

# Developing a Word Composition Educational Game for Young Children After the Covid-19 Pandemic

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## Abstract

The purpose of this study is to develop a word composition educational game for young children in the post-COVID-19 pandemic era. The game is designed to help children strengthen their word composition skills and introduce new letters and syllables related to fruits. Utilizing a 2D display, the game was developed using the Construct 2 game engine and followed the waterfall development method. The game's effectiveness was validated through testing with 10 parents and teachers, demonstrating its potential in aiding children's learning of word composition. The study results indicate that the integration of gamification and technology in early childhood education significantly enhances children's motivation and learning outcomes. The use of Construct 2 enabled the creation of a user-friendly and visually appealing educational game. This study contributes to knowledge by providing an innovative approach to improving children's word composition skills in an engaging manner. Additionally, it highlights the broader potential of gamified learning tools to transform traditional educational practices, offering valuable insights for future educational technology development.

**Keywords:** Word Composition; Educational Game; Young Children; Covid-19.

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## Introduction

The advancement of technology has a positive impact on various aspects of life, including education. In the digital era, education that uses technology is increasingly being used to assist the learning process and improve students' learning outcomes (Andryanto et al., 2022). In this case, educational games play an important role in helping young children strengthen their skills. The Covid-19 pandemic has had a profound impact on the world, including the education sector. With schools closing and the shift to online learning, many children, especially those in early childhood, have been affected (Rashid & Yadav, 2020). The lack of in-person interaction and hands-on learning experiences has made it challenging for children to continue their education and develop their skills (Hu et al., 2021). To address these challenges, the advancement of technology and the use of educational games have become increasingly important in the learning process. Gamification in education provides a fun and engaging way for children to learn, and technology has made it possible to reach a larger audience and provide educational resources to children who may not have access to traditional learning methods (Rusmardiana et al., 2022).

In addition, it is important to note that education in early childhood is crucial for a child's overall development (Kim, 2020). During these formative years, children are developing their cognitive, social, and emotional skills, and providing them with a positive educational experience can have a lasting impact on their future success. By using technology and gamification in early childhood education, children can learn and develop essential skills in a fun and engaging way (Pakpahan et al., 2020). This can help to foster a love for learning and set them on a path toward academic success. Thus, investing in education for young children is an investment in the future, and it is important to continue exploring new and innovative ways to make learning enjoyable and effective for them.

Furthermore, the development of game engines has played a significant role in the growth of educational games (Vidakis et al., 2019). Game engines provide a platform for game developers to create and publish games easily and efficiently. With the advancement of technology, game engines have become more sophisticated and user-friendly, making it easier

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for developers to create games with high-quality graphics and interactive elements. This has led to an increase in the number of educational games that are being developed and used in the classroom.

One of the game engines that has been widely used in the development of educational games is Construct 2. Construct 2 is a user-friendly game engine that allows developers to create games without the need for coding skills. It has a drag-and-drop interface and a large library of assets and effects, making it easy for developers to create high-quality educational games. Additionally, Construct 2 has a large community of developers who share their knowledge and resources, making it an excellent choice for those who are just starting in game development.

Based on previous research by Gabriel Indra Widi Tamtama, Neslihan Kaynar, and Umit Tokac, it can be seen that gamification and the use of technology in early childhood education can help motivate children and improve their learning outcomes (Tamtama et al., 2020). Neslihan Kaynar's research shows that the use of electronic books (e-books) in early childhood education can increase students' interest in reading and reading skills (Kaynar et al., 2020). Meanwhile, Umit Tokac's research shows that mathematics video games have a small but significant effect on the growth of mathematics learning compared to traditional teaching methods (Tokac et al., 2019).

Therefore, this research offers a new solution by developing a word composition educational game for young children after the Covid-19 pandemic. This solution is an educational game that is designed to help young children strengthen their word composition skills and introduce new letters and syllables related to fruits. The game uses a 2D display and is developed using the Construct 2 application as its game engine. The development method used is the waterfall, and the results of testing on 10 parents and teachers will be used to validate the effectiveness of this game in helping children learn to compose words.

## Method

The development method used in this study is the waterfall method. The waterfall method is a sequential software development process consisting of several different stages, including needs collection, design, implementation, testing, and maintenance (Iskandar et al., 2022). This method was chosen because of its ease and structure, making it easier for the development team to follow and ensuring that the project is completed within the allotted time. Figure 1 shows the Waterfall system development method.

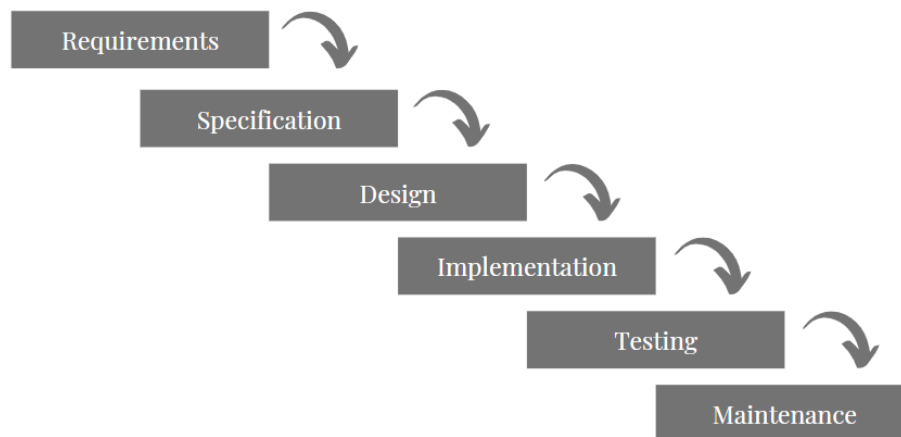


Figure 1. Waterfall Method Flow

## Requirements

The first step in the development process was to gather the requirements for the game. This involved identifying the learning objectives, target audience, and features that needed to be included in the game. The next step was the design phase, where the game's user interface and overall design were created. This was followed by the implementation phase, where the game was developed using Construct 2.

The hardware requirements for this study include a computer or laptop with the following specifications:

1. Processor: Intel Core i3 or higher
2. RAM: 4 GB or higher
3. Storage: 500 GB or higher
4. Graphics Card: Dedicated graphics card or integrated graphics card with at least 1 GB VRAM

The software requirements for this study include:

1. Construct 2 game engine
2. Windows operating system (Windows 7 or higher)
3. Google Chrome or any other modern web browser

The game was developed using Construct 2, a game engine that allows for the creation of 2D games without the need for coding knowledge. The game was tested on Windows operating systems, but it can also be run on other operating systems such as MacOS or Linux. A modern web browser such as Google Chrome was used to access the game. By using these hardware and software requirements, this study was able to develop a word composition educational game for young children that is user-friendly, visually appealing, and effective in helping children learn to compose words.

### System Design

The process of planning and designing a game using visual representations such as sketches, images, or diagrams to show how the game will unfold. This helps game developers to visualize and understand the storyline, game mechanics, and user interactions before starting the actual game development. Storyboards can help address issues such as difficulties in understanding the game concept or technical problems before the game development starts. It also helps in communication with colleagues and ensures that all parties understand the goals and vision of the game. In educational games, storyboards can also help determine how educational content can be effectively applied in the game. Figure 2 shows a game design using a storyboard.

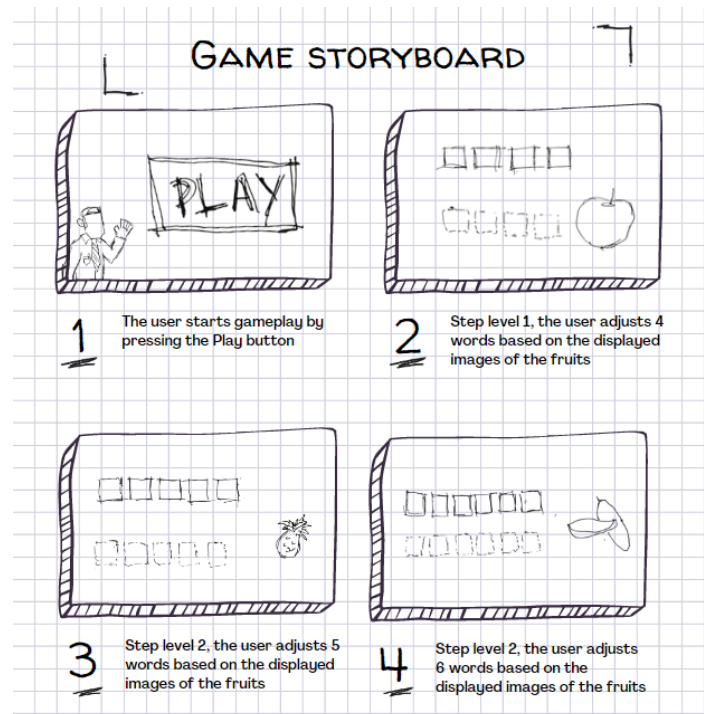


Figure 2. Game Design Using Storyboard

The game starts by pressing the Play button, then the player will arrange words based on the displayed fruit images in each level. There are three levels where the number of words to be arranged increases in each level. Each level has 3

chances to arrange the words correctly, and if wrong 3 times then the game will end. If the player successfully arranges the words correctly, they will earn points and the level will increase. After completing level 3, the game will display the final score and provide options to start the game from the beginning or exit the game. This game also has a feature to save the highest score and allows players to compare their scores with other players. The game ends after the player completes level 3 or decides to exit the game.

## Results and Discussion

### Result

The results of this research showed that the educational game designed using the storyboard was successfully implemented on the Construct 2 game engine. The game engine allows for the smooth execution of the educational game, including drag-and-drop features, sound effects, animations, and visual effects. The implementation of the educational game on the Construct 2 game engine creates an interactive and enjoyable learning experience for young children



Figure 3. Game Implementation Using Construct 2

In this game, players have three chances to correctly arrange the words at each level. If the player makes three incorrect attempts, the game will end. If the player successfully arranges the words, they will earn points and move on to the next level. Upon completing level 3, the game will display the final score and give the option to restart the game or exit. The game also has a feature to save the highest score and allows the player to compare their score with other players. The game ends after the player completes level 3 or decides to exit the game.

Table 1. User feedback testing

Feedback Categories	Number of Respondents	Percentage
Game View	10	100%
Fun Interactions	10	100%
Easy to Understand	9	90%
Educational Content	9	90%
Score Storage feature	8	80%
Recommendations for Children	10	100%
Total	57	95%

Based on the feedback testing results from 10 Respondents consisting of parents of students and teachers, the results showed that 57 positive feedbacks were received with an average percentage of 95%. This indicates that the educational

game we designed has very good results and is positively received by both groups of respondents. This percentage also shows that our educational game meets the expectations and needs of both groups of respondents. This is very important to take note of as it indicates that our educational game has great potential to improve children's learning outcomes.

## Discussion

The use of educational games in learning has great potential to improve children's learning outcomes. The results of this study are in line with previous research that shows that gamification can increase children's interest and motivation in learning, as found by Gabriel Indra Widi Tamtama in his research on English language learning through gamification (Tamtama et al., 2020). Umit Tokac also showed that video games can be an effective instructional method for teaching mathematics at various age levels (Tokac et al., 2019). Neslihan Kaynar's research also showed that electronic books (e-books) play a significant role in improving reading skills for young children (Kaynar et al., 2020).

This research adds important information about the potential of educational games in improving early childhood word formation abilities. In the context of post-pandemic Covid-19 learning, this research provides an alternative solution to ensure that young children can still learn well despite having to adapt to new circumstances.

## Conclusions and Suggestions

### Conclusions

Based on the research conducted, it can be concluded that educational games have great potential to enhance children's learning outcomes. This is evidenced by the feedback testing results from 10 respondents consisting of parents and teachers, where 57 positive feedbacks were received with an average percentage of 95%. This indicates that the designed educational game has very good results and is positively received by both groups of respondents.

This research adds important information about the potential of educational games in improving children's abilities, such as the ability to arrange words. In the context of post-pandemic Covid-19 learning, this research provides an alternative solution to ensure that young children can still learn well despite having to adapt to new situations. Therefore, it can be concluded that the use of educational games in learning has great potential to enhance children's learning outcomes and is a good alternative solution in post-pandemic COVID-19 learning.

### Suggestions

Based on the results of this research, it is recommended to expand the use of educational games in early childhood education. Educational games can be an effective alternative method for improving children's learning outcomes, especially in enhancing their word arrangement abilities. Another suggestion is to develop more interactive and enjoyable educational games, to motivate children to learn and maintain their interest in learning. The addition of features such as animation, sound effects, and visual effects can make educational games more appealing and help improve children's understanding.

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