

# Design of 3D Puzzle Game "Moodoria" Using Unity as an Educational Media for Emotional Intelligence

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## Abstract

Emotional awareness is crucial for mental health, yet conventional education methods are often less engaging for adolescents. This study aims to design and develop a 3D puzzle game called "Moodoria" using Unity as an interactive medium for emotional intelligence education. The research method used is Research and Development (R&D) with the Game Development Life Cycle (GDLC) model, including needs analysis, literature study, concept design, implementation, and user testing. 3D assets were created using Blender. The game was tested on a small group of users (5–10 people) using a Likert-scale questionnaire. Results show that all main features (menu navigation, character movement, object interaction) function well. User assessments scored high on gameplay (4.87 for challenge) and enjoyment (4.67), and the game was considered feasible as an emotional education medium (average score 4.23). In conclusion, "Moodoria" was successfully developed as an engaging educational game, although sound effects and character expression variations need improvement.

**Keywords:** 3D Puzzle Game; Emotional Education; Game-Based Learning; Unity

## 1. Introduction

Digital technology has opened innovative opportunities in education, one of which is the use of games as interactive learning media. Games with attractive visuals and stimulating challenges have been proven to increase learning enthusiasm and provide enjoyable experiences, especially for young people [1]. However, most educational games still focus on cognitive aspects such as mathematics and science, while emotional development has not been widely explored. Emotional awareness plays a central role in shaping character and maintaining mental health. Unfortunately, conventional approaches such as seminars or group discussions are often less interesting and effective, particularly for adolescents who are more responsive to visual and interactive media [2]. This condition shows an opportunity to package emotional education in a more attractive format, such as a game.

In the world of digital games, the puzzle genre is known to train logic, persistence, and problem-solving abilities. Moreover, several studies reveal that puzzle games also have the potential to encourage social and emotional development, especially when designed with appropriate narrative and visual elements [3]. However, puzzle games that also raise the theme of emotional exploration, especially those developed in 3D format and aimed as an educational tool, are still very rare. Unity, as a widely used game engine, offers ease in creating 3D games with interactive and immersive visual, audio, and gameplay features [4]. This engine also allows flexibility in inserting educational values into the game, making it suitable for developing games aimed at emotional education.

Furthermore, various studies show that game-based and interactive multimedia media can increase learning motivation, thinking skills, and even students' social and emotional development, especially at a young age [5]. In the context of emotional development, visual media based on facial expressions have been shown to improve children's ability to recognize emotions significantly [6]. Digital media also have a substantial influence on elementary students' emotional development, both positively (motivation, social skills) and negatively, underscoring the need for well-designed educational games [7]. Moreover, research on Android-based educational games using Unity has shown high feasibility and user satisfaction, for instance in introducing fruits or other basic concepts to early childhood learners [8]. Despite these advances, in the context of emotional development for adolescents and young adults, the use of Unity-based 3D puzzle games is still very limited. Based on this background, a 3D puzzle game is needed that not only sharpens thinking skills but also invites players to understand and reflect on their own emotions through narrative, visualization, and audio designed holistically. Therefore, this study aims to design and develop a 3D puzzle game named "Moodoria" using Unity as an educational medium for emotional intelligence.

## 2. Method

This study uses a Research and Development (R&D) approach to produce a product in the form of a 3D puzzle game that emphasizes problem-solving abilities while providing an implicit emotional experience through the game's atmosphere. The development process follows the Game Development Life Cycle (GDLC) model, which includes needs analysis, literature study, concept design, implementation, user testing, evaluation, and revision. The following subsections describe each stage in detail.

### 2.1. Needs Analysis

This stage was conducted to determine user needs for a game that provides logical challenges while remaining fun to play. Based on literature studies and observations of adolescent and young adult player characteristics, it was found that they prefer games with exploration and puzzle elements that encourage thinking activities, compared to direct material delivery. The emotional elements in this game are not presented explicitly as learning material but are conveyed subtly through visuals, environmental colors, character expressions, and narrative fragments appearing as easter eggs.

### 2.2. Literature Study

A literature study was conducted to collect theories and relevant research as a basis for game design. References reviewed included concepts of puzzle games, interaction design patterns such as tap and drag controls, user experience theory, the Game-Based Learning approach, and representation of emotions in digital media through colors, atmosphere, expressions, and narrative.

### 2.3. Game Concept Design (Pre-Production)

The main character of "Moodoria" is a slime that represents basic emotions: normal, joy, angry, sad, and shock. Five levels were designed with increasing difficulty: Mining Cave Puzzle (introducing generator and box mechanics), Battery and Hole Puzzle (combining battery activation and hole-filling mechanics), Stare Lever Puzzle (introducing lever mechanisms powered by batteries), Forest Puzzle (introducing log objects that move two tiles per push), and Hill Puzzle (high-difficulty puzzle with many boxes and narrow paths). The core gameplay mechanics include tapping a tile to move the slime and dragging objects to push them. Emotional mechanics are implemented through Memory Shards, which trigger "echoes" (short text narratives) and change the slime's expression.

### 2.4. Implementation

The game was developed using Unity 6000.2.6f1 for the Android platform. All 3D assets, including the slime character, boxes, batteries, and environmental objects, were created using Blender 4.5.3 LTS. The game features a main menu with Play, Options (music volume control), and Exit buttons, a level selection page, in-game controls for character movement and object interaction, and a level completion screen offering Next, Retry, or Exit options. The emotion system displays different slime expressions depending on player actions (e.g., joy when progressing, angry after multiple retries, sad when retrying, shock after sudden events).

### 2.5. User Testing

User testing was conducted on a small group of 15 respondents (adolescents to young adults) using a Likert-scale questionnaire (1–5) to assess visual, audio, gameplay, and emotional experience aspects. System testing was performed using the Black Box method to verify functionality of all main features. Data were analyzed using mean scores and percentage of feasibility, with interpretation categories ranging from "Very Poor" to "Very Good".

## 3. Results and Discussion

This section presents the results of the development and testing of the "Moodoria" game. The results include the implementation of the user interface, character designs, and gameplay mechanics as realized from the design stage. Subsequently, a discussion is presented based on system testing using the Black Box method and user assessments through a questionnaire. The evaluation focuses on visual quality, audio, gameplay, and the implicit emotional experience conveyed by the game.

### 3.1. System Testing

Black Box testing was performed on all main features: Play button, Options button, Exit button, music volume setting, SFX volume setting, level selection, character movement, character facing direction, object interaction, level completion, character expressions, and echoes. Table 1 shows the results of Black Box testing.

**Table 1:** Black Box testing results for "Moodoria"

No	Featured Tested	Expected Result	Test Result	Status
1	Play Button	Enter level page	Successfully entered	Valid
2	Options Button	Open audio setting menu	Menu appeared	Valid
3	Exit Button	Close application	Application closed	Valid
4	Music Volume Setting	Volume changes	Volume changes as input	Valid
5	SFX Volume Setting	Sound effect volume changes	Volume did not change	Not Valid
6	Level Selection	Enter selected level	Successfully entered	Valid
7	Character Movement	Character moves to tapped tile	Character moved	Valid
8	Character Facing	Face direction according to tile	Correct direction	Valid
9	Object Interaction	Object responds	Object responded	Valid

10	Level Completion	Victory page appears	Victory page appeared	Valid
11	Character Expressions	Expression changes	Expression changed	Valid
12	Echoes (Text Narrative)	Text appears after Memory Shards	Text appeared	Valid

Based on the test results, the SFX (sound effect) feature did not function optimally. The sound produced did not match expectations, so this feature requires further improvement. All other features worked as expected.

### 3.2. User Assessment Result

User testing was conducted to determine user responses and assessments of the "Moodoria" game. A questionnaire using a Likert scale (1-5) was distributed via Google Forms to 15 respondents who had played the game. Aspects assessed included gameplay, visuals, audio, and emotional education. Table 2 presents the average scores from the 15 respondents.

**Table 2:** User questionnaire results (N=15)

No	Indicator	Mean Score	Category
1	Game easy to play	4.60	Very Good
2	Puzzle easy to understand	4.80	Very Good
3	Appropriate difficulty level	4.13	Good
4	Game provides challenge	4.87	Very Good
5	Attractive game display	4.67	Very Good
6	Attractive character design	4.47	Very Good
7	Attractive character expressions	4.27	Very Good
8	Comfortable music	4.60	Very Good
9	Emotional expressions display well	3.77	Good
10	Emotions interesting for players	4.23	Very Good
11	Provides emotional and logical learning experience	4.46	Very Good
12	Feasible as emotional education media	4.23	Very Good
13	Game fun to play	4.67	Very Good

The category determination was based on a Likert scale range: 1.00–1.80 (Very Poor), 1.81–2.60 (Poor), 2.61–3.40 (Fair), 3.41–4.20 (Good), 4.21–5.00 (Very Good).

### 3.3. Game Interface

The following figures illustrate the game interface and gameplay.

This page shows the main screen of the game, containing Play, Options, and Quit buttons.



**Fig. 1:** Main screen of "Moodoria" with Play, Options, and Exit buttons.

This page shows the level selection screen where players can choose from five available levels.



Fig. 2: Level selection screen displaying five available levels.

This page shows the options menu for adjusting music and sound effect (SFX) volume.



Fig. 3: Options menu for adjusting music volume.

This game show the slime character with five different expressions representing emotional states: normal, joy, angry, sad, and shock.



Fig. 4: Slime character expressions: (a) normal, (b) joy, (c) sad, (d) angry, (e) shock.

This page shows the gameplay view of Level 1 (Mining Cave Puzzle) where players must activate the generator and push the box onto the button.



Fig. 5: Gameplay view of Level 1 (Mining Cave Puzzle) with generator and box mechanics.

This page shows the gameplay view of Level 3 (Stare Lever Puzzle), where players must activate the lever using a battery to lower the stairs and reach the exit.

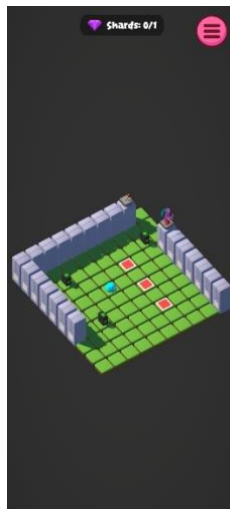


Fig. 6: Gameplay view of Level 3 (Stare Lever Puzzle) with battery and lever mechanics.

This page shows the echoes (emotional narrative) that appear when the player collects a Memory Shard, displaying text such as "Cahaya di Balik Gelap".

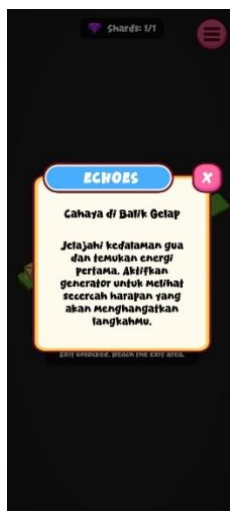


Fig. 7: View the echoes (emotional narrative) when collecting a Memory Shard.

This page shows the level completion screen, displaying victory message, collected shards, and buttons for Next, Restart, or Home.



Fig. 8: Level completion screen with Next, Retry, and Exit options.

### 3.4. Discussion

The core gameplay of "Moodoria" is based on tile-based puzzle solving. Players control a slime character by tapping on tiles to move and dragging objects to push them. Each level introduces different mechanics: Level 1 (Mining Cave) requires activating a generator and pushing a box onto a button to lower a bridge. Level 2 combines battery activation and hole-filling puzzles. Level 3 introduces levers powered by batteries. Level 4 introduces log objects that move two tiles per push. Level 5 presents a high-difficulty puzzle with multiple boxes and narrow paths. Emotional elements are implemented through Memory Shards, which trigger "echoes" (short text narratives) and change the slime's expression.

Based on user assessments, the game received high ratings for challenge (4.87) and enjoyment (4.67), indicating that the puzzle mechanics are engaging. The visual aspects were also rated very good (4.67 for display, 4.47 for character design), confirming that the Blender-created assets and Unity implementation are appealing. The audio aspect showed that background music was comfortable (4.60), but the SFX feature malfunction (from Table 1) likely contributed to the lower score for emotional expression clarity (3.77). The game's feasibility as an emotional education medium was rated 4.23 (Very Good), and it scored 4.46 for providing emotional and logical learning experiences. This suggests that the implicit approach to emotional education (through atmosphere, expressions, and narrative fragments) is effective.

The advantages of "Moodoria" include: (1) engaging puzzle-based gameplay with gradual difficulty; (2) intuitive tap-and-drag controls; (3) attractive 3D visuals and character design; (4) successful integration of emotional feedback through character expressions; and (5) positive user ratings confirming feasibility as an emotional education medium.

The study has several limitations: (1) the SFX feature does not function optimally; (2) only five levels are available; (3) no save system; (4) character expression variations are limited and not always clearly visible; (5) interaction mechanics are basic and could be more complex.

## 4. Conclusion

In this section you should present the conclusion of the paper. Conclusions must focus on the novelty and exceptional results you acquired. Allow a sufficient space in the article for conclusions. Do not repeat the contents of Introduction or the Abstract. Focus on the essential things of your article.

Black Box testing confirmed that all core features function correctly, except for the SFX feature which needs further improvement. User assessments rated the game as "Very Good" in terms of challenge, enjoyment, visuals, and feasibility as an emotional education medium. The results indicate that a puzzle game with implicit emotional cues can effectively support emotional and logical learning for adolescents and young adults.

Future work should focus on fixing the SFX feature, adding more levels with a level-lock system, implementing a save system, and improving character expression visibility (e.g., camera zoom).

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