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PCMJ

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PREFACE

Welcome to the inaugural volume of the **Progress in Computing and Mathematics Journal (PCMJ)**, a publication proudly presented by the College of Computing, Informatics, and Mathematics at UiTM Cawangan Melaka.

This journal represents a significant step in our commitment to fostering a vibrant research culture, initially providing a crucial platform for our undergraduate students to showcase their intellectual curiosity, dedication to scholarly pursuit, and potential to contribute to the broader academic discourse in the fields of computing and mathematics. However, we envision PCMJ evolving into a beacon for researchers both nationally and internationally. We aspire to cultivate a space where groundbreaking research and innovative ideas converge, fostering collaboration and intellectual exchange among established scholars and emerging talents alike.

The manuscripts featured in this first volume, predominantly authored by our undergraduate students, are a testament to the hard work and dedication of these budding researchers, as well as the guidance and support provided by their faculty mentors. They cover a diverse range of topics, reflecting the breadth and depth of research interests within our college, and set the stage for the high-quality scholarship we aim to attract in future volumes.

As editors, we are honored to have played a role in bringing this journal to fruition. We extend our sincere gratitude to all the authors, reviewers, and members of the editorial board for their invaluable contributions. We also acknowledge the unwavering support of the college administration in making this initiative possible.

We hope that PCMJ will inspire future generations of students and researchers to embrace research and innovation, to push the boundaries of knowledge, and to make their mark on the world of computing and mathematics.

Editors
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POPULAR MONSTER:
A GAME BASED LEARNING VIDEO GAME

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Article Info	Abstract
	Depression is a mental illness that has a pessimistic impact on its host. Common symptoms of depression include low energy, a depressed mood, a loss of interest or pleasure, feelings of guilt or low self-worth, trouble sleeping or eating, and difficulty concentrating. This problem should be taken seriously as it may endanger someone's life. Many actions had taken to spread awareness about mental health. Many campaigns and advertisement used to promote mental health awareness to public. However, these methods are lacks entertainment and needs a new approach to this problem. Hence, the purpose of this project is to develop a 2D game to spread awareness and knowledge about various types of mental health disorders. The genre of the game is serious game or also known as game-based learning. Game Development Life Cycle (GDLC) methodology was used in this project to guide the process of development resulted from user feedback from the project. Then, User Experience Questionnaire is used to investigate and evaluate user's experience and feedback on the project.

INTRODUCTION

Depression, a common mental disorder, impacts individuals with symptoms such as low mood, decreased energy, and disturbed sleep. Research shows its pervasive effects on work and home life. Among students, the prevalence is significant, with 24.3% in Malaysia experiencing depression at lite and moderate levels. This leads to increased risks like substance abuse, as highlighted by Kerr. Simultaneously, the video game industry, valued over $300 billion, is criticized for potential negative impacts on social skills and behavior. Serious games, like Minecraft and Actual Sunlight, offer educational opportunities, providing a platform to create a game focused on raising awareness about depression. Proposing an interactive project,

this initiative aims to educate and support young people, fostering awareness of depression's detrimental effects and encouraging mutual support to mitigate its severity.

Students often face stress and depression, affecting well-being and academic performance. Stressors like responsibilities and poor time management lead to accumulated stress, evolving into depression (Stress and Depression - The Role of Stress in Depression). According to the International Board of Credentialing and Continuing Education Standards (IBCCES), anxiety disorders and depression correlate with academic decline (Impact of Anxiety and Depression on Student Academic Progress, 2020). Depression impairs cognitive abilities, hindering tasks and disrupting memory (Lesser, 2021). Traumatic events increase the likelihood of developing depression, with a study at the University of Malaya showing 30% of undergraduates experiencing depression, including 25% with moderate depression and 4.4% with severe depression; additionally, 63.4% from a poor economic background reported depression (Md. Ashraful Islam, 2016).

To effectively address the issue of depression through gaming, it is crucial to engage users with immersive storytelling and emotional interactions. The game's educational storyline should captivate users while addressing the serious problem of depression. As technology evolves, educational games have gained popularity, and the video game industry's success continues to grow. Utilizing video games as an interactive platform can positively impact young teenagers, promoting a healthier lifestyle and user satisfaction. By creating awareness about the effects of depression, users can proactively avoid it by applying the knowledge gained from the game. Additionally, if users ever face depression, the game equips them with the awareness to seek help and take preventive actions, ensuring a positive impact on their well-being and satisfaction.

LITERATURE REVIEW

Awareness, as per the Cambridge definition, involves recognizing the existence of something or having a current understanding of a situation based on information or experience (Cambridge Dictionary, 2022). Mental health awareness is an ongoing societal effort to reduce the stigma surrounding mental health issues, enhance knowledge, and broaden access to healthcare, encompassing our social, physical, emotional, and cognitive well-being (Cooks-Campbell, 2022).

Unfortunately, due to the associated stigma, many individuals do not seek the necessary mental health therapy. Depression, a common outcome of mental health issues, is characterized by chronic sadness and a loss of interest or pleasure in activities, affecting about 5% of adults globally (Moturi, 2019). Depression negatively impacts academic achievement, employment productivity, social connections, and community involvement. If left unaddressed, depression can have widespread consequences on the body, affecting sleep, emotions, cognitive function, and physical health (Pietrangelo, 2019). Major depression, a more severe form, necessitates immediate medical attention due to its significant impact on overall quality of life.

Types of Video Games

Ernest Adams (2014) defines video games as play activities where participants aim to achieve a specific goal by following rules in a pretended reality. Video game technology allows individuals to fulfill fantasies, overcome social restrictions, prove themselves, or socialize, depending on the game's genre. Popular genres like action and RPG, seen in games like Call of Duty and Elden Ring, have gained prominence in recent years.

Benefits of Educational in Video Games

Video games, known as serious or educational games, serve as a medium for both enjoyment and learning. They are designed to educate players while incorporating gameplay elements. This approach to raising awareness is not new and has been successfully applied to various topics, including social and environmental issues. For instance, the well-known game Final Fantasy VII addresses ecological concerns. In a study published in Clin Med (2019), the serious game Stigma Stop was used to investigate its effectiveness in bringing attention to mental health issues. The findings indicated a positive impact on reducing stigma, particularly among university students with initially low stigma values. This highlights the success of serious games in raising public awareness and decreasing stigma.

METHODOLOGY

Game Development Life Cycle or known as GDLC was chosen for this project to proceeds its development and a guideline. GDLC consist of eight (8) stages: Initiation, Team building, Feasible study, Pre-production, Production, Alpha version, Beta version and lastly the final release. However, team building stage is not required in this study as only person is involved in this project.

Figure 1: GDLC model diagram

Initiation Stage

The initiation stage is the first step of the game where initial ideas are required to determine the genre, type, target audience, character, and more ideas about the game. The initiation stage is the first step of the game where initial ideas are required to determine the genre, type, target audience, character, and more ideas about the game.

Table 1: Initiation Table

Stage	Activity	Output	Tools
Initiation	- Research and review articles and resources from reliable sources regarding the project. - Decision making on the genre of the game and its purpose. - Research and compare the differences of existing similar games with proposed project. - Research and compare the differences of existing similar games with proposed project.	Project proposal	Microsoft Word

Concept of the game.

To determine the genre, description and information of the game, a discussion regarding the concept of the game will be initiated. This will give a rough idea of the game before development.

Table 2: Concept of the game

Criteria	Description
Genre	Educational/Serious game
Theme	Depression in Mental Health
Target Audience	Students and Adults
Language	English
Platform	PC
Game Dimension	2D
Objective	The purpose of this project is to increase awareness of students and adults about depression in mental health.
Context	The user will learn the differences, symptoms, and factors of depression and how to prevent it.
Challenges	The user will have to answer questions regarding depression in mental health for 10 days in-game, and based on the emotion meter of the character, 3 different endings of the game will appear at the end of the game

Pre-production Stage

In this stage, before the real game development, this is the stage where planning for the game development starts. Programmers and game designers will start focusing on the concept by creating a prototype. The prototype consists of flowchart, storyboard, and structure of the game.

Table 3: Pre-production stage

Stage	Activity	Output	Tools
Pre-Production Stage	• Sketch a flowchart of the game	• Flowchart	• Draw io
	• Draw a low fidelity storyboard	• Low Fidelity	• Adobe Illustrator
		• Storyboard	• CC 2019

Flowchart.

A flowchart is a graphic representation of a system, algorithm, or process that shows the decisions, actions, and processes involved in a given order using a variety of symbols and connectors. It offers a methodical and comprehensible approach to illustrate the flow of data or tasks between stages of a system. Flowcharts are frequently used to help explain and communicate complicated processes or workflows in a variety of industries, including software development, business processes, engineering, and decision-making. Figure 2 shows the flowchart of the project. User will press play to start the game. User will be greeted with fwen and interact with them while using Book to guide them through a set of question. These questions will provide a score later on to evaluate user's understanding of the game.
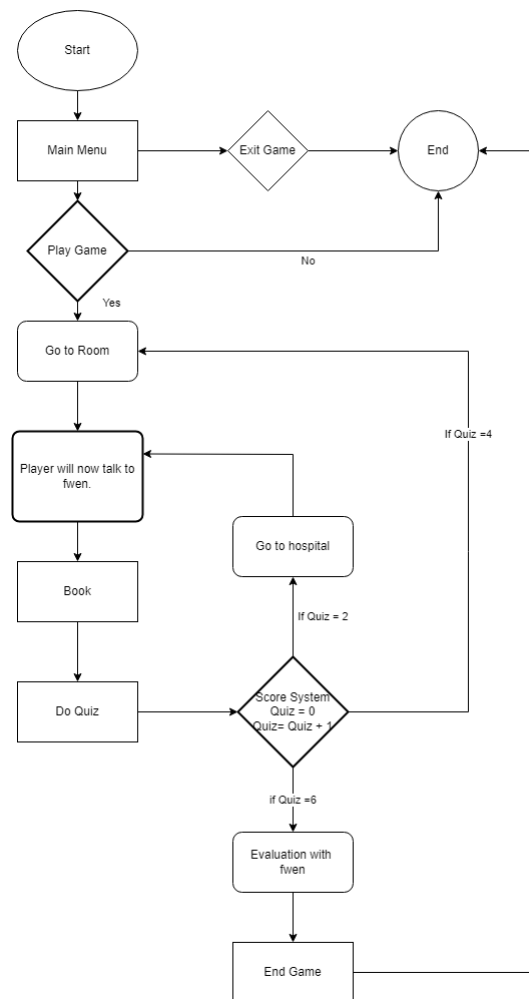
Figure 2: Flowchart of the project

Production Stage

According to Ramadan & Widyani (2013), production is the process of making the source code, creating the assets, and integrating them as one. These assets can be created from other software, such as Adobe Photoshop and Adobe Illustrator to create objects and characters. All these assets will then be compiled and coded in Unity.

Table 4: This is the Style for Table Captions

Stage	Activity	Output	Tools
Production Phase	• Software installation and set-up • Creating source codes for the project • Create assets such as objects, character, background, audio, and sprites	Assets created, ready to be compiled into Unity.	• Unity • Adobe Photoshop • Adobe Illustrator • Adobe Media Encoder

Alpha and Beta Stage

The alpha version of the game is playable but lacking, requiring activities such as bug-fixing and alpha testing to address faults post-gameplay correction. Following this, the game reaches its finished and complete state in the beta version, where beta testing, issue patching, and balancing take place before moving to the final release stage. The beta version undergoes testing and is distributed to various communities, including Reddit, UiTM Jasin students, and Politeknik Merlimau students.

Table 5: Alpha and Beta Stage Table.

Stage	Activity	Output
Alpha Testing	Alpha version testing	Test Results
Beta Testing	• Patching Beta version • Testing Beta version	Test Results

RESULT AND DISCUSSION

The evaluation process aims to assess users' awareness and understanding of mental health, utilizing the User Experience Questionnaire (UEQ). This standardized tool gauges the overall user experience of products, including digital interfaces, by gathering insights on usability, satisfaction, efficiency, and aesthetics. Participants relevant to the project scope will complete the questionnaire, and their scores will be analyzed to provide a comprehensive understanding of the user experience, aligning with the game's objectives.

Instruments

The evaluation method for understanding and enjoyment in the game involves a questionnaire based on the User Experience Questionnaire (UEQ). This efficient and easy-to-execute method gathers data on usability, satisfaction, aesthetics, and efficiency. The questionnaire is divided into four sections: User Information, where demographic details are collected; Knowledge, where participants express their thoughts on mental health; Comprehension, focusing on users' understanding after playing the game; and Feedback, where users share their personal thoughts about the game. This structured approach allows for a comprehensive assessment and improvement of the user experience in alignment with the game's objectives.

Procedures

Prepared questions will be arranged online using Google Form for user evaluation. Users need to have a laptop or PC ready. Initially, users will receive a game link, allowing them to explore and play at their own pace. After completion, a questionnaire link will be provided, giving users around 5 minutes to submit their feedback. The entire process is expected to take 10-15 minutes. Post-testing, results will be compiled and analyzed for evaluation.

Demographic Characteristics

In this study, 28 participants, drawn from the general public, engaged in the online testing process. The results, compiled and evaluated, are summarized in Table 6, illustrating the respondent demographic for evaluation. Notably, 64.3% of participants were male, and the majority (64.3%) fell within the 19-25 age range. A significant portion (56.5%) spent 5-10

hours weekly on video games. Students comprised the majority of participants at 60.7%. Regarding their understanding of mental health, 35.7% rated it at level 4, while the lowest rating of 7.1% was at level 2.

Table 6: Participants Demographic for Evaluation

Questions	Range	Frequency (n)	Percentage (%)
Gender	Male	18	64.3
	Female	10	35.7
Time spends to play video games (week)	Less than 5 hours	6	26.1
	5-20 hour per week	13	56.5
	15-20 hour per week	4	17.4
	More than 20 hour per week	0	0
Age	18 and below	6	21.4
	19 – 25	18	64.3
	26 – 30	3	10.7
	Above 31	1	3.6
Occupation	Student	17	60.7
	Government Employee	0	0
	Private Employee	5	17.9
	Unemployed	3	10.7
	Self-Employed	3	10.7
	Retired	3	10.7
Rate of their understanding in mental health	1	0	0
	2	2	7.1
	3	8	28.6
	4	10	35.7
	5	8	28.6

Overall Findings

The questionnaire results will be analyzed by calculating the mean value for each section based on the 5-point Likert scale, where participants indicate their affirmability on a scale of 1-5. This scale is chosen for its ease in statistical evaluation to compute mean values for each questionnaire section. Likert scales provide participants with independence in choosing responses in a balanced and symmetric manner in either direction (Joshi et al., 2015). The data collected from the Google Form questionnaire will be transferred to a Google Spreadsheet for comprehensive calculations, including mean, total mean, overall mean, and the percentage of overall mean.

Table 7: Total section from the mean of all questionnaire.

Section	Question	N	Mean
	1	28	4.29
	2	28	4.04
	3	28	3.71
	4	28	3.36
Knowledge	5	28	4.21
	6	28	3.71
	7	28	3.53
	8	28	3.54
	9	28	3.75
	10	28	4.11
Total Mean			3.83
	11	28	3.97
	12	28	3.86
	13	28	4.00
	14	28	3.79
Comprehension	15	28	3.68
	16	28	3.64
	17	28	3.79
	18	28	4.11
	19	28	4.11
Total Mean			3.88
	20	28	3.86
Feedback	21	28	3.96
	22	28	3.96

23	28	3.79
24	28	3.89
25	28	3.96
Total Mean		4.68
Overall Mean	4.13	
Percentage of Overall Average	83%	

The total mean of all sections above the average percentile is based on Table 7. The table shows that the feedback section has the highest mean overall. As a result, players gave the game excellent feedback. This questionnaire's overall mean is 4.13, which falls within the agreeableness range. According to the results, 83% of the participants gained knowledge about mental health and enjoyed the game. Thus, the project's goal has been accomplished.

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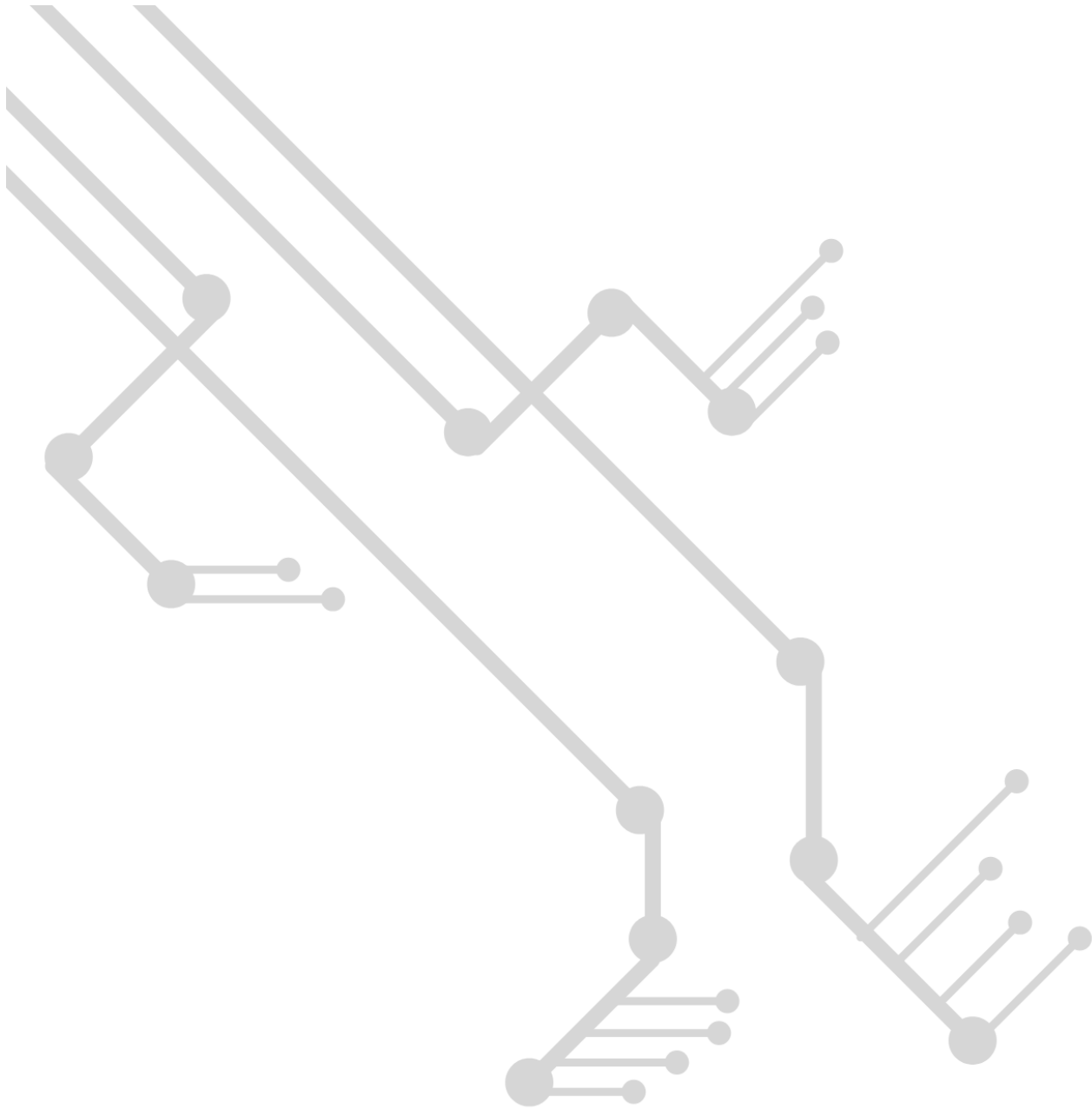
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