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"ANXISCAPE": An Adventure in Conquering Anxiety Via Game-Based Learning For Students

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Abstract: This study discusses the development and evaluation of a Game-Based Learning (GBL) application designed to educate students about anxiety disorders. The study addresses the challenge of engaging students in mental health education by creating an interactive game called "AnxiScape" using the Game Development Life Cycle (GDLC) methodology. The game aims to enhance students' understanding of anxiety through an enjoyable and immersive experience. Evaluation results, based on the E-Game Flow Model and Heuristic Evaluation, indicate high levels of user enjoyment (90%) and usability (85.4%), demonstrating the game's effectiveness in capturing attention, providing feedback, and improving knowledge. Integrating educational content with interactive elements can significantly enhance learning outcomes. The study suggests future improvements to optimize the game's performance and balance educational depth with user engagement.

Keywords: *Game-Based Learning, Anxiety, Game Development Life Cycle, Mental Health Education*

1. Introduction

Anxiety disorders are the most common mental health issues resulting in excessive worry, social fears, sudden panic attacks, and avoidance behaviors (Adwas et al., 2019; 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).

Anxiety involves having constant thoughts and worries that make you feel tense all the time - It's like having too much worry and fear about everyday things, leading to a belief that bad things will happen in the future (Shi et al., 2022). 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 (Perrotta, 2019). It's important to evaluate anxiety levels to understand their impact on student's academic success and well-being (Tan et al., 2023).

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. For instance, GBL is an approach that has the potential and appeal to help students learn abilities such as creativity, problem-solving, collaboration cooperative interaction, and communication (Liu et al., 2020). , therefore, the goal of this project is to enhance students' understanding of anxiety disorders while providing an engaging experience through the interactive game "AnxiScape".

2. Literature Review

Anxiety Disorders

Anxiety disorders are the most common type of mental health disorder, 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. Anxiety disorders are common mental health issues that often occur with depression, making treatment more difficult (Thibaut, 2017). 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). 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.

Types and Symptoms: Comprehensive Guide to Anxiety Disorders

There are several types of anxiety disorders, each with its signs and symptoms, all of which involve excessive worry or fear (Adwas et al., 2019). 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 (Shi et al., 2022; Nasca, 2024; Nauphal et al., 2023).

3. Methodology

Selecting a game development strategy is imperative to ensure a streamlined development process. The Game Development Life Cycle (GDLC) methodology involves several stages to oversee video game development, which usually consists of initiation, pre-production, production, testing, beta, and release phases.

Initiation Phase

The outcome of initiation is the game's premise and an introduction to the game. 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 anxiety disorder, they will easily catch up with the concept of the Game Anxiety Odyssey.

Pre-production Phase

This phase involves planning gameplay and the game's style. This includes familiarizing with the game engine, selecting the game platform, and generating an early design for the game are some of the activities that take place at this stage of the process.

Production Phase

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. This includes the hardware and software specifications determination. The minimum requirement for this project is 12GB of RAM, AMD Ryzen 5, and Radeon Vega Mobile Gfx 2.10 GHz graphic card. For the software, Windows 11, Construct 3, Canva and Aseprite are used.

Testing Phase

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.

4. Findings

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 females constituted 14 individuals (46.7%). Additionally, the findings indicate that most respondents were 20 and 22 years old, with 7 students representing 23.3% of the participants, followed by 19 and 20 years old with 6 students, accounting for 20%. Furthermore, most of the responses were provided by students 20 years old and 22 years old. Table I showcases the survey results.

Table 1: 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

The evaluation questions provided were based on the EGameFlow. A total of 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's enjoyment when playing the game. The questions are then segregated into 5 main factors namely concentration (E1, E2), goal clarity (E3, E4), feedback (E5), immersion (E6, E7), and knowledge improvement (E8). The total number of responses for this survey was 30 respondents. Table II indicates the findings of the survey.

Table 2: Frequency and Mean Score for User Enjoyment Evaluation

Factor	Questions Code	Frequency					Mean
Concentration	E1	0	0	0	9	21	4.70
	E2	0	0	0	9	21	4.70
Goal Clarity	E3	0	0	5	11	14	4.30
	E4	0	0	1	9	20	4.63
Feedback	E5	0	0	7	9	14	4.23
Immersion	E6	0	0	2	10	18	4.53
	E7	0	0	4	7	19	4.50
Knowledge Improvement	E8	0	0	2	9	19	4.57
					Total Mean		**4.52**

Based on the results from Table II, 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

The evaluation questions provided were based on the Heuristic Evaluation. The survey comprised a total of 8 questions that describe the usability of the application.

Table 3: Frequency and Mean Score for Usability

Factor	Questions Code	Frequency					Mean
Game Usability Component	GU1	0	1	1	13	15	4.40
	GU2	1	0	3	11	15	4.30
	GU3	0	0	2	14	14	4.40
	GU4	0	0	0	11	19	4.63
	GU5	0	0	1	11	18	4.57
	GU6	0	1	6	13	10	4.07
	GU7	3	1	17	4	5	3.23
	GU8	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 IV and V 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 IV shows the overall mean value for the user enjoyment survey, and Table V shows the overall mean value for the usability survey.

Table 4: 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 5: 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.

5. Conclusion and Recommendations

In conclusion, the development and evaluation of "AnxiScape" demonstrate the potential of Game-Based Learning (GBL) as an effective tool for mental health education, specifically in addressing anxiety among students. The project successfully utilized the Game Development Life Cycle (GDLC) methodology to create an engaging and educational platform that resonates with its target audience. The mean evaluation results for user enjoyment and usability are 90% and 85.4% respectively. This indicates that the game not only captures the attention of students but also provides a meaningful learning experience. The positive feedback on various aspects such as concentration, goal clarity, feedback, immersion, and knowledge improvement underscores the game's effectiveness in making complex mental health concepts accessible and engaging. Furthermore, the study highlights the importance of integrating educational content with interactive and enjoyable elements to enhance learning outcomes. Future enhancements, including optimizing the game's performance across different devices and balancing educational content with user engagement, are essential for further improving the game's impact. Overall, "AnxiScape" represents a significant step forward in leveraging technology to address mental health education, offering a promising approach to help students better understand and manage anxiety.

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