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"ANXISCAPE": AN ADVENTURE IN CONQUERING ANXIETY VIA GAME-BASED LEARNING (GBL) FOR STUDENTS

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Abstract

On Anxiety is a pervasive mental health issue that significantly impacts individuals' physical, mental, and emotional well-being. Despite the crucial importance of mental health education, the young generation, especially students are facing difficulty in acquiring information about anxiety from sources or tools which appeal to them. As an example, the scarcity or the absence of a usability of Game-Based Learning (GBL) application in providing the abovementioned information. This is a possible challenge leading to a lack of enjoyment in learning about mental health education. Recognizing the need for a more engaging approach, this study aims to create a GBL application designed to disseminate information to students about anxiety. The project used the Game Development Life Cycle (GDLC) methodology. The evaluation was conducted using the instrument from the E-Game Flow Model and Heuristic Evaluation with a 5-point Likert scale. The results show a remarkable overall mean of 90%, indicating that most users have a positive enjoyment with the application. Moreover, 85.4% of the overall mean, indicating that most user have positive result on the usability of the application. This project has an impact on students by making it easier for them to know about Mental Health Education on topic anxiety via Game-Based Learning. Further enhancements in this project have been identified for future improvement, including explore ways to balance the depth and complexity of educational content with user engagement in serious games and develop ways to optimize the game's performance across different devices and internet conditions.

Keywords: Anxiety; Anxiety Disorder; Mental Health Education; Game-Based Learning; Learning.

INTRODUCTION

Anxiety disorders are the most common mental health issues, and they can cause excessive worry, social fears, sudden panic attacks, and avoidance behaviors (Adwas et al., 2020; Szuhany & Simon, 2022). These conditions, such as separation anxiety disorder, specific phobias, selective mutism, social anxiety disorder, panic disorder, agoraphobia, and generalized anxiety disorder, often start when people are young (Craske & Stein, 2016). For

college and university students, starting school is a big step into adulthood. It comes with more responsibilities, like managing academics, hobbies, friends, relationships, money, and sometimes a part-time job (Craske & Stein, 2016). Balancing these responsibilities can be stressful, leading to common mental health problems like anxiety, depression, sleep disorders, and eating disorders (Cuttilan et al., 2016; Tavolacci et al., 2015; Wang & Liu, 2022).

Many students might experience anxiety, which means they often worry or feel uneasy about things. Anxiety involves having constant thoughts and worries that make you feel tense all the time (VandenBos, 2007). It's like having too much worry and fear about everyday things, leading to a belief that bad things will happen in the future (Perrotta, 2019). This can cause health problems, sleep issues, and difficulties in thinking clearly. Because of this, anxiety is a significant concern for colleges and universities, but its global prevalence among students is still uncertain (Tan et al., 2023). It's important to evaluate anxiety levels to understand their impact on students' academic success and well-being (Sahin & Tuna, 2022).

Nowadays, a wealth of information is easily accessible through our devices. Technology allows for quick and efficient information sharing while making it engaging by using multimedia elements. As an instance, Game-Based Learning (GBL) is an approach that has the potential and appeal for helping students learn abilities such creativity, problem-solving, collaboration and cooperative interaction, and communication (Liu et al., 2020). The goal of this project is to enhance students' understanding of anxiety disorders while providing an engaging experience through the interactive game "AnxiScape".

In today's app markets like the App Store and Google Play, analyzing user reviews can uncover usability issues and provide insights for improving mental health education apps (Alqahtani & Orji, 2019). Although usability testing is common in IT, educators often overlook it, leading to dissatisfied users and underutilized systems (Kushniruk et al., 2013). Usability studies can help improve the perceived benefits for students (Verkuyl et al., 2018). However, there is limited direct evidence about why mental health apps have low engagement, and poor usability is a significant factor (Alqahtani & Orji, 2019; Torous et al., 2018). An analysis of user reviews for 106 mental health apps found 1,236 comments about usability issues, highlighting the importance of reviewing app feedback to improve user experience and increase adoption rates (Alqahtani & Orji, 2019). This analysis helps researchers understand users' perspectives on the usability problems they encounter. The study initially compiled a list of 437 apps by searching keywords like "emotions," "depression," "anxiety," "stress," "mental health," and "mood" in the Google Play and App Store (Alqahtani & Orji, 2019). The summary of this research is shown in Figure 1.

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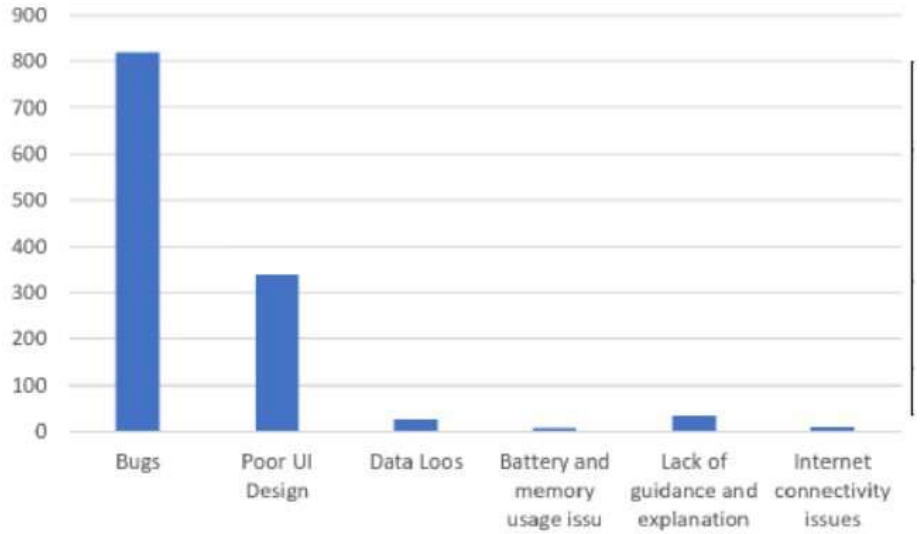

Figure 1: Usability Issues of Mental Health apps

According to Alqahtani and Orji (2019), many mental health apps have serious usability problems, such as battery drain, bugs, poor UI design, and issues with losing personal data. These apps also often lack internet connectivity, user manuals, and have redownload problems. Out of 106 mental health apps reviewed, 7 were game-based learning apps that also faced these usability issues. This shows that evaluating the usability of mental health apps is essential. Therefore, developing a game-based learning app for mental health, like AnxiScape, is important and necessary.

As we are familiar, anxiety is an important topic in mental health education, which is a vital part of quality education today. Educators face the challenge of providing effective mental health education to students (Jin, 2022). Modern education aims to develop well-rounded individuals by including both skill development and psychological support (Jin, 2022). A keyway to promote mental health in schools is to create a calm, dignified, and structured environment, which helps prevent mental health issues (Ferrín, 2020). However, if students don't enjoy learning, it can negatively impact their mental health, leading to less engagement and lower academic and social progress (*Students' Mental Health in School - K12*, 2024). Enjoyment, which is a positive feeling of satisfaction, is essential for a balanced life (Hernik & Jaworska, 2018). Outdated educational content fails to engage students, making mental health education less effective (Li, 2020). This project aims to develop an application that makes learning about mental health more enjoyable and engaging with appealing content.

LITERATURE REVIEW

Definition of Anxiety Disorders

Anxiety disorders are the most common type of mental health disorders, usually starting in late adolescence or early adulthood (Penninx et al., 2021). They involve issues with brain circuits

responsible for detecting and responding to danger. According to Thibaut (2017), anxiety disorders are common mental health issues that often occur with depression, making treatment more difficult. The International Classification of Diseases (ICD-10) identifies different types of anxiety disorders, such as phobias, panic disorder, generalized anxiety disorder, and mixed anxiety and depression (Ströhle et al., 2018). These disorders often result from a combination of genetics, psychological factors, and life experiences (Chand & Marwaha, 2024). Stress is a response to challenges in our lives and can affect our thoughts, feelings, and behaviors if not managed well (Isha et al., 2023). Anxiety disorders can impact a person's overall well-being, including their emotions and social interactions. It's important to note that mental health is not just about avoiding illness; it also involves building positive traits like resilience and self-esteem.

Comprehensive Guide to Anxiety Disorders: Types and Symptoms

There are several types of anxiety disorders, each with its own signs and symptoms, all of which involve excessive worry or fear (Adwas et al., 2020). Panic disorder involves sudden panic attacks with intense fear and physical symptoms. Social anxiety disorder causes fear of social situations due to worry about judgment. Separation anxiety disorder results in excessive worry about being apart from loved ones. Obsessive-Compulsive Disorder (OCD) features repetitive thoughts and behaviors. Post-Traumatic Stress Disorder (PTSD) develops after trauma, leading to flashbacks and avoidance. Generalized Anxiety Disorder (GAD) is marked by constant worry about everyday life, while specific phobias are intense fears of particular things, causing distress (Chand & Marwaha, 2024).

Effective Approaches for Anxiety Prevention

Preventing anxiety is important because it can lead to serious problems. Programs that use Cognitive Behavioural Therapy (CBT) can help reduce anxiety and depression, especially in young adults, by teaching them how to manage emotions and improve social skills. These programs work best when they include practice sessions and feedback. Being aware of what triggers your anxiety, like stress from work or school, helps you manage it better. Using coping strategies can keep you calm. Having supportive friends is also important, as they provide a safe place to share concerns and get advice, which can prevent anxiety from taking over your life (Nasca, 2024; Nauphal et al., 2023; Shi et al., 2022).

METHODOLOGY

In this project, I selected the GDLC as the chosen methodology. The adoption of GDLC has enhanced project predictability by offering multiple approaches to identify and resolve issues while formulating strategies for seamless project execution. The 2D game is a web-based title accessible to players on laptops or tablets. To ensure a streamlined development process, selecting a game development strategy is imperative. The Game Development Life Cycle (GDLC) methodology involves several stages to oversee video game development, which usually consist of initiation, pre-production, production, testing, beta, and release phases (Adiwikarta & Dirgantara, 2017). Additionally, studies have found that most research has

focused on the production phase of the game development process, followed by the pre-production phase, while the post-production phase has received less attention (Aleem et al., 2016).

1. Initiation

The goal in this project games is to share information about anxiety through Game-Based Learning (GBL). This game's design concept is based on the preferences of platformer gamers, especially those who enjoy adventure and challenge games that are both entertaining and educational, allowing users to discover new things and broaden their perspective. Students in university are the intended audience for this initiative (19 to 23 years old). Since many students in university are familiar with the anxiety disorder so they will easily catch up with the concept of Game AnxiScape.

2. Pre-production

Planning the gameplay and other game development tasks fall under this phase. This involves preparing for game production, developing the gameplay, deciding on the game's style, selecting the game engine and gaming platform, and generating an early design for the game. Anxiscape is designed in the style of an adventure game where the main character experiences various types of anxiety and learns to overcome them throughout the journey. The game consists of three stages, each with its own guidelines and rules, allowing players to progress through different challenges and develop coping strategies for anxiety.

3. Production Phase

Software and Hardware Requirement

The requirements for the construction phase and the criteria for the implementation phase are the two distinct types of requirements that must be satisfied to finish the development of this game. The two types of build phase requirements were hardware requirements and software requirements. Table 1 and 2 below shows the list of essential conditions.

Table 1: Hardware Specifications

No.	Features	Details
1	Device	Laptop
2	Type of System	64-bit operating system, x64-based processor
3	Random-Access Memory (RAM)	12 GB
4	Storage	512 GB SSD
5	Processor	AMD Ryzen 5 3550H with Radeon Vega Mobile Gfx 2.10 GHz
6	Graphic Card	NVIDIA GeForce

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Table 2: Software Requirement

No.	Software	Description
1.	Operation System	Windows 11 Home Single Language
2.	GBL Application Development	Construct 3
3.	Animation and Sound Effects	Canva
4.	2D Characters/ Environment	Aseprite and Canva

4. Testing Phase

In this phase, called testing or alpha testing, we check how well the game works and if its features are balanced and not too hard. Playtesting helps us understand how the game features work, how useful they are, and if the game is too easy or hard. While playing, if a tester finds a problem, like a mistake or a sudden game ending, they write down what caused it and how they made it happen again. Testers play the game on laptops and share their thoughts on the game, including how fun it is, the story, and the controls.

5. Beta Phase

In this beta testing phase, the goal is to improve Anxiscape by gathering feedback from real users. Thirty students aged 19 to 23 will play the game on Windows computers for 5 to 10 minutes. Afterward, they'll fill out a Google Survey to provide feedback. This helps us collect reliable data. The evaluation focuses on player enjoyment and usability, with enjoyment linked to positive player reactions and affected by factors like the game system and player experience. Usability is assessed through methods like walkthroughs and questionnaires, and heuristic evaluation identifies usability issues. This evaluation helps us understand player enjoyment and ease of use, aligning with the project's goals.

6. Release Phase

Once all projects and designs are finalized, the deployment phase initiates. However, it's important to note that in this instance, the game will not be deployed to the market. Instead, it will remain the intellectual property of UiTM and will be housed within the UiTM collection. Thus, any changes or regressions are unlikely to occur during the deployment phase. If any adjustments are needed, the developer will take prompt action.

RESULT AND DISCUSSION

Based on the questionnaire data, a greater portion of the participants involved in testing the game project were male, comprising 16 individuals (53.3%), while female constituted 14 individuals (46.7%). Additionally, the findings indicate that most of the respondents were 20 years old and 22 years old, with 7 students representing 23.3% of the participants, followed by 19 years old and 20 years old with 6 students, accounting for 20%. Furthermore, most of the responses were provided by students in 20 years old and 22 years old.

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Table 3: Respondent's Demography

Question	Range	Frequency (n)	Percentage (%)
Gender	Male	16	53.3
	Female	14	46.7
Age	19	6	20
	20	7	23.3
	21	4	13.3
	22	7	23.3
	23	7	20

User Enjoyment Findings

The evaluation questions provided were based on the EGameFlow. Only 8 questions were chosen for this project's user enjoyment testing, as they were the most suitable to use. The survey comprised a total of 8 questions that describe the user enjoyment when playing the game. The total number of responses for this survey was 30 respondents.

Table 4: Frequency and Mean Score for User Enjoyment Evaluation

Code	Factor	Questions	Frequancy					Mean
			SD (1)	D (2)	N (3)	A (4)	SA (5)	
E1	Concentration	The game grabs my attention	0	0	0	9	21	4.70
E2	Concentration	The game provide content that stimulates my attention	0	0	0	9	21	4.70
E3	Goal Clarity	Overall goals were presented clearly	0	0	5	11	14	4.30
E4	Goal Clarity	I understand the learning goals through the game	0	0	1	9	20	4.63
E5	Feedback	I receive feedback on my progress in the game	0	0	7	9	14	4.23
E6	Immersion	I forgot about time while playing the game	0	0	2	10	18	4.53
E7	Immersion	I become involved in the game	0	0	4	7	19	4.50
E8	Knowledge Improvement	The game increases my knowledge	0	0	2	9	19	4.57
		Total Mean						4.52

Based on the results from Table 6, the majority of participants found the game engaging. For E1 and E2, 70% of respondents strongly agreed that the game captured their attention and provided stimulating content, while 30% agreed. In E3, 46.7% strongly agreed that the goals were clear, 36.7% agreed, and 16.7% were neutral. For E4, 66.7% strongly agreed they understood the learning goals, 30% agreed, and 9% were neutral. Moving to E5, 46.7% strongly agreed they received feedback on their progress, while 30% agreed, and 23.3% were neutral. In E6, 60% strongly agreed they lost track of time while playing, 30.6% agreed, and 6.7% were neutral. For E7, 63.3% strongly agreed they became involved in the game, with 23.3% agreeing, and 13.3% neutral. Lastly, for E8, 63.3% strongly agreed the game increased

their knowledge, 30% agreed, and 5.6% were neutral. Overall, most participants responded positively to the game's ability to capture attention, provide feedback, and enhance learning.

Usability Findings

The evaluation questions provided were based on the Heuristic Evaluation. Only 8 questions were chosen for this project's usability testing, as they were the most suitable to use. The survey comprised a total of 8 questions that describe the user enjoyment when playing the game. The total number of responses for this survey was 30 respondents.

Table 5: Frequency and Mean Score for Usability Evaluation

Code	Factor	Questions	Frequancy					Mean
			SD (1)	D (2)	N (3)	A (4)	SA (5)	
GU1	Game	Interesting game visual graphic	0	1	1	13	15	4.40
GU2	Usability	Suitable audio with the game	1	0	3	11	15	4.30
GU3	Component	The Screen layout is visually pleasing	0	0	2	14	14	4.40
GU4		The Navigation menu is easy to use	0	0	0	11	19	4.63
GU5		Control keys are consistent	0	0	1	11	18	4.57
GU6		The Interactive features provided are sufficient	0	1	6	13	10	4.07
GU7		The game gives feedback on the player's actions	3	1	17	4	5	3.23
GU8		The game contains help	0	0	2	10	18	4.53
		Total Mean						4.27

According to the results of the evaluation, GU1 indicates that 50% of respondents strongly agreed with the statement “Interesting game visual graphic,” while 43.3% agreed. The remaining respondents were split, with 3.3% selecting neutral and another 3.3% disagreeing. For GU2, 50% strongly agreed that there was “Suitable audio with the game,” and 36.7% agreed. Additionally, 10% were neutral, and 3.3% strongly disagreed. In GU3, 46.7% strongly agreed with “The Screen layout is visually pleasing,” and another 46.7% agreed, while 6.7% were neutral. For GU4, 63.3% strongly agreed that “The Navigation menu is easy to use,” and 36.7% agreed, resulting in 11 respondents confirming ease of use. In GU5, 60% strongly agreed that “Control keys are consistent,” while 36.7% agreed, and 3.3% were neutral. In GU6, 33.3% strongly agreed that “The Interactive features provided are sufficient,” 43.3% agreed, 20% were neutral, and 3.3% disagreed. For GU7, 16.7% strongly agreed with “The game gives feedback on the player's actions,” 13.3% agreed, 17.3% were neutral, 1 respondent disagreed, and 10% strongly disagreed. Finally, in GU8, 60% strongly agreed that “The game increases my knowledge,” confirmed by 18 respondents, while 33.3% agreed, and 6.7% were neutral.

Overall Findings

The level of agreement for each aspect is shown by the total values in the user enjoyment and usability evaluation. A 5-point scale is used for the survey: 1 means 'Strongly Disagree,' 2 is 'Disagree,' 3 is 'Neutral,' 4 is 'Agree,' and 5 is 'Strongly Agree'. Tables 4 and 5 were calculated using Microsoft Excel. This software is important for data calculation and is often used for analyzing and displaying data for analysis and business purposes. Table 6 shows the overall mean value for the user enjoyment survey, and Table 7 shows the overall mean value for the usability survey.

Table 6: Total Overall Mean for User Enjoyment

Enjoyment Category	Total Average
Concentration	4.70
Goal Clarity	4.47
Feedback	4.23
Immersion	4.52
Knowledge improvement	4.57
Overall Mean	4.50
Percentage (%)	90%

Table 7: Total Overall Mean for Usability

Usability Category	Total Average
Game Usability Component	4.27
Overall Mean	4.27
Percentage (%)	85.4

The findings demonstrate the program's effectiveness in assessing the usability and user enjoyment of "AnxiScape: An Adventure in Conquering Anxiety Via Game-Based Learning (GBL) For Students." These results show that the program successfully achieved its third objective, which was to evaluate user enjoyment and usability of the application.

CONCLUSION

The AnxiScape game project effectively provides mental health education for students in a fun and engaging way. It addresses the lack of user enjoyment and usability issues found in traditional mental health education methods. The game significantly improves students' understanding of mental health, especially anxiety, by offering an alternative learning approach. Evaluations using EGameFlow and Heuristic Evaluation confirmed its success. Although there are some limitations, such as limited learning depth, accessibility issues, and technological requirements, these can be improved in the future by enhancing settings functionality, expanding platform accessibility, and improving game design and technology.

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