

## CHAPTER 1

# GAME-BASED LEARNING: WATCH OUT, LITTLE ONES! - A SAFETY EDUCATION MOBILE APPLICATION LEARNING FOR CHILDREN

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### 1.1 INTRODUCTION

Safety awareness involves taking responsibility for creating a safe and secure environment. The people that perform this role should be parents who must learn about the possible threats to children. The danger of comprehending must also be monitored as the kid grows, especially between the ages of one and five. Psychologists have now discovered why youngsters frequently fail to notice basic risks, why they appear eager to jeopardize their futures for a few moments of enjoyment, and the educational hurdles that can prevent people from learning to assess risk rationally, even as adults [1].

Furthermore, children are especially prone to accidents, and their safety necessitates procedures that differ from those employed for adults [2]. These children's growth is influenced by their environment since they are in the exploration period, which means they want to go from one location to another without impediments, such as in the house or shopping center. Parents must always monitor their children's movements and actions. However, in this day and age of globalization, the majority of parents work in the public and private sectors [3]. This inhibits parents from fully focusing on their children's safety and causes youngsters to disregard their parental obligations. We will develop a 3D game for youngsters to learn about safety awareness in risky scenarios in which they frequently find themselves with or without parental supervision [4]. We also created a mobile application to assist parents in fulfilling their obligations while still making a wage for the family. With this game, children may simulate what would happen if it happened in the location or area where they would be without their parents.

## **1.1 LITERATURE REVIEW**

Game-based learning has become an increasingly popular approach in modern education due to its ability to engage learners through interaction and motivation [5]. Digital learning platforms can transform abstract knowledge into experiential understanding, particularly effective for children's cognitive and behavioral development [6].

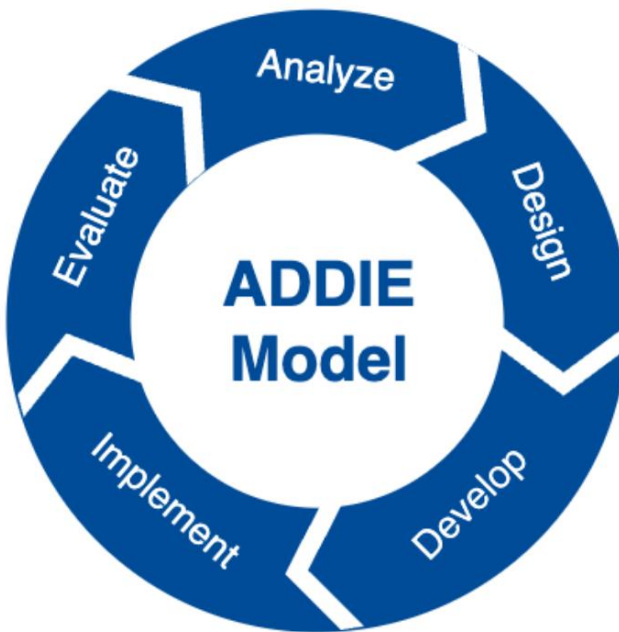
Several applications have attempted to address child safety through digital media. For example, Safety for Kids – Section 1 uses 2D animation to teach basic safety but is limited by static interaction [7]. Finding Dangers requires players to identify hazards in specific environments but lacks multiple scenario depth. Kidnap for Life adopts a 3D puzzle approach but includes only a single level, restricting learning variety. Finally, Pororo Life Safety Education offers an engaging experience but suffers from technical performance issues [8].

This review indicates a gap for a fully interactive 3D safety

education game that combines realism, interactivity, and adaptability. Hence, Watch Out, Little Ones! is developed to provide scenario-based learning that is both engaging and educational.

## 1.2 METHODOLOGY

The development of Watch Out, Little Ones! adopted the ADDIE model [9], consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation in Figure 1.1.



**Figure 1.1:** ADDIE Model

### 1.2.1 ANALYSIS

The project began with an assessment of children's learning

needs and the challenges parents face in teaching safety. Surveys and informal interviews were conducted to identify common accident scenarios involving children aged three to seven. Key findings emphasized the importance of interactive simulations to reinforce decision-making skills.

### **1.2.2 DESIGN**

The game was conceptualized using storyboards created in Canva 2.0, illustrating visual flow and character interaction. The design focused on bright colors, friendly characters, and child-friendly navigation to sustain engagement. Each level represents different safety scenarios such as road crossing, home hazards, and playground safety.

### **1.2.3 DEVELOPMENT**

The 3D game was developed using Unity Engine (version 2022.1.2f1) integrated with Visual Studio 2022 for C# scripting. Unity's built-in physics engine and animation tools enabled realistic movement and response to player interactions. The project assets were optimized for Android smartphones to ensure smooth performance and accessibility.

### **1.2.4 IMPLEMENTATION**

The prototype was deployed for testing among parents, educators, and young learners. Respondents were invited to interact with the application and complete a feedback questionnaire focusing on usability, design appeal, and educational relevance.

### **1.2.5 EVALUATION**

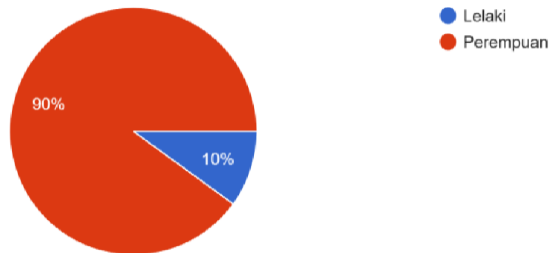
Quantitative survey data were collected from 100 respondents, including parents (35%), students (45%), and working adults

(20%). The Likert-scale responses evaluated perceived usefulness, child engagement, and learning effectiveness in safety. Results were analyzed to identify strengths and areas for improvement in future iterations.

The following survey questions have been prepared for the public to research the application requirements for this project.

Jantina

20 responses

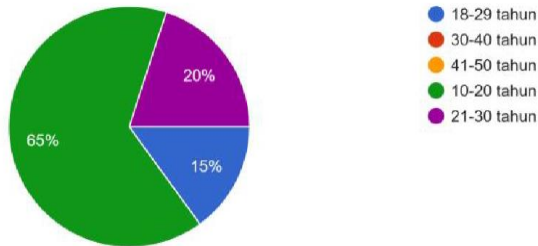


**Figure 1.2:** Gender

Figure 1.2 illustrates a pie chart of the respondents' gender. This is to determine how concerned the person is about the safety of children and their desire to protect them. There are approximately 90% females who participate in this survey, while only 10% are males.

Umur

20 responses

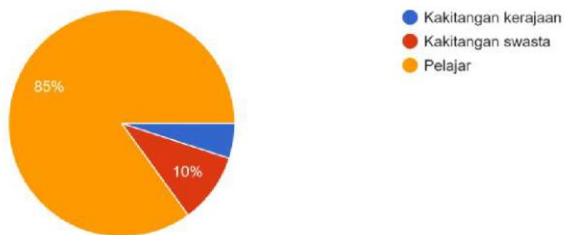


**Figure 1.3:** Age

Figure 1.3 illustrates the age distribution of the respondents who completed this questionnaire. The majority of those who answered this questionnaire are between the ages of 18 and 29, who have been recognized as adults capable of making decisions about the needs of this application.

Kategori responden

20 responses

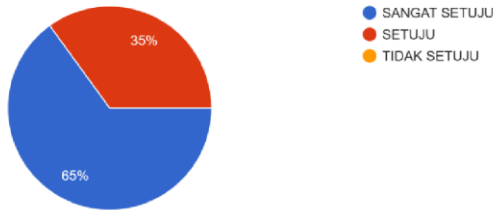


**Figure 1.4:** Category of the respondent

Figure 1.4 illustrates the categories of respondents who completed the questionnaire. The diagram shows that the majority of students answered the requirements of this application.

1. Adakah anda bersetuju bahawa kemalangan yang melibatkan kanak-kanak masih berlaku walaupun kita sudah berada di era pascamoden (2023) ?

20 responses

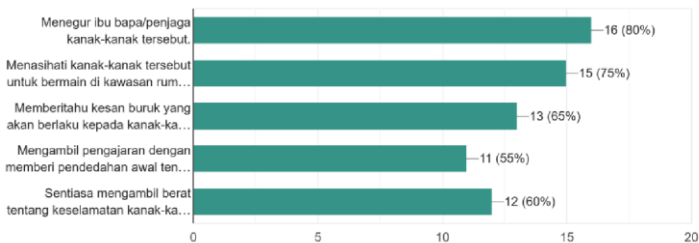


**Figure 1.5:** Section 1 - Question 1

Figure 1.5 illustrates questions related to the current situation and the purpose of this application. The majority of respondents strongly agree and agree with the current situation, especially in 2023.

2. Apakah langkah-langkah yang dapat diambil oleh anda sekiranya kanak-kanak bermain di luar kawasan rumah tanpa pengawasan ibu bapa/penjaga ?

20 responses



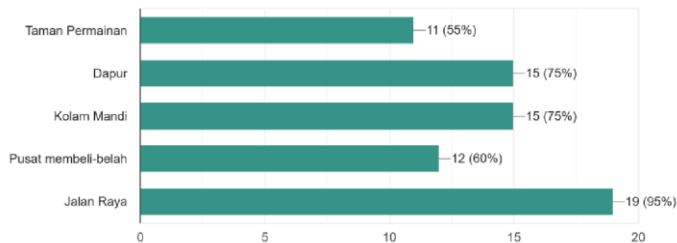
**Figure 1.6:** Section 1 - Question 2

Figure 1.6 illustrates questions about the steps that should be taken when children are playing without adult supervision. Respondents provided different answers based on their opinions. Nevertheless, a majority of respondents choose to reprimand the

child's parents. This needs to be discussed from various angles by the role.

3. Pada pendapat anda, apakah jenis situasi yang mungkin menjadi ancaman atau berbahaya kepada kanak-kanak ?

20 responses

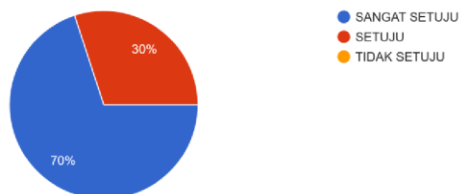


**Figure 1.7:** Section 1 - Question 3

Figure 1.7 illustrates questions related to situations that frequently occur or pose a threat to children's safety. The majority of respondents reported road situations where accidents often occur involving children due to parental negligence.

1. Pada era globalisasi kini, adakah semua pihak perlu memainkan peranan penting dalam menjaga keselamatan kanak-kanak agar dapat mengelakkan sebarang kemalangan berlaku ?

20 responses



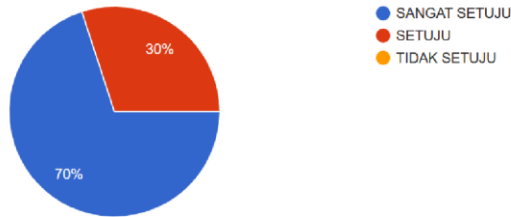
**Figure 1.8:** Section 2 - Question 1

Figure 1.8 illustrates questions about the current situation that involve multiple parties in ensuring children's safety. The majority of respondents strongly agree and agree on the role in keeping children safe.



2. Kami akan bangunkan aplikasi permainan melalui telefon pintar tentang pembelajaran keselamatan untuk kanak-kanak berdasarkan situasi yang memberi kemungkinan untuk mengancam atau berbahaya kepada mereka. Adakah anda bersetuju bahawa aplikasi permainan tersebut bersesuaian dengan kanak-kanak ?

20 responses

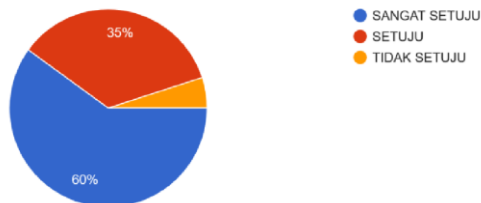


**Figure 1.9:** Section 2 – Question 2

Figure 1.9 illustrates the question about consent from respondents regarding the development of game applications for smartphones, focusing on situations that may cause harm to children. The majority of the respondents are very agreeable and agree to develop this application.

3. Adakah anda berpendapat bahawa aplikasi ini dapat membantu dalam merangsang minda kanak-kanak?

20 responses



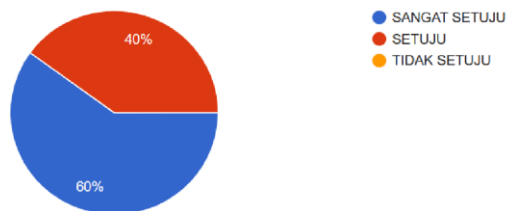
**Figure 1.10:** Section 2 – Question 3

Figure 1.10 illustrates questions about respondents' opinions related to this application that can help stimulate children's minds. The majority who answered this question strongly agreed and disagreed. However, there are also opinions from respondents

who disagree. This needs to be discussed with the respondents in mind.

4. Kognitif ialah satu proses mental untuk mentafsir, mempelajari dan memahami sesuatu di mana mereka mampu berfikir.  
Adakah anda berpendapat bahawa aplikasi ini dapat membantu dalam meningkatkan kemahiran kognitif kanak-kanak?

20 responses

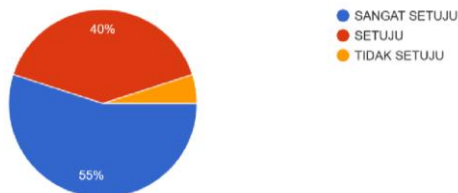


**Figure 1.11:** Section 2 – Question 4

Figure 1.11 illustrates the questions regarding the respondents' opinions on improving children's cognitive skills. The majority of respondents strongly agree and agree that improving children's cognitive skills is necessary.

5. Pada pendapat anda, adakah aplikasi ini dapat memberi kesedaran kepada kanak-kanak tentang situasi yang berbahaya dan dapat mengatasi situasi tersebut?

20 responses



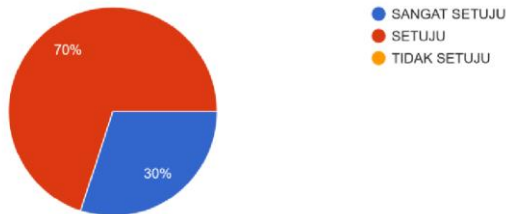
**Figure 1.12:** Section 2 – Question 5

Figure 1.12 illustrates the question regarding the respondents' opinions on this application, which aims to raise awareness in children about dangerous situations and help them overcome them. The majority who answered this question strongly agreed and agreed. However, there are also respondents who disagree. This matter needs to be discussed from various angles to facilitate

improvement.

6. Adakah aplikasi pembelajaran ini lebih berkesan dan dapat memberi manfaat kepada kanak-kanak untuk belajar tentang keselamatan melalui permainan mudah alih ?

20 responses



**Figure 1.13:** Section 2 – Question 6

Figure 1.13 shows questions about the effectiveness of this learning application and the benefits to children of safety through mobile games. The majority of respondents strongly agree and agree with the development of this application.

### 1.3 RESULT AND DISCUSSIONS

Survey results showed overwhelmingly positive responses regarding the need for a safety-focused learning game.

- **Awareness and Relevance:** 90% of respondents agreed that child safety education through mobile apps is necessary in today's environment.
- **Cognitive Benefits:** 88% believed the game could improve children's awareness, attention, and problem-solving skills.
- **User Acceptance:** Most respondents (85%) expressed willingness to introduce the app to their children, citing its interactive and educational appeal.

Furthermore, respondents highlighted the importance of including real-world contexts such as traffic rules, home safety, and stranger danger. The findings align with prior research emphasizing experiential learning as a key driver in developing children's self-protective behavior (Robson, 2022; Nunes, 2018).

A comparison of existing safety games (Table 1) reveals that *Watch Out, Little Ones!* addresses several limitations of earlier 2D-based applications by offering a fully 3D interactive experience with multiple safety scenarios.

**TABLE 1.1:** Comparison of Existing Games and the Proposed Application

| Game Title                         | Type | Advantages                               | Limitations                     |
|------------------------------------|------|------------------------------------------|---------------------------------|
| Safety for Kids – Section 1        | 2D   | Multiple activities per level            | Limited movement, static design |
| Finding Dangers                    | 2D   | Encourages exploration                   | Limited learning scope          |
| Kidnap for Life                    | 3D   | Puzzle-solving gameplay                  | Only one level available        |
| Pororo Life Safety Education       | 2D   | Friendly UI                              | Performance lag issues          |
| Watch Out, Little Ones! (proposed) | 3D   | Multi-scenario, interactive, educational | Requires further field testing  |

The evaluation confirms that game-based learning can enhance safety education outcomes by transforming abstract warnings into immersive, experiential training. The ADDIE model ensured that pedagogical goals were systematically achieved through iterative design and testing.

## 1.4 CONCLUSION AND FUTURE WORKS

This study successfully developed a 3D mobile game aimed at increasing children's safety awareness through interactive learning. The game *Watch Out, Little Ones!* demonstrated the feasibility of integrating educational principles into a game-based environment to improve cognitive and behavioral understanding.

Future work will focus on large-scale testing involving preschool

institutions and educators to measure learning outcomes quantitatively. Further enhancement will include multilingual support, parental monitoring features, and adaptive gameplay to match different age groups.