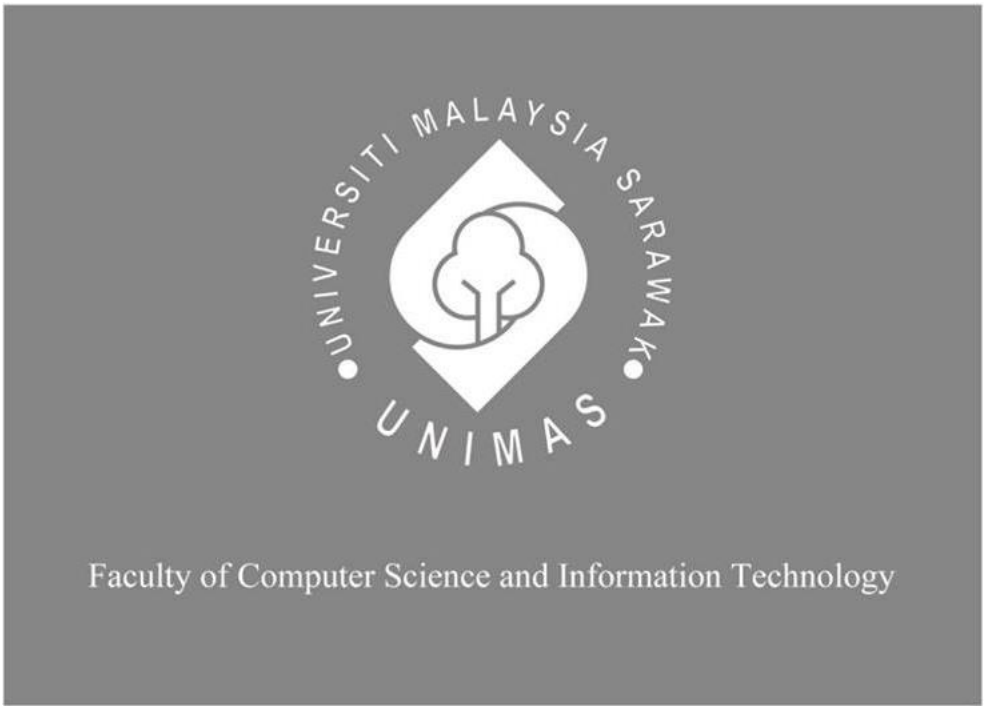

MENTAL HEALTH ASSISTANT CHATBOT FOR UNIVERSITY STUDENTS BASED ON THE DEPRESSION ANXIETY AND STRESS SCALE 21 (DASS-21)

Viola Voon Li Wei

Bachelor of Computer Science with Honors

(Software Engineering)

2023

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VIOLA VOON LI WEI

This project is submitted in partial fulfillment of the
requirements for the degree of
Bachelor of Computer Science with Honors
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UNIVERSITY MALAYSIA SARAWAK

2023

CHATBOT PEMBANTU KESIHATAN MENTAL UNTUK PELAJAR UNIVERSITI BERDASARKAN KEMURUNGAN KECEMASAN DAN STRES SKALA 21 (DASS-21)

VIOLA VOON LI WEI

Projek ini merupakan salah satu keperluan untuk
Ijazah Sarjana Muda Sains Komputer dengan Kepujian
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ABSTRACT

Mental illness is becoming more common nowadays, particularly among university students. This is owing to the changing nature of society today, which may cause stress on society members, as well as the COVID-19 pandemic, which causes a global lockdown. Furthermore, relationship problems may contribute to mental illness among university students. The lingering effects of this condition may result in untreated mental disease that may even lead to suicidal thoughts. The proposed solution is a Mental Health Assistant Chatbot that can provide a psychometric evaluation by using Depression Anxiety and Stress Scale 21. (DASS-21). Through comprehensive testing involving users and practitioners, the chatbot prototype demonstrated effectiveness in supporting mental health prevention. Feedback from practitioners affirmed its usefulness in their practice. The study involved 15 university students, with the majority being male (60.0%) and in the age range of 24-26 years (53.3%). While most students agreed with the chatbot's features, some aspects such as information availability (6.67%) and user interface design were rated as (13.33%) average, suggesting a need for improvement in knowledge, data, and functionality. By addressing these limitations and receiving positive feedback, our study contributes to enhancing mental health support through technology.

ABSTRAK

Penyakit mental menjadi lebih biasa pada masa kini, terutamanya dalam kalangan pelajar universiti. Ini disebabkan oleh perubahan sifat masyarakat hari ini, yang boleh menyebabkan tekanan kepada ahli masyarakat, serta pandemik COVID-19, yang menyebabkan penutupan global. Tambahan pula, masalah perhubungan boleh menyumbang kepada penyakit mental dalam kalangan pelajar universiti. Kesan yang berlarutan daripada keadaan ini boleh mengakibatkan penyakit mental yang tidak dirawat yang mungkin membawa kepada pemikiran untuk membunuh diri. Penyelesaian yang dicadangkan ialah Chatbot Pembantu Kesihatan Mental yang boleh memberikan penilaian psikometrik dengan menggunakan Kebimbangan Kemurungan dan Skala Tekanan 21. (DASS-21). Melalui ujian komprehensif yang melibatkan pengguna dan pengamal, prototaip chatbot menunjukkan keberkesanan dalam menyokong pencegahan kesihatan mental. Maklum balas daripada pengamal mengesahkan kegunaannya dalam amalan mereka. Kajian ini melibatkan 15 pelajar universiti, dengan majoriti lelaki (60.0%) dan dalam lingkungan umur 24-26 tahun (53.3%). Walaupun kebanyakan pelajar bersetuju dengan ciri chatbot, beberapa aspek seperti ketersediaan maklumat (6.67%) dan reka bentuk antara muka pengguna (13.33%) dinilai sebagai purata, mencadangkan keperluan untuk peningkatan dalam pengetahuan, data dan kefungsian. Dengan menangani batasan ini dan menerima maklum balas positif, kajian kami menyumbang kepada meningkatkan sokongan kesihatan mental melalui teknologi.

CHAPTER 1: INTRODUCTION

1.1 Introduction

In Malaysia, the COVID-19 pandemic has contributed to an increase in mental health problems. In a survey done by National Health and Morbidity 2022, data from 355 Malaysian university students were collected and the study adopted the Depression Anxiety and Stress Scale 21 (DASS-21). Through the survey, the majority of them suffered from depression by having negative feelings such as sadness, difficulty in thinking, loss of concentration in activity, change in appetite, change in sleeping time (44.2%), and experiencing apathy (44.5%). 40.3% of them were feeling stressed and found themselves getting irritated, in the meanwhile 40.8% of them were finding it difficult to relax. Besides, some of them were feeling worried when they were on the verge of panic (33.8%) and experiencing dry mouth (31.5%) (Hassan et al., 2022).

The DASS-21 is a self-report test that assesses depression, anxiety, and stress. For each of those three negative emotional states, the user will be assigned a severity rating of Normal, Mild, Moderate, Severe, or Extremely Severe at the end of the test. However, the DASS-21 is a screening tool, not a diagnostic tool since it does not assist in determining the underlying causes of these emotional states. The test’s developers recommend consulting a trained professional in psychology for a complete interpretation of the test's results (Soo, 2020).

Thus, the findings may imply that more research is proposed to include successful coping strategies used by university students during the COVID-19 pandemic. In addition, research should be conducted to develop interventions and preventive strategies for university students' mental health based on the DASS-21.

In this project, the Mental Health Assistant Chatbot incorporates the DASS-21 to provide a psychometric evaluation test and advice on coping strategies based on different severity for helping university students overcome depression, anxiety, and stress. At the end of the evaluation test, the user will be always get connected to mental health professionals regardless of the result of the test since the Mental Health Assistant Chatbot is not a counseling or professional mental health service. In other words, It mainly assists more

university students who experience mental health issues to better understand their mental health situation and get access to mental health professionals more efficiently.

1.2 Problem Statement

Most university students suffer from mental health issues such as depression and anxiety caused by stress due to increasing workloads in their workplace or learning environment, as well as financial matters. Besides, they get used to social distancing as face-to-face social interaction is gradually decreased since the COVID-19 pandemic, and this causes them constantly to keep their mental problems in their mind with less heart-to-heart consultation with families, friends, and colleagues. University students even have difficulty seeking advice by approaching families, friends, and mental health professionals mostly due to feelings of shyness, low self-esteem and a lack of mental health professionals' contact information (Wong et al., 2021).

To help university students better manage their mental health conditions, the Mental Health Assistant Chatbot for university students based on the DASS-21 is proposed. It acts as a middleman which enables university students and mental health professionals to connect more efficiently through a psychometric evaluation test.

1.3 Scope

This project focuses on university students and develops a Mental Health Assistant Chatbot that formulates the DASS-21 as an algorithm for them. It can help in evaluating university students' mental health conditions and recommend several examples of mental health professionals to ease the route for them to seek suitable medical advice. After taking the psychometric evaluation test, university students will be aware of their mental health problems, allowing them to take preventive actions before their mental health deteriorates. This project develops an Android mobile application that runs on Android-based applications only.

1.4 Objectives

The main objectives of this project are:

1. To design and develop a Mental Health Assistant Chatbot in Android Mobile that acts as a screening tool in evaluating mental health situations of university students

based on the Depression Anxiety and Stress Scale 21 (DASS-21) to prevent serious mental health issues among university students.

2. To evaluate the performance and effectiveness of the Mental Health Assistant Chatbot.

1.5 Methodology

The Scrum methodology is selected to design and develop the Mental Health Assistant Chatbot. It is a sprint-based approach in which the project is broken down into smaller tasks that are assigned to each Scrum team member and must be completed by the deadline set for each job. Each sprint basically runs for 1 to 4 weeks. The Scrum team will discuss their current accomplishment and upcoming tasks of work in a stand-up meeting for every sprint. Time is divided into sprints, which are brief work periods that last typically one week. This methodology is selected as it allows for the flexible development of high-quality products while conserving valuable resources based on the iterative approach (Wrike, 2022). Figure 1.1 shows a graphical illustration of the Scrum methodology:

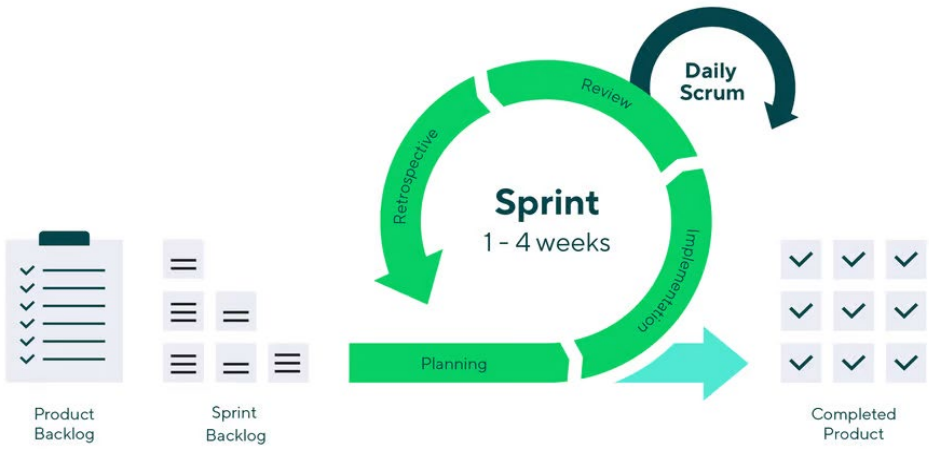

Figure 1.1 A Graphical Illustration of the Scrum Methodology

1.5.1 Product Backlog

The first phase of this project is collecting and analyzing the user requirements to understand the problems that need to be solved. The requirements are gathered through interviews with 5 mental health professionals and research on the problems faced by university students who have difficulty seeking mental health professionals.

After the user requirements are determined through discussion with the supervisor, all the essential requirements are listed down and the priority task is placed at the top of the list to establish an expected project timeline.

1.5.2 Sprint Backlog

In the second phase, a list of tasks is created by the Scrum team to be finished within the Scrum sprint. A certain number of product backlog items is chosen typically in the form of user stories and the tasks required to finish each user story are determined during each sprint planning meeting. The time allocation required from a team member to complete a task is also estimated. The number of tasks assigned to each team member during a sprint will depend on how much time is allocated for each task. Then, all the tasks that need to be completed from the current and prior sprints are also verified to ensure that everything is on schedule.

1.5.3 Sprint Week

There are four stages included in this third phase, such as the planning stage, implementation, sprint review and testing, and sprint retrospective.

1.5.3.1 Planning Stage

In this stage, a sprint planning meeting is conducted by the Scrum team to determine the most priority product backlog items for the following sprint. Then, the sprint's objectives are finalized and a prototype of the Mental Health Assistant Chatbot is designed based on the priority user requirements.

1.5.3.2 Implementation

This stage requires the Scrum team to start working on their progress. A product increment is developed with the sprint-prioritized and completed backlog items and features by creating a more user-friendly prototype for the chatbot system. A marketing survey is also conducted by collecting feedback from 5 mental health professionals and 33 respondents who are university students through interviews and questionnaires respectively regarding the current prototype of the Mental Health Assistant Chatbot. The weekly scrum meeting is conducted for the team to keep track of the progress and product development when it comes to completing the sprint goal.