Metabharata Game Based on Javanese Wayang Art Using Unity

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Article Info	ABSTRACT
	The development of the 2D game Metabharata was initiated as an effort to introduce and preserve the art of Javanese puppetry, especially to the younger generation. Javanese wayang, with its deep artistic and philosophical values, is considered to have the potential to be creatively conveyed through the medium of 2D games. This research applies the Waterfall model development method to ensure a structured approach in the creation process. The Metabharata game is geared towards bringing together digital technology, structured software development methods, and the rich cultural arts of Javanese wayang. The testing of this game involved content validity analysis, construct validity through a multi-expert approach, and usability testing with the USE Questionnaire. The validity results showed a very valid level of validity, and usability testing showed high satisfaction with a usability percentage of 94%. With these results, it can be concluded that 'Metabharata' is worth maintaining and developing further as a contribution to the development of local culture-based games.

1. INTRODUCTION

The rapid advancement of information technology in various sectors, such as computers and mobile devices, especially in the multimedia field, has increased public demand for technology[1]–[4]. Games become a popular choice of entertainment due to their focus on visual experiences[5]–[8]. Currently, most fighting games are developed solely as entertainment tools for users[9]–[11]. Games can not only serve as a form of entertainment but also as an effective tool for teaching cultural values to the younger generation[12], [13].

Contemporary youth have become increasingly detached from traditional cultural values, often favoring modern trends and Western influences. The decline in interest in traditional arts, especially among the younger generation, is partly due to a lack of effective means to introduce and appreciate these arts. Modernization and technology have further exacerbated this issue, threatening the survival of traditional arts and the cultural heritage they represent[14].

Unity Technologies has developed a widely used cross-platform game engine called Unity. It is extensively utilized for the development of 2D and 3D video games, as well as computer, console, and mobile device simulations[15]–[19]. Unity provides a powerful platform for developers and designers to build interactive content, utilizing a range of tools and capabilities that simplify the creation process[20]–[24].

This study presents the development of a game called Metabhrata which is set in Javanese culture in Indonesia using the Unity application. Therefore, the development of a 2D Metabharata game is expected to provide a creative solution for conveying the cultural messages of Javanese wayang to players. The advantage

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of 2D games is that they do not require high-performance hardware. Additionally, the simple graphics of 2D games are easily accepted by users, especially children.

Game development requires a structured methodology to ensure a smooth process. The waterfall model, a classic software development model, offers a sequential and structured approach. This approach involves a series of well-defined phases that must be completed in order, making it impossible to skip any stage in the development process.

By combining the power of digital technology, a structured software development methodology, and the rich cultural heritage of Javanese wayang, this research aims to create a 2D game that can introduce and preserve traditional arts based on local wisdom for the revitalization of Indonesian traditional culture. This is a step towards preserving Indonesia's cultural heritage, particularly in enriching the understanding of wayang, ensuring that this heritage is not overshadowed by the advancements of technology and globalization. This study presents the development of a game called Metabhrata which is set in Javanese culture in Indonesia using the Unity application.

2. METHOD
2.1 Unity
Unity refers to the Unity Editor software used to develop video games, simulations, and other interactive applications. Unity is a game engine that provides an integrated development environment (IDE) and the tools needed to create cross-platform applications in both 2D and 3D formats. Uses of Unity Applications Game Development:

- Create various types of games, from simple indie games to AAA games.
- Simulation and Training: Create simulations for training in the military, medical, and other industries.
- Virtual Reality (VR) and Augmented Reality (AR) Applications: Develop applications that use VR and AR technologies.
- Interactive Applications: Include educational applications, interactive art installations, and architectural presentations.
- Unity has become popular among developers because of its flexibility, strong ecosystem, and ability to support multiple platforms.

Unity has a number of advantages that make it a popular choice among game and interactive application developers. Here are some of the main advantages of Unity such as Multi-Platform Support, User-Friendly Interface, Large Community and Strong Support, Asset Store, Real-Time Development and Testing, Scripting with C#, Compatibility with VR and AR, Complete Development Tools and Features, Visual Scripting, High Performance, Complete Documentation and Tutorials and Team Collaboration[25], [26].

2.2. Data Analysis Techniques
2.2.1. Content and Construct Validity Analysis
The data analysis technique for assessing Content and Construct validity is conducted using descriptive statistical methods, specifically by calculating the mean (Excel). The data collected in the form of responses to a questionnaire with a four-point Likert scale are then processed by calculating the average score of responses from each respondent. The results of the data analysis are interpreted and concluded according to the established validity criteria, as outlined in the Table 1.

Table 1. Validity criteria

Content Validity Criteria		Construct Validity Criteria	
$3.25 < V \leq 4.00$	Very	$3.25 < V \leq 4.00$	Very
$2.50 < V \leq 3.25$	Valid	$2.50 < V \leq 3.25$	Valid
$1.75 < V \leq 2.50$	Less	$1.75 < V \leq 2.50$	Less
$1.00 < V \leq 1.75$	Not Valid	$1.00 < V \leq 1.75$	Not Valid
Description: V = Validity Score.			

2.2.2. Usability Analysis
For the usability testing aspect, data was analyzed by calculating the average value of the responses provided by respondents in the USE questionnaire. After obtaining the total score, the subsequent steps include calculating the feasibility percentage using the following method:

$$Percentage = \frac{Score\ Obtained}{Maximum\ Score} \times 100\% \tag{1}$$

After obtaining the percentage result, compare it with the score interpretation criteria table for usability, as shown in Table 2.

Table 2. Usability Score Criteria

Percentage Range	Feasibility Criteria
0% - 20%	Very Poor Feasibility
21% - 40%	Poor Feasibility
41% - 60%	Fair Feasibility
61% - 80%	Good Feasibility
81% - 100%	Excellent Feasibility

3.   Proposed

The development of this game uses the application of the waterfall model using Unity by following linear steps, starting from analysis and planning, then going to design, development, testing, and publication. The following are the stages of its implementation: In the development of this game, there are 2 parts, including the needs in hardware (hardware) and the needs in software (software). Details of the hardware and software can be seen in Table 3 and Table 4.

Table 3. Hardware Requirements

No	Hardware	Specification
1	Processor	Intel Core i7-8750H
2	Memory	8 GB DDR4 2666 MHz
3	Disk	128 GB SSD + 1 TB SSHD
4	Graphic	Nvidia GeForce GTX 1050 Ti 4GB

Table 4. Software Requirements

No	Software	Description
1	Unity	Game Engine
2	Figma	flowchart design

This step provides a design in the form of a framework design at the game creation stage by displaying the flowchart design and use case diagram. It can be seen in Figure 1.
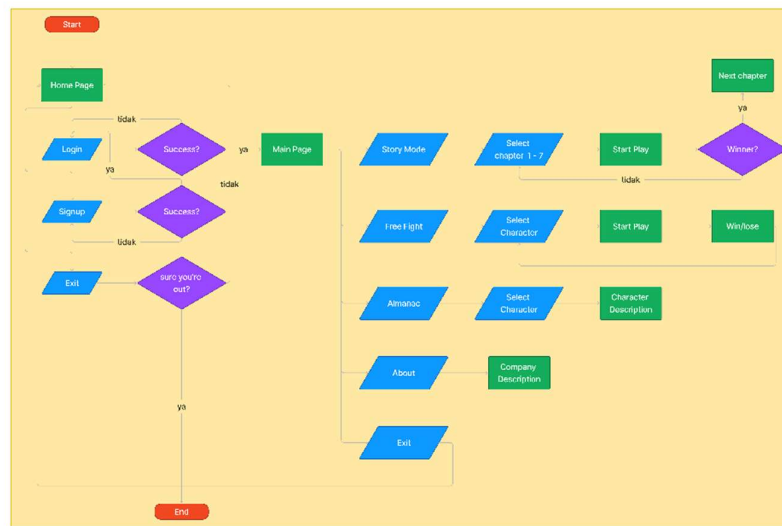

Figure 1. Metabharata flowchart

The homepage is the login section for username and password input, then directed to the main page. If a new user is directed to register an account, after that return to the login. On the main page there are 5 processes (story mode, free fight, almanac, about, exit). It can be seen in Figure 2.
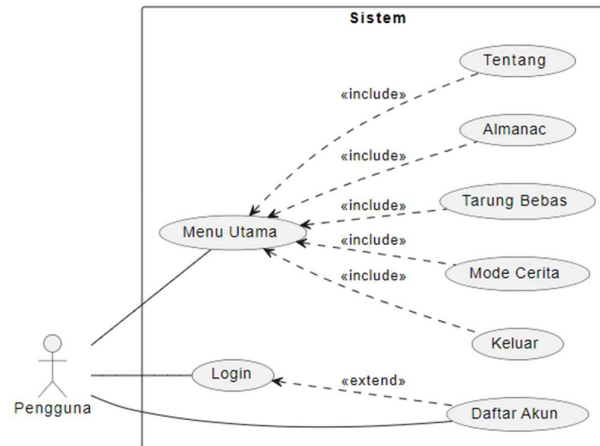
Figure 2. use case diagram Metabharata

4.   RESULTS AND DISCUSSION
4.1. Metabhrata Game View

Developing software using the C# programming language in conjunction with Unity involves a series of steps to design, implement, and test a project. Unity is a popular game engine and development environment that supports C# as its primary scripting language. Using C# and Unity together provides a robust framework for developing interactive applications. It can be seen in Figure 3.

Figure 3. home page

Story mode is one of the main features in the Metabharata game which functions to face the enemies of each chapter one on one. In each chapter features a continuous story and provides a different background of each chapter. Victory in each battle opens the chapter to the next stage. The illustration of story mode can be seen in Figure 4. After displaying a brief story in each chapter, it will be directed to the battle mode according to the character in the chapter taken. If the user manages to win the battle, they can proceed to the next chapter and get the character according to the chapter that has been completed. However, when the user loses, it will automatically be directed to repeat or exit the battle. The batlle mode can be seen in Figure 5.
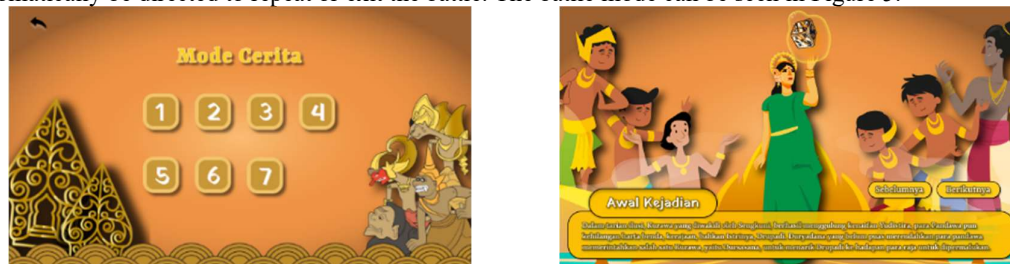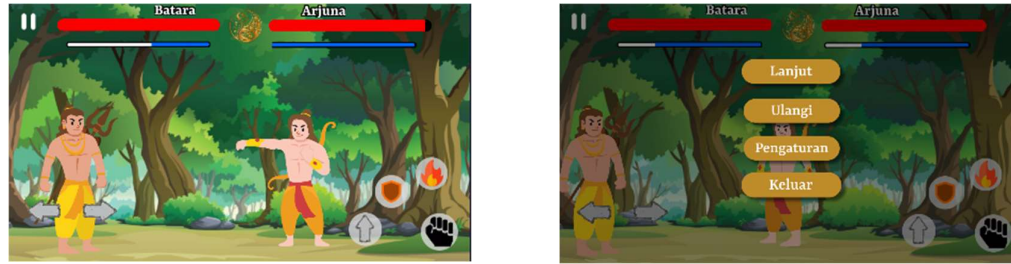

Figure 4. story mode chapter 1

Figure 5. fighting in the game

4.2. Data Testing Result Metabharata Game

The validity of the questionnaire was tested through a multi-expert approach, where four media experts and a material expert were involved in the evaluation process. The role of the media experts was to ensure that the visual and presentation aspects of the game conformed to good media standards. Meanwhile, the subject matter experts were responsible for evaluating the content and construct of the game by involving an in-depth understanding of the material carried by the Metabharata game. Based on the results of construct validity, the result is 3.29. So if interpreted with the Validity Criteria, the data in this study can be categorised as Very Valid. Details of the testing values can be seen in Table 5 and Table 6.

Table 5. Content and construct validity data results

No	Aspects Assessed	Rating Scale			
		1	2	3	4
VALIDITY OF GAME CONTENT					
1	The storyline of this game is in accordance with the elements of puppetry.	0	0	3	1
2	This media can increase the user's interest in puppetry.	0	1	1	2
3	It creates a fun cultural atmosphere.	0	0	1	3
4	This media can increase the user's motivation to explore wayang art.	0	0	4	0
5	The time to access wayang art using this media can be adjusted to the user's needs.	0	0	3	1
6	The game characters are very suitable and interesting.	0	1	1	2
7	The game storyline is interesting.	0	0	3	1
8	The game content is in accordance with puppet culture.	0	1	1	2
GAME CONSTRUCT VALIDITY					
9	This game has a consistent button layout.	0	0	3	1
10	The game is easy to start.	0	0	1	3
11	The game is easy to end.	0	0	2	2
12	Has an attractive background colour and design	0	0	2	2
13	Has a harmonious and attractive selection of objects in the game	0	0	3	1
14	Has a good level of interactivity between the user and the game	0	1	2	1
15	Has an orderly location of game components (icons, navigation)	0	1	2	1
16	Has clarity of object visualisation.	0	0	3	1
17	Has ease of operation.	0	1	1	2
AMOUNT		0	6	36	25
VALUE		0	24	144	100
AVERAGE (TOTAL SCORE / TOTAL NUMBER)		3.29 (Very Valid)			

Table 6. usability testing results

No	Statement	Score			
		1	2	3	4
Usefulness					
1	This game helps me be more effective.	0	0	4	16
2	This game helps me be more productive.	0	0	3	17
3	This game is very useful.	0	0	5	15
4	It gives me more control over my activities.	0	1	4	15
5	This game makes it easier for me to finish what I am doing.	0	1	3	16
6	This game saves me time when I use it.	0	2	3	15
7	This game fits my needs.	0	2	3	15
8	It does everything that I expect it to do.	0	2	2	16

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	Ease of Use				
9	This game is easy to use.	0	0	3	17
10	This game is practical to use.	0	0	3	17
11	This game is easy to understand.	0	0	4	16
12	This game requires few steps to achieve what I want to do with this game.	0	1	4	15
13	This game is flexible.	0	1	4	15
14	There is no difficulty in using this game.	0	0	4	16
15	I can use this game without written instructions.	0	1	3	16
16	I did not notice any inconsistent parts when I used this game.	0	1	4	15
17	Both infrequent users and habitual users will like this game.	0	0	5	15
18	I can handle errors quickly and easily.	0	0	5	15
19	I can use this Game correctly every time I use it.	0	0	4	16
	Ease of Learning				
20	I learnt to use this game quickly.	0	0	3	17
21	I easily remember how to use this.	0	0	5	15
23	I became skilled at using this game quickly.	0	1	2	17
	Satisfication				
24	I am satisfied with this game.	0	0	5	15
25	I would recommend this game to a friend.	0	0	4	16
26	This game is fun to use	0	0	4	16
27	This game works the way I want it to	0	1	3	16
28	This game has a very nice appearance.	0	0	3	17
29	I think I need to have this game.	0	0	4	16
30	This game is convenient to use.	0	0	5	15
AMOUNT		0	16	110	474
VALUE		0	32	330	1896
TOTAL VALUE		2.258			

The usability test results are reported based on the implementation of the USE Questionnaire, which was adapted from the work of Arnold M. Lund (2001). The participants in this test included 20 respondents, with 15 males and 5 females. The age range of the respondents ranged from 10 to 25 years old, with the majority of them being students. To evaluate usability, the scoring criteria used involved a scale from 1 to 4, with 1 being Strongly Disagree (STS), 2 being Disagree (TS), 3 being Agree (S), and 4 being Strongly Agree (SS).

Based on the results of usability testing using the USE Questionnaire on the game tested involving 20 student respondents, a usability score of 94% was obtained. This shows that the game is feasible to use and obtained positive responses from the majority of respondents regarding its usefulness and ease of use.

This section explains how to download and install the Metabharata game on Android devices, with a file size of 141 MB. The download process requires an internet connection, but after installation, the game can be accessed without an internet connection through the Android system under the name 'Metabharata' in the Play Store. It can be seen in Figure 6.
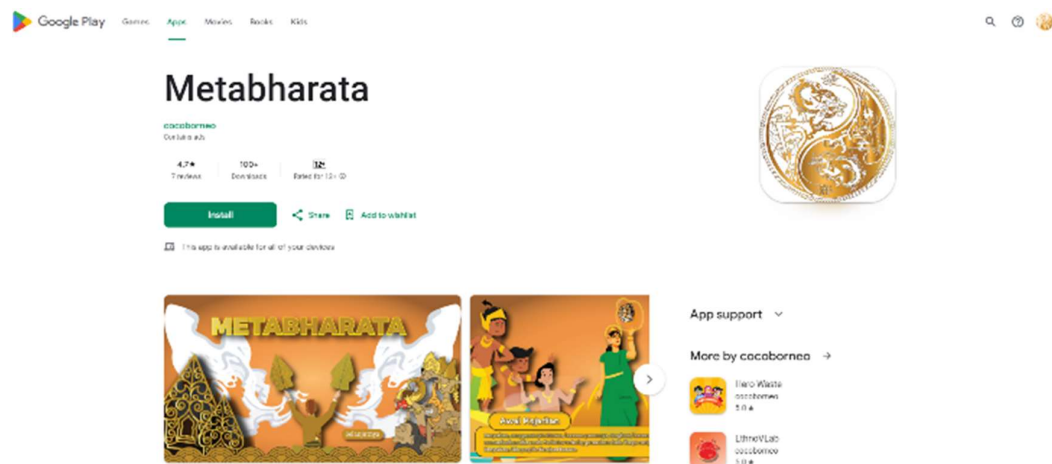

Figure 6. metabharata app

5. CONCLUSION AND LIMITATION

The development of the 2D Metabharata game aims to introduce and preserve the art of Javanese puppetry to the younger generation through an innovative approach. Javanese Wayang, which is rich in artistic and philosophical values, is integrated into this game as an effort to revitalise Indonesia's traditional culture by utilising digital technology. The use of the Waterfall model in the development of this game ensures a structured approach, while the Android platform allows the game to be accessed with customised controls for optimal user experience. The evaluation of this game included an examination of content validity, assessment of construct validity using a multi-expert approach, and testing of usability using the USE Questionnaire. The validity results demonstrated a good level of validity, while the usability testing indicated a high level of satisfaction with a usability rate of 94%. Based on these findings, it can be inferred that 'Metabharata' is valuable and should be continued and expanded upon as a contribution to the advancement of games rooted in local culture.

As a follow-up step, it is important to conduct regular user trials to get feedback that is useful in improving the quality of the game. In addition, ensuring that the game is easily understood and enjoyed by people of different ages and cultural backgrounds is essential. To support the growth of the gaming industry, collaboration between developers, cultural artists and other relevant parties should be encouraged. Regular evaluation and updates to the Metabharata game will help maintain its relevance in spreading the message of Javanese wayang culture, while paying attention to user feedback and keeping up with evolving game industry trends.

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