CHAPTER 3

METHODOLOGY

This chapter explain the use of prototype model in this project and the activities that had been carried out in each phase.

3.1 Prototyping Model

Prototyping model is a software development approach that usually will be together with SDLC, it where preliminary versions of system is built to refine the requirements, validate concepts, and gather user feedback. It was iterative process and since it related with agile scrum, there will be multiple prototype process along with development phase to improve the system. Prototype model is chosen due to low of cost, time and resources to begin it, it can be drawing on paper and simple mock-up system in Figma software. The process will begin following the agile scrum method, with pre-sprint, and after few sprints till the project is complete. The pre-sprint will have 4 process while the sprint1, 2, 3 and 4 will have iterative process contain 6 processes. Figure below shows example of agile scrum methodology for better understanding.

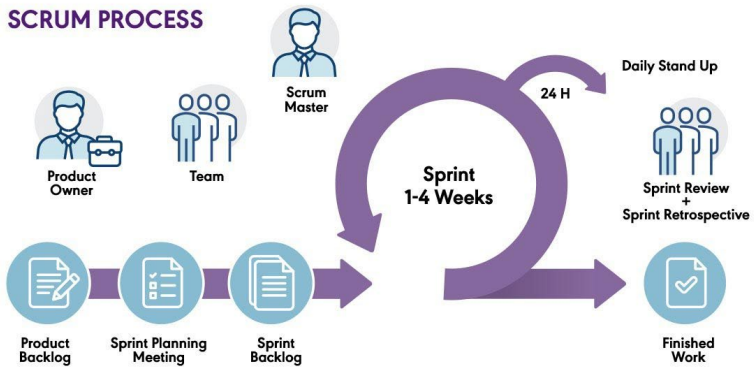

Figure 1

3.1.1 Planning (Sprint 0 and Pre-Sprint Planning

The starting point of development phase, there is 4 processes during this phase with goal to establish the foundation of project and prepare for system development. The process will have it is own objective and goals to be done.

The first process is requirement gathering and analysis, this process is to understand goals of project, the need of user for better understanding. It will define the core features of the application to meet the requirements users.

Initial user story mapping and creation is creating user stories based on situations of users will likely happen when using the system. All the stories will be organized to create story map.

Initial product backlog creation is compiling all user stories into product backlog, this is to prioritize the stories based on their value to the users.

Architecture and technology selection, the process where technology to develop mobile applications chosen, for mobile the programming language is Flutter, while for website is React with Node.js with Express.js for backend.

3.1.2 Sprint 1

The goal is to implement the basic student profile in the application with the functionality.

Planning 1 is selecting user stories, break down these stories into tasks, estimate task effort and duration and define the sprint goal.

Development, developing the profile system using Flutter and write unit tests.

Integration testing, testing the profile system to work without issues.

Code review, reviewing the code for better and consistent quality.

Sprint review and demo, show the demo of system to supervisor and stakeholder to gather any feedback.

Sprint retrospective, reflect on the current sprint and create action activity for sprint 2.

3.1.3 Sprint 2

This phase is to implement talent assessment and viewing functionality. The process same with previous sprint.

Planning 2, same activity as planning 1.

Development, develop the talent assessment tab section, implement profile view for lecturers and write unit tests.

Integration testing, the assessment form is tested, and profile view.

Code review, reviewing the code.

Sprint review and demo, the system is demonstrated to supervisors and stakeholders.

Sprint retrospective, reflect on current sprint and create action item for sprint 3.

3.1.4 Sprint 3

To integrate data mining techniques for student recommendation and implement management website for administrator.

Planning 3, same with planning 1 and 2.

Development, implement data preprocessing using Python, clustering algorithms to group similar talents, develop website and write unit tests.

Integration testing, test the data mining integration.

Code review, reviewing the code.

Sprint review and demo, demonstrating to supervisor and stakeholder.

Sprint retrospective, reflect on current sprint and create action items for sprint 4

3.1.5 Sprint 4

To refine the application based on feedback

Planning 4, same as planning 1, 2 and 3.

Development, address feedback from all previous sprint, implement report generation to website administrators.

Integration testing, testing the refined application and report generation.

Code review, review the code.

Sprint review and demo, demonstrating the system to supervisor and stakeholder.

Sprint retrospective, reflect on all sprint and overall project, create action items for future iterations or maintenance.

3.2 System Development Workflow

There are a total of five phases from the prototype model. As shown in Table 3.2.1, each phase has its assignment and output that needs to be produced during the entire project development.

Table Error! No text of specified style in document.**.2.1**: Software development activities and their task

Phase	Tasks	Output
Planning (Sprint 0 and Pre-Sprint	• Conduct interview with students, lecturers and stakeholder. • List core feature of the app. • Create user stories and create user story map. • Compile user stories into product backlog. • Prepare technology environment, install IDE, Flutter, Android Studio.	• Documented user requirement, specification and project goals. • User story map and user stories. • Prioritized product backlog. • Documented architecture design and technology stack.
Sprint 1	• Create task based on user story map. • Develop profile section using Flutter. • Testing the profile section. • Review code. • Demonstrate to SV and Stakeholders. • Create action for sprint 2.	• Student profile creation with function. • Tested profile system. • Feedback from SV and stakeholder. • Action for improvement
Sprint 2	• Create task based on user story map • Develop talent assessment and viewing function. • Testing the developed section. • Review code. • Demonstrate to SV and Stakeholders. • Create action for sprint 3.	• Student talent assessment and profile viewing. • Tested developed system • Feedback from SV and stakeholder. • Action for improvement.
Sprint 3	• Create task based on user story map • Integrate data mining techniques. • Testing data mining function.	• Student recommendation algorithm.

	• Review code. • Demonstrate to SV and Stakeholders. • Create action for sprint 4.	• Tested data mining technique • Feedback from SV and stakeholder. • Action for improvement.
Sprint 4	• Create task based on user story map • Address feedback and implement report generation. • Testing overall the application. • Review code. • Demonstrate to SV and Stakeholders. • Create action for future maintenance.	• Refined application and report function. • Tested the overall application. • Feedback from SV and stakeholder. • Action for improvement.

3.3 Chapter Summary

Overall, agile scrum for the development of this application is better option to choose for development with phase contain of Sprint 0, 1, 2, 3 and 4 with each process iteratively till the end of the project. The sprint 1 focused on implementing the basic student profile creation function, for student to input their own information. Sprint 2, expanded by adding talent assessment and profile viewing features allowing students to declare their own skills and lecturer to insight the student profile. Sprint 3, implement data mining techniques to enable the application to provide student based on personalized activity recommendations based on their profile. Lastly sprint 4, the end of phase development refining application based on SV and stakeholder and implement reporting generation for administrator.