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Designing Interactive Animations to Introduce Hindu-Buddhist Kingdoms in Indonesia for Students in Grades 1 to 6 at Al-Amal Islamic Elementary School in Bekasi

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Abstract

The development of educational media has a significant impact on the field of education. In the learning process at SD Islam Al-Amal, the author has written a thesis on the design of an interactive animation about the history of Hindu-Buddhist kingdoms in Indonesia. This interactive animation was created using the waterfall method and the Action Script 3 programming language. The interactive animation game features menus for learning, playing, and puzzles. This interactive animation game can be played by students using laptops or computers, making it easier for them to learn history in a fun and interactive way. It is hoped that this will enhance students' understanding and interest in national history, particularly the Hindu-Buddhist kingdoms of Indonesia.

Keywords*: Development of learning media, Waterfall, History of Hindu-Buddhist kingdoms, ActionScript 3*

INTRODUCTION

Education plays an important role in shaping children's character and knowledge. In Indonesia, elementary schools, including SD Islam Al-Amal Bekasi, strive to provide comprehensive education to their students, including an introduction to national culture and history. One important aspect of Indonesia's cultural wealth is the existence of ancient relics scattered throughout various regions. However, understanding of Hindu-Buddhist kingdoms in Indonesia is still limited, especially among elementary school students. Education is a teaching process carried out by educators to students, in which adults are expected to set an example, provide learning, guidance, and improve ethics and morals. In addition, education also aims to explore the knowledge of each individual (Ujud 2023). Learning media can be described as a means that contains information or instructional messages and can be used in the teaching and learning process (Kansaa 2021).

Interactive refers to something related to two-way communication, where there is mutual action and an active relationship between the parties involved (Indana 2023). Meanwhile, animated image media is audiovisual media that combines sound with moving images. Games are activities aimed at acquiring certain skills in a fun way. If the skills acquired in the game are

language skills, then the game is called a language game.

The use of interactive animation as a learning tool has been proven effective in increasing students' interest and understanding of the subject matter. However, there is still a lack of research that explores the potential of interactive animation as a means of introducing Hindu-Buddhist kingdoms in Indonesia at the elementary school level. Introducing cultural diversity from an early age is expected to help students develop a sense of love and pride in their ancestral heritage. In addition, by utilizing interactive animation technology, the learning process can become more interesting and enjoyable for students.

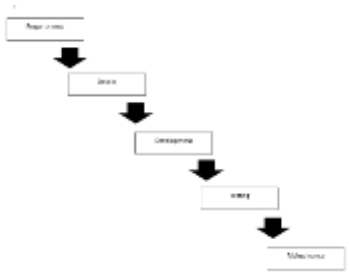
Modern learning media are usually interactive and generally use electronic devices such as cell phones or laptops as tools or intermediaries (Hasan 2021). In game-based learning research, it can be concluded that the learning process utilizes games, both digital and traditional, to introduce concepts and achieve learning objectives. Science learning using this method creates an interactive atmosphere because students are required to actively participate as players. In addition, this method makes learning more contextual, meaningful, enjoyable, and can motivate students. (Wahyuning 2022) in the second study showed that the use of Wordwall interactive game media can improve social studies learning outcomes and foster students' interest and motivation to learn through their interest in the media. (Oktaviana 2021)

METHODS

A. Research method

The Waterfall method is a type of application development model that falls under the classic life cycle category. (Kelen 2024)

The waterfall research model presents software in stages or sequentially, starting from the analysis, design, coding, testing, and system support stages. (Solehudin et al. 2023).



Source: Author's design results (2024)

Figure 1 Waterfall method

In creating this interactive animated game, the waterfall method was used as the workflow. The waterfall workflow consists of the following steps: requirements analysis, design, implementation, testing, and maintenance. The author began by analyzing the learning needs of students in grades 1 to 6 at Al-Amal Islamic Elementary School for the creation of interactive animated games, including software and hardware. Design: The author designed the animation elements separately, then combined them into a single functional unit. Code Creation: The author developed the interactive animated game application using Adobe Animate, Figma, and Canva. Testing: The author tested the application using the black box testing method to reduce errors and ensure the results were as expected. Support: The author determined the appropriate hardware and software to support the implementation of interactive

animated games so that the application could function properly.

B. Data collection methods

The data collection used by the author consisted of the following four processes:

1. Observation: the author directly observed the teaching and learning process of students in grades 1 to 6 at SD Isalam Al-Amal.
2. Interviews: the author conducted interviews with the principal, teachers, and curriculum representatives to obtain the data needed to create an interactive animated game about the history of Hindu-Buddhist kingdoms in Indonesia.
3. Literature study: In developing and creating this animated game, the author conducted a literature study through Google Scholar and other online journal references.
4. Questionnaire: This was the method chosen by the author to determine the interest and satisfaction of students after learning using interactive animated games.

RESULT

A. Needs Analysis

The creation of this interactive animated game on the history of Hindu-Buddhist kingdoms requires the following software and hardware:

1. Software

Table 1 Software

Requirements	Description
Windows 10	Operating system
Adobe Animate	Interactive animation creation application
Figma dan canva	Applications for image processing

Source: Author's design results (2024)

2. Hardware

Table 2 Hardware

Kebutuhan	**keterangan**
Processor	AMD Rayzen 5
Memori	8 GB
SSD	275 GB
Monitor	*Standart* 14 *inch*
Mouse	*Standart*

Source: Author's design results (2024)

B. Design

Design is the depiction of plans and sketches, as well as the arrangement of several separate elements into a single entity according to their respective functions.

C. Software characteristics

When designing a system, including interactive animation, it is necessary to pay attention to the characteristics and elements contained therein, namely:

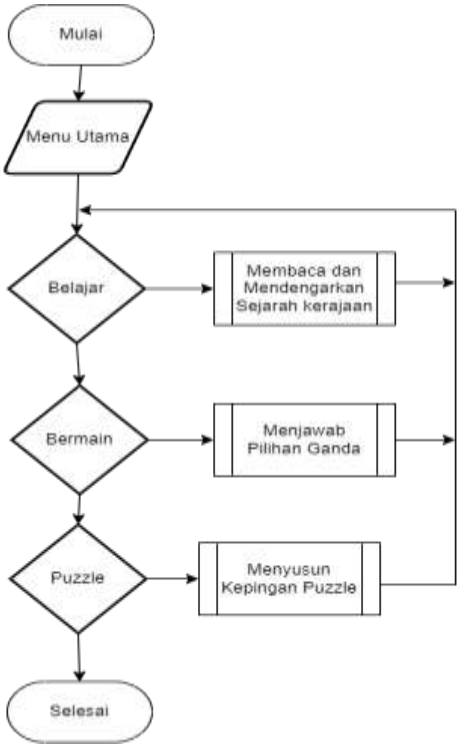
1. The interactive animation game format about Hindu-Buddhist kingdoms in Indonesia is an interactive learning game consisting of three main menus. The first is a learning menu containing the history of Hindu-Buddhist kingdoms in Indonesia, the second is a play menu containing 20 multiple-choice questions, and the third is a puzzle menu with four levels of difficulty.
2. The rules of this interactive animation game suggest that users read and listen to the material about Hindu-Buddhist kingdoms in Indonesia first, so that they can easily answer the questions in the play section. In the puzzle menu,

users must arrange all the puzzle pieces back into their original order to complete the game within the specified time.

3. Policy: In the play section, if users answer 10 questions correctly, an emoji image with the word “pandai” (smart) will appear. If users answer less than 10 questions correctly, an emoji image with the words “coba belajar lagi” (try learning again) will appear. In the puzzle section, users must complete the puzzle pieces as they were originally before the specified time runs out.
4. Scenario: First, users can click the start button to enter the main menu, which contains 3 menu options, namely the learning menu containing the history of Hindu-Buddhist kingdoms in Indonesia, the play menu where users must answer 20 multiple-choice questions, and the puzzle menu containing 4 difficulty levels with different numbers of pieces and time limits for each level.
5. Events/Challenge The play menu contains 20 multiple-choice questions, each of which increases in difficulty depending on the level, and each question cannot be repeated because it is one-way. If the user answers 10 questions correctly, a “smart” emoji will appear. If the user answers less than 10 questions correctly, a “try again” emoji will appear. In the puzzle section, users are asked to arrange the puzzle pieces into their original image within a specified time. This challenge is provided so that users can hone their memory, speed, and accuracy in completing the learning process.
6. Roles Players must answer the questions provided and cannot repeat the questions. In the puzzle menu, players must arrange the puzzle pieces back into the original image within a specified time limit.
7. Decision The user's decision in choosing the correct answer will affect the score.
8. Levels The game menu consists of 5 levels that will differentiate the difficulty level of each question to be answered. In the puzzle menu, there are 4 levels with a time limit. Users must complete the puzzle pieces as they were originally.
9. Score in the question menu: if the user can answer half of the total questions correctly, an emoji image with the word “smart” will appear; if the user cannot answer 10 questions correctly, an emoji image with the words “try again” will appear. In the puzzle menu, if the user can assemble all the puzzle pieces quickly, they can continue to the next level.
10. Indicators used are numbers 1 to 5 in the play menu, which serve to categorize the level of each question.
11. Symbols in this interactive animated game, there are several symbols that can be clicked. Each button has a different function and when clicked, it functions according to the name of the symbol.

D. Flowchart

The creation of this interactive animated game on the history of Hindu-Buddhist kingdoms in Indonesia has the following flowchart:



Source: Author's design results (2024)

Figure 1 Flowchart

E. User Interface

The following is the user interface for the interactive animated game on the history of the Hindu-Buddhist kingdom.

Intro menu and main menu display

In this animated game on the Hindu-Buddhist kingdom in Indonesia, there is an intro menu and a main menu consisting of three menu options: learn, play, and puzzle.

Source: Author's design results (2024)

Figure 3 Intro menu and main menu

Learning and play menu display

In this animated game about Hindu-Buddhist kingdoms in Indonesia, there is a learning menu consisting of writings, pictures, and narrations about Hindu-Buddhist kingdoms in Indonesia, and a play menu in the form of multiple-choice questions with 5 levels of difficulty.

Source: Author's design results (2024)

Figure 4 Play and learn menu

Puzzle menu display

In this animated game about the Hindu-Buddhist kingdom in Indonesia, there is a puzzle menu where users can arrange puzzle pieces with 4 levels of difficulty.

Source: Author's design results (2024)

Figue 5 Puzzle Menu

F. Questionnaire data processing results

After completing the interactive animation game, the author created a questionnaire to assess whether this game could be used as an interactive animation learning medium for students in grades 1 to 6 at Al-Amal Islamic Elementary School. This questionnaire was given to students in grades 1 to 6 with the following 10 questions:

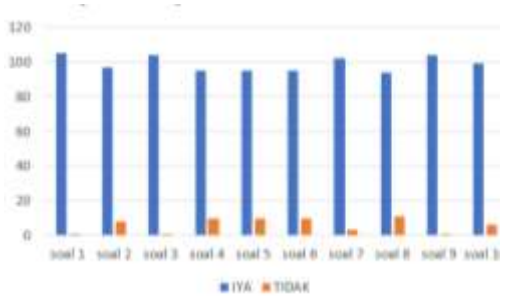
Table 3 Questionnaire

No.	Question	Yes	No
1	Do you enjoy learning history?		
2	Do you understand the history material that has been provided?		

3	Is the history material in this game interesting?		
4	Is this game easy to play?		
5	Are you interested in playing this history game?		
6	Do you find this history game enjoyable to play?		
7	Do you prefer learning through games?		
8	Would you like to learn history more through games?		
9	Would you like more games like this for other subjects?		
10	Are you satisfied with this history game?		

Source: Author's design results (2024)

The questionnaire was distributed to 105 respondents. The following is a graph of the questionnaire data processing results regarding the use of interactive animated games about the Hindu-Buddhist kingdom in Indonesia:

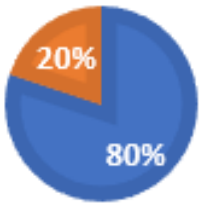


Source: Author's design results (2024)

Figure 6: Questionnaire results

The results of the questionnaire data processing were divided into the following three assessments:

1. Historical Material Criteria

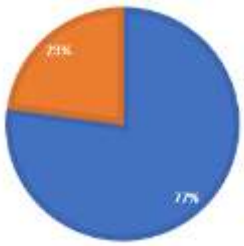


Source: Author's design results (2024)

Figure 7: history material

In the results of the historical material criteria pie chart, 80% of students answered yes (enjoy playing the game, understand the material provided, and are interested in playing historical games) and 20% of students answered no.

2. Criteria For Historical Games

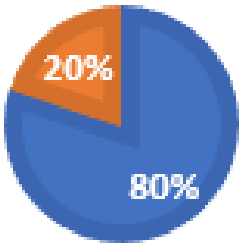


Source: Author's design results (2024)

Figure 8: historical games

In the pie chart results for the history game criteria, 77% of students answered yes (easy to play history games, interested in playing history games, fun to play history games, use of games as a learning medium) and 23% of students answered no.

3. Development criteria



Source: Author's design results (2024)

Figure 9 Development

The results of the development criteria pie chart show that 80% of students answered yes (increase historical games in other subjects, increase games in other subjects, and satisfaction with playing historical games) and 20% of students answered no.

CONCLUSION

Conclusions drawn from the creation of interactive animated games is This interactive animated game offers in-depth knowledge about the history of Hindu-Buddhist kingdoms in Indonesia. Players can learn about the history of the kingdom, its founders, and their influence on Indonesian culture and civilization. This game serves as an engaging educational tool, combining visual and narrative elements to enhance players' understanding of history. This interactive animated game can only be played on a laptop or computer, so that players can enjoy a wider visual display. In this interactive animated game, once players have finished answering the multiple-choice questions, a score will appear, but there is no history for that score, as the interactive animated game is not yet connected to a database. This interactive animated game only displays one topic, namely the Hindu-Buddhist kingdoms in Indonesia.

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