CHAPTER 1

METHODOLOGY

The main focus of this chapter is to outline the methodology employed to meet the objectives of the study, with a specific emphasis on early detection of mental health problems. To ensure the research project's success and address the growing significance of mental health care, it is essential to utilize appropriate techniques. In response to the need for inventive solutions in this field, the Design Science Research Methodology (DSRM) will be utilized throughout the investigation. By choosing this methodology, the aim is to effectively manage each phase of the project, ultimately delivering a high-quality system for the early identification of mental health issues.

1.0Design Science Research Methodology (DSRM)

Design Science Research Methodology (DSRM) is a systematic approach used to develop innovative solutions for real-world problems(Sabri & Odeh, 2019). The methodology consists of several steps(Mansor et al., 2021). First, identify the problem or opportunity and define clear objectives. Then, conduct a literature review to understand existing knowledge and theories relevant to the problem. Next, create a design artifact, such as a prototype or model, which represents the proposed solution. Evaluate the artifact's performance through rigorous testing and gather feedback from experts and stakeholders. Based on the results, refine the artifact and iterate the design process if necessary. Finally, document and communicate the findings, including the design principles and guidelines derived from the research. DSRM enables researchers to bridge the gap between theory and practice by creating practical solutions that address complex problems(Winter, 2021).

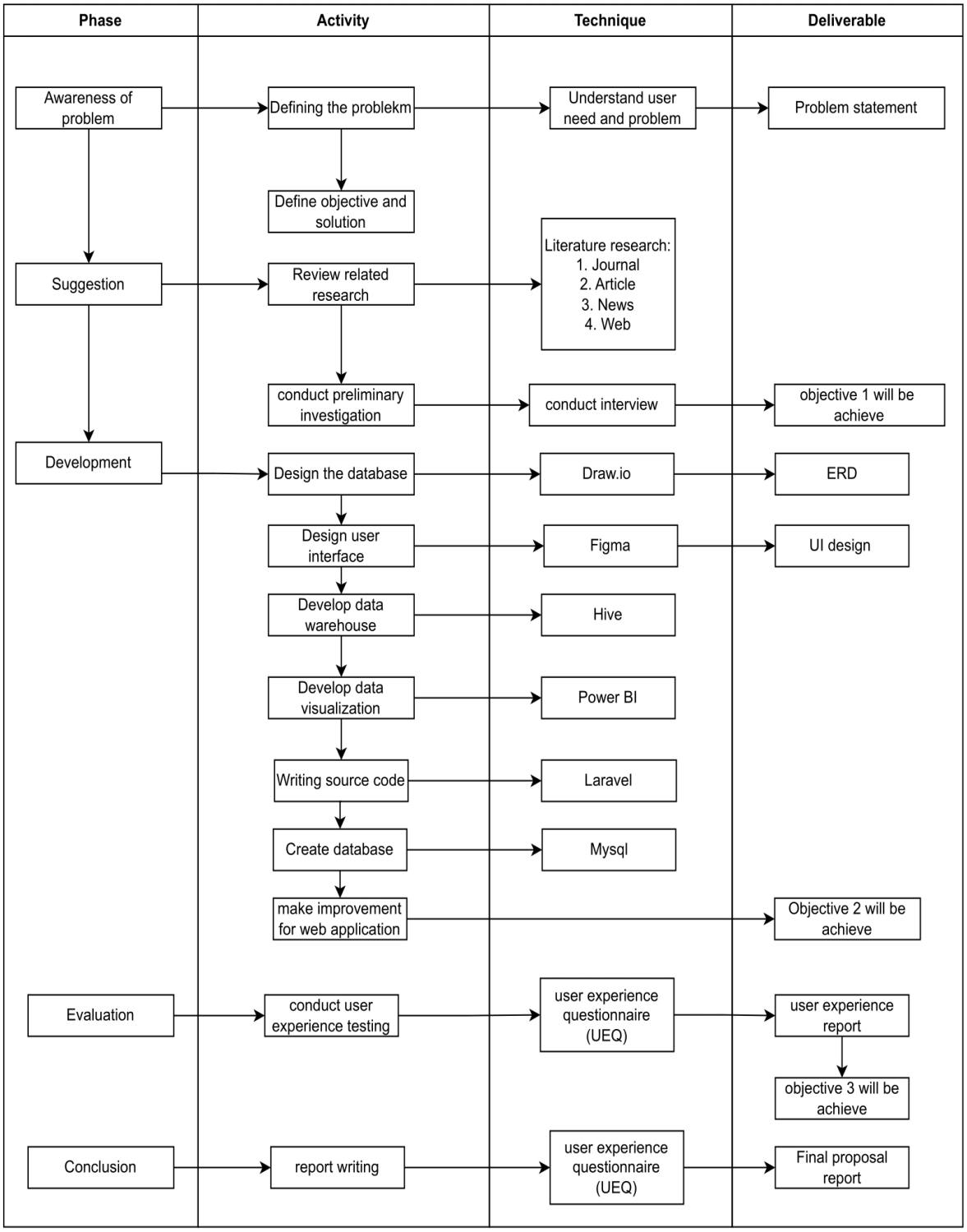

Figure 1.1 Summary Flow of Development Science Research Methodology (DSRM)

1.1Phase 1: Awareness of problem

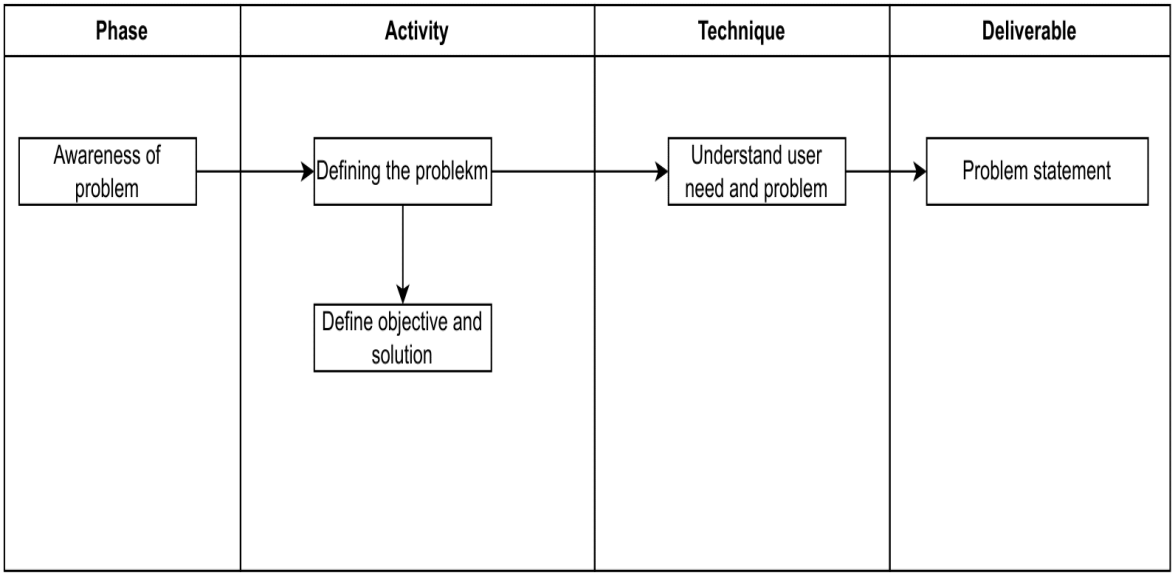

Figure 1.2 Awareness of problem phase

The first step in the Design Science Research Methodology (DSRM) model is to identify the problem and find motivation for the research. In this phase, the researcher will do a few things like selecting a title for the web application, clearly defining the specific problem, reviewing existing research related to the problem, and choosing an appropriate methodology for the study. This initial phase sets the foundation for the research and helps the researcher understand the purpose and direction of the study.

1.1.1 Defining Problem

Just like any research project, the initial step in the Design Science Research Methodology (DSRM) involves gathering information about the problem that needs to be addressed. In addition to clearly defining the specific issues at hand, it is important for the researcher to have a deep understanding of the users' requirements in order to develop a web application that caters to their

needs. In this particular study, the main objective is to identify and express the problem statement related to the early detection of mental health issues.

1.1.2 Define objective and problem

After thoroughly reviewing existing research, the subsequent step is to clearly define objectives and identify problems that require attention. This step is crucial because it enables an accurate identification of potential issues, thereby simplifying the process of understanding and generating effective ideas to address them. By establishing specific and well-defined goals, researchers can focus their efforts on developing targeted solutions that have a meaningful impact in their field. This focused approach allows for the efficient utilization of resources and expertise in addressing the identified problems.

1.2 Phase 2: Suggestion

In this phase, the focus is on studying the requirements for early detection for mental health web application base on previous study and consulting with experts.

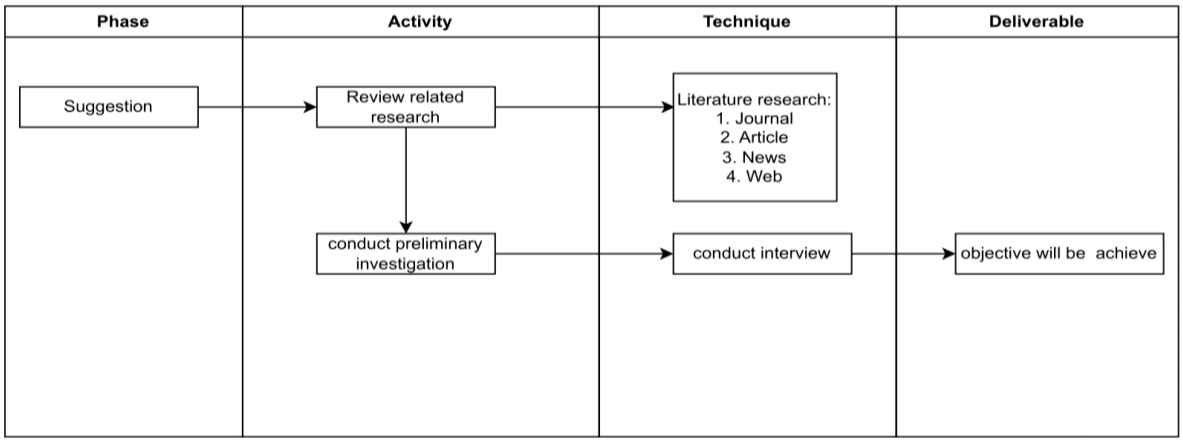

Figure 1.3 Suggestion phase

Review related research

During this phase, the main focus is on studying the requirements for developing a web application that can detect mental health issues early. To

understand the characteristics of individuals with mental health problems, the first activity involves thoroughly examining the components needed for the web application. This includes looking into existing works and critically analyzing them.

1.2.1 Conducting preliminary investigations

The second activity involves consulting with experts in relevant fields, such as counsellors from Universiti Teknologi Mara. Through face-to-face interview, these experts provide valuable feedback, ideas, and reviews on the research materials. Their input helps shape the proposed solution for the research problems, ensuring that the web application meets the necessary standards and effectively detects mental health issues at an early stage. Since only professionals can diagnose individuals with mental health issues, it was crucial to establish that the system follows the correct approach in detecting early signs of mental health problems. By engaging with experts, valuable knowledge and perspectives were obtained, contributing to the development of a system that effectively supports early detection while respecting the expertise and role of mental health professionals.

1.3 Phase 3: Design and Development

The design phase, which is the third phase of the Design Science Research Methodology (DSRM) model, involves several tasks that need to be accomplished by the researcher to achieve a successful system design. This phase encompasses various processes, as outlined in Figure 3.3, which are instrumental in creating an effective design for the system.

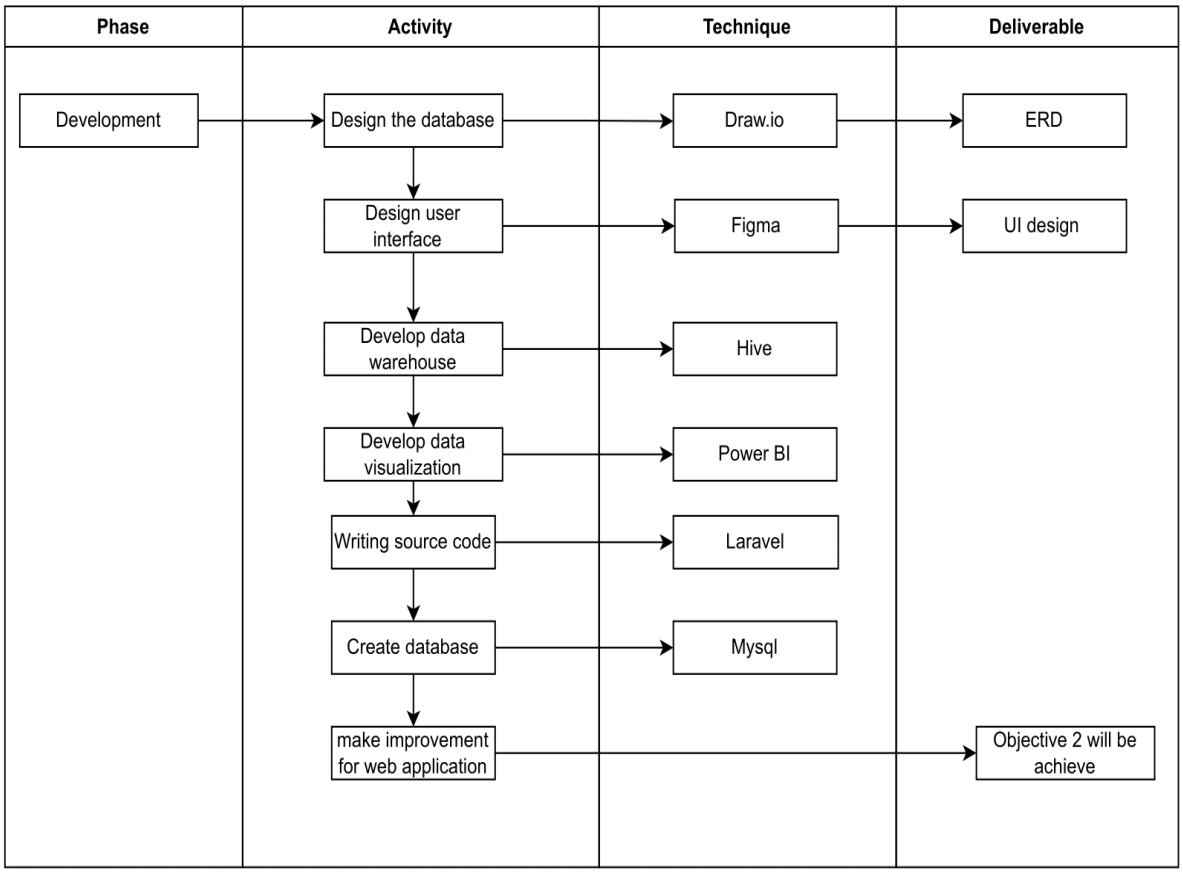

Figure 1.5 Design and Development phase

1.3.1 Designing data base

The system flow will be designed using an Entity Relational Diagram (ERD). Entity Relational Diagram (ERD) shows how different "entities" such as people, objects, or concepts are related to each other within a system. It emphasizes the relationships between elements within entities rather than relationships between entities themselves. ER diagrams are often used together with data flow diagrams, which depict the flow of information within a system.

1.3.2 Design user interface

In this phase, the researcher will use Figma to design the user interface for the system. Figma is a digital design and prototyping tool that operates on the cloud. It allows users to collaborate on projects and work from anywhere.

Figma serves as an application for creating user interfaces (UI) and enhancing user experiences (UX). The researcher can utilize Figma to develop application interfaces or smaller UI components that can be smoothly integrated into the overall project.

1.3.3 Develop Data Warehouse

During this phase, the data warehouse been develop by using Hive. Hive is a data storage and querying system built on Apache Hadoop. It helps handle large datasets effectively. By utilizing Hive, the researcher can create a strong and scalable data warehouse that can store and retrieve data efficiently. Hive also allows for complex data transformations and analysis, making it easier to gain valuable insights from the collected data. With the data warehouse in place, the researcher has a centralized and well-organized repository for the data, which facilitates easy reporting and decision-making. Additionally, Hive integrates smoothly with other big data tools and frameworks, enhancing the system's overall data processing capabilities.

1.3.4 Develop Data Visualization

In the next step of the design and development phase, Power BI is used to create data visualizations for the web application. Power BI is a tool that enables the creation of interactive and visually appealing representations of data. By utilizing Power BI, the researcher can develop compelling visualizations that help users understand and analyze the data effectively. These visualizations enhance the overall user experience of the web application by presenting information in a clear and intuitive manner. Power BI offers various customizable features, allowing the researcher to tailor the visualizations according to the specific needs and requirements of the application. With Power BI, the researcher can showcase data insights and trends, making it easier for users to interpret and make informed decisions based on the visualized data.

1.3.5 Writing Source Code

In this step of the design and development phase, the researcher focuses on writing the source code for the web application. To build the website, Laravel is employed as the framework of choice. Laravel is a popular and efficient PHP framework that offers a wide range of features and tools to facilitate web development. By utilizing Laravel, the researcher can streamline the development process and leverage its built-in functionalities, such as routing, database management, and security measures. The framework provides an organized structure and a robust set of libraries, making it easier to create a scalable and maintainable web application. With Laravel, the researcher can efficiently implement the desired functionality, handle user requests, and ensure a smooth and seamless user experience. Additionally, Laravel's extensive documentation and active community support contribute to a more efficient development process and enable the researcher to overcome any challenges that may arise during the coding phase.

1.3.6 Create database

For the creation of the database, the next step involves utilizing MySQL via phpMyAdmin. MySQL is a popular open-source relational database management system, and phpMyAdmin is a web-based tool that allows for the administration and management of MySQL databases. With phpMyAdmin, the researcher can easily create and configure the database to meet the specific requirements of the web application. It provides a user-friendly interface that simplifies tasks such as creating tables, defining relationships, and setting up access permissions. By leveraging the capabilities of MySQL and phpMyAdmin, the researcher can ensure the secure and efficient storage of data for the web application. The combination of MySQL and phpMyAdmin offers a reliable and powerful solution for managing and maintaining the database, enabling smooth operations and optimal performance of the web application.

1.4 Phase 4: Evaluation phase

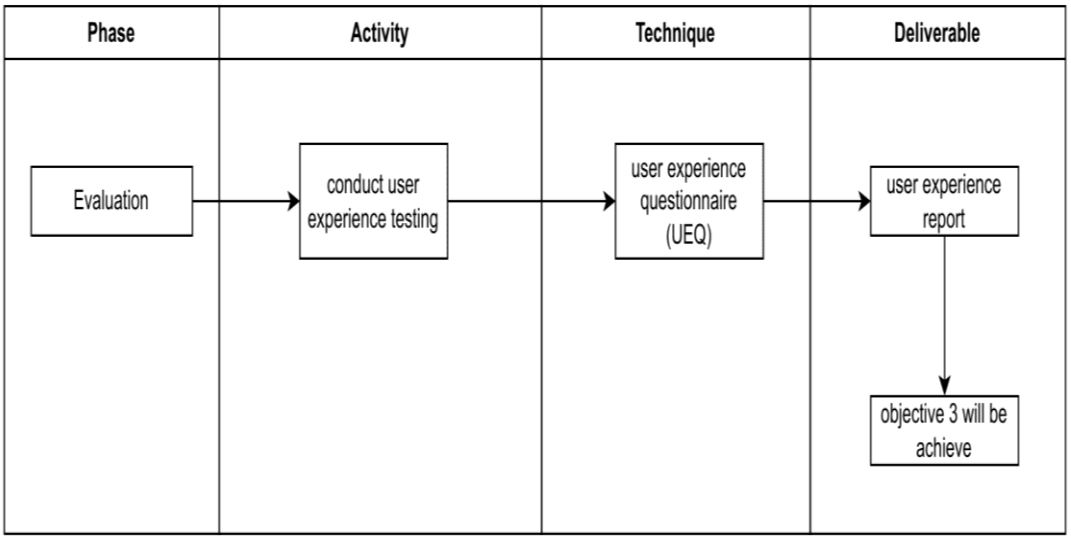

Figure 1.6 Evaluation Phase

In the evaluation phase, the system undergoes rigorous testing to assess its performance and user experience. One crucial aspect of this phase is conducting user experience testing. User experience testing involves observing and collecting feedback from users as they interact with the system. This evaluation method helps identify any usability issues, design flaws, or areas for improvement in terms of user satisfaction and ease of use. Through user experience testing, the researcher can gain valuable insights into how well the system meets the needs and expectations of its intended users. The feedback obtained from users serves as valuable input for refining and enhancing the system's design and functionality. By incorporating user feedback and making iterative improvements based on their experiences, the system can be optimized to provide an enhanced and satisfactory user experience.

1.5 Phase 5: Conclusion phase

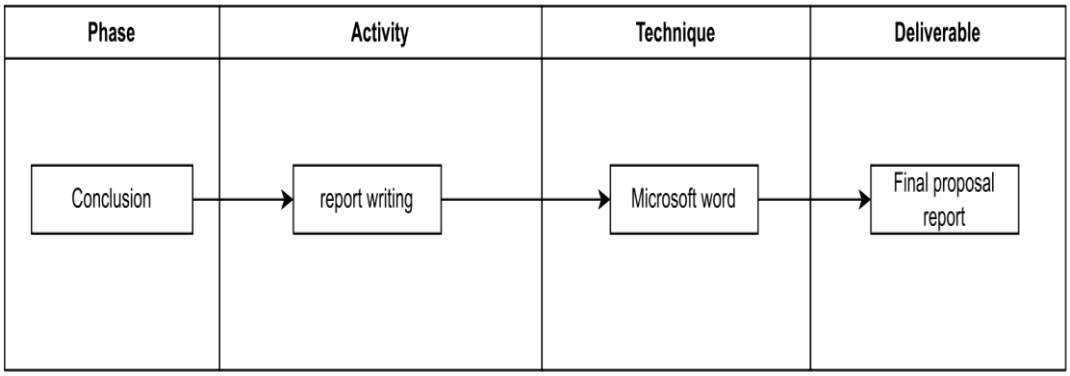

Figure 1.7 Conclusion phase

In the final phase, known as the conclusion phase, the researcher prepares and writes the report. This report summarizes the entire research process, findings, and outcomes of the study. It serves as a comprehensive document that presents the methodology, results, and conclusions of the research project. The report provides a detailed analysis of the objectives, research questions, and the solutions developed during the study. Additionally, it highlights the significance of the research, its contributions to the field, and potential areas for future exploration. By documenting the research process and its outcomes, the report enables others to understand and build upon the research findings. It plays a crucial role in sharing knowledge and ensuring the research has a lasting impact in the relevant domain.

1.6 Gantt Chart

Phase \ Month	March 2023	April 2023	May 2023	June 2023	July 2023	August 2023	September 2023	October 2023	November 2023	December 2023	January 2024	February 2024
Awareness of problem												
Suggestion												
Design & Development												
Evaluation												
Conclusion												