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Development of an Interactive Game Application using Linear Congruent Method (LCM) to Improve Hijaiyah Letter Recognition Skills in Children

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ABSTRACT

Introducing Hijaiyah letters is an essential first step in early childhood education. To make learning these letters enjoyable, we developed an interactive game application using the Scratch platform. This application aims to help children recognize and memorize Hijaiyah letters in an engaging way. The development methodology employed is the Game Development Life Cycle (GDLC). We built the application by utilizing various features of Scratch, including animations, sounds, and user interactions. Users are invited to play while learning the Hijaiyah letters. After understanding the letters, they enter a game page where they must navigate toward the provided Hijaiyah letters. To avoid repeated appearances of the same letters, we applied the Linear Congruent Method (LCM) algorithm as a randomization technique. The LCM algorithm generates random numbers to shuffle the appearance of Hijaiyah letters in the game. Testing results show that using Scratch to develop this Hijaiyah letter recognition game is effective and can improve children's ability to recognize these letters.

1. INTRODUCTION

Hijaiyah letters serve as the primary gateway for understanding and mastering the Qur'an as well as the Arabic language. As the divine revelation of Allah SWT delivered in Arabic, the Qur'an is the main source of Islamic teachings that every Muslim is obliged to study and practice. Mastering Hijaiyah letters from an early age is a crucial foundation for children to be able to read and comprehend the content of the Qur'an properly and correctly. In addition, learning Hijaiyah letters also becomes the initial step for studying various other Islamic sciences based on Arabic, such as Hadith, Fiqh (Islamic law), and Islamic history. With a strong grasp of reading Hijaiyah letters, children will find it easier to absorb and understand these fields of knowledge.

However, despite its vital importance, the process of teaching Hijaiyah letters to children is often considered boring and difficult to grasp. Traditional learning methods, such as memorizing letter shapes, pronunciation, and recognizing harakat (diacritical marks), are frequently seen as less engaging and interactive. This can lead children to quickly lose interest and motivation to learn. Furthermore, the limited learning media available, which still largely rely on books and blackboards, often fail to provide enough stimulus to attract children's attention and interest.

The lack of interest in learning Hijaiyah letters at an early age can have long-term negative impacts. Children who struggle to understand these letters may face obstacles when learning the Qur'an and other Islamic sciences. This can result in a weak understanding of Islamic teachings and hinder the emergence of future generations who are proficient in reading and comprehending the Qur'an.

In today's era of rapid technological development, especially in information and communication, innovation and new breakthroughs in Islamic education are urgently needed, particularly in teaching Hijaiyah letters. Digital technology, which has become deeply integrated into the lives of children, can actually be utilized as an effective and enjoyable learning medium. Educational games are one such innovation with great potential to address challenges in teaching Hijaiyah letters. Well-designed educational games can transform the learning process into a more engaging, interactive, and fun experience for children.

This research on the development of an educational game is expected to make a meaningful contribution to the field of Islamic education, especially in teaching Hijaiyah letters. The resulting educational game aims to serve as an alternative learning medium that is both effective and enjoyable for children. Through this study, it is also hoped that a new generation will emerge with a high enthusiasm for learning Hijaiyah letters, enabling them to understand and practice Islamic teachings well, while contributing to the preservation and advancement of Islamic values in the future.

2. METHOD AND MODELS

In collecting the data and developing this research, several methods were employed, including:

1. Observation Method

The researchers conducted direct observations by visiting relevant locations to gather the initial data needed for this study.

2. Interview Method
   To complement the observations, interviews were carried out with related parties to obtain deeper insights and validate the findings.
3. System Design and Development
   At this stage, the educational game system was designed and developed using the Game Development Life Cycle (GDLC) approach. This involved planning the logical flow and designing the user interface of the application, as well as incorporating animations, sounds, and interactive elements to support children's learning of Hijaiyah letters.
4. Implementation of the Linear Congruent Method (LCM)
   To avoid repetitive appearances of the same Hijaiyah letters and ensure a more dynamic learning experience, the Linear Congruent Method (LCM) was used for randomizing the sequence of letters shown in the game. LCM is a simple yet effective algorithm for generating pseudo-random numbers, which in this context helped shuffle the appearance of Hijaiyah letters, making each gameplay session unique.
5. System Implementation
   Finally, the game was implemented on the Scratch platform as a tangible realization of the designed system. The application was then tested to evaluate its functionality and effectiveness in enhancing children's ability to recognize Hijaiyah letters.

3. RESULT AND DISCUSSION

The next stage after preparing and assembling all the necessary components was to implement and complete the development of the game. This involved formulating and applying plans aimed at improving children's ability to read, recognize, and memorize Hijaiyah letters.

This educational game offers several key features, one of which is the Main Menu Page.

Figure 1. Main Menu Page

Figure 1 shows the Home Screen that users see when they first launch the game. This page is designed with colorful visuals and friendly characters to capture children's interest and make them feel engaged right from the start. The main components displayed on this page include Play Button, this button functions to link the main menu to the gameplay. When clicked, it directs the user to the game level where they begin learning to identify Hijaiyah letters through interactive tasks.

In addition, the top-right corner of the screen features a Score panel that displays the current points earned by the player. Decorative Hijaiyah letters also appear on the screen to create an immersive learning atmosphere. This initial interface is intentionally designed to be simple, cheerful, and intuitive so that children can easily navigate the application without assistance.

Through this implementation, the game successfully combines educational content with an appealing interface, providing a fun and interactive medium for children to start recognizing Hijaiyah letters effectively.

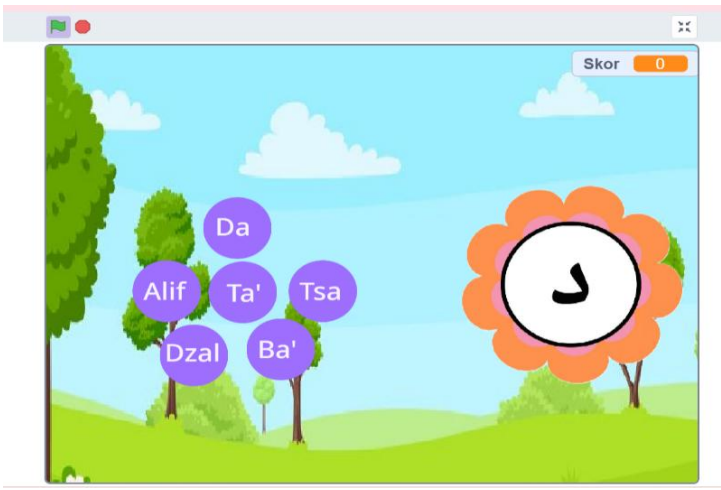

Figure 6. In-Game Display

Figure 2 shows the gameplay screen where the core learning activity takes place. In this game, players are prompted to identify Hijaiyah letters by looking at the visual clue presented on the screen. Users are challenged to recognize the displayed Hijaiyah letter and select the correct name from several options provided.

This educational game combines children's reading and memory skills into an entertaining yet instructional letter guessing game. Each player is given ten randomly selected questions, each accompanied by an image of a Hijaiyah letter and multiple choice answers. The questions are designed to vary in each session through a randomization algorithm, ensuring a unique experience every time the game is played.

As depicted in Figure 2, the right side of the screen displays a large Hijaiyah letter inside a colorful flower frame, while on the left, various name options such as "Alif", "Ba'", "Ta'", "Tsa", "Dzal", and "Da" are shown in circular buttons attached to tree graphics, creating a playful natural scene. The score panel at the top right tracks the player's current points, providing immediate feedback and motivating continued engagement.

This implementation demonstrates how the game successfully integrates the fundamental elements of letter recognition with an interactive and visually appealing interface, thereby making the process of learning Hijaiyah letters more enjoyable and effective for children.

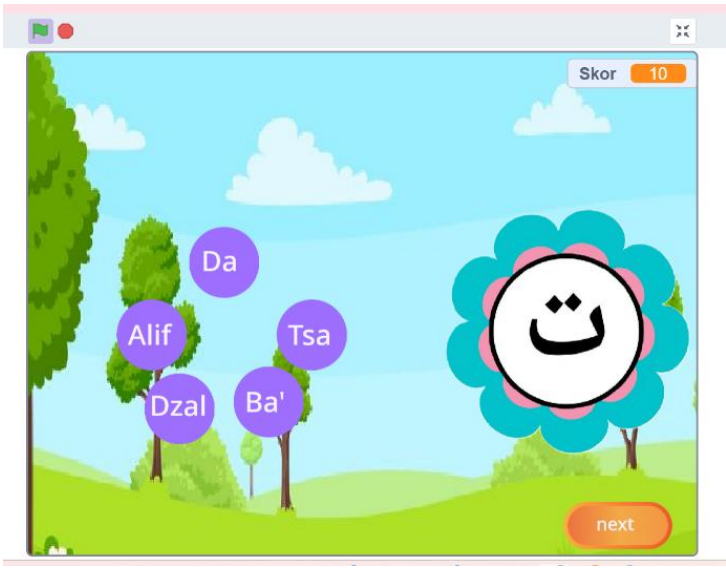

Figure 3. Correct Answer Display

Figure 3 illustrates the display when a player selects the correct Hijaiyah letter. In this stage, players are required to choose the appropriate Hijaiyah letter name that matches the letter shown on the screen. If the player selects the correct answer, two things happen: a "next" button appears at the bottom right of the screen, allowing them to proceed to the next question, and the game plays the pronunciation sound of the selected Hijaiyah letter to reinforce learning.

However, if the player chooses the wrong option, the "next" button does not appear, and the game waits for the player to identify the correct letter. This mechanism encourages players to continue trying until they find the right answer, thereby helping to solidify their recognition of Hijaiyah letters. Additionally, each correct answer increases the player's score, which is displayed at the top right, providing motivation and a sense of achievement.

Through this interactive approach, the game combines visual identification, auditory reinforcement, and incremental scoring to create an effective and enjoyable learning experience for children in recognizing and memorizing Hijaiyah letters.

4. CONCLUSION

This research has successfully developed an educational game using Scratch to assist children in learning and recognizing Hijaiyah letters. The game was carefully designed by incorporating various engaging and interactive features such as animations, sounds, and educational gameplay elements. Testing results demonstrate that this educational game is effective in enhancing children's ability to identify and memorize Hijaiyah letters. Children who played the game showed noticeable improvement in their understanding and recognition of the letters.

Moreover, the game also proved to be valuable in increasing children's interest and motivation to learn Hijaiyah letters. The enjoyable and interactive nature of the game made children feel happy and enthusiastic throughout the learning process. Overall, this educational game serves as a promising alternative learning medium that combines fun and education, and holds potential for broader application in introducing Islamic knowledge from an early age.

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