

EDUCATIONAL GAME DEVELOPMENT BUDI AND AYA'S ADVENTURE AS ALTERNATIVE LEARNING MEDIA TO LEARN WEST JAVA'S CULTURE FOR ANDROID

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ABSTRACT

Culture according to "Kamus Besar Bahasa Indonesia" or KBBI is a results of thinking, knowledge. Culture is a result of activity and making people's soul. Culture is an ancestral heritage that is inherited in hope becoming part of modern people's life. Foreign culture's influence is becoming more and more greater, and there is no fun learning method resulting lacks of attention towards culture, especially in West Java. This could lead younger generation does not even know the culture from their own region. Budi and Aya Educational Game giving us an alternative to learn culture from West Java, especially in traditional games to improve younger generation's knowledge about traditional games. Method used to build this educational game is Game Development Life Cycle or GDLC from Blitz Game Studio. Result of the study prove that Budi and Aya Educational Game has successfully improve younger generation's knowledge about traditional games from West Java

Keyword : Education Game, West Java's Culture, Adventure, Alternative Learning Method, Android

1. PRELIMINARY

Culture according to "Kamus Besar Bahasa Indonesia" or KBBI is a results of thinking, knowledge. Culture is a result of activity and making people's soul (like a beliefs, arts, and heritage)[1]. Culture is an ancestral heritage that is inherited in hope becoming part of modern people's life.

Introduction to many customs of Indonesian's culture is an important thing, especially for younger generation. Younger generation is given Indonesian's culture as their heritage[2]. Yet, nowadays there is a lot of foreign cultures influences making younger generation doesn't attracted to learn Indonesian traditional's culture and it slowly vanish.

Foreign culture influences became more greater. Usage of traditional clothes, and traditional songs limited to events only. Such as marriage, traditional parade, etc. This is making culture became less attentive[3]. There is no fun learning method resulting lacks of younger generation's attention

towards their own traditional culture, especially in West Java. Game can be used as media to deliver many things to learn in fun way. Game will become a media with interesting visualization with expectation to increase learning enthusiasm toward traditional culture, especially game with competitive features could increase enthusiasm to repeatedly play again because there is a challenge[3]. All learning materials contained inside a game will be delivered with a fun and easy to learn method.

According to description above, we can conclude that Indonesian traditional culture slowly forgotten by younger generation as time passes by, especially regional culture. To prove that statement, a questionnaire was distributed to 35 younger generations at Bandung. Based on result of questionnaire, we can conclude that there is a lot of respondents does not understand West Java's traditional culture, especially traditional games from West Java. In this case, understanding West Java's traditional games means the respondent can tell the rules of specific game, although the name of the game is different. About 80% of respondents can not tell more than 2 traditional games from West Java. 77% respondents claims that they have hard times to learn about traditional games from West Java, and 94% respondents want to learn more about traditional games from West Java.

According to description above, traditional games is a category that younger generations know less than other category. To solve that problem, we need an alternative to learn West Java's culture that focused on traditional games. Based on result of questionnaire, 95% respondents is Smartphone user. So it would be effective to use Smartphone as educational tools to learn West Java's traditional game. 97% respondents agreed to learn traditional games through games on Smartphone. So, based on the problem described, the purpose of this study is to develop an educational game Budi and Aya's Adventure as Alternative Learning Media to learn West Java's Culture for Android.

Based on description above, we can identify a problem, it is younger generation lacks of knowledge about West Java's traditional games.

So Based on the problems that have been identified, the purpose of this study is to build educational games as an alternative media for the introduction of traditional games which are West Java culture to make them more recognizable and easy to understand.

The aim of this research is to increase the knowledge of the young generation towards traditional West Java games through alternative media in the form of educational games.

1.1. Culture

Culture according to “Kamus Besar Bahasa Indonesia” or KBBI is a results of thinking, knowledge. Culture is a result of activity and making people’s soul (like a beliefs, arts, and heritage)[1]. Culture can also be defined as the overall human knowledge to understand and interpret the environment and its experience, and to be a guideline for its behavior. Culture is the common property of members of a society or a certain social group whose distribution to its members and inheritance to the next generation is carried out through a learning process and by using symbols that are manifested in spoken form or which do not include various equipment made by humans[4].

1.2. Game

Game is a video game that was originally played on computers and is one of the entertainment media that is popular with all ages. Computer games have evolved from simple graphic systems to complex and up-to-date graphic systems. 3-dimensional (3D) game is one game that has a complex graphics system [5]. Game consists of a set of rules that build competing situations from two to several people or groups by having a strategy built to maximize one's own victory or to minimize opponent's victory. Rules determine the possibility of postponement for each player, the amount of information each player receives as playing progress, and a number of wins or losses in various situations [6].

1.3. Educational Games

Educational Games are games that are designed and created to stimulate thinking power, including increasing concentration and solving problems. Another definition states that educational games are one of the genre of games used to increase knowledge using interactive and interesting media. Games offer a form of learning by doing where users will learn something by doing it directly in the form of interactive games. Learning done is a consequence of the game user to be able to get through the challenges that exist in an educational game [7].

1.4. GDLC

The software development method used in the construction of this West Java cultural education

game uses GDLC (Game Development Life Cycle). According to Blitz Game Studio, there are six stages of game development methods, namely pitch, pre-production, main production, alpha, beta, and master. The description of the GDLC method can be seen in the following figure:



Figure 1 Game Development Life Cycle

The explanation of the stages of the GDLC model is as follows:

1. Pitch

Pitch is the initial or rough concept in designing the game that will be made. Output from initiation is a simple game concept and description.

2. Pre-production

Pre-production is one of the first stages in the production cycle. Pre-production involves the creation and revision of game design and the making of game prototypes. Game design focuses on the type of game, gameplay, mechanics, storyline, character, challenges, fun factors, technical aspects, and documentation of elements in game documentation design. After the documentation elements are made, the next form of prototype is made to assess game design and all ideas.

3. Main Production

Main production is a core process where there is a process of making assets, coding processes and the integration of both. The related prototypes in this phase are formal details and improvements. Formal details are activities related to making and perfecting games to balance games, add new features, improve performance and fix bugs.

4. Alpha

Alpha is a test of the game to assess and ensure that the functions and features are running well and checking assets is still missing or there are still bugs.

5. Beta

Beta is a phase for testing to external users or testers. The results of beta testing are bug reports and user input. The beta phase is closed if the beta test ends or all beta tester participants have provided their test report.

6. Master

Master is the final stage in game development and is ready to be released to the public. Release includes product launches, project documentation, evaluation, and maintenance planning. [8]

2. CONTENTS OF STUDY

2.1. Problem Analysis

Analysis of the problems obtained for the construction of this application is the lack of knowledge of the younger generation of traditional West Java games.

2.2. Material Collecting

Material Collecting is about what materials will be made, and then used for the application, as well as from where the material sources are obtained. The material used is in the form of text, images, audio and animation. The following is a picture of material collection which can be seen in the following table:

Table 1 Material Collecting

No	Material	Ekstension	Source
1	Main Character 1 (Budi)	Fuse	Made using the Fuse application
2	Main Character 2 (Aya)	Fuse	Made using the Fuse application
3	NPC (Kakek Abud)	Fuse	Made using the Fuse application
4	Main Character Animation 1 (Budi)	fbx	Made using Mixamo
5	Main Character Animation 2 (Aya)	fbx	Made using Mixamo
6	NPC Animation (Kakek Abud)	fbx	Made using Mixamo
7	Assets Package	fbx	Obtained from the Unity Asset Store

2.3. Game Concept

The Game Concept can be seen in the following figure:

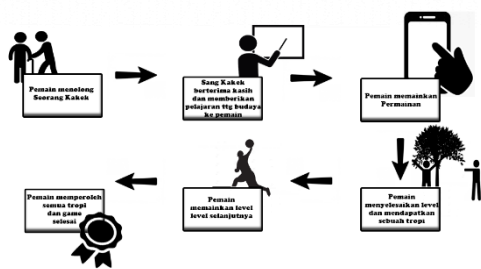


Figure 2 Game Concept

In the game Adventure Budi and Aya, the game will begin with a scene where the player accidentally bumps into a grandfather and trying to get the grandfather to the nearest clinic as a basic tutorial to control the game. Then grandfather will ask the player "are you playing a traditional game?". Players who don't know anything about traditional games asked grandfather to teach them traditional games, then the player will adventure to find friends who can be invited to play traditional games with grandfather's guidance.

2.4. Storyline

Storyline of educational game Budi and Aya's Adventure are as follows:

1. The main character will hit a supporting character and make him injured.
2. The main character brings supporting characters to the clinic, then apologizes to the supporting characters.
3. Supporting characters forgive and ask if they are playing traditional games, the main characters who don't know anything about traditional games then ask to be told.
4. Supporting characters tell about 3 traditional games and want the main characters to play traditional games correctly.
5. The main characters manage to play traditional games and supporting characters give awards.

2.5. Gameplay


Gameplay of educational game Budi and Aya's Adventure are as follows:

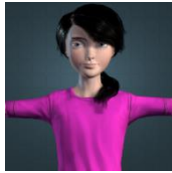
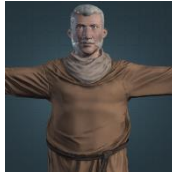


1. Supporting characters will tell a story related to a particular culture.
2. Players will learn about the culture that has been told by supporting characters.
3. Supporting characters explain about the told culture. And provides a challenge to complete the level based on the related culture.
4. If the requirements of success for that level are met, the player will be awarded a trophy.
5. If the success requirements of the level are not met, the player will be considered defeated and must repeat that level.
6. If all trophies have been obtained, supporting characters will reward players with a gratitude.



2.6. Character

Characters of educational game Budi and Aya's Adventure can be seen in the following table:

Table 2. Characters

No	Character	Description
1		Name: Budi Age : 10 years old Physical characteristics: Red hat, purple shirt, green vest. Description: Budi is one of the main characters. Budi is a child who likes to do activities and always wants to know.

No	Character	Description
2		<p>Name: Aya Age : 10 years old Physical characteristics: Long black hair tied, pink shirt. Description: Aya is one of the main characters. Aya is a child who is quick to learn something and always curious.</p>
3		<p>Name: Kakek Abud Age : 65 years old Physical characteristics: gray hair, brown clothes, brown belt. Description: Kakek Abud is a culture-loving grandfather from West Java. He always wants to teach children about the culture he loves.</p>
4		<p>Name: Asep Age: 11 years old Physical characteristics: Short brown hair, blue t-shirt. Description: Asep is one of the side characters that can be found in the first city.</p>
5		<p>Name: Nia Age : 10 years old Physical characteristics: Unraveled black hair, red T-shirt. Description: Nia is one of the side characters that can be found in the second city.</p>

No	Character	Description
6		<p>Name: Toni Age : 10 years old Physical characteristics: Short brown hair, green t-shirt. Description: Toni is one of the side characters that can be found in the third city.</p>
7		<p>Name: Tina Age : 10 years old Physical characteristics: Short brown hair, green t-shirt. Description: Tina is one of the side characters that can be found in the third city.</p>

2.7. Learning Material

Learning material in the educational game Adventure Budi and Aya there are 3 learning materials. Learning material is chosen based on the popularity sequence which refers to the number of respondents who answered the learning material in the questionnaire. Learning materials are sorted from the most popular ones, Ucing Sumput. Then the less popular, Boy-Boyan. And unpopular, Bebentengan. Learning material that will be displayed in the educational game Adventure Budi and Aya can be seen in the following table:

Table 3 Learning Material

Level	Title	Rules	Win Condition
1	<i>Ucing Sumput</i>	<ol style="list-style-type: none"> 1. Budi and Aya do Hompimpa. 2. Budi or Aya becomes ucing (depending on player's choice), while others are hiding 3. Ucing have to find hiding NPCs 4. When finding a hiding NPC, ucing and NPC had to run to the post to win 	Players managed to find all hiding NPCs

Level	Title	Rules	Win Condition
2	Boy-boyan	<ol style="list-style-type: none"> 1. Budi dan Aya others do Hompimpa to separate team. 2. Player choose to move as Budi or Aya. 3. As organizer team, players must arranges the fallen tiles. 4. As throw team, players must knock down the tiles and throw the ball to opposing team. 	<p>Organizer team : Successfully arranged tiles back to its original form</p> <p>Throw team: Successfully knock down the tiles and throw the ball to opposing team</p>
3	Bebentengan	<ol style="list-style-type: none"> 1. Budi dan Aya others do Hompimpa to separate team. 2. Player choose to move as Budi or Aya. 3. As a guard team, players must hold the NPCs in order to not pass the fort. 4. As attacking team, player must successfully break through the fort guarded by NPCs 	<p>Player successfully break through the fort guarded by NPCs</p>

2.8. Hardware Requirement Analysis

Hardware requirement for user can be seen in the following table :

Table 4 Hardware Requirement

Hardware Type	Spesification
Processor	Dual Core 1.8GHz
RAM	1 GB
Storage	1 GB

2.9. Software Requirement Analysis

Software requirement for user can be seen in the following table:

Table 5 Software Requirement

Software Type	Spesification
Operating system	Android 4.1 (Jelly Bean)

2.10. Brainware Analysis

In this study grouped into 2 categories, namely User Knowledge and Experience and User Physical Characteristic.

1. User Knowledge and Experience

User Knowledge and Experience expected from user can be seen in the following table:

Tabel 6 User Knowledge and Experience

User Knowledge And Experience	Knowledge and Experience Expected
Android knowledge	Can operate Android
System Experience	Can install an Application
Software Application Knowledge	Can use common Application on Android
Reading experience	Can read and write
Language knowlege	Bahasa Indonesia

2. User Phycical Characteristic

User Physical Characteristic expected from user can be seen in the following table:

Table 7 User Physical Characteristic

User Characteristic	Characteristic Expected
Age	15-24 years old
Hand Usability	Both hands in good condition
Disabilities	No

2.11. Menu Designing

Menu designing aims to design a system of physics education games built. Next is the menu structure of the design of the educational game Adventure Budi and Aya which can be seen in the following figure:

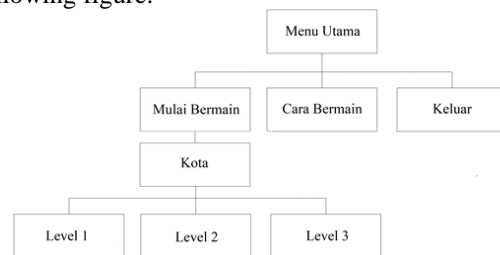


Figure 3 Menu Designing

2.12. System Implementation

System implementation is applying the results of the system analysis and design that have been carried out, one of which is the implementation of the needs of the device. Implementation of device requirements is needed to determine the specifications of the device to be used to run the educational game Budi and Aya's Adventure. Minimum specification of mobile devices that are recommended to run this educational game can be seen in the following table.

Table 8 Implementation of device requirements

No.	Device Specifications	Description
1.	Processor	1.0 ghz Dual Core
2.	RAM	1 GB
3.	Storage	1GB
4.	Android Version	4.1 Jelly Bean

2.13. System Testing

System testing is a stage that aims to determine the existence of errors and shortcomings in the application that has been built, so that it can be known if the system built has met the criteria and is in accordance with the goal or not. Testing is done using Blackbox Testing[9] with following scenario:

Table 9 Testing Scenario

No.	Component To Be Tested	Testing Method
1.	Memulai Bermain	Black Box
2.	Menampilkan Cara Bermain	Black Box
3.	Menggerakkan Karakter	Black Box
4.	Melakukan Interaksi	Black Box
5.	Memulai Misi	Black Box

Some test results can be seen in the following table:

Table 10 Result Test of Menggerakkan Karakter

Component	Test Scenario	Result Expected	Result
Menggerakkan Karakter	Direct the Analog Button Up	Character move to front	Success
	Direct the Analog Button Right	Character move to right	Success
	Direct the Analog Button Down	Character move to back	Success
	Direct the Analog Button Left	Character move to left	Success

Table 11 Result Test of Memulai Misi

Component	Test Scenario	Result Expected	Result
Memulai Misi	Character is near NPC	Show Button Interaksi	Success
	Touch Button Interaksi	Show dialog with NPC	Success
	Touch Button terima misi	Show Level Information	Success

Thus it can be concluded that the system testing has been running as expected.

2.14. User Testing

User Testing is a test conducted objectively, which is tested directly to the user or player of educational game Budi and Aya’s Adventure using questionnaire. This aims to find out how far educational game Budi and Aya’s Adventure can increase the knowledge of the younger generation as explained in the problem identification.

To find out the assessment of the user questionnaires have been distributed which have been responded to by 30 respondents. The questionnaire is in the form of a pre-test and post-test given before and after the user plays the educational game Budi and Aya’s Adventure, then compare the answers to the pre-test and post-test. Then tested using hypothesis testing to find out whether the assumption is that the educational game Budi and Aya’s Adventure managed to increase the knowledge of the younger generation is accepted or rejected.

Hypothesis testing is done by using a sample 2 test t test [10] where the post-test value becomes the first sample (μ_1) and the pre-test value becomes the second sample (μ_2). The hypothesis is determined as follows:

$H_0 : \mu_1 \leq \mu_2$ (The result of the pre-test value is better or equal to the post-test value)

$H_1 : \mu_1 > \mu_2$ (The result of the post-test value is better than the pre-test value)

The steps taken are as follows:

1. Determine Significance Level
 $\alpha = 0,05$
2. Acceptance criteria for Hypothesis testing
Accept H_0 if t count \leq t table
Reject H_0 if t count $>$ t table
3. Calculations are performed using Microsoft Excel using the Data Analysis function, the results of the calculations are as follows:

	Post Test (%)	Pre Test (%)
Mean	96.600	42.900
Variance	107.628	236.576
Observations	30.000	30.000
Pooled Variance	172.102	
Hypothesized Mean Difference	0.000	
df	58.000	
t Stat	15.854	
P(T<=t) one-tail	0.000	
t Critical one-tail	1.672	
P(T<=t) two-tail	0.000	
t Critical two-tail	2.002	

Gambar 4 Result of Hypothesis Testing

4. Determining Decisions

From the results of the statistical analysis of the hypothesis test t-test above, it can be concluded that t Stat or t count (15,854) is greater than t Critical one-tail or t table (1,672), then H_0 is

rejected. The H_1 hypothesis is accepted, namely the post-test value is better than the pre-test value. Based on the results of the hypothesis test decision, it can be concluded that the educational game Budi and Aya's Adventure can increase the knowledge of the younger generation towards traditional West Java games.

3. Closing

3.1. Conclusion

Based on the results of testing of the research conducted in the preparation of the thesis that refers to the research objectives, it can be concluded that educational game Budi and Aya's Adventure can improve the understanding of the young generation in learning traditional games of West Java. Thus, the objectives of this study have been achieved.

3.2. Suggestion

While developing educational game Budi and Aya's Adventure, there are still many shortcomings, therefore it is necessary to do some development to make this application better. In this educational game Budi and Aya's Adventure, the author applies 3 levels where each level introduces and explains a traditional game. But there are still more traditional West Java games. Therefore, in order for this application to be better, the authors suggest increasing the level so that other traditional games can be introduced to the younger generation. As well as adding a function that gives a variation of the level so that when a level is played back, the condition of that level has a difference with the previous one even though the level played is the same.

BIBLIOGRAPHY

- [1] Kamus Besar Bahasa Indonesia. 2016, [Online]. Tersedia: <https://kbbi.kemdikbud.go.id/entri/kebudayaan> [Diakses: 10 September 2018]
- [2] F. A. Arifiati, E. Nena, A. Sofiya dan D. P. Didik, "Aplikasi Game Edukasi Petualangan Nusantara", Jurnal Prosiding Sentia. Vol. 8, pp A-168 – A-172. 2016.
- [3] W. Ekaprana, K. S. Yunita dan K. Etika, "Game Kebudayaan Sebagai Salah Satu Bentuk Pelestarian Kebudayaan dan Media Pembelajaran", in Seminar Nasional Teknologi Informasi & Komunikasi Terapan, Semarang, 2012. pp. 522-525
- [4] A. Muhammad, Filsafat Kebudayaan. Bandung : Pustaka Setia, 2013.
- [5] Januar. Iwan. M dan Turmidzo. F. E, Game Mania. Jakarta : Gema Insani, 2006.
- [6] O. Morgenstern, J. V. Neumann, Theory of Games and Economic Behavior. 1953.
- [7] A. Irawan, M. F. Rifan, "The Herbalist Game Edukasi Pengobatan Herbal Berbasis Android", Jurnal Sistem Informasi Bisnis. Vol. 8 No. 2, pp 27-34. 2018.
- [8] R. Ramdan, W. Yani, "Game Development Life Cycle Guidelines", Jurnal ICACISIS. Vol. 13, pp 95-100. 2013.
- [9] Hariyanto Bambang. 2004. Rekayasa Sistem Berorientasi Objek. Bandung :Informatika.
- [10] M.A. Sudjana, Metoda Statistika. Bandung : Tarsito, 2001.