

## Game Android-Based Vocabulary Introduction Education for Early Childhood

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### ABSTRACT

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*The educational challenges at TK Al-Hidayah, a kindergarten in Kangean, Sumenep, are significant, with passive learning methods and ineffective educational media reducing student engagement and motivation. Most children speak their regional language, limiting their Indonesian vocabulary acquisition. To address this, we developed an interactive Android-based educational game for vocabulary learning aimed at young children. Using the Game Development Life Cycle (GDLC) method, the game was designed, developed, and tested through several phases, including concept, design, development, testing, release, and maintenance. The game features a learning menu with lessons on vowels, consonants, uppercase and lowercase letters, and object names, as well as a game menu with activities like matching object names and letters. Testing showed the game effectively enhances children's vocabulary skills and engagement in learning. This research contributes to the development of interactive and innovative educational methods for early childhood education.*

#### **Keywords:**

*Educational game, vocabulary learning, early childhood, Android, interactive learning*

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### INTRODUCTION

Technological progress is increasingly rapid in various aspects of life, including politics, economics, communication and education. This makes it easier for humans to carry out many activities[1]. Smartphones are a technological innovation that can be used as a learning medium. If supported by media that attracts students' interest and attention, their perception of learning will be positive, effective and enjoyable. Games can be a learning medium that combines the concept of learning while playing [2].

Education aims to develop students' social, spiritual, knowledge and skills competencies through conscious and planned efforts. By achieving this goal, quality human resources (HR) will be produced. The quality of human resources is a measure of a nation's progress and the main capital in facing globalization and technological developments [3].

Games are an entertainment medium that is often played to overcome boredom and fill free time. Apart from that, games can also be used as a learning medium [4]. Educational games is a term used to describe games that contain learning elements [5]. Educational games are an effective tool for increasing children's engagement and learning through interactive and fun experiences[6].

Language mastery starts with basic material, especially vocabulary mastery. A good vocabulary improves language skills. Therefore, learning vocabulary is an important aspect of learning a language[7]. Vocabulary is a collection of words in a language that provide meaning when used [8].

Android is a Linux-based framework designed for mobile devices such as phones and tablets. Therefore, Android has become an operating system that is widely used on smart devices, especially smartphones [9].

Early childhood is a group of individuals who are growing and developing. This period is often referred to by experts as the "golden age" which only occurs once in the development of human life [10].

Al-Hidayah Kindergarten is a kindergarten educational institution located in Kangean, Sumenep Regency, East Java Province. This institution faces several significant challenges in the learning process that need to be addressed to improve the quality of children's education.

Among them is that the learning method used is one-way, where the teacher dominates the teaching and learning activities. This causes active participation from children to be less than optimal. They tend to be passive recipients of information without being much involved in the learning process itself. Apart from that, the learning media used is not able to maintain children's interest and attention for a long time. As a result, they quickly feel bored and their motivation to learn becomes low. The lack of innovation in developing learning media is the main obstacle in creating an interesting and interactive learning atmosphere. Another problem faced is that the majority of children use regional languages as the main means of communication, both at home and in the school environment. This has an impact on the lack of mastery of Indonesian vocabulary, which should be the language of instruction in learning at school.

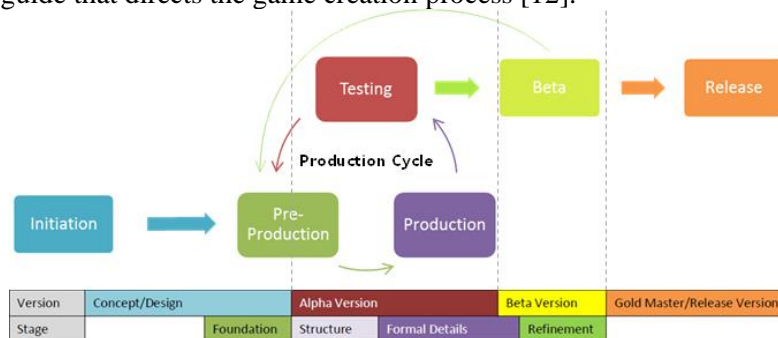
The aim of this research is to increase children's active participation in the learning process with more interactive methods. Develop learning media that is able to maintain children's interest and attention for a long time, so that they do not get bored quickly and their motivation to learn remains high. Increase mastery of Indonesian vocabulary for children who predominantly use regional languages, through interesting and interactive vocabulary education games

Using games as a learning tool can increase children's learning motivation and facilitate their understanding of subject matter, including vocabulary. The novelty of this research is that it focuses on vocabulary recognition, without discussing language structure.

## METHOD

This research uses this type of research *quasi experimental* where to use the design *one-group pretest-posttest*, where measurements will be made before and after treatment [11].

Meanwhile, the system development model uses a model *Game Development Life Cycle*. This model is a guide that directs the game creation process [12].



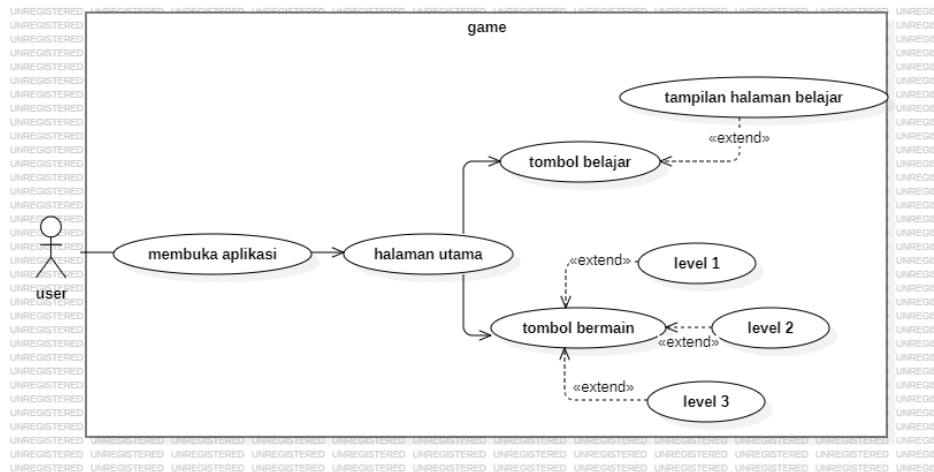
Gambar 1 model GDLC

Initiation is a game concept design process that will be developed including several stages, including: Identifying problems faced by users by observing schools at Al-Hidayah Kindergarten, especially problems faced by teachers in learning children's vocabulary. This stage also includes a literature review to support research, such as searching for journals and other reading sources related to vocabulary; Needs identification aims to understand the needs of teachers and children for vocabulary recognition educational games, identify scenarios that will be used in the game, and determine the required hardware requirements; Lastly, determining the target users of vocabulary recognition educational games.

Pre-production is the design of the game. The application used to create this game is construct2.

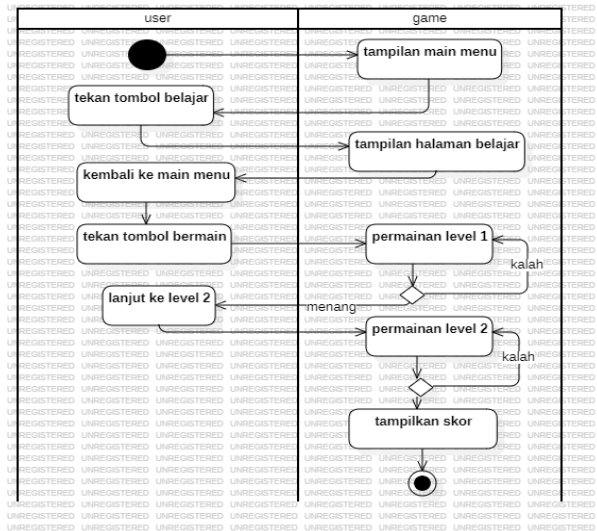
This stage involves analyzing the game design to be developed. The production stages of this game are as follows:

- a. Use case diagram used to design functional games. The designed game has three main menus: settings (sound or music settings), learning (learning materials), and playing (level 1, level 2, and level 3 games)



Gambar 2 Use Case Diagram

- b. Activity diagram is used to describe the processes that occur in a designed game, and is explained as follows:



Gambar 3 Activity Diagram

- c. Sequence diagram is a derivative of the activity diagram. In this stage, the processes and responses provided by the application to the user are described. The sequence diagram designed is as follows:

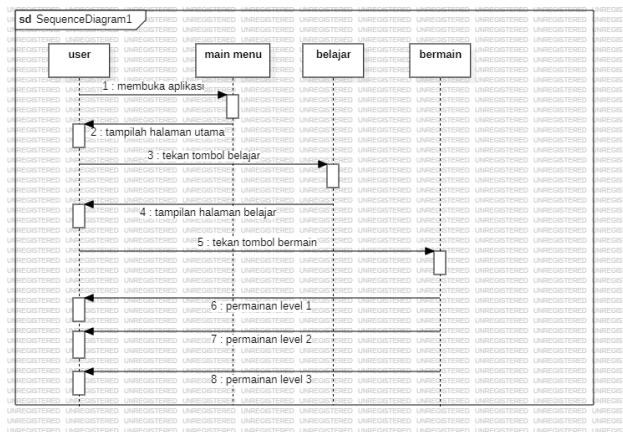


Figure 4 Sequence Diagram

- d. Production is the process of converting analysis results from the pre-production stage into an application using Construct2.
- e. Beta where this application has been completed, but needs to be tested by users and experts to ensure that the educational game functions as expected.
- f. Release is the final stage in this research, where the application that has been tested will be launched for use by students as an interesting learning medium.

**RESULTS AND DISCUSSION**

**Game Engine**

The game engine used in developing this game is construct2. Construct 2 is an HTML-based game engine application created to make it easier to create games, even for beginners[13].

**StarUML**

StarUML is modeling software that supports Unified Modeling Language (UML). This tool is based on UML and other UML notations, and offers various types of diagrams[14].

**CorelDraw**

CorelDRAW is an application for creating or editing images that can produce computer graphic design products [15].

**System Page *Game***

This page displays a game system related to matching the names of objects. On this page, there is a mini bar for time and level, a back button, a random letter button, and pictures of objects that must be guessed. The following is the system design *game*:

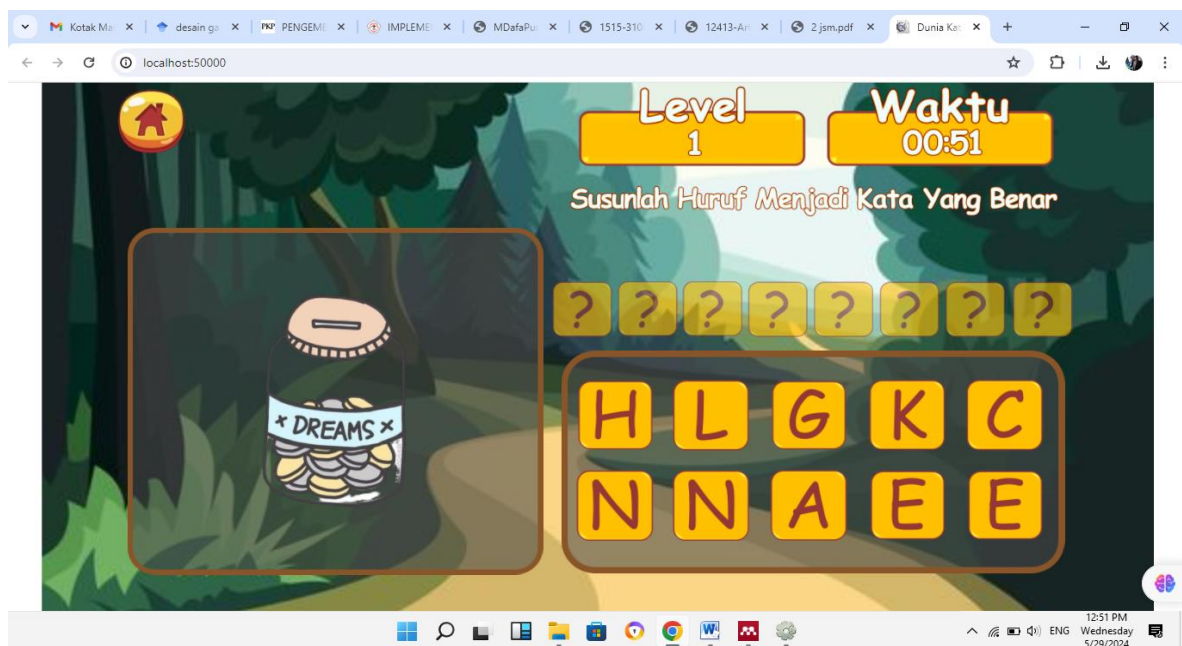


Figure 3 system design *game*

**Winning UI Page**

This page displays the user interface design (UI) for the victory screen. On this page, there are elements such as a congratulations message, final score, a button to play again, and a button to return to the main menu. Design UI win can be seen in the following picture:



Figure 4 UI win

## CONCLUSION

In general, *game* Android-based education for introducing vocabulary to early childhood aims to make the learning process more interesting and effective. Research shows that *game* can significantly improve children's language skills through interactive and interesting learning methods. We hope that this research makes an important contribution to the development of interactive and innovative learning methods in early childhood education, especially in vocabulary mastery.

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