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Design and Building A 2D Game as Educational Media for The Babad Pasirluhur Folklore Using Construct 3

Virginawan Alessandro Chevin*[1], Dimas Fanny Hebrasianto Permadi[2]

[1,2]) Study Program Informatics Engineering Faculty of Informatics Institute of Technology Telkom Purwokerto
[1,2]) Jl. DI Panjaitan No. 128, Karangreja, Purwokerto Kidul, Sub-district South Purwokerto, Banyumas Regency, Central Jawa, Indonesia, postcode : 53147
[1] 19102235@ittelkom-pwt.ac.id
[2] dimas@ittelkom-pwt.ac.id

Abstract

Folklore can also be called a part of Indonesian culture, which tells about entertainment, history, and culture of a region in Indonesia. Indonesian folklore has educational value and cultural elements that can be studied. One way of learning about folklore can be implemented through games. Games can be used as educational media because, apart from producing information, they can also be used to entertain those who play them. Based on the background, we have conducted interviews with teachers at Public Elementary School 2 Purwokerto Lor and obtained results regarding the need for media to introduce folklore. In this elementary school, students do not yet understand the folklore about Babad Pasirluhur. So, we propose to design a 2D game as an educational medium for the Babad Pasirluhur folklore implemented into the adventure genre. Therefore, this research aims to design an educational adventure game for the Babad Pasirluhur folklore using the Game Development Life Cycle (GDLC) method. This game was built using the Construct 3 game engine because it is suitable for a simple adventure game. The results obtained were that the black box method was functional, with a success score of 100% from 5 testers. Meanwhile, the UAT test obtained results of 84.7% from 33 grade 4th students at Public Elementary School 2 Purwokerto Lor. The UAT test results stated that it was included in the "strongly agree" category. These results were tested using the normality test and one sample t-test, and the conclusion was that H0 was rejected and H1 was accepted. So, the results of this game can be accepted as a learning media for the Babad Pasirluhur folklore by grade 4 students at Public Elementary School 2 Purwokerto Lor. Suggestions for further development are needed to improve the design to suit the character of grade 4 students based on the results of the UAT testing on the design section, which got the lowest score of 84%.

Keywords: Construct 3, Folklore, Game, Game Development Life Cycle (GDLC).

Corresponding Author:
* Virginawan Alessandro Chevin
Study Program Informatics Engineering Faculty of Informatics Institute of Technology Telkom Purwokerto
Jl. DI Panjaitan No. 128, Karangreja, Purwokerto Kidul, Sub-district South Purwokerto, Banyumas Regency, Central Jawa, Indonesia, postcode : 53147
Email: 19102235@ittelkom-pwt.ac.id

I. INTRODUCTION

THE development technology in Indonesia is growing rapidly with the intervention of the internet, and one example of this technology is games, which are one form of entertainment that is currently popular among children [1]. Games, in general, are entertainment mediums in the form of multimedia-based games that have their objectives, according to the creator, with the aim of keeping the players entertained and getting information [2]. According to Christian, Dringhuzen, and Alwin [3], games are a form of virtual worlds that have special goals that can only be achieved if played according to the rules of the game. The development of games in Indonesia is too fast and has become a part of our society's life. It isn't easy to separate it because apart from being a means of entertainment, games can also be a means of disseminating information [4]. One type of game that is currently in great demand is an adventure, which has a storyline that makes players feel the sensation of being a character and getting to know the characters in the story. Adventure games generally make players think and solve problems throughout the game [5]. Indonesia is

a country that has a variety of ethnicities and cultures, each of which has its own unique stories, legends, myths, and folklore in each region. Folklore is generally passed down from ancestors to the next generation and is a valuable heritage that certainly has its moral message. Folk tales generally tell a story about an area, heroes, and even animals. Folklore also has a constructive structure so that it can be said to be a meaningful work and can be said to be important to study because it contains an element of value that can be used as a guide or example for anyone who reads it [6]. Traditions to guide children to behave well also usually use folklore as a medium. Folklore is a story that has existed since time immemorial, has been told from generation to generation, and is attached to local culture in the surrounding area [7]. According to Icmi and Aan [8], folklore is a literary work in story format that is passed down from generation to generation through speech.

Based on the information above, the researcher interviewed the teacher of class 4 at Public Elementary School (SD) Negeri 2 Purwokerto Lor to find out whether there was material about folklore and whether there were problems in delivering this material. The result of this interview is there was material on the Babad Pasirluhur folklore in Javanese language lessons for grade 4 elementary school. The problem was found when the teacher experienced difficulty in conveying material from the Babad Pasirluhur folklore, which resulted in students having difficulty understanding because the story was in Javanese language and because there were many names of characters and also places in the story, so that media was needed as an introduction medium for the Babad Pasirluhur folklore.

Based on the problems with the folklore material, the researcher focused on designing and building an adventure game using folklore texts from the 4th-grade Javanese language textbook used at the school. Babad Pasirluhur is a folklore from the Banyumas area that tells the story of the adventures of a person named Raden Kamandaka. The method used to design and make the game is the Game Development Life Cycle method. Game Development Life Cycle, commonly abbreviated as GDLC, is a game development method that consists of 6 stages, namely initiation, preproduction, production, alpha testing, beta testing, and release [9]. According to Fazri [10], GDLC is a sequential game development method that starts from the initial stage and continues to the final stage, making it easier to analyze and create games in a complete cycle. Construct 3 is used as a game engine and as a tool for the game. Construct 3 is a tool based on Hyper Text Markup Language 5 for creating games. Construct 3 already has features for creating objects and setting the attribute of the object without having to write the program line by line [2]. According to Reno and Ade [11], Construct 3 has functional features that new users can easily understand.

II.   RESEARCH METHOD

Figure 1 shows the steps that researchers take to develop an educational game using a Game Development Life Cycle (GDLC) method. GDLC method consists of initiation, preproduction, production, alpha testing, beta testing, and final version release.
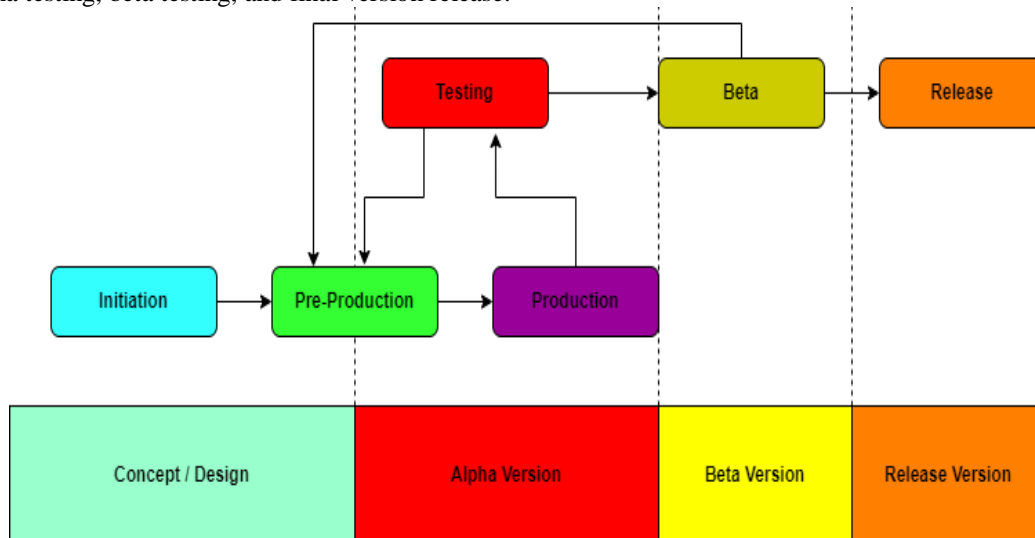

Fig. 1.   Game Development Life Cycle Method [12]

A. Initiation

In the first step of initiation, the concept of the game is created. The game concept is in the form of an analysis of how the game will be made, and initiation produces the game concept, the mechanical system in the game, and the storyline of the game. To create the concepts, researchers used a Unified Modeling Language (UML) [13]. See the Figure 2.
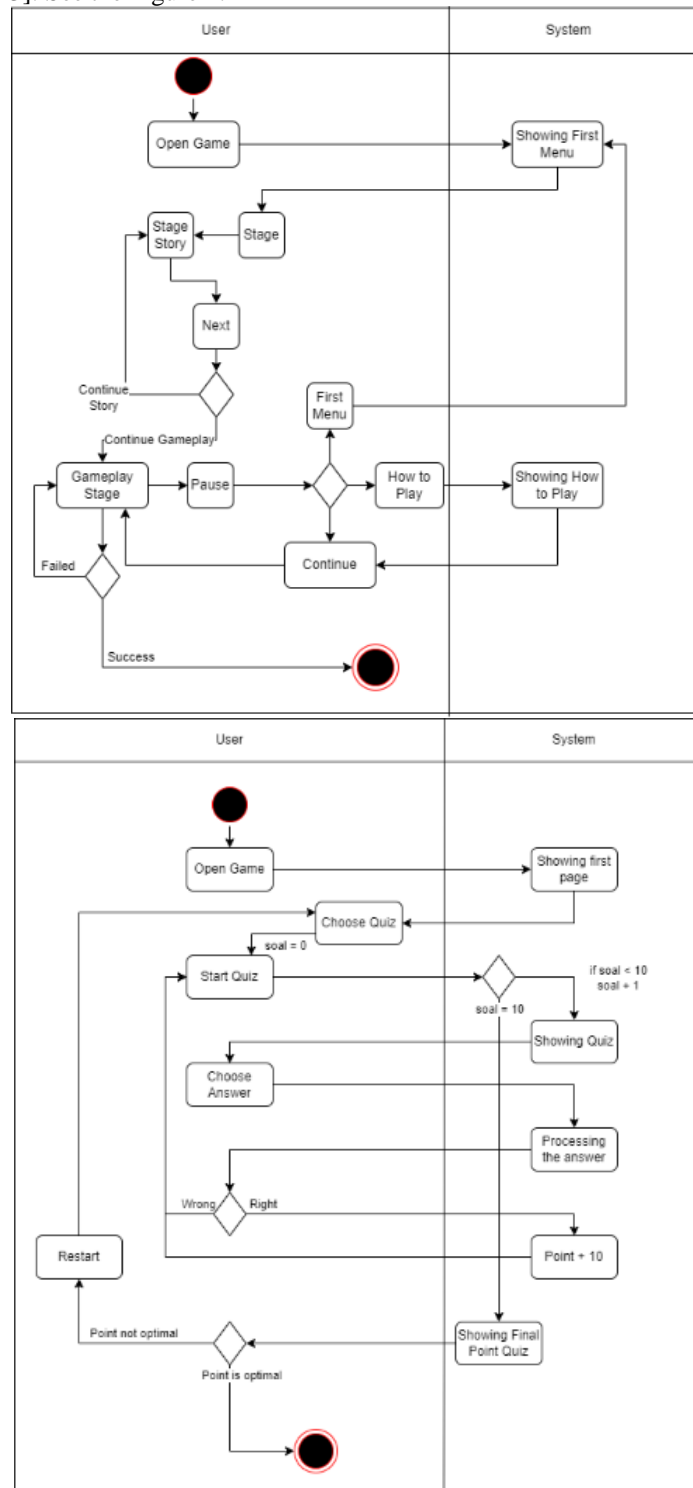

Fig. 2.   Activity Diagram for the game

B. Preproduction

In this second step, the character, storyboard, and asset are produced. Creating characters it was produced using ibis paint x software, for storyboard using draw.io software, and for game assets using Pixel Studio and Photoshop. Figure 3 is an example of one of the characters in this game. Raden Kamandaka is the main character in this game, as well as folklore in Babad Pasirluhur. This character is also playable in the gameplay stage. Figure 4 is an example of four storyboard menu stages: scene story, gameplay, and quiz game. Figure 5 is an example of one of the scene stories and audio that will used in the production game.
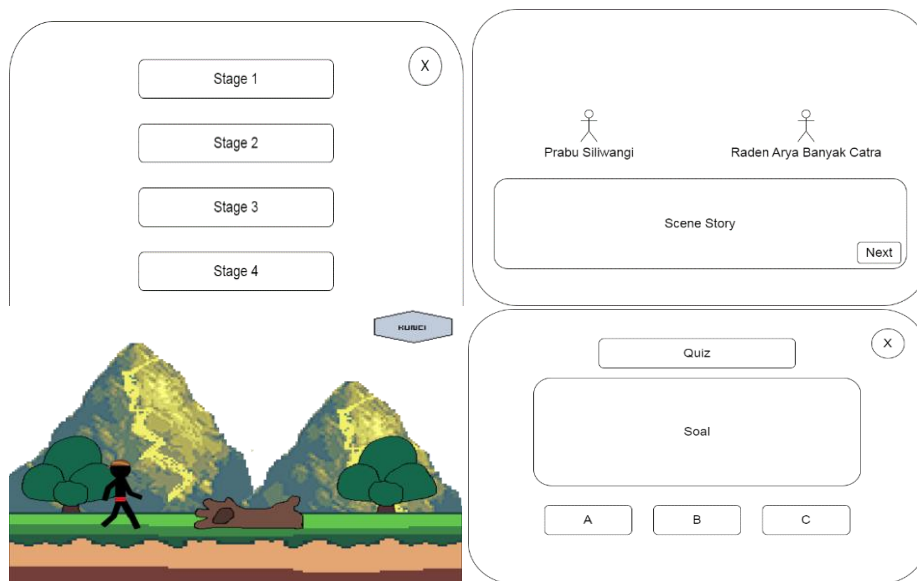
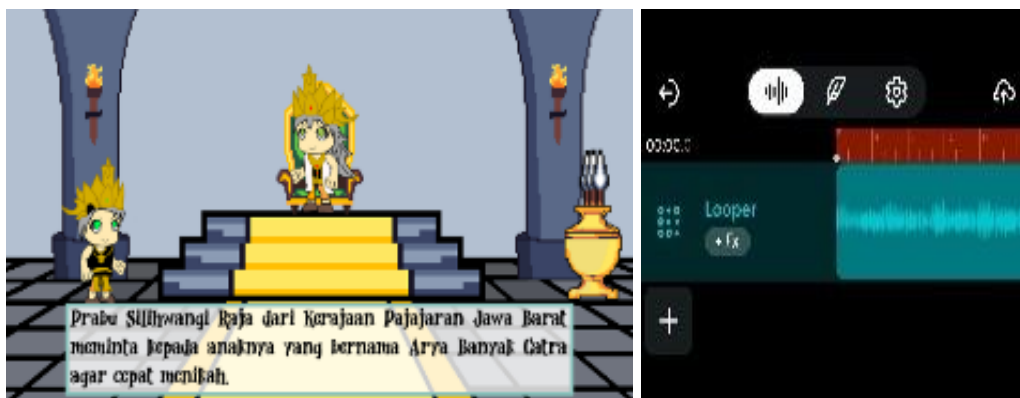Fig. 3.   Raden Kamandaka Character

Fig. 4.   Example Storyboard Game

Fig. 5.   Asset Game example (scene story & audio)

C. Production

At this step, a 2D folklore Babad Pasirluhur game was produced using the game engine Construct 3. The researcher also included assets that had been made in the preproduction step, such as characters, story scenes, audio, accessories, and movement animations, and then combined them all to make the game. Figure 6 is the documentation for creating a menu, story, gameplay, and quiz for a game in Construct 3.
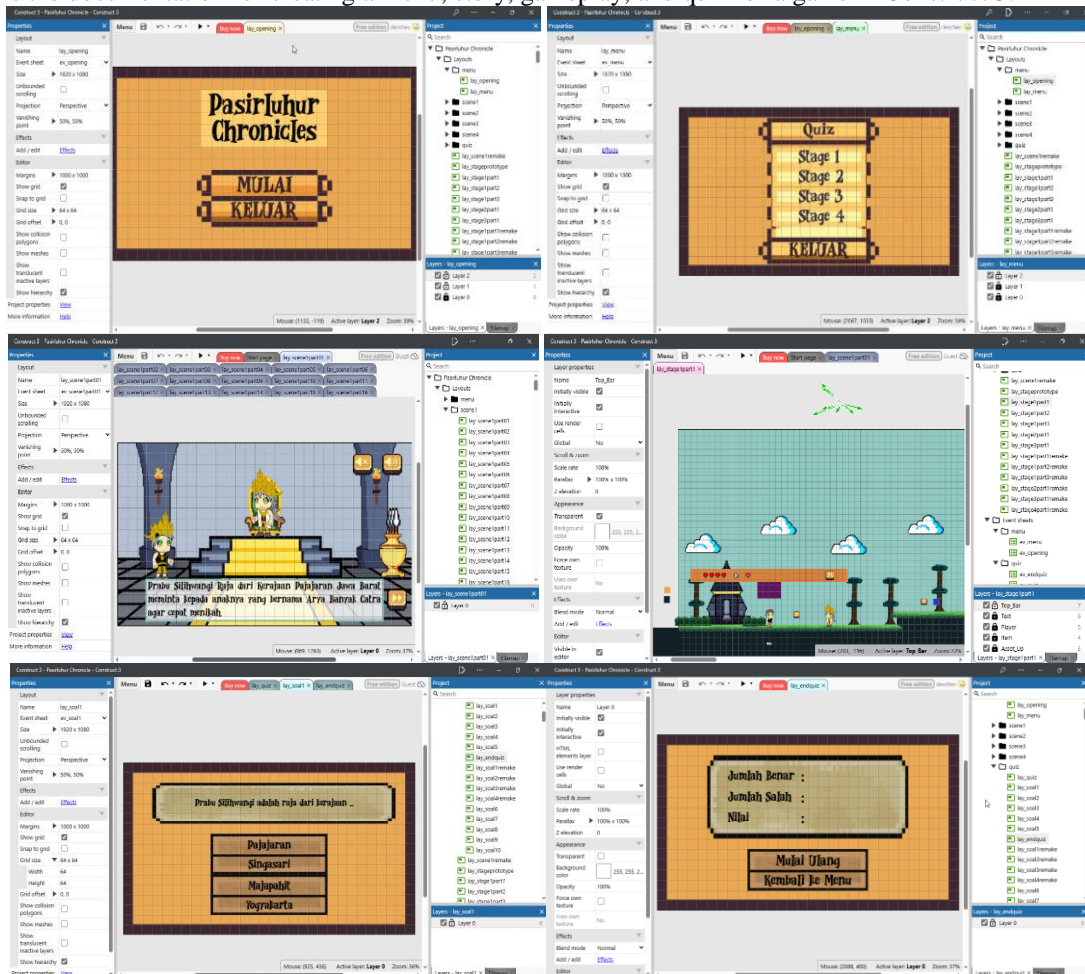

Fig. 6.   Production Game on Construct 3

D. Alpha Testing

This alpha testing will use the Black Box method, which focuses on whether the functional requirements of the game are successful or not. This test will be tested on the homeroom teacher and one additional teacher. The Table I are several test stages in the game being created:

TABLE I.   ALPHA TESTING SCENARIO

No	Component	Scenario	Method
1	Enter the main menu	Enter the home menu display	Black Box
2	Select a stage	Can choose stages 1-4	Black Box
3	Show how to play	They help how to play	Black Box
4	Starting Stage	Can start stage 1-4	Black Box
5	Playing Character	Characters can move as they should	Black Box
6	Character jump	Character can jump	Black Box
7	Background music sounds	There is background music on the menu and stage	Black Box
8	Scene Story	There is a story scene containing the Babad Pasirluhur story	Black Box
9	Select a quiz	Can choose quiz	Black Box
10	Playing Quiz	The quiz can run smoothly	Black Box

E. Beta Testing

At this step, the test was conducted on Grade 4th students of Purwokerto Lor State Elementary School 2 by using a user acceptance test method with 3 variables, namely design, convenience, and efficiency, with a total of 10 questions as in Table II. To find out the results from the respondents, a Likert scale questionnaire was used, which consists of levels as in Table III.

TABLE II.   Beta Testing Scenario

No	Variable	Question	SA	A	U	D	SD
1	Design	The appearance of the learning media for the Babad Pasirluhur folklore game is interesting.					
2	Design	Are the menu or features of the Babad Pasirluhur folklore game learning media easy to understand?					
3	Design	Is the use of colors, fonts, and backgrounds appropriate?					
4	Convenience	Is it easy to understand the presentation of the Babad Pasirluhur folklore using game media?					
5	Convenience	Can the media introduce the Babad Pasirluhur folklore to help you recognize the characters in the story?					
6	Convenience	Can the Babad Pasirluhur folklore game help students and teachers in introducing folklore?					
7	Convenience	Can the Babad Pasirluhur folklore game be used as a tool to take a quiz?					
8	Efficient	Understanding the Babad Pasirluhur folklore is easier with game media					
9	Efficient	The evaluation process of introducing the Babad Pasirluhur folklore using game media					
10	Efficient	The process of conveying the Babad Pasirluhur folklore is faster by using game media.					

TABLE III.   Weight of answer value [14]

Skor	Answer	Weight
SA	Strongly Agree	5
A	Agree	4
U	Undecided	3
D	Disagree	2
SD	Strongly Disagree	1

III.   RESULTS AND DISCUSSION

This step will contain the final results of the game, the result of alpha testing, and the result of beta testing, which will decide whether the game can be said to be competent and ready to be released or not.

A. Display on the game

The display in the game of the Babad Pasirluhur Folklore serves as a captivating visual and interactive interface that immerses players in the rich cultural tapestry of Pasirluhur's legendary tales. This aspect of the game showcases meticulously crafted environments, characters, and artifacts that reflect the historical and mythical essence of the folklore. The visual design incorporates traditional art styles, color schemes, and motifs to represent the cultural heritage authentically. Additionally, the user interface is intuitively designed to enhance the gaming experience, allowing players to seamlessly navigate through the narrative, interact with characters, and engage in various quests and challenges. The display is not only a feast for the eyes but also an integral part of storytelling, bringing the legends of Pasirluhur to life in a way that is both educational and entertaining.

Figure 7 is the first menu display, which contains options for start and exit.

Fig. 7.   First Menu Display

Figure 8 is the stage menu display, which contains option quiz, stage 1, stage 2, stage 3, stage 4, and exit.
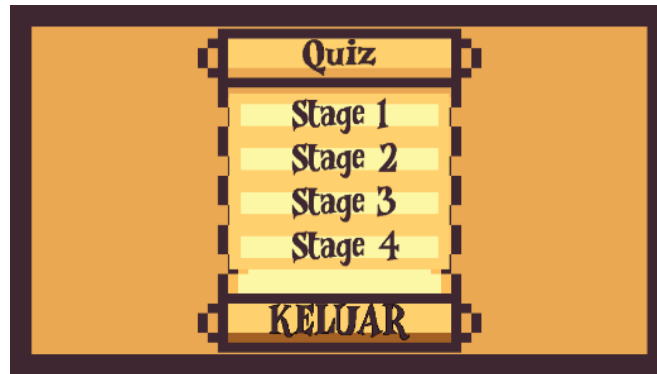

Fig. 8.   Stage Menu Display

Figure 9 is a scene story display that contains a piece of a story from Babad Pasirluhur folklore.

Fig. 9.   Scene Story Display

Figure 10 is the gameplay display where the player can play as a character, collect items, buy items, and fight some enemies.

Fig. 10.   Gameplay Display

Figure 11 is the display of the game in pause. All aspect of gameplay was stopped.
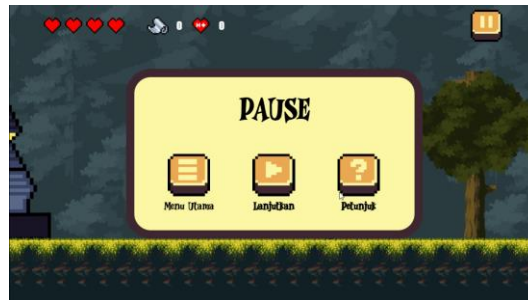

Fig. 11.   How to Play Display

When the gameplay has successfully finished, a display will appear, as shown in Figure 12.

Fig. 12.   Stage Menu Display

Figure 13 is the quiz display containing questions that the player must answer the question are about the story scene in the game.
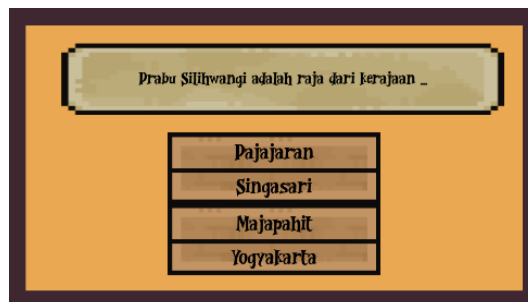

Fig. 13.   Quiz Display

Figure 14 is the quiz score display containing the result of the quiz score that the player has completed.

Fig. 14.   Quiz Score Display

B. Alpha testing result

Table IV is the result of the alpha testing that has been carried out, and based on the test that two testers have tested, it's stated that all components are functioning properly.

TABLE IV.   ALPHA TESTING SCENARIO

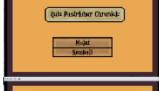| No	Component	Display	Scenario	Conclusion
1	Enter the main menu		Enter the home menu display	[5] Success [ ] Not Successful
2	Select a stage		Can choose stages 1-4	[5] Success [ ] Not Successful
3	Show how to play		They help how to play	[5] Success [ ] Not Successful
4	Starting Stage		Can start stage 1-4	[5] Success [ ] Not Successful
5	Playing Character		Characters can move as they should	[5] Success [ ] Not Successful
6	Character jump		Character can jump	[5] Success [ ] Not Successful
7	Background music sounds		There is background music on the menu and stage	[5] Success [ ] Not Successful
8	Scene Story		There is a story scene containing the Babad Pasirluhur story	[5] Success [ ] Not Successful
9	Select a quiz		Can choose quiz	[5] Success [ ] Not Successful
10	Playing Quiz		The quiz can run smoothly	[5] Success [ ] Not Successful

C. Beta testing result

Table V contains the questionnaire results from 30 respondents who took part in beta testing.

TABLE V.   UAT QUESTIONNAIRE DATA

No	Variable	Q	Score					Amount
			SAx5	Ax4	Ux3	Dx2	SDx1	
1	Design	Q1	80	64	3	0	0	147
		Q2	20	92	18	0	0	130
		Q3	55	72	12	0	0	139
2	Convenience	Q4	50	80	9	0	0	139
		Q5	65	60	15	0	0	140
		Q6	60	84	0	0	0	144
		Q7	60	76	6	0	0	142
3	Efficient	Q8	40	80	15	0	0	135
		Q9	80	56	9	0	0	145
		Q10	55	64	18	0	0	137

Table V, Q stands for Question, SA is "Strongly Agree" with a score of 5, A is "Agree" with a score of 4, U is "Undecided" with a score of 3, D is "Disagree" with a score of 2, and SD is "Strongly Disagree" with a score of 1.

The result of the respondent's answer will be calculated based on Equation (1)

$$P = \frac{\frac{f}{n}}{ideal\ score} \times 100\% \tag{1}$$

P is a percentage, f is the frequency of answers, n is the number of respondents, and the ideal score is mistaken for the highest score from the weighted value of the Likert scale answer [15].

For question Q1 $P = \frac{\frac{147}{33}}{5} \times 100\%$: 89%. For question Q2 $P = \frac{\frac{130}{33}}{5} \times 100\%$: 79%.

For question Q3 $P = \frac{\frac{139}{33}}{5} \times 100\%$: 84%. For question Q4 $P = \frac{\frac{139}{33}}{5} \times 100\%$: 84%.

For question Q5 $P = \frac{\frac{140}{33}}{5} \times 100\%$: 85%. For question Q6 $P = \frac{\frac{144}{33}}{5} \times 100\%$: 87%.

For question Q7 $P = \frac{\frac{142}{33}}{5} \times 100\%$: 86%. For question Q8 $P = \frac{\frac{135}{33}}{5} \times 100\%$: 82%.

For question Q9 $P = \frac{\frac{145}{33}}{5} \times 100\%$: 88%. For question Q10 $P = \frac{\frac{137}{33}}{5} \times 100\%$: 83%.

After being calculated with the formula, the results of the User Acceptance Test can be seen in Table VI:

TABLE VI. UAT QUESTIONNAIRE DATA PERCENTAGE

No	Variable	Q	Score					Data	
			SA	A	U	D	SD	Percentage	Category
1	Design	Q1	16	16	1	0	0	89%	SA
		Q2	4	23	6	0	0	79%	A
		Q3	11	18	4	0	0	84%	SA
Average of the design variable questions								84%	SA
2	Convenience	Q4	10	20	3	0	0	84%	SA
		Q5	13	15	5	0	0	85%	SA
		Q6	12	21	0	0	0	87%	SA
		Q7	12	19	2	0	0	86%	SA
Average of the convenience variable questions								85.5%	SA
3	Efficient	Q8	8	20	5	0	0	82%	SA
		Q9	16	14	3	0	0	88%	SA
		Q10	11	16	6	0	0	83%	SA
Average of the efficient variable questions								84.3%	SA
Average of all variable questions								84.7%	SA

Based on table VII. The average score obtained from the UAT calculation from 10 questions in 3 variables is 84.7%. The result of the calculation is mapped based on Table III.

D. Hypothesis

The following are the research hypotheses according to the method used:
H0: The UAT evaluation score gets an average of less than or equal to 60%
H1: The UAT evaluation score gets an average of more than 60%

E. Normality Test

The normality test was tested using Shapiro-Wilk on user acceptance test data, which was carried out during the beta testing stage to find out if the data used had a normal or abnormal distribution. [16] Normality test results can be seen in Table VII below:

TABLE VII. NORMALITY TEST

	Kolmonogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
UAT Result	0.144	33	0.079	0.938	33	0.061

Based on Table VII, the significance value of the UAT results, which was tested using Shapiro-Wilk normality, obtained a value of 0.061; this result is greater than 0.05, and the UAT result data can be said to be normally distributed.

F. One Sample T-Test

After carrying out the normality test, the next step is to carry out hypothesis testing using the One Sample T-Test method with the test value according to the hypothesis created [17], namely 60. The One Sample T-Test test can be seen in Table VIII:

TABLE VIII.   One Sample Statistic

	N	Mean	Std.Deviation	Std. Error Mean
UAT Result	33	84.7273	2.90767	0.50616

Table VIII shows that N is 33, and n is the number of respondents used, namely 33 students. The mean or average of the user acceptance test results was 84.7273. The Standard Deviation obtained was 2.90767, and the Standard Error Mean obtained was 0.50616. After carrying out the One Sample Statistics test, the next step is to carry out the One Sample T-Test to get the results of the research hypothesis. The One Sample T-Test test can be seen in Table IX.

TABLE IX.   One Sample T-Test

			Test Value = 60		95% Confidence Interval of the Difference	
	T	df	Sig.(2-tailed)	Mean Difference	Lower	Upper
UAT Result	48.853	32	0.001	24.72727	23.6963	25.7583

Based on Table IX, a significance value of 0.001 was obtained in the One Sample T-Test using a test value of 60. This shows that the resulting significance value is smaller than 0.05, and it can be concluded that H0 is rejected and H1 is accepted. The results obtained through the user acceptance test method at the beta testing stage were no less than 60%. This is proven by the average calculation results obtained through the user acceptance test at the beta testing stage through 10 questions, getting an average of 84.7%.

IV. Conclusion

The result of designing and making the Babad Pasirluhur folklore game was obtained after conducting research in beta testing at Public Elementary School 2 Purwokerto Lor with 33 respondents, all of whom were fourth-grade students. The process of retrieving these results includes three variable aspects, namely design, convenience, and efficiency. The final result obtained from beta testing using the user acceptance test received a score of 84.7% or entered the "Strongly Agree" category, meaning the game was successful in becoming a learning medium for the Babad Pasirluhur folklore and can continue to release the game.

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