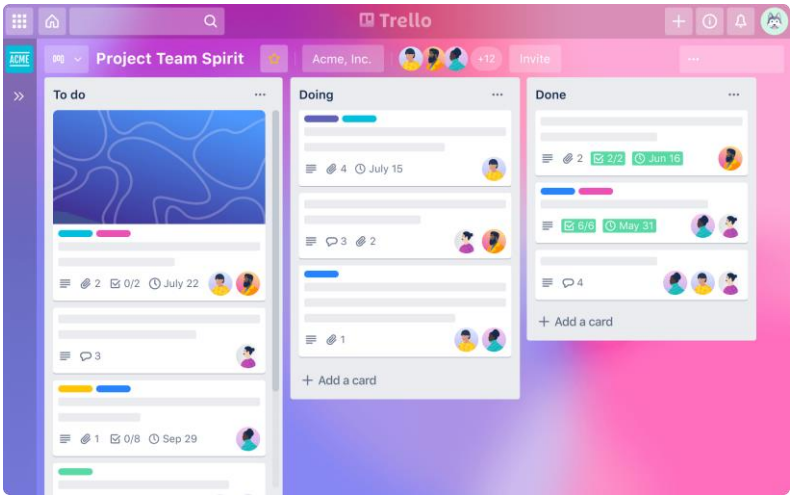

Figure 2.3 The example of Trello system interface

2.3 Comparison of Existing System

The three existing systems which are the Decision Support System for Final Year Project Management, the Asana system, and the Trello system will be analysed and compared based on their design, module, features, integration system that be used, and technique or method of the systems. Table 2.1 shows the summarise comparisons of three existing project management systems.

2.3.1 Decision Support System for Final Year Project Management

The Decision Support System for Final Year Project Management is a static and dynamic web-based system. The system is a static web-based system because of all the users will obtain the same interface and information on the main page once the user successfully login the system and the Decision Support System (DSS) interface. The dynamic web-based system can be seen in the prediction result interface since the data will be displayed differently based on the user's input and activities.

Besides, the design of the Decision Support System for the Final Year Project Management is simple but not attractive as shown in Figure 2.4. The system has used a lot of colours and each interface uses a different colour. However, the Decision Support System for Final Year Project Management is able to make the user understand the operation of the system since its implements a simple and common metaphor. Figure 2.5 shows the example of metaphor in the system.

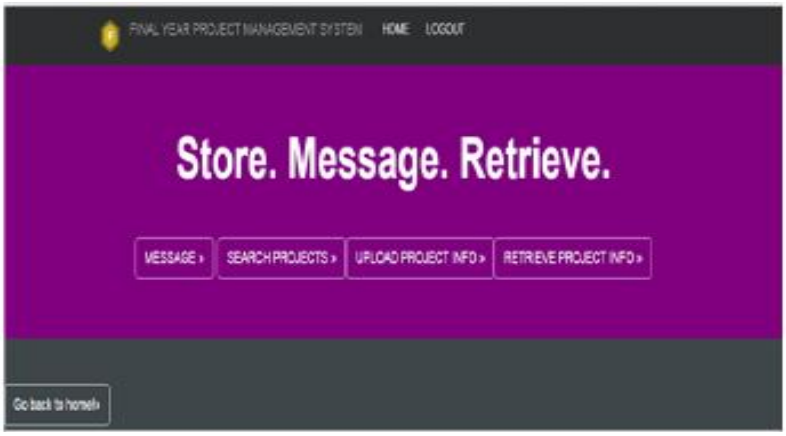

Figure 2.4 The design of the Decision Support System for Final Year Project Management

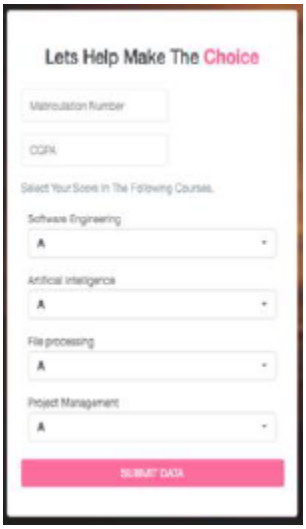

Figure 2.5 The example of a metaphor in the Decision Support System for Final Year Project Management

The Decision Support System for Final Year Project Management has 4 features. The first feature is the Message. The message is the communication platform between the student, supervisor and institution. The second, third and last feature is the function for the project information. For example, the student can find the previous students' projects by selecting the Search Projects feature. Besides, the student also allows to upload and retrieve their project information in the system once their project has been completed using the features of Upload Project Info and Retrieve Project Info. Figure 2.6 shows the features provided in the system.

Figure 2.6 4 features in the Decision Support System for Final Year Project Management

For the module, the Decision Support System for Final Year Project Management has 7 modules. The first module is the main page as shown in Figure 2.7. The main page contains

4 functions which are Message, Search Projects, Upload Project Info and Retrieve Project Info. Each function will directly bring the user to the other modules.

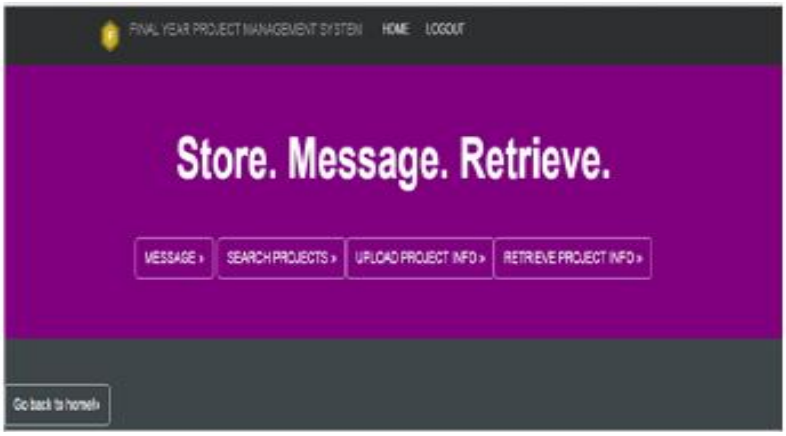

Figure 2.7 Main page module

The second module is Decision Support System (DSS) module. In the DSS module, the system has provided the form for the student or user to fill in the required data in order to help the system in making the prediction about the project title and supervisor for the student. Hence, the student needs to insert their metric number, CGPA and result of Software Engineering, Artificial Intelligence, File Processing and Project Management as shown in Figure 2.8.

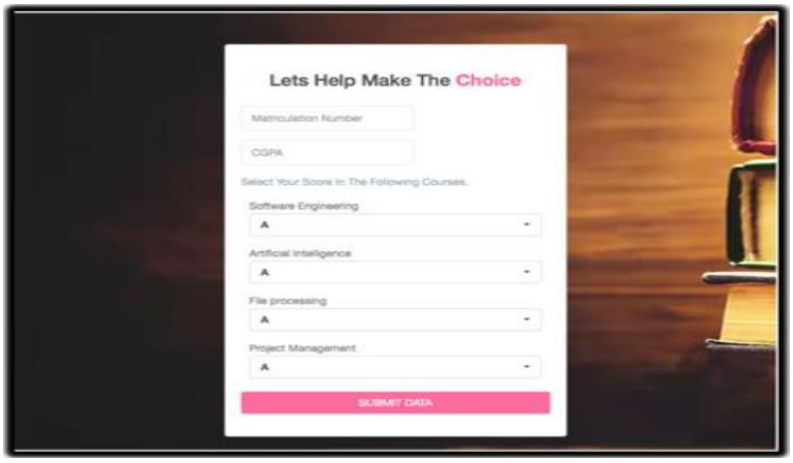

Figure 2.8 DSS module

The third module is the Suggestion module. The prediction result for the project title and supervisor will be shown in the Suggestion module. Figure 2.9 shows the interface of the suggestion module in the Decision Support System for Final Year Project Management.

Figure 2.9 Suggestion module

As mentioned before, in the Message module, the student is allowed to communicate with their supervisor. Moreover, the student also has the ability to find the previous project, upload and retrieve their project in the Search, Upload Project and Retrieve Project modules. Moreover, The Decision Support System for Final Year Project Management has integration with machine learning algorithms which is the Naïve Bayes algorithm. Figure 2.10 and Figure 2.11 shows the formula of the Naïve Bayes algorithm.

$$P(C_i|\mathbf{X}) = \frac{P(\mathbf{X}|C_i)\ P(C_i)}{P(\mathbf{X})}.$$

Figure 2.10 Naïve Bayes algorithm

$$P(\mathbf{X}|C_i) \approx \prod_{k=1}^{n} P(x_k|C_i).$$

Figure 2.11 Continue of Naïve Bayes algorithm

Lastly, The Decision Support System for the Final Year Project Management has been developed using the Naïve Bayes algorithm approach to make the accurate prediction and Java-Server Pages (JSP) by executing in the NetBeans IDE to create the interface.

2.3.2 Trello system

The Trello system is a dynamic web-based application. This is because all the information in the Trello system will be displayed dynamically according to the user data and behaviour. For instance, all the user's workspace or boards will be different based on their set style and information. Even, the user's recent view also changes variance according to the user's past activities.

Besides, the interfaces of the Trello system are very simple and interactive as shown in Figure 2.12. This is because the interface of the Trello system is not crowded with many information at one interface. Each feature and function of the Trello system is very neatly organized and appealing on the interface. Moreover, the Trello system was use the common language (metaphor) as can be seen in Figure 2.13. Hence, the user is able to understand the flow or function of the system without user guidance. In fact, the Trello system managed to achieve a flexible and user-friendly system.

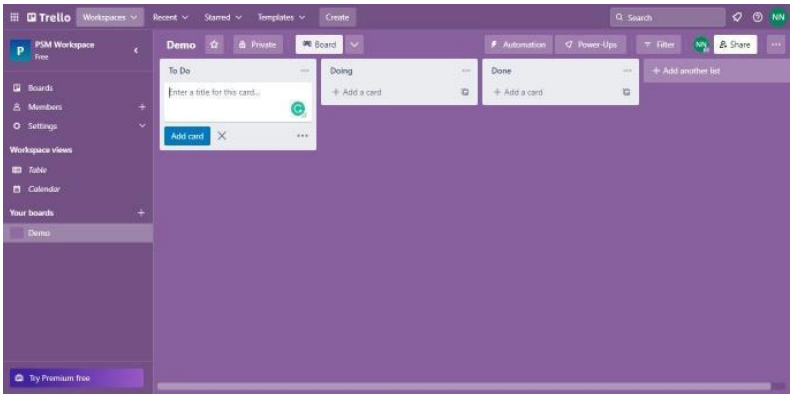

Figure 2.12 The design of the Trello system

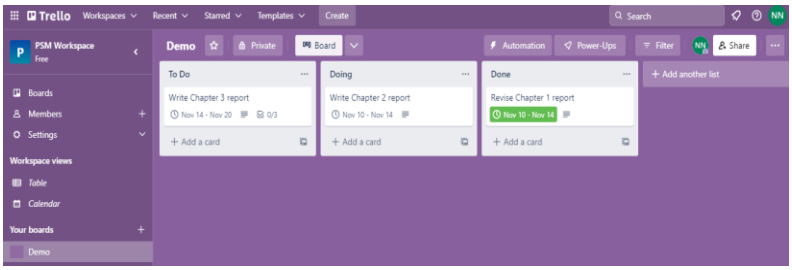

Figure 2.13 The example of a metaphor in the Trello system

Furthermore, the Trello system has proper and flexible features. Each feature in the Trello system is useful and related to project management. For instance, the Trello system has a feature to add group members, labels, and checklists in order to accomplish the project. In addition, the Trello system also has a calendar feature to create the due date for the task. The user is able to attach the important file, pictures or folders by utilizing the attachment function. The Figure 2.14 shows the certain features in the Trello system.

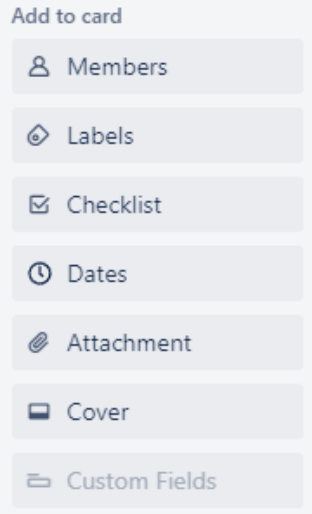

Figure 2.14 List of features to add in the task card

Apart from that, the Trello system has provided many action functions for the user to manage each project task as shown in Figure 2.15.

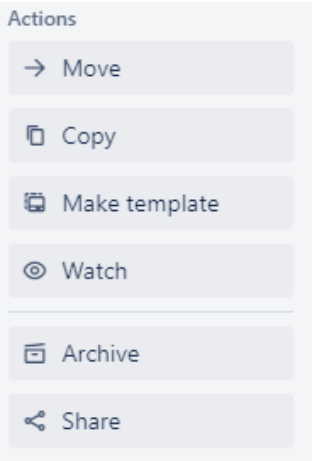

Figure 2.15 List of action features

The Trello system has 12 modules which are Home, Template, Board, Table, Calendar, Highlights, Views, Members, Setting, Automation, Power up, and Description modules. Each module has different information and functionality. Even though, the Trello system has 12 modules but, there has 4 modules that are important and need to be highlighted. The first module is the main page called the Home. The Home module contains information of the project task as shown in Figure 2.16. For instance, the due date of the task and two functional buttons. If the user successfully completes the project task, the user can click the ‘Complete’ button or otherwise.

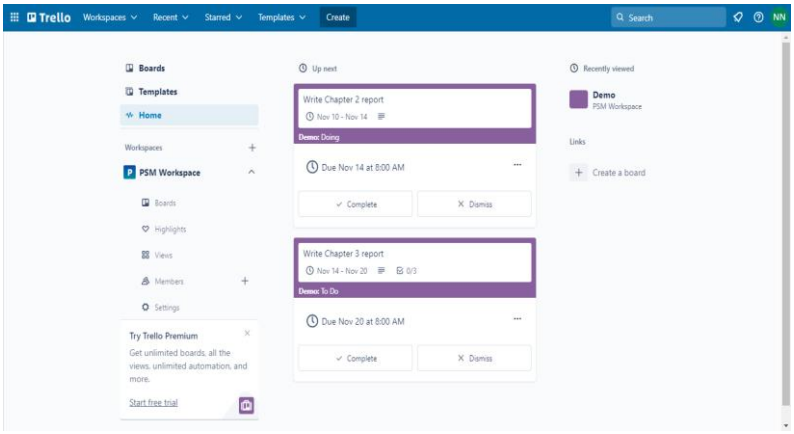

Figure 2.16 Home module

The second module is the Template module. In the Template module, the Trello system allow the user to utilize the template provided for the project board. Hence, it becomes one of the attractions for the user to use Trello system since they can decorate their project board based on their preference. Figure 2.17 shows the template provided in the module. Meanwhile, Figure 2.18 shows an example of the templates provided.

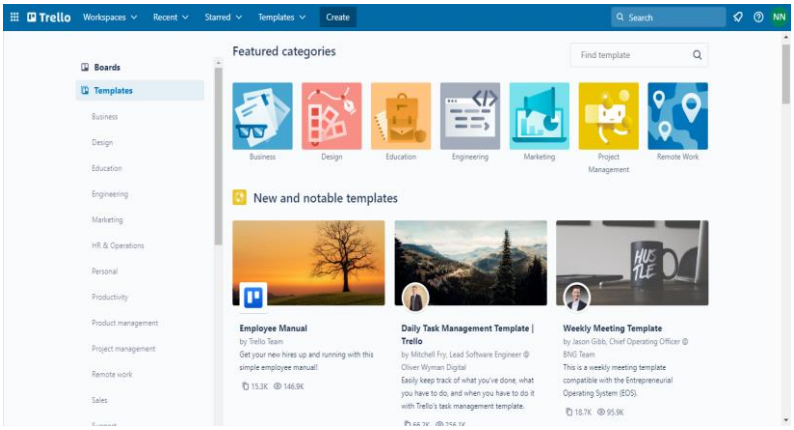

Figure 2.17 Template module

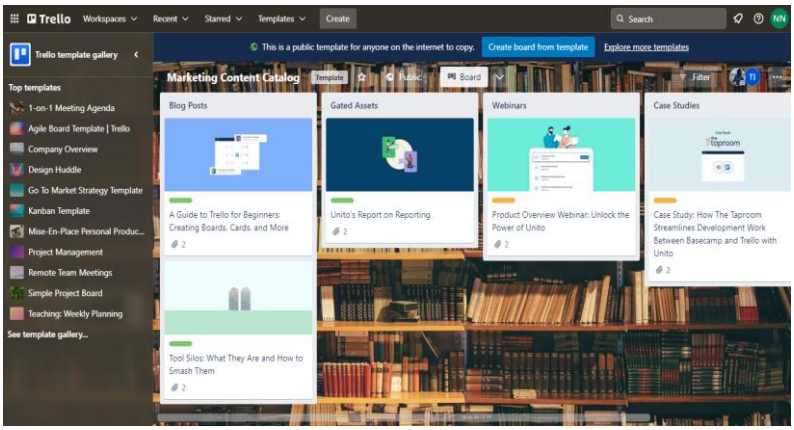

Figure 2.18 Example of the template provided

The third module is the Board module. The user is able to provide and view the task of the project on each list at the Board module. Basically, the Trello system will prepare the three basic lists such as ‘To Do’, ‘Doing’, and ‘Done’ lists as shown in Figure 2.19. However, the user is able to change the three basic list names or build another list. Besides, the user is also able to drag the task to the other list. For example, the user is able to drag the task from the ‘Doing’ list to the ‘Done’ list once they successfully complete the task.

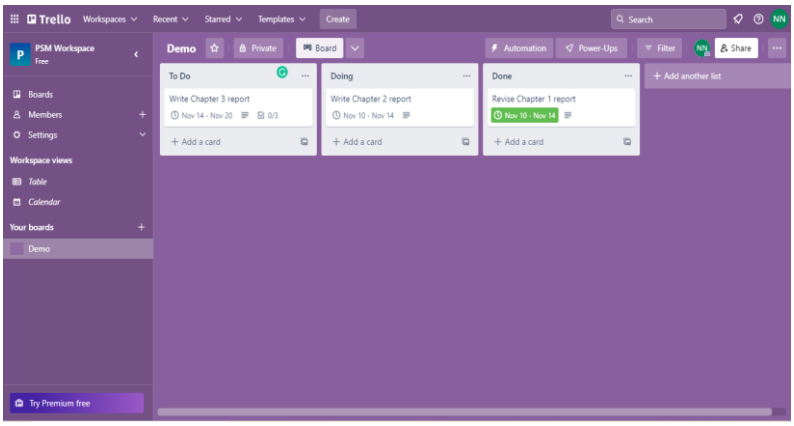

Figure 2.19 Board module

In the Description module as shown in Figure 2.20, the user is able to write the description of the task in more detail, assign the group members to the task, create the due date of the task, and attach the files or folders for their project reference. In addition, the user is also able to create a checklist and label in order to highlight the important work thus, ensure the task is done completely without missing anything. Besides, the Trello system allows the group members to leave comments about the task. Hence, the Trello system makes it convenient for the group members to communicate with each other. The action functions are in the Description module.

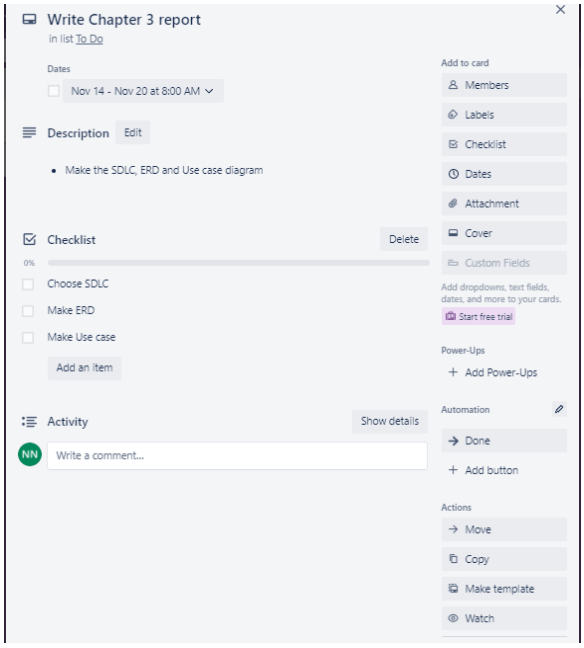

Figure 2.20 Description module

In the addition, the Trello system has developed the 'Power-Ups' function to make it conducive for the user to make the combination between their project progression with other software tools. The other tools that allow integration and work with the Trello system are Box, Jira. GitHub, Google Chat, Google Drive, OneDrive, Twitter, CloudApp, Agile Retrospectives, and so on. Figure 2.21 and Figure 2.22 shows the list of integrated tools.

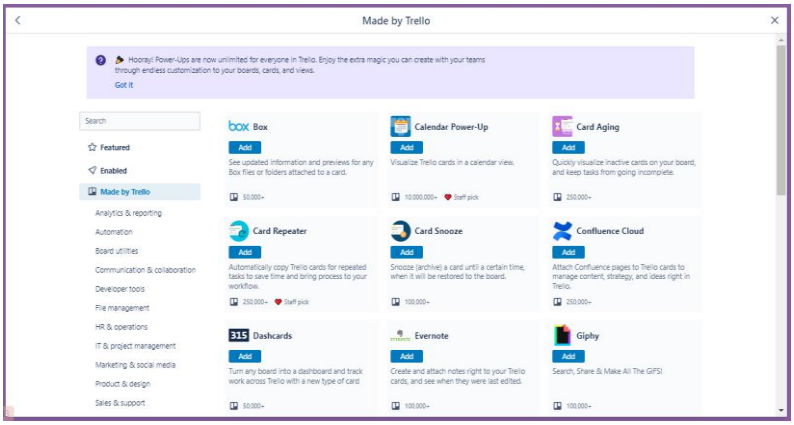

Figure 2.21 List of integrated tools for Trello system

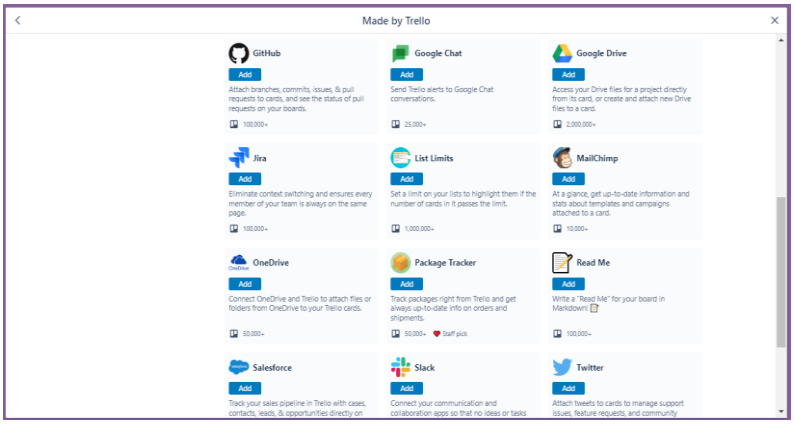

Figure 2.22 Continue a list of integrated tools for the Trello system

Lastly, the Trello system has utilized the Scrum process for the development methodology and the Kanban board ("IEEE Xplore Full-Text PDF:," n.d.). The Kanban board has been implemented in the Board module.

2.3.3 Asana system

Asana system is a dynamic web-based application due to the project progression will changed every day based on the user's input and updates. Besides, the design of the Asana system is simple and more minimalist as can be seen in Figure 2.23. Each module or interface contains the appropriate and important information for project management. In addition, all the information was presented in an organized thus, all the interfaces did not mess up with the many information. Moreover, the Asana system also uses a simple metaphor as shown in Figure 2.24 for the user to utilize the system in easier.

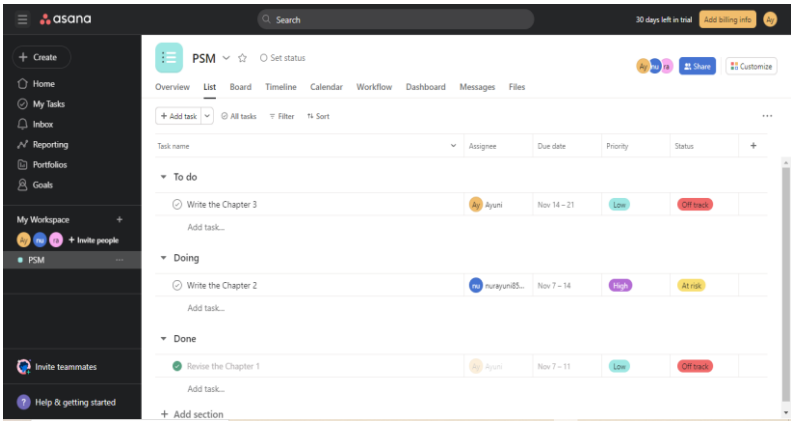

Figure 2.23 The design of the Asana system

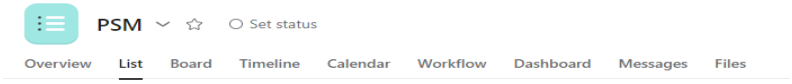

Figure 2.24 The example of a metaphor in the Asana system

For the feature, the Asana system provides various features. For example, the Asana system has prepare the priority and status features for the project task as shown in Figure 2.25. The user is able to declare the importance level of the project task whether Low, Medium or High through the priority feature. Hence, the group member can get the notification to complete the project task based on priority. Meanwhile, the status feature can well inform the user, manager or group member about the status progression of the project task whether is on the track, off track or at a risk.

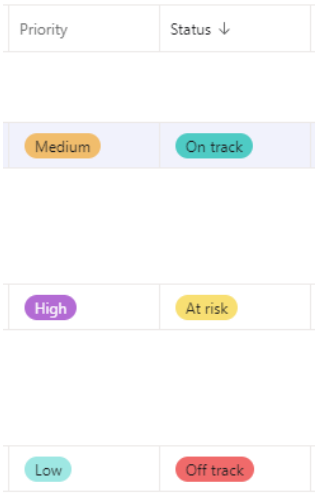

Figure 2.25 Priority and status features

In addition, the Asana system has a specialization feature for the user to view or display the project task progression based on their preference. For instance, if the user wants to view the project task progression in the list style, they can select the list feature. Otherwise, they can select the board, timeline, and calendar features once they want to view the project task progression in the Kanban board, Gantt Chart, and Calendar styles. Figure 2.26 until Figure 2.29 shows the features of list, Kanban board, Gantt Chart and calendar.

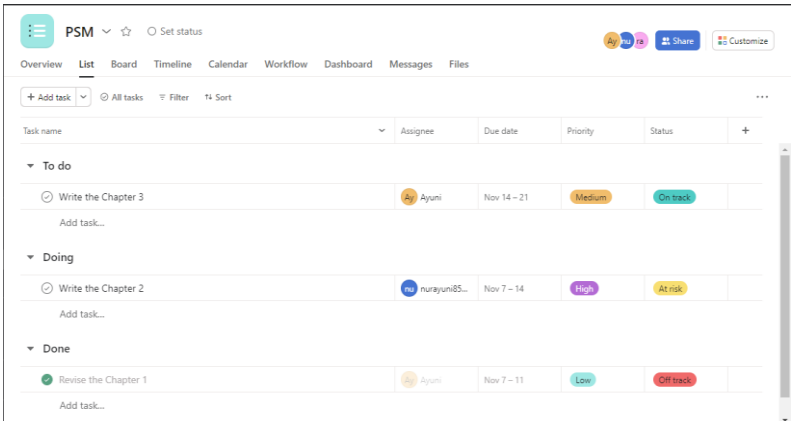

Figure 2.26 List feature

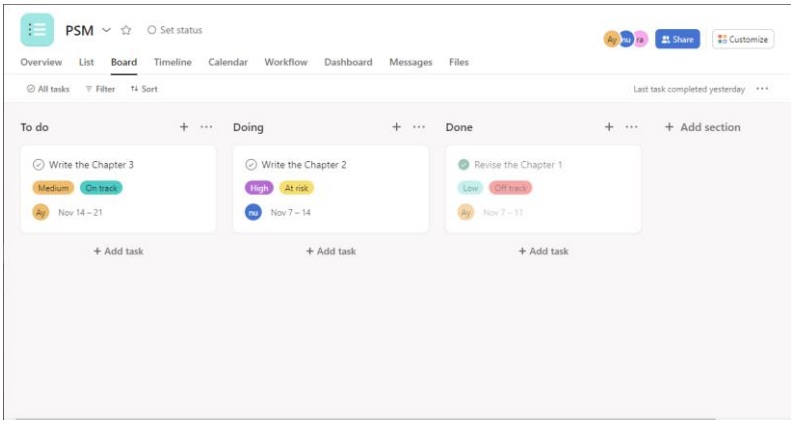

Figure 2.27 Board feature

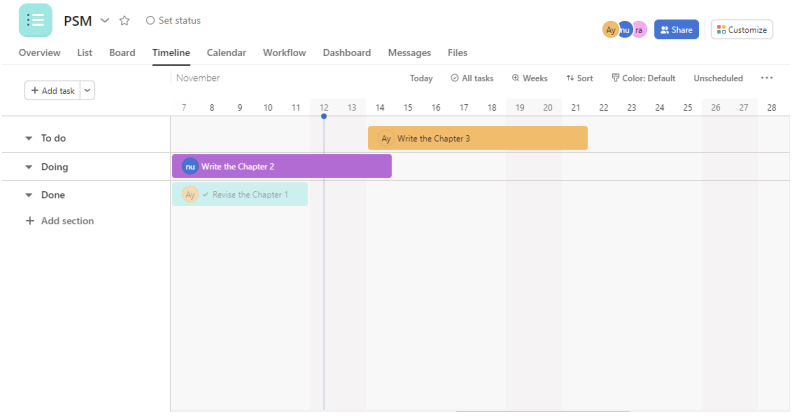

Figure 2.28 Timeline feature

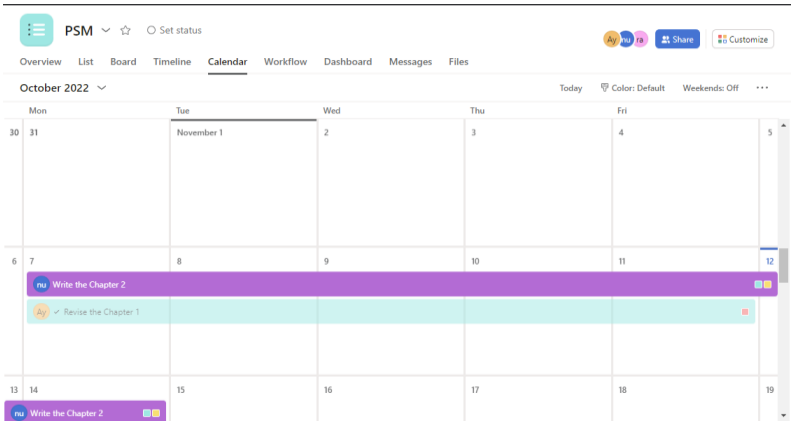

Figure 2.29 Calendar feature

Similar to the Trello system, the Asana system also has the features to add the project task, subscription to the task, subtask, assign the person to handle the task, create a deadline of the task, and attach the file, folder or picture for the task material as can be seen in Figure 2.30 until Figure 2.32.

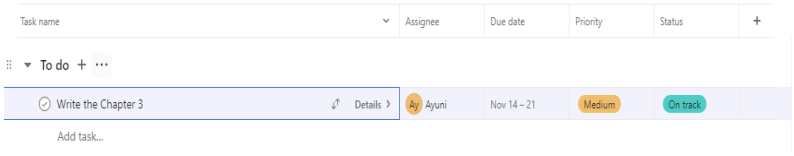

Figure 2.30 Add task feature

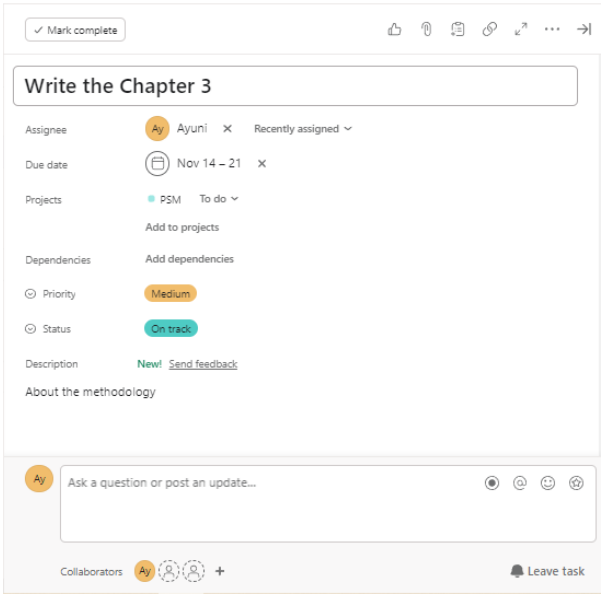

Figure 2.31 Project task feature

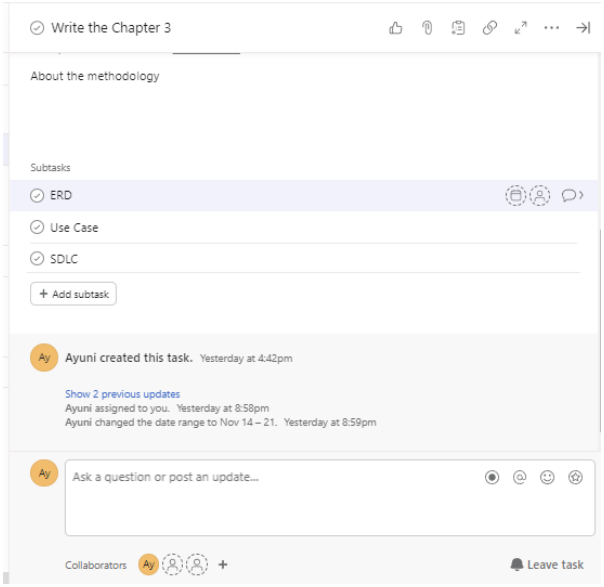

Figure 2.32 Subtask feature

The Asana system has 15 modules. However, the 15 modules were apart into two parts. The modules for the first part were developed for the user to preview all the project progression that manage or create by the user. Those modules are Home, My Tasks, Inbox, Reporting, Portfolios, and Goals as shown in Figure 2.33.

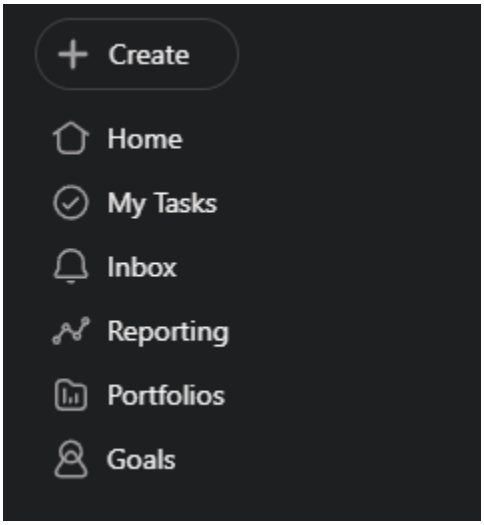

Figure 2.33 First part modules

Meantime, the modules for the second part were developed to preview the one project progress only from the several projects. Those modules are Overview, List, Board, Timeline, Calendar, Workflow, Dashboard, Messages, Task Details, and Files. Figure 2.34 shows the second part modules in the Asana system.

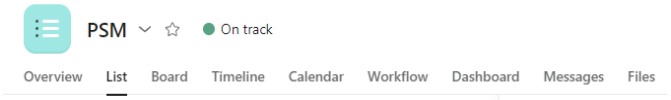

Figure 2.34 Second part module

The home module as shown in Figure 2.35 was developed for the user to view all the user's priorities tasks, projects, and the list of people which is the user collaborates for the projects.

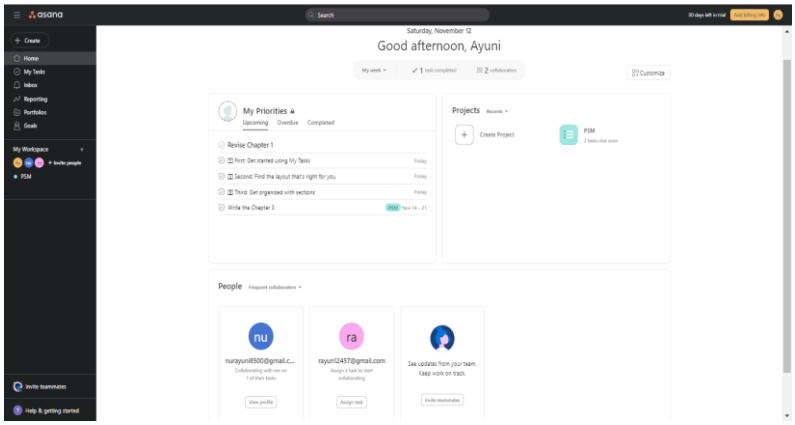

Figure 2.35 Home module

In the My Tasks module, the user is able to view the information of the user's task from all the projects either through a list, board or calendar include view all the files from the project.

In addition, the user is also able to add additional tasks or files in the My Tasks module. Figure 2.36 until Figure 2.39 shows the features and functions in the My Tasks module.

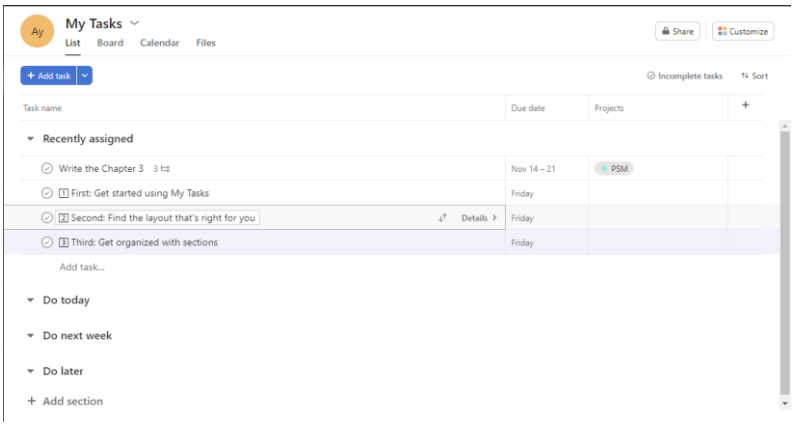

Figure 2.36 My Task module for list view

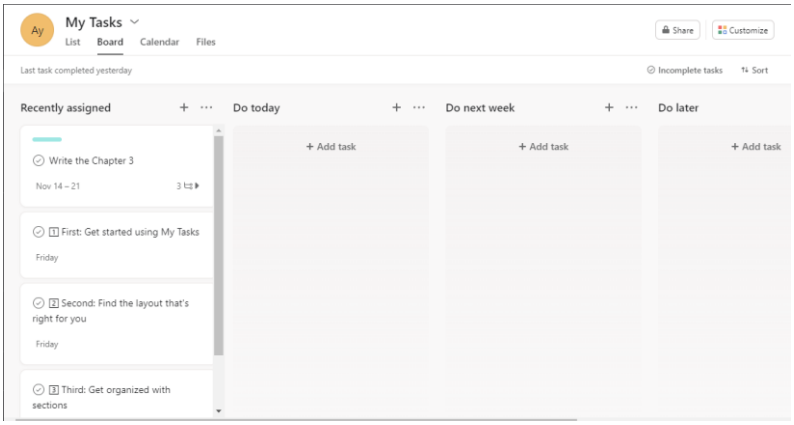

Figure 2.37 My Task module for board view

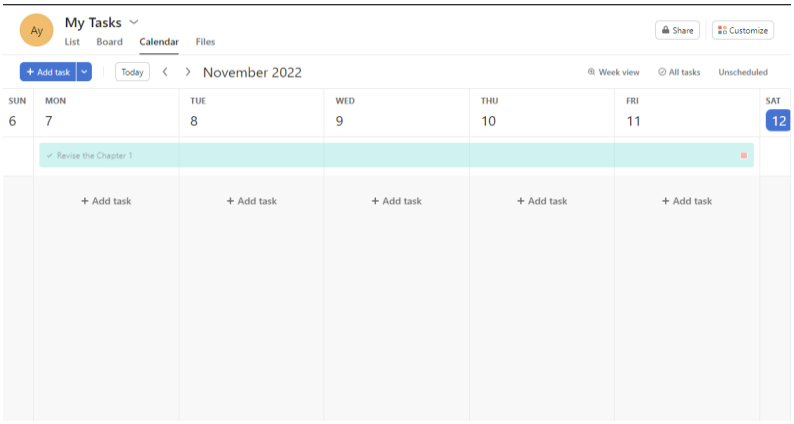

Figure 2.38 My Task module for calendar view

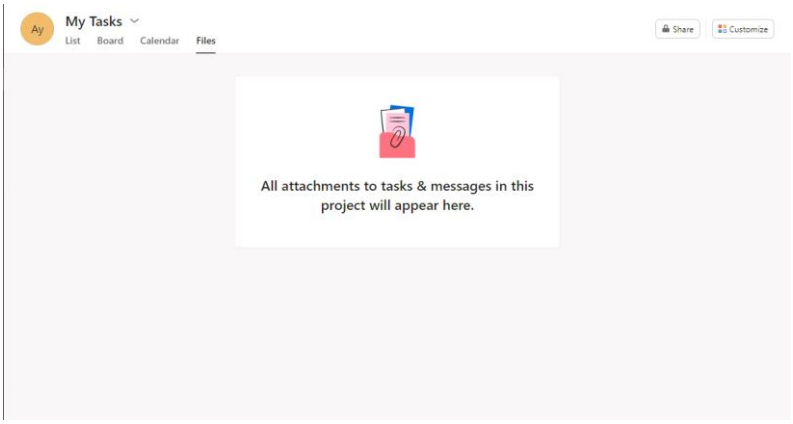

Figure 2.39 My Task module for uploading the material

In the Inbox module as shown in Figure 2.40, the user can send messages to the group members and read messages similar to email.

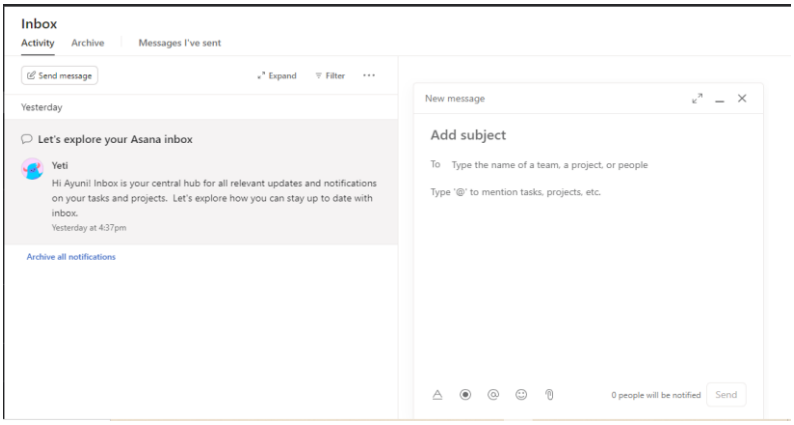

Figure 2.40 Inbox module

The Asana system has provided the visualization report of all projects through graphs and pie charts in the Reporting module as can be seen in Figure 2.41.

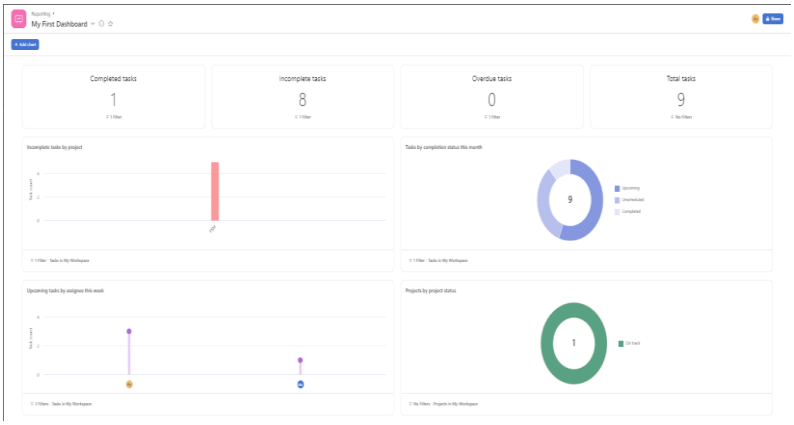

Figure 2.41 Reporting module

Apart from that, the user is able to view the task of each project including the assigned person, due date, priority, and status in the List, Board, Timeline, and Calendar modules as

shown in Figure 2.42 until Figure 2.45. The difference for each module is the method and style that has been developed to display the information of the task project. For example, the user is able to view the task project in Kanban style once the user selects the Board module.

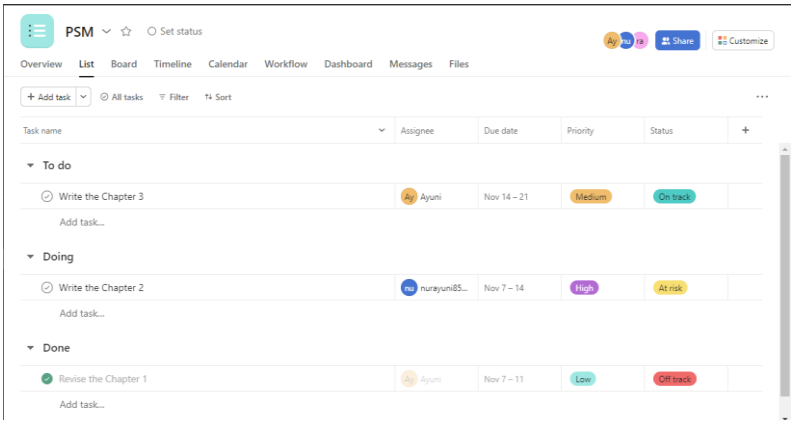

Figure 2.42 List module

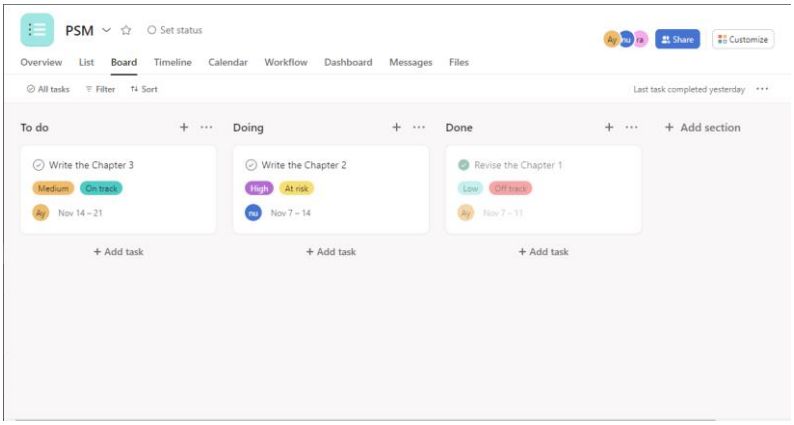

Figure 2.43 Board module

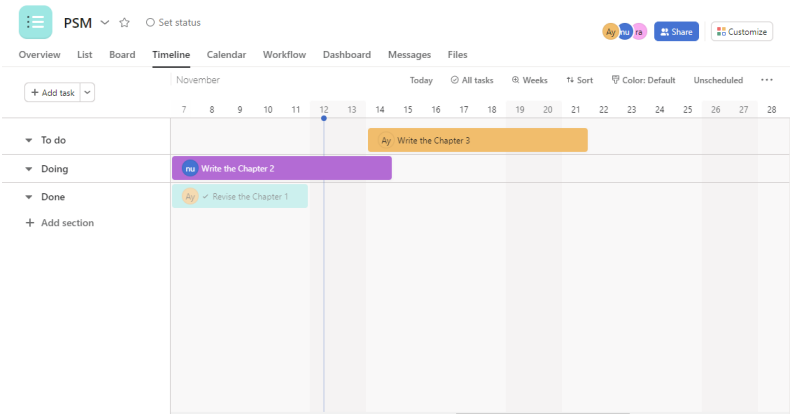

Figure 2.44 Timeline module

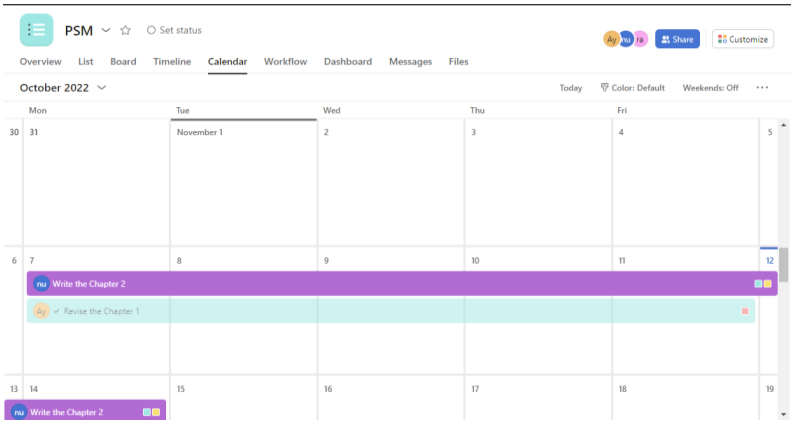

Figure 2.45 Calendar module

Moreover, the Messages and Files module is the platform for the user to send the message to the other group member of that project and upload the material for the project. Figure 2.46 shows the Message module. Meanwhile, Figure 2.47 shows the Files module.

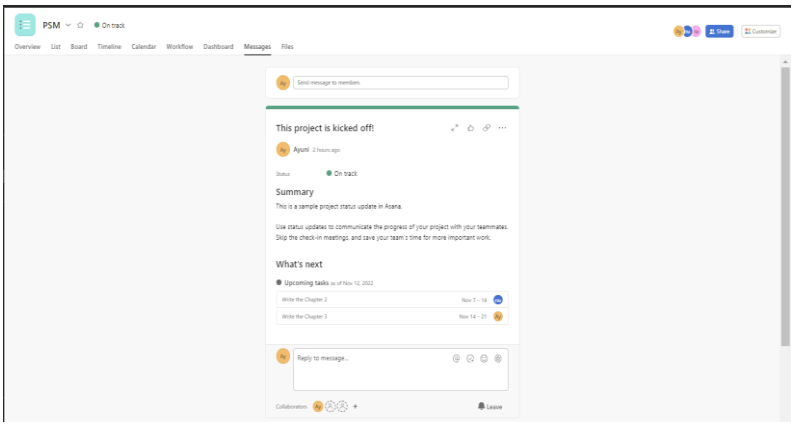

Figure 2.46 Messages module

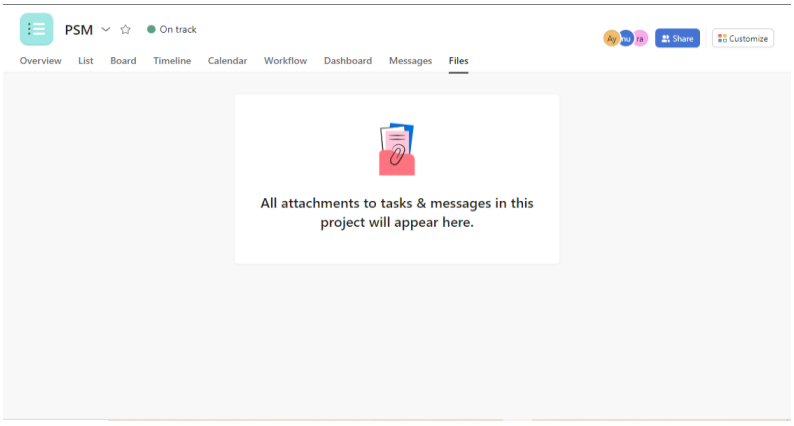

Figure 2.47 Files module

The user is able to get the information about the summary of a project progression through a graph and pie chart in the Dashboard module as can be seen in Figure 2.48.

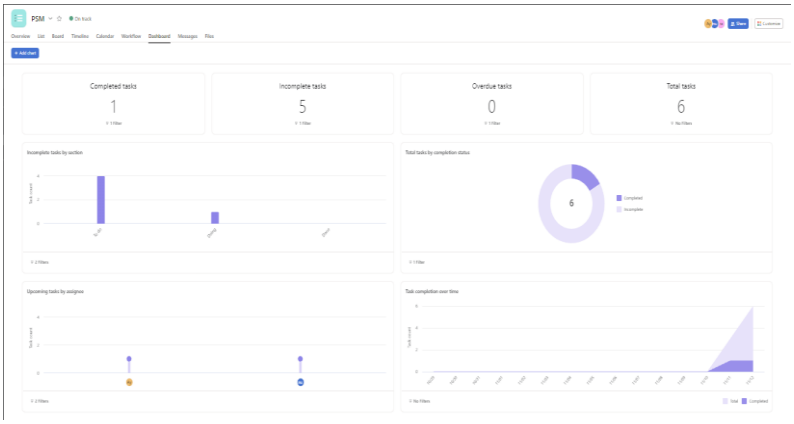

Figure 2.48 Dashboard module

Furthermore, the user is allowing to integrate the Asana system with the other applications such as Google Drive, Slack, Zoom, Microsoft Teams, Outlook, Box, SharePoint and so on. Figure 2.49 until Figure 2.50 shows the list of integrated tools for Asana system.

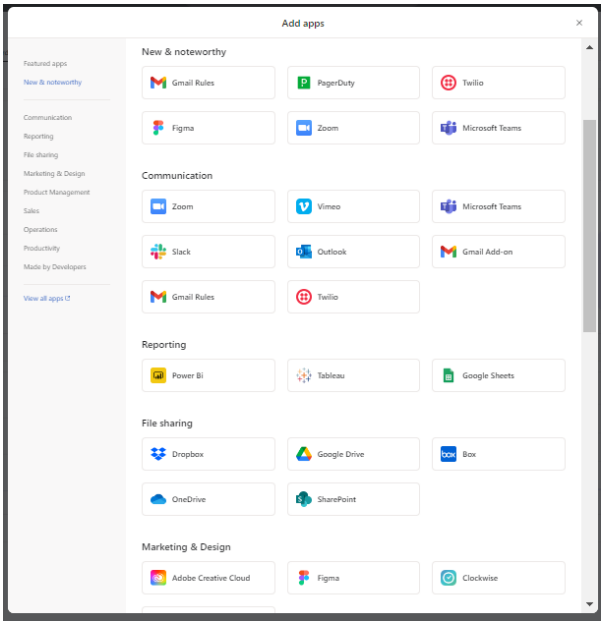

Figure 2.49 List of integrated tools for Asana system

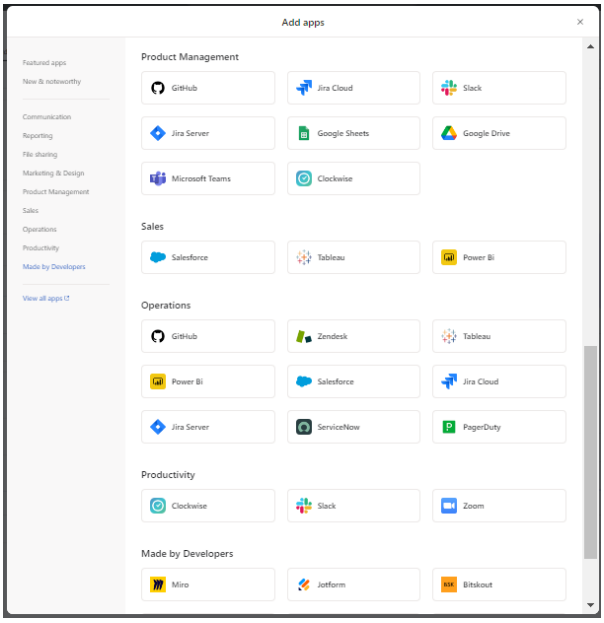

Figure 2.50 Continue a list of integrated tools for Asana system

Lastly, for displaying the information of the project task, the Asana system has utilized the list, Kanban, Gantt Chart and calendar method. Meanwhile, the Asana system also has implemented the graph and pie chart to visualization the progression of the whole and the certain project.

2.3.4 Analysis of existing system comparison.

Table 2.1 The comparison summary between three existing system

Element	Decision Support System for Final Year Project Management	Trello system	Asana system
Web application categories	✓ Static web-based system. ✓ Dynamic web-based system.	✓ Dynamic web-based system.	✓ Dynamic web-based system.
Design	✓ Simple. ✓ Unattractive.	✓ Simple. ✓ Interactive.	✓ Simple. ✓ Minimalist.
Metaphor (Language)	✓ Simple.	✓ Common	✓ Simple.
Features	✓ Message. ✓ Search Projects. ✓ Upload Project Info.	✓ Members. ✓ Labels. ✓ Checklists.	✓ Priority. ✓ Status. ✓ List.

	✓ Retrieve Project Info.	✓ Dates (Calendar). ✓ Attachment. ✓ Cover. ✓ Move. ✓ Copy. ✓ Make template. ✓ Watch. ✓ Archive. ✓ Share.	✓ Board. ✓ Timeline. ✓ Calendar. ✓ Add task. ✓ Subscription. ✓ Subtask. ✓ Assignee. ✓ Due date. ✓ Attachment.
Module	✓ Main Page. ✓ Decision Support System (DSS). ✓ Suggestion. ✓ Message. ✓ Search. ✓ Upload Project. ✓ Retrieve Project.	✓ Home. ✓ Template. ✓ Board. ✓ Table. ✓ Calendar. ✓ Highlights. ✓ Views. ✓ Members. ✓ Setting. ✓ Automation. ✓ Power up. ✓ Description.	✓ Home. ✓ My Tasks. ✓ Inbox. ✓ Reporting. ✓ Portfolios. ✓ Goals. ✓ Overview. ✓ List. ✓ Board. ✓ Timeline. ✓ Calendar. ✓ Workflow. ✓ Dashboard. ✓ Messages. ✓ Task Details. ✓ Files.
Integration system	✓ Naïve Bayes.	✓ Box. ✓ Jira. ✓ GitHub. ✓ Google Chat. ✓ Google Drive. ✓ OneDrive. ✓ Twitter. ✓ CloudApp.	✓ Google Drive. ✓ Slack. ✓ Zoom. ✓ Microsoft Teams. ✓ Outlook. ✓ Box. ✓ SharePoint. ✓ Google Sheets.

		✓ Agile Retrospectives.	
Method/ technique	✓ Java-Server Pages (JSP). ✓ NetBeans IDE. ✓ Naïve Bayes.	✓ Scrum methodology. ✓ Kanban board.	✓ List. ✓ Kanban board. ✓ Gantt Chart. ✓ Calendar. ✓ Graph. ✓ Pie Chart.

2.4 Relevance of Comparison with Project Title

2.4.1 Comparison between existing system and proposed system

1. Decision Support System for Final Year Project Management

The advantage of the Decision Support System for Final Year Project Management is the system has provided accurate decision-makers. Hence, the system is able to help solve the final year students' problem in the first process of project progression which is finding the project title and supervisor. Basically, this system is suitable for the final year student who is hesitant in making a decision for their project. In short, the Decision Support System for Final Year Project Management is a great system to avoid the burden for final year students in completing their project since the project is based on their capability, interest and skill.

Unfortunately, the Decision Support System for Final Year Project Management has shortcomings in the design. The design of this system is unattractive and difficult to gain the user's impression. Therefore, the Decision Support System for Final Year Project Management can be used as a reference in improving and avoiding the mistake in designing the proposed system. Moreover, the Decision Support System for Final Year Project Management did not have the features and functionality to manage the project management such as visualization report of project progression and supervisor quota as provided in the propose system.

2. Trello system

The pros of the Trello system are the system an easier and user-friendly system. The Trello system is not a complex system until needed guidance in order to use it. All the project tasks in the Trello system can simply move by drag and drop method only. In fact, the Trello system is suitable software to help in creating and managing smaller project progression in a

more organized and systematic ("Trello Review - The Good and The Bad for 2022," 2022). In the Trello system, the user is able to write a details description of the task and create a deadline for the task. In addition, the design of the Trello system is very appealing.

However, the cons of the Trello system are this system did not have a visualization report about the project in order to monitor the progression of the project in more detail. In the Trello system, the supervisor is able to monitor the project task based on the task being moved from one phase to another phase until it is complete. For example, the supervisor is able to know the supervisee is doing their project task once the task was moving from the 'To Do' phase to the 'Doing' phase. Once the project task has been in the 'Done' phase, the supervisor cannot obtain the summary and performance of the student's project. The supervisor only can check and leave a comment if there is a correction that needs to be done by the supervisee. In addition, the Trello system also did not provide the status priority of the project task in order to assist the supervisee in performing the most important task.

Therefore, the proposed system which is the Final Year Project Management System for the Faculty of Computing will implement the real-live project progression report in order to help the supervisor know the problem and status of the student's project. In fact, the supervisor is able to take quick action to help their supervisee who faces the project problem based on the shown status level of the project. The summary of project progression in the Final Year Project Management System for the Faculty of Computing will be shown in the graph and pie chart to make it easier for the supervisor to understand and monitor their supervisee. In fact, the Final Year Project Management System for the Faculty of Computing also will develop the function of status priority of the project task to make it convenient for the supervisee.

3. Asana system

The advantage of the Asana system is that system has the great task management ("Asana Pros and Cons: Top 4 Advantages & Disadvantages," 2021). Asana system has provided the features of priority level and status task level for the user to notice and make a preparation for any possibility or obstacle. Besides, the features of priority level and status task level also can help the user in planning and making a decision about which task that needs to be performed first. Apart from that, the Asana system has implemented the project progression report or summary for the user to review. As the result, the user can check or view their project

progression information. For instance, the user is allowed to view the total of completed tasks, incomplete tasks, and overdue tasks.

The disadvantage of the Asana system is this system has a shortcoming with the assigned task. The Asana system can allow assigning one person per task only (SANTOS, 2022). As the consequence, there will be multiple and duplicate tasks in order to assign to many people. Moreover, the Asana system has too many features that need to be set to create one task only ("Asana Pros and Cons: Top 4 Advantages & Disadvantages," 2021). Many features also contribute to the system becoming inflexible and difficult. In short, the Asana system is not a suitable system to be utilized by the supervisor due to the supervisor will be overloaded with work.

Thus, the Final Year Project Management System for the Faculty of Computing is able to minimize the supervisor's work. This proposed system will allow the supervisor to assign one task to many supervisees at the same time in an easier way like email. In addition, the Final Year Project Management System for the Faculty of Computing will develop important and useful features only in order to avoid the supervisor and supervisee from overwhelming with the required action and work for completing or creating the task.

2.4.2 Comparison of three existing and proposed system

Based on Table 2.2, the proposed system has special features which make proposed system different and more usable than the existing systems. The proposed system which is the Final Year Project Management System for the Faculty of Computing has provided the list of supervisor quota, supervisor approval by the coordinator and project evaluation information features in the system that are not provided in the three existing systems. As the result, the Final Year Project Management System for the Faculty of Computing will cover all the listed features and user requirements. In fact, the proposed system managed to implement the advantage and make the disadvantage of the existing system as the improvement for the proposed system.

Table 2.2 The comparison summary between three existing system and proposed system

Features	**Decision Support System for Final Year Project Management**	**Trello system**	**Asana system**	**Final Year Project Management System for Faculty of Computing**
Simple and attractive design.	✗	✓	✓	✓
User-friendly system.	✓	✓	✓	✓
Suitable to manage the project progression.	✗	✓	✓	✓
Provide the detail description for the project task.	✗	✓	✓	✓
Communication platform.	✓	✓	✓	✓

Create deadline of the project task.	✓	✓	✓	✓
Visualization report for project progression.	✗	✗	✓	✓
Status of project task.	✗	✓	✓	✓
Priority of project task.	✗	✗	✓	✓
Assign project task to many supervisee at one time.	✗	✓	✗	✓
Supervisor quota	✗	✗	✗	✓
Attachment/submission platform	✓	✓	✓	✓
Supervisor approval	✗	✗	✗	✓
Project evaluation information.	✗	✗	✗	✓

2.5 Summary

In conclusion, the comparison of the three existing systems is able to make the improvement in the features and design of the proposed system. The features in the Final Year Project Management System for Faculty of Computing is able to manage the beginning process of the project until the end in more efficiently. This is because the Final Year Project Management System for Faculty of Computing has provide the supervisor quota for the supervisor and supervisee. Hence, the supervisor quota able to make it convenient for the supervisee to find their preferred supervisor based on the quota provided. In addition, the supervisor also able to aware the quota that they obtain in order to take the student as the supervisee.

Moreover, the Final Year Project Management System for Faculty of Computing has implement the visualization report of supervisee project progression. Thus, the supervisor able to obtain the performance of the supervisee project and help the supervisee problem. The supervisee project progression report will be shown using the status, graph and pie chart. Besides, the Final Year Project Management System for Faculty of Computing also provide the communication platform for the supervisor and supervisee to communicate with each other. For instance, communication platform that able the supervisee to approach the lecturer to become their supervisor, discussion about the project and provide the project task for the supervisee.

Apart from that, the Final Year Project Management System for Faculty of Computing has the submission platform for the supervisee to submit their project progress and project documentation to the supervisor for the checking purpose. Furthermore, the Final Year Project Management System for Faculty of Computing has provide the supervisor research group and evaluator list for the supervisee. The supervisor research group can help the supervisee to determine the suitable supervisor for their project. Meanwhile, the evaluator list will help the supervisee aware who will be evaluate their project during the evaluation.

As the result, the proposed system is able to achieve a better web-based system in helping the supervisor and supervisee in managing the final year project in a more organized, systematic and efficient. Last but not least, the Trello system has utilized the Scrum methodology (“IEEE Xplore Full-Text PDF:,” 2018) and based on the analysis, the top 3 methodology that will be used for the project management development are Waterfall, Agile and Scrum methodologies (Westland, 2021). Therefore, the Final Year Project Management

System for Faculty of Computing will be used the Agile methodology. The detail explanation about the Agile methodology of the Final Year Project Management System for Faculty of Computing will be provided in the Chapter 3 (Ibukun.T. Afolabi, Ayodele A. Adebiyi, 2019).

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will be explained the SDLC, system requirement, user requirement, system design, data design which is ERD, testing plan, and proposed solution of the Final Year Project Management System for Faculty of Computing.

According to the analysis of the three existing systems and the top 3 methodologies of the project management systems (Westland, 2021), the suitable SDLC for the Final Year Project Management System for Faculty of Computing is Agile methodology (Rasnacis & Berzisa, 2017). Agile methodology is very flexible, dynamic and fast for the development of the Final Year Project Management System for Faculty of Computing ("What Is Agile Methodology in Project Management?," 2021).

Unlike the Waterfall methodology, the Agile methodology makes it easier to change or upgrade the system during the development process by going back to the problem phase only. Hence, the developer does not need to start from the first phase in order to make the changes. Moreover, the Agile methodology is acceptable and convenient for the project management system that needs a more responsive and fast-paced production schedule (Westland, 2021).

Since the Final Year Project Management System for Faculty of Computing need a responsive and fast-paced project progression report thus, it is appropriate to use the Agile methodology for the system development.

3.2 Project Management Framework/Methodology

Agile methodology is the process to develop and manage the Final Year Project Management System for Faculty of Computing in a more systematic and faster. However, the Final Year Project Management System for Faculty of Computing needs to go through several phases in order to become a good system that satisfied the objective and users. The Agile methodology has 6 different phases which are Plan, Design, Develop, Test, Deploy and Review. Hence, the Final Year Project Management System for Faculty of Computing will implement and go through the different processes for each phase.

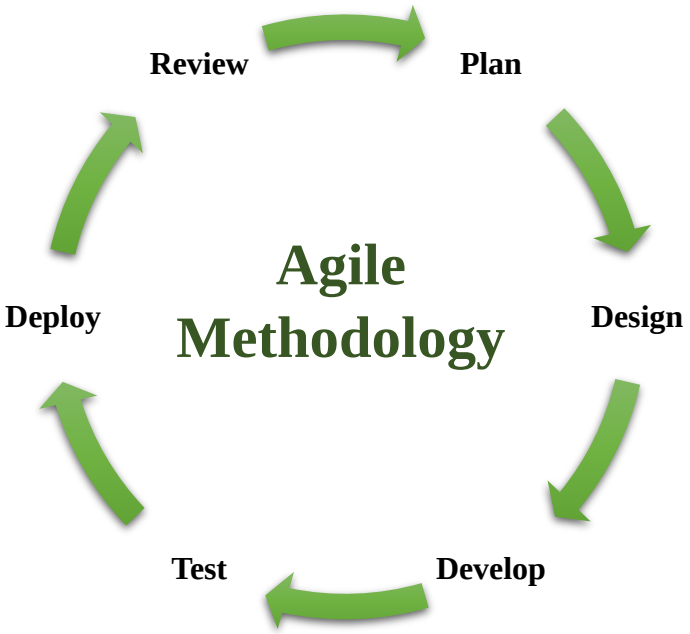

Figure 3.1 Methodology for the Final Year Project Management System for Faculty of Computing

I. Plan

In the planning phase, the development of the Final Year Project Management System for Faculty of Computing will start with an analysis of the problem that will be solved by the proposed system. Analyzing the problem will help to determine the appropriate objective and scope for the Final Year Project Management System for Faculty of Computing. Determining the objective is important for ensuring the development of the Final Year Project Management System for Faculty of Computing manage to responsively solve the problem and achieve the users' needs. Likewise, the scope will help to determine which user, admin and location that have the authority to access the Final Year Project Management System for Faculty of Computing. Detailed information about the problem statement, objective and scope of the Final Year Project Management System for Faculty of Computing can be referred to the Chapter 1.

Besides, the planning phase also required the comparison analysis of three existing project management systems in order to improve the features and design of the Final Year Project Management System for Faculty of Computing. Those three existing project management which is the Decision Support System for Final Year Project Management, Trello system and Asana system will be compared in terms of features, design, modules, and metaphor. Lastly, the development of the Final Year Project Management System for Faculty of Computing needed the review of the user and system requirements in order to help with the development process. The information about the comparative analysis of three existing project management systems and the proposed system can be referring in Chapter 2.

II. Design

In the design phase, it is important to start with the draft or sketch of the interface design of the Final Year Project Management System for Faculty of Computing in order to understand the flow of the system. Besides, the draft interface design of the Final Year Project Management System for Faculty of Computing also can help as the guideline in performing the storyboard, flowchart, context diagram and use case of the proposed system. Moreover, the design and flow of the database are also needed to determine the data that is required and inserted in the database. Basically, the design and flow of the database will be shown using the Entity-Relationship Diagram (ERD). The Final Year Project Management System for Faculty of Computing also will have the mock up design and prototype in order to overview the design and features of the proposed system.

In addition, in the design phase, the project requirement such as functional requirements, non-functional requirements, constraints and limitations, system requirements, hardware requirements and user requirements for the Final Year Project Management System for Faculty of Computing will be determined. The user requirement for the Final Year Project Management System for Faculty of Computing will be obtained from the conducting survey and interviews among the final year students and lecturers from the Faculty of Computing. Hence, the modules in the Final Year Project Management System for Faculty of Computing also will be determined and identified from the users' requirements. The detail information about the design, flowchart, use case, ERD, context diagram, modules, project and user requirements will be explained in this chapter which is Chapter 3.

III. Develop

In the development phase, the Final Year Project Management System for Faculty of Computing will start to develop using the programming language and system. The Final Year Project Management System for Faculty of Computing will be developed using Visual Studio Code for the programming software and phpMyAdmin for the database. According to the scope of the system in Chapter 1, the design and interface for the Final Year Project Management System for Faculty of Computing will be developed using the HTML and CSS language. Meanwhile, the features and validation of the Final Year Project Management System for Faculty of Computing will be developed using the JavaScript language. At the same time, the PHP language will be used to make the connection and process between phpMyAdmin and the proposed system in terms of creating, inserting, retrieving, updating and deleting data. The

detailed development process of the Final Year Project Management System for Faculty of Computing will be discussed in Chapter 4.

IV. Test

Once the development of the proposed system has been completed, the Final Year Project Management System for Faculty of Computing will go through the testing process. In the test phase, the Final Year Project Management System for Faculty of Computing will be tested in terms of its functionality of the features and validation in order to ensure the system and code are clean without any errors or bugs ("The Agile Software Development Life Cycle | Wrike Agile Guide," 2021). If there is an error or bug occurred during the testing process, the Final Year Project Management System for Faculty of Computing will be returned back to the plan and develop phases again in order to determine the solution and fix the problem. Then, the system will be inspected again in the testing phase. Moreover, in the test phase, the Final Year Project Management System for Faculty of Computing will be tested by the developer, supervisor and admin of the system. Once they have been testing the system, they need to fill in the User Acceptance Test form to obtain results on whether they approve the functionality of the Final Year Project Management System for Faculty of Computing or not. The detailed information about the testing process and User Acceptance Test form for the Final Year Project Management System for Faculty of Computing can be referred in Chapter 4.

V. Deploy

After completing testing the proposed system and ensuring the system is clean of the bugs or errors, the Final Year Project Management System for Faculty of Computing will be utilized by the users and admin.

VI. Review

In the review phase, the Final Year Project Management System for Faculty of Computing will be always upgraded and monitored due to avoid any new errors and bugs. In addition, the Final Year Project Management System for Faculty of Computing also will be maintained according to the review and feedback from the users. Hence, the Final Year Project Management System for Faculty of Computing is able to achieve the users' satisfaction.

3.3 Project Requirement

Project requirement is one of the most priority in the project or software development needs (Harwell, Aslaksen, Mengot, Hooks, & Ptack, 1993). All the project requirement is the guideline for the development project in achieving the objectives and scope of the project. Hence, the Final Year Project Management System for Faculty of Computing has six requirements in order to ensure becomes the complete system that fulfils user needs and the objective of the project. Those six requirements are functional requirements, non-functional requirements, constraints and limitations, hardware requirements, software requirements and user requirements. A detailed explanation of each requirement is the below:

3.3.1 Functional requirement

A functional requirement is the functions or features in the Final Year Project Management System for Faculty of Computing that enable the users and admins to perform and complete the tasks ("Functional and Non-functional Requirements: Specification and Types | AltexSoft," 2021). The users and admins are able to obtain the results that they expected once completed the required tasks. Below are the functional requirements of the Final Year Project Management System for Faculty of Computing. The users are referring to the supervisor and supervisee. Meanwhile, admins are referring to the coordinator of the final year project.

- Users must login in order to access the Final Year Project Management System for Faculty of Computing system.
- The system allows users to review the updated supervisor quota in the supervisor quota interface.
- The coordinator is able to edit the supervisor quota in the supervisor quota interface.
- The system allowed the communication between supervisor and supervisee in the chat feature.
- The system allows users to utilize the email platform for supervisor hunting making integration with Google Mail.
- The coordinator is able to approve the supervisor application by the supervisee in the supervisor approval interface.

- The supervisee is able to submit the project materials and files in the submission function in order to review the status of the project progression.
- The supervisor and supervisee are able to view and monitor the project progress in the project overview function.
- The system allows the supervisor to create the task for the supervisee in the task function.
- The system allows the supervisee to update the status level of the task either on track, risk or off track in the task function.
- The coordinator is able to provide the list of evaluators and evaluation information for each supervisee in the evaluation function.
- The system is able to provide the evaluation information once the supervisee searches their name on the search function in the evaluation info interface.

3.3.2 Non-functional requirement

A non-functional requirement is a method that the Final Year Project Management System for the Faculty of Computing should perform in order to satisfy the users' and admins' needs ("Functional and Non-functional Requirements: Specification and Types | AltexSoft," 2021). Below are the non-functional requirements of the Final Year Project Management System for Faculty of Computing.

- The system is able to support 1000 users at one time without system downtime and performance degradation.
- The system is able to provide a fast and reliable response time.

3.3.3 Constraints and limitations

The Final Year Project Management System for Faculty of Computing has several constraints and limitations for the users and admins in order to secure the data integrity from alternation and loss. Since, the Final Year Project Management System for Faculty of Computing provides the visualization of project overview hence, the integrity of data is important in order to provide the accurate result of project progression. Below are the several

constraints and limitations in the Final Year Project Management System for Faculty of Computing.

- The users did not have the authority to update and edit the supervisor quota.
- The users and admins did not have the ability to change and edit the overview of the supervisee's project progression. The result of project progression is automated by the system based on the completed task and submission from the supervisee.

3.3.4 Hardware and software requirements

The Final Year Project Management System for Faculty of Computing required the utilisation of the hardware and software in order to assist and support the development of the system. In fact, the usage of hardware and software is able to overcome the shortcoming and bugs in the system. Table 3.1 shows the hardware and software requirements for the Final Year Project Management System for Faculty of Computing.

Table 3.1 Hardware and software requirements

Type of requirements	The requirement
Hardware	• Laptop for typing the code and developing the Final Year Project Management System for Faculty of Computing. • UMP server to launch the Final Year Project Management System for Faculty of Computing once completed the development and testing.
Software	• Visual Studio Code to write the code using the programming language and build the Final Year Project Management System for Faculty of Computing. • phpMyAdmin to create the database of the Final Year Project Management System for Faculty of Computing. • XAMPP Control Panel to develop and make the connection between the database and system of the Final Year Project Management System for Faculty of Computing using the PHP language.

	• W3Schools in assisting and obtaining the correct coding for the development of the Final Year Project Management System for Faculty of Computing.

3.3.5 User requirements

Two methods that the Final Year Project Management System for Faculty of Computing has conducted to obtain the user requirements. Those two method are survey and interview. The survey method has been implemented using Google Form before being distributed to the final year students that take the PSM and PTA course through the WhatsApp platform. However, the Final Year Project Management System for Faculty of Computing manages to obtain 11 responses only. Figure 3.2 until Figure 3.6 shows the feedback and user requirements from the final year students of Faculty of Computing.

According to the feedback from Figure 3.2, most students did not review or monitor their project progression. Hence, the students are not able to be aware of their status of project progression. As the consequence, they perform their final year project in not a strategic and unsystematic. In fact, they also will miss out on several important tasks in order to complete their projects and PSM or PTA courses. For instance, the testing process that important to prove the proposed system has perfect function without any error.

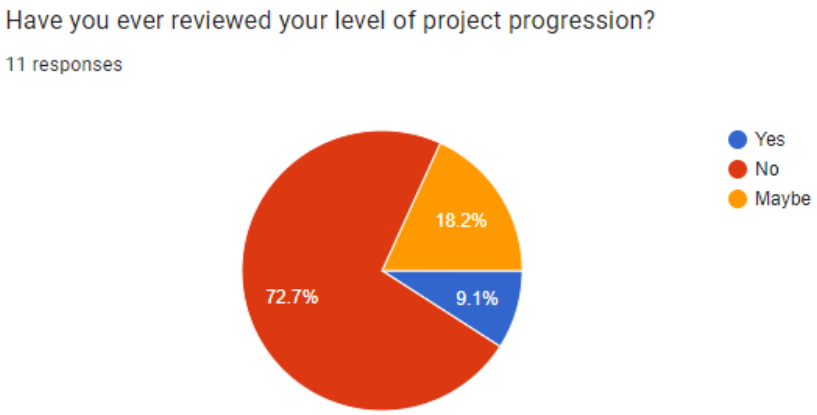

Figure 3.2 The feedback about status review the project progression from the students

Based on Figure 3.3, all 11 responses never utilised any project management tools or applications for assisting and managing their final year project in order to become more organized and systematic. Hence, it is a good solution to develop the Final Year Project Management System for Faculty of Computing for helping this students' problem.

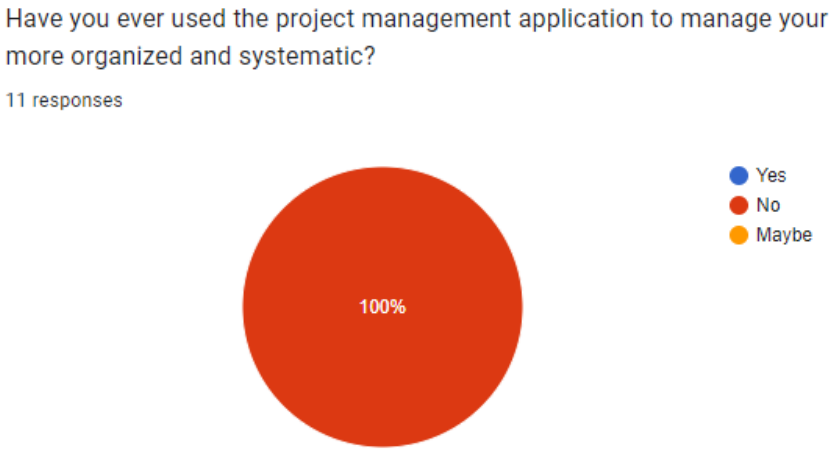

Figure 3.3 The feedback about utilising other project management application

54.5% of feedback from the students are agreed that utilising many platforms to manage the PSM/PTA process and progression unsuitable and inconvenient according to Figure 3.4. They feel a bit burdened to open many platforms at the same time in order to perform their PSM/PTA project.

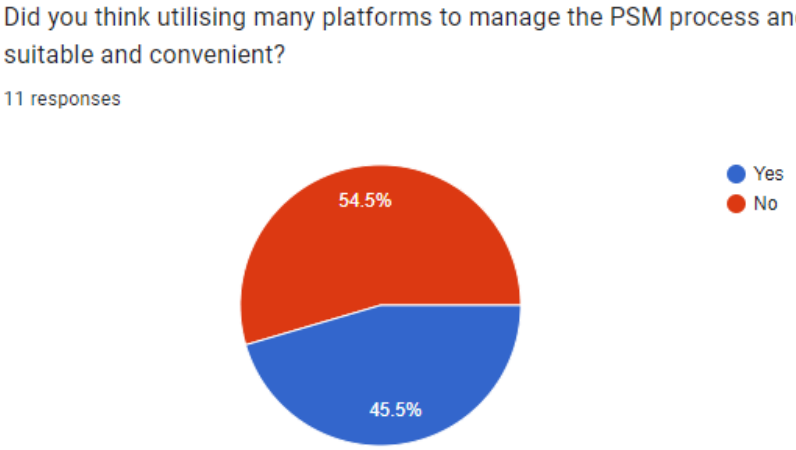

Figure 3.4 The feedback about the PSM process and progression now

Figure 3.5 shows that the final year students agree and approve of the development of the Final Year Project Management System for Faculty of Computing.

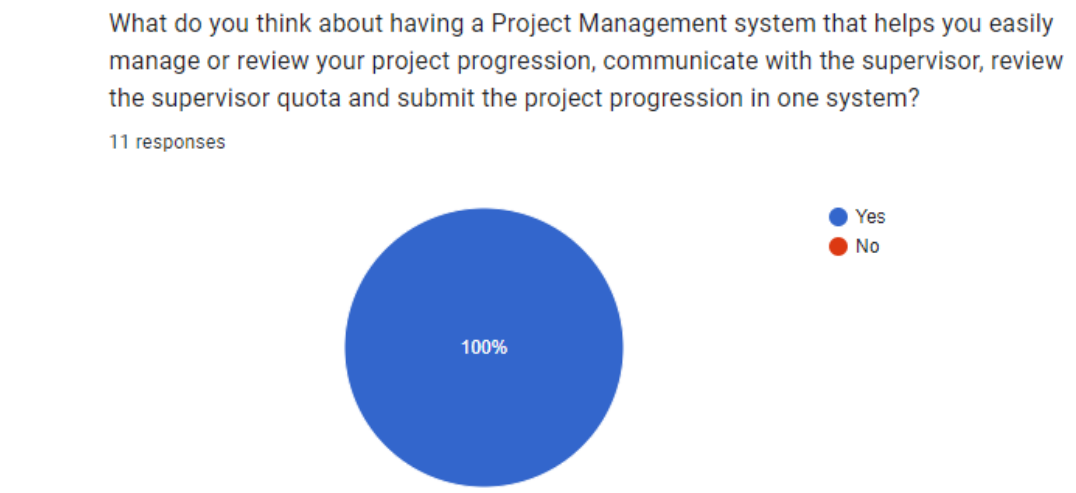

Figure 3.5 The feedback about the development of the Final Year Project Management System for Faculty of Computing

According to Figure 3.6, apart from the visualization of the project progression that is already in the development function list, the final year student also makes the requirement about the alert reminder or notification for the project progression, submission date and supervisor announcement. Therefore, the Final Year Project Management System for Faculty of Computing will develop the alert notification as they expected in order to fulfil the user satisfaction.

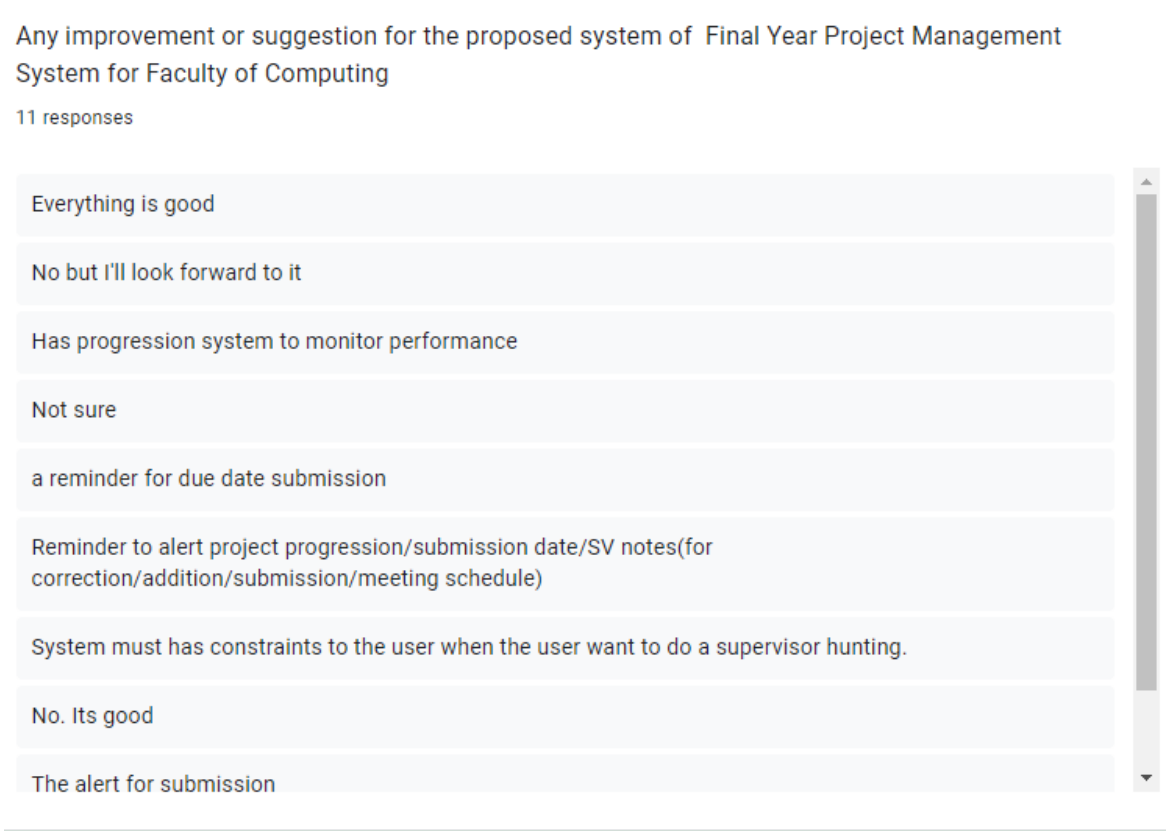

Figure 3.6 Requirement for the Final Year Project Management System for Faculty of Computing

In addition, for the interview method, the Final Year Project Management System for Faculty of Computing has obtained the user requirement of the supervisor and admin from the coordinator's perspective. During the interview session, Dr Danakorn, the coordinator of PSM and supervisor become the interviewee. Appendix A shows a picture of the interview session with Dr Danakorn. Below are all the admin and supervisor requirements from Dr Danakorn.

- It is better to develop the Final Year Project Management System for Faculty of Computing for the PSM and PTA course.

- The students or supervisees are able to obtain all the important forms, materials and guidelines in one interface. Examples of important forms, materials and guidelines are report guidelines, slides of chapters, and thesis templates.

- The coordinators are able to make important announcements such as the colloquium meeting and the date of submission on the main page.

- The manual logbook needs to become the system.

- Provide the dropdown function to make it easier for the supervisor to review their supervisees' submissions once they selected their name like KALAM.

- The supervisor is able to open their supervisees' file submissions and directly grade the supervisees' work based on the rubric. Hence, the system needs to implement the rubric of PSM and PTA.

- Provide the dropdown function for the coordinators to assign the evaluator name, place and students that will be evaluated by that evaluator for the evaluation information in the system.

- Provide the appointment function for the supervisee to make the appointment meeting with their supervisee. The supervisor is able to accept or reject the requested appointment.

APPENDIX

Appendix A

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