

## Introduction of Fruit Plants as Kindergarten Students Learning Media Based on Mobile Applications

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### ABSTRACT

*The world of childhood is mostly filled with play. They tend to be more interested and enthusiastic if they play a game, this is natural considering their young age and they should enjoy their childhood. By applying learning media in the form of games, children unconsciously have been doing learning by playing. Moreover, modern learning methods are more impactful and provide more significant outcomes when compared to conventional learning methods. This study aims to design an educational game about the introduction of fruit plants as a mobile application-based learning medium for kindergarten students. This game design method uses the Waterfall method which consists of 5 stages, namely Requirement, Design, Implementation, Verification, and Maintenance. The results of the trial of this application get an average level of understanding of 89%. By making this game, the author hopes that children who are still in their golden period can be helped in learning and optimize their golden period.*

**Keywords:** Education game; Android; Waterfall; Kindergarten student.

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### INTRODUCTION

The development of technology today has made many people more interested in accessing anything digitally that can be seen directly or indirectly. The development of science and technology lately has greatly influenced people's activities in living or filling their days, such as getting or looking for information, reading news, and so on instantly and quickly (Bahreisy, et al., 2021). The development of this technology has made the game one of the facilities that many fans love because it can be used as a stress reliever after a day of work or a means to fill spare time (Budiono & Hasmira, 2020); (Winarti et al, 2021). However, educational-themed games for early childhood are still lacking, this is very inversely proportional to the advancement of technology in the field of games.

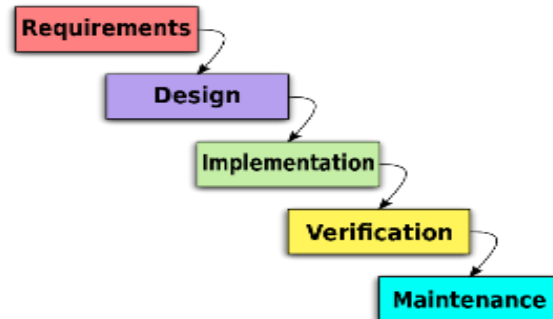
Education-based games can further support education and are superior in several aspects when compared to conventional learning methods (Nuqisari & Sudarmilah, 2019). One of the advantages of educational games is that animation is easier to remember so that children can remember material for a longer period of time compared to conventional methods (Vitianingsih & Anik, 2016).

The world of early childhood is mostly filled with play (Firdaus & Nugroho, 2016). They tend to be more interested and enthusiastic if they play a game, by applying learning media in the form of games, children have unconsciously learned by playing (Rahayu, et al., 2018); (Prasetyo & Qomariyah, 2021). The development of learning media is needed as a support for learning activities, with respect to that UNESCO (United Nations Educational Scientific and Cultural Organization) has made 4 pillars of education to improve the quality and quality of a nation's education including Learn to Know, Learn to do, Learn to be (learn to be yourself) and Learning to Live Together (Laksana, 2016).

Children will experience a Golden Period at the age of 3-6 years so that their cognitive, imagination, and memory aspects are more honed (Putra, et al., 2016). The creation of this educational game is expected to help children to maximize their imagination and memory.

## METHOD

In the process of making this game, researchers used the Waterfall design method. The stages in this method include Requirements, Design, Implementation, Verification, and Maintenance. The stages of the Waterfall method can be seen in Figure 1.



**Figure 1.** The Stages of Waterfall Method

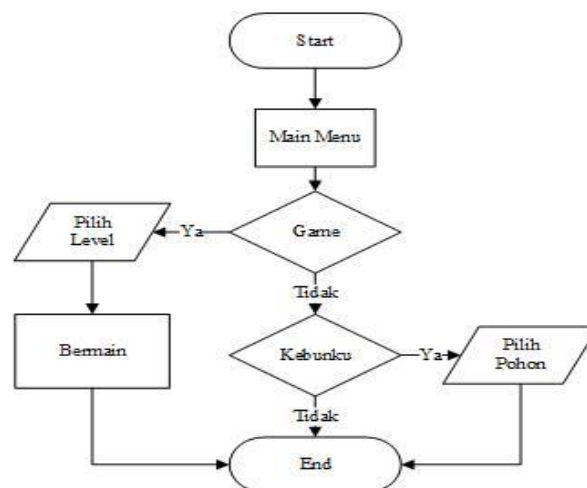
The following is an explanation and stages based on the stages in the waterfall method, which is used in designing this game :

- Requirements

This stage needs to be done because it is the first stage in the waterfall method. In this stage discuss and analyze the needs needed in the game and determine the data, materials and others needed in making the game.

- Design

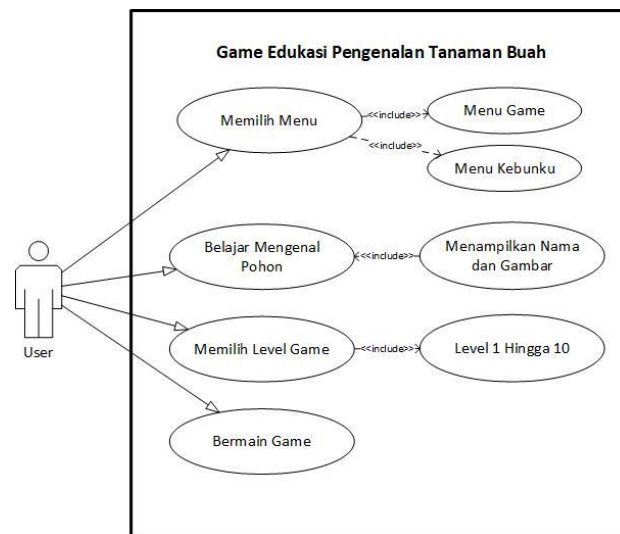
This stage is the second stage in the waterfall method, in this stage the program architecture, style, appearance, or interface player as well as material and material requirements are made. In Figure 2 it can be seen that the flowchart is used to describe a stage in a simple way.



**Figure 2.** Flowchart

In Figure 2 it can be seen that the flow of making this educational game starts from the start, the main menu, the game as a decision to choose, until the end of the game. The flowchart illustrates the whole process of making educational games. The following figure is a use case diagram that serves to map and represent user interactions with the system.

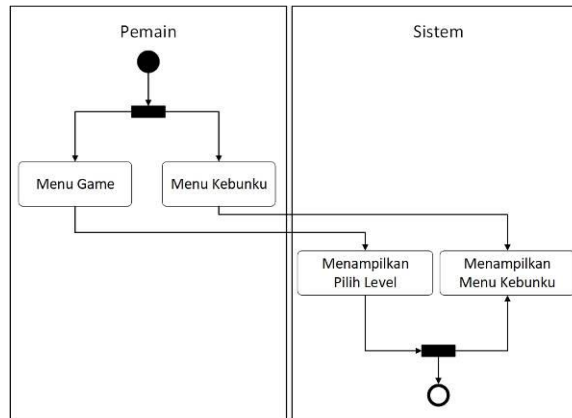
Figure 3 below is a use case diagram that serves to map and represent user interactions with the system.



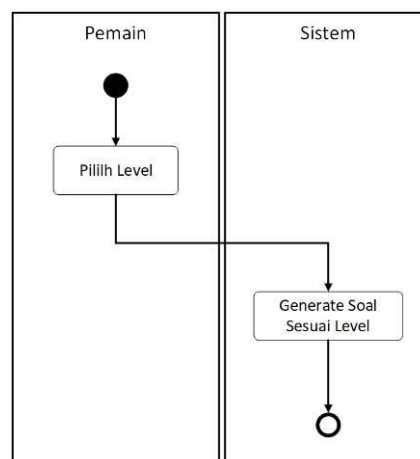
**Figure 3.** Use Case Diagram

In figure 3 it can be seen that use case diagrams can describe an interaction between one or more actors and the system to be created. Use case diagrams can also be used to find out what functions are in a system and can also represent an actor's interaction with the system.

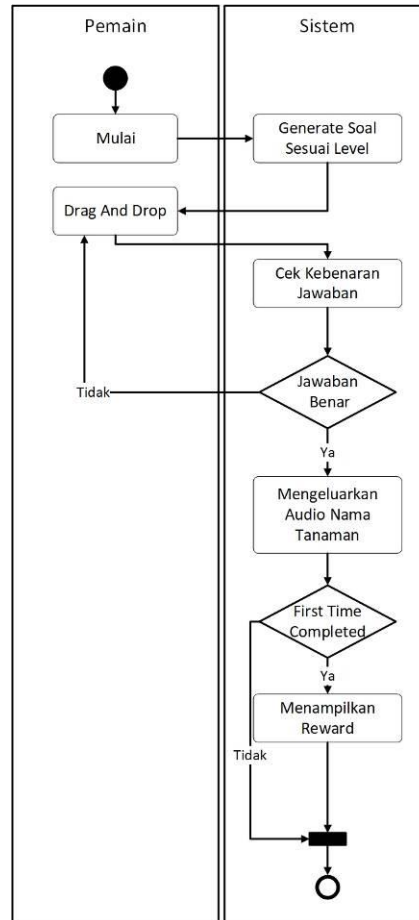
Figures 4, 5, 6 and 7 are activity diagrams used for per menu, activity diagrams are useful for explaining the sequence of activities in a process.



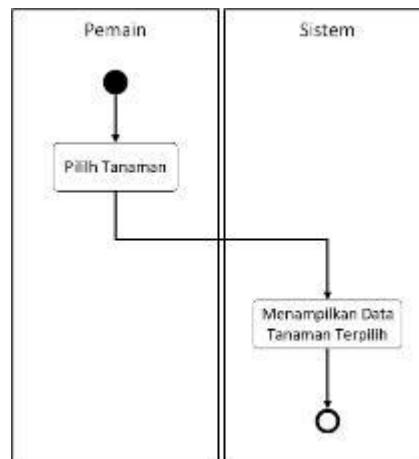
**Figure 4.** Activity Diagram Main Menu



**Figure 5.** Activity Diagram Select Level



**Figure 6.** Activity Diagram Game



**Figure 7.** Activity Diagram Kebun Menu

- **Implementation**

This stage is the third stage, and is the stage of making the menus of the game which will be put together. At this stage testing is also carried out by the developer whether it has met the criteria or not.

- **Verification**

At this stage, the manufacturing process can be said to be complete because at this stage, the game can already be played on an Android Smartphone and it is at this stage that testing is carried out. Tests are performed by users. In this study, the users are children who are kindergarten students and are accompanied by assistants. This stage can be said to be the end of the manufacturing process but not yet over for the development process.

- Maintenance

This stage is the last stage of the Waterfall development method. This last stage includes maintenance and care from the installation process to system repair.

## RESULT AND DISCUSSION

### Result

In this discussion, the display per menu in the game will be displayed.

- Main Menu

Main Menu is the initial menu that players see before entering the game or other menus as shown in Figure 8 as an image of the main menu.



**Figure 8.** Main Menu

- Kebun Menu

The Kebun Menu is the next menu after the Main Menu, players can choose the tree they want to learn but there are trees that are still locked to be able to open it, players must play and complete the game level by level. Figure 9.a. is a picture of the garden menu and if the button is pressed, an illustration will appear which is shown as figure 9.b.



(a)



(b)

**Figure 9.** Kebun Menu

- Select Level Menu

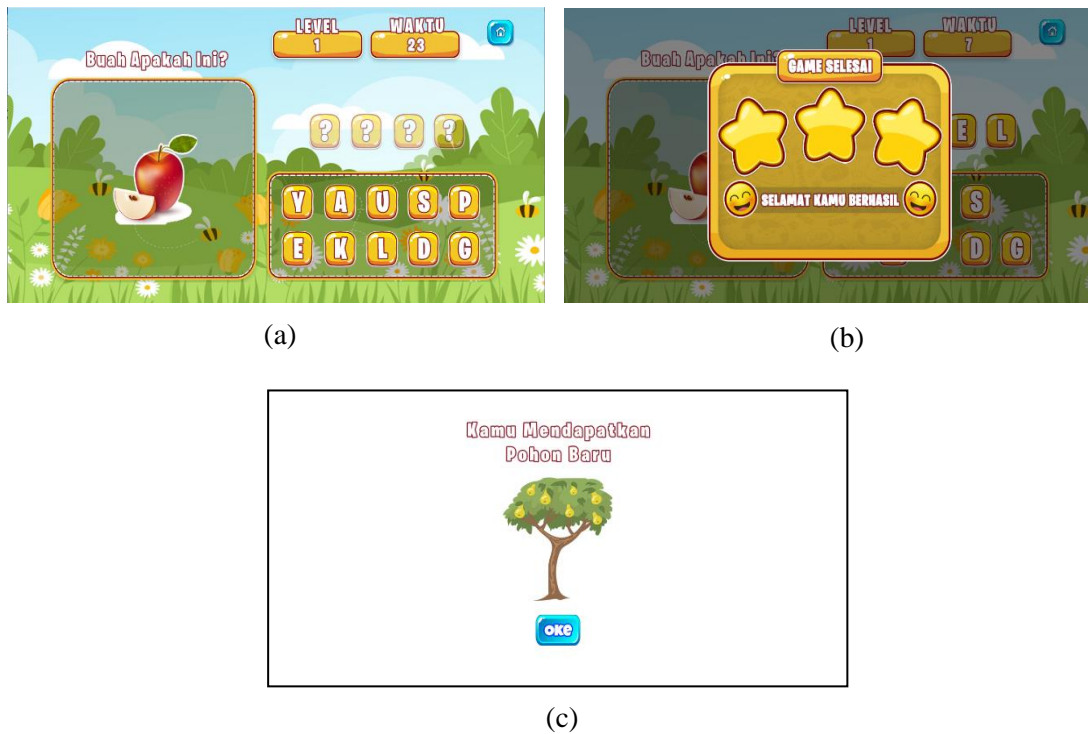
The Select Level menu is the menu after the player chooses or presses the button that says "Game". On this menu, players can only choose an open level, and the reward that will be received can be seen above the level button. Figure 10 is a picture of the select level menu.



**Figure 10.** Select Level Menu

- Game Menu

The game menu is a menu where players can play, with the drag and drop system as in Figure 11.a, the player is told to remember the name of the tree and or the fruit name that has been open or unlocked before. If the player has completed a level then there will be an illustration as shown in 11.b. If the player is able to complete a level, then at the end of the game it will receive a reward in the form of a new tree as shown in Figure 11.c.



**Figure 11.** Game Menu

### Discussion

The trial was carried out by students accompanied by teachers or other assistants and asked to fill out the online questionnaire that had been given because the assistants understood more and felt more understanding of the child or student. The companion who fills out the questionnaire is the companion who previously accompanied the child or student when using this application.

The following is a list of questions that must be filled out by the companion:

1. Material Suitability (1-100)
2. Understanding Level (1-100)
3. Image Fit (1-100)
4. Student Enthusiasm in Playing (1-100)

Then the results of the questionnaire were calculated using the average formula per question.

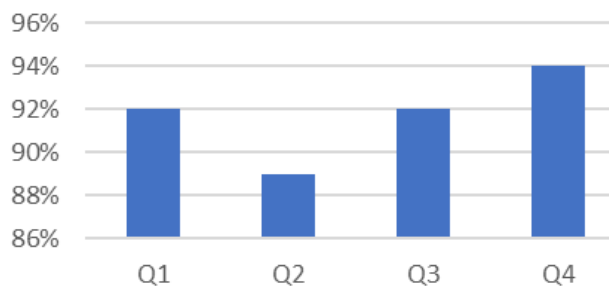
The following is the average formula used:

$$\bar{X} = \frac{\sum f}{n}$$

Where:

- $\bar{X}$  = means
- $\sum f$  = Total of all data
- n = number of data

The following is a graph of the results of the questionnaire, which can be seen in Figure 12.



**Figure 12.** Graphic of Questionnaire Mean

For Q1 (first question) get a percentage of 92%. For Q2 (second question) get a percentage of 89%. For Q3 (the third question) get a percentage of 92%. For Q4 (last question) get 94%.

Based on the results of the opinion poll analysis of the games that were made, it showed that 92% stated that this game was in accordance with the material to be taught to kindergarten level students, 89% of this material could be understood by students, 92% stated that the images used were appropriate and finally 94% of students were interested. in this educational game. This shows that this educational game is very interesting for kindergarten students in order to increase their knowledge about fruit plants. They tend to be more interested and enthusiastic if they play a game, by applying learning media in the form of games, children have unconsciously learned by playing (Rahayu, et al., 2018).

## CONCLUSIONS

Based on the results of the design of the educational game about the introduction of fruit trees, it can be concluded that, this game is in addition to being used to train children's knowledge about trees and also train children's memory to memorize the names of trees. The game engine used to make this game is Construct 2, while for its compiler it uses Cordova. Based on the testing of the system can be taken and the conclusion that this game runs smoothly in the expected functionality. In an effort to make it easier for the child to play this game, the need for a good companion from parents at home and the elderly in schools shown that the percentage of student understanding reached 89%.

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