

## The Development of an Android-Based Educational Game “Orang Kayo Hitam” Jambi Folklore to Improve Student Motivation at Al-Falah Kindergarten Jambi

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### Abstract

Fairy tales based on folklore are the right media to raise awareness of moral values. However, practically, it is often found that students are not interested in this kind of learning activity. The lack of interest in participating the learning activities can be caused by the learning media used by the teacher that is not attractive enough. This study developed and tested the feasibility and the effectiveness of an Android-based Orang Kayo Hitam Jambi folklore educational game. This study used the research and development method with the 4D model consisting of defining, designing, developing, and disseminating. The result of this study shows that the product feasibility assessment score through product validation from media experts was 3.8 (very feasible) and from material experts was 3.85 (very feasible). The effectiveness of this android-based Orang Kayo Hitam Jambi folklore educational game was tested through the hypothesis. The type of experimental research method used is One-Group Pretest-Posttest Design in which the experiment is carried out in one group without a comparison group. The sample of this study were 30 students at Al-Falah Kindergarten. The result of the sig.(2-tailed) effectiveness test shows that the android-based Orang Kayo Hitam Jambi folklore educational game increases students' motivation in the learning process.

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## INTRODUCTION

The development of information and communication technology (ICT) and science and technology affects all aspects of human life. One of them is in the field of early childhood education or known in Bahasa Indonesia as PAUD. Early childhood education (PAUD) teachers are always required to create innovations for the learning activities. In general, children tend to be more interested in playing than learning because early childhood learning is naturally done through fun activities, hence playing becomes an approach in early childhood education and children will gain some skills through games (Akman & Guchan, 2015).

Nowadays some PAUD teachers still use conventional learning media, such as storytelling activities using hand puppet media. Storytelling has many benefits for children's education, one of which is as an effort to help personal development and early childhood potential in instilling character values in children. Fairy tales that are based on folklore are the right media to raise awareness of moral values. Indonesia has an abundance of folk traditions. Folklore that develops is basically full of educational things and full of moral messages, such as individual moral values, social moral values, and religious values (Karabayir, 2015). These moral messages can be used to sharpen the nation's character (Rini & Mahanani, 2019). Children can take lessons and moral messages that are virtuous without feeling being taught because a story is more memorable than advice that is directly conveyed (Silalahi et al., 2021). But in fact, it is often found that students are not interested in the learning material (Dunn & Finley, 2010). The lack of interest in participating the learning activities can be caused by the unattractive learning media used by the teacher (Walters et al., 2018; Utomo et al., 2021). For this reason, the use of technology is needed in learning media, children will be more interested in learning with audio and visual effects (Sudarsana, 2019). According to Luo et al. (2021), children are ready to respond to what is

given by their environment compared to using books and blackboards.

In Indonesia, digital games have not become the basis of education yet. This is due to the lack of educational game producers and is also supported by the common belief that playing games is such a waste of time. This common mindset is not always true because there have been many studies these days that describe the benefits of digital games as learning tools to increase interest in learning for students (Wicadee & Pattanapichet, 2018; Dehghanzadeh et al., 2021). With the support of cellular and computer technology, nowadays digital games have become a part of the learning media because digital games no longer only provide entertainment but also activities related to learning content, thus now digital games are transformed into educational games. According to Edwards (2013) digital educational games for children can provide interactive learning experiences and expand their imagination. If the media used is attractive, distortion is less likely to occur during the learning process. In learning, the use of digital educational games is not only to improve certain skills, but also the fact that there are several other skills such as verbal-linguistic, logical-mathematical, and visual-spatial in an educational game (Aleksic & Ivanovic, 2017).

There are several studies have been conducted regarding the development of digital educational games for early childhood learning in various learning contexts including Miller's research (2018) on developing digital educational games in the context of learning mathematics that aims to improve early childhood numeracy skills. In addition, Ardani et al. (2020) developed an Android-based educational game introducing Balinese folklore. This study aims at increasing the interest of children and the public to recognize and read Balinese folklore which is a cultural heritage that must be preserved, as well as instill the noble values from the folklore. Widhiyanti & Gunanto (2020) conducted an analysis of literacy studies on the delivery of folklore using digital media. The result of the analysis showed that the

delivery of folklore using digital media was more effectively accepted by children. This is also in line with the research of Naufal & Kusuma (2016) that interactive digital storybooks can increase children's interest in reading Indonesian folklore.

Folklore is a cultural heritage that every nation has. Folklore presents the values of life that are inherent in people's lives. However, as time goes by, folklore is starting to be forgotten due to the easy access to stories from abroad which is the impact of digital media. One of the legendary Jambi folklores is the story of Orang Kayo Hitam. Orang Kayo Hitam is a courageous figure who cares deeply about his homeland. He was the one who fought for the freedom of the Jambi Malay kingdom from the Mataram Kingdom. There are many values contained in the story of Orang Kayo Hitam including fighting against injustice, being wise and firm as a leader in decision making, and not being greedy.

Based on the background and problems that have been stated above, it is necessary to develop an android-based educational game of Orang Kayo Hitam Jambi folklore to increase students' motivation in getting to know folklore. This research focuses on the development, the testing of the appropriateness as well as the effectiveness of the android-based educational game. This game can be downloaded free on Google Playstore, therefore it can be used to introduce the Orang Kayo Hitam folklore to children. This game not only presents interactive digital stories but also features memory match games and puzzle games to improve children's logical and visual-spatial intelligence.

## METHODS

In this study, the researchers used the research and development method. Development research is a type of research that aims to design, develop and evaluate a matter which will produce a product, tool, or model with a better quality (Richey & Klein, 2014). It is also said that development research is a process used to develop and validate products used in

learning. The product from this research is an Android-based Orang Kayo Hitam Jambi folklore educational game.

This study used the model developed by Thiagarajan et al. (1974) known as the 4-D model (Four D). It consists of 4 main stages, namely: Defining, Designing, Developing, and Disseminating. The Defining stage is the stage where the problem is defined by carrying out a series of analytical activities which include student analysis and material analysis. The result of this activity is the collection of useful information for the development of educational game products. The second stage is Designing, this stage aims to design an android-based Orang Kayo Hitam Jambi folklore educational game. In this stage, the researcher made a storyboard that was used as a tool in the multimedia designing stage. A storyboard is a sketch of images that are arranged sequentially according to the script. The third stage is Developing in which the product is created. The game engine used is the Godot engine that uses GDScript as its programming. After this game has been created, the media and material validation are carried out by experts. This validation aims to assess whether the game that has been built is feasible to be used by students. In this stage, the effectiveness test is also carried out for the educational game. Effectiveness can be considered as the impact or outcome arising from action, in this case, the impact is the use of Android-based educational games on learning motivation. After validation is done by the experts, the effectiveness test, and the application itself have run as expected, then the next stage is Disseminating. In this stage, dissemination of the educational game that has been developed is done. The condition for dissemination is the educational game that has been developed has to be valid and effective measured by the validator and the trials that have been carried out.

For the feasibility test in this study, there are two questionnaire instruments used which are media experts and material experts. This media expert instrument aims to determine the feasibility of educational games in terms of the

educational game interface, while the material expert instrument aims to determine the feasibility of the content of the material in terms of learning objectives. Each expert provides scores, scores from the questionnaire, comments, and suggestions for improvement.

For the effectiveness test of the game, the source of data comes from primary data obtained directly from students. The research subjects are Al-Falah Kindergarten students in Jambi City, 30 people in total. The sampling technique used is random sampling. The type of experiment used is One-Group Pretest-Posttest Design which is an experiment carried out in only one group without a comparison group. In this design, there is no control variable, a pretest is then given before the treatment. Thus, the results of the treatment can be obtained more accurately since they can be compared to the situation before being treated and after being given the treatment. The data collection technique used is observation. The instrument observation sheet contains indicators of learning motivation for the children. The rating scale uses a Likert scale that very good is given a score of 4, good given a score of 3, less given a score of 2, and very less given a score of 1. The data analysis technique in this study uses a parametric statistical test which is the Paired Sample T-test since it comes from two different variables that are related to one another. First, the analysis of the prerequisite test is carried out, namely the normality test. In this study, it can be seen how influential is the educational game to the children's learning motivation in Al-Falah Kindergarten, Jambi City. The formula of effect size is used to determine how big is the effect. Effect size is a measurement of the magnitude of the effect of a variable on other variables, the magnitude of the difference, and the relationship which is free from the effect of sample size.

## RESULTS AND DISCUSSION

The method of educational game development uses a 4D model consisting of defining stage, designing, developing, and disseminating. The product developed is an

Android-based Orang Kayo Hitam Jambi folklore educational game application as a learning medium for kindergarten students. The purpose of this research is to produce a proper and effective educational game.

### Defining

The initial step in creating this product is analyzing. In this phase, a need analysis in the field is carried out by conducting preliminary observations and interviews on things used by schools to improve the quality of teaching in the classroom. By conducting observations and interviews, it was found that there are gaps occurred in Al-Falah Kindergarten that are related to the product that would be developed. The lack of useful learning media made the school still uses conventional learning models. In the student analysis activities, the researcher observed student learning activities in class. When the teacher read a story, it was difficult for the children to focus and pay attention to the teacher. One characteristic of children at an early age is that they have difficulties in understanding abstract matters (Inhelder & Piaget, 2013). Children need help from objects or symbols that are drawn concretely to help them understand a concept (Patria & Mutmainah, 2018). To attract children's interest in this storytelling activity, pictures were used to illustrate the story. The pictures were drawn according to the child's imagination and matched the story.

The material analysis included determining the material adapted to the applied curriculum in the school and developing it with references related to the material so that it would be able to achieve the learning objectives. Based on the observation result, interviews, and document studies conducted, information was obtained that the Al-Falah Islamic Kindergarten in Jambi City uses the 2013 curriculum. In the sub-theme of culture, children will be introduced to Jambi's regional culture which includes traditional houses, Jambi batik, traditional weapons, traditional transportation, folklore, and local music. An introduction to the

traditional culture could be packaged in an educational game for the Orang Kayo Hitam Jambi folklore. Material analysis was done by identifying the folklore material and the type of game shown. This game contains the content of the Orang Kayo Hitam Jambi folklore, which is equipped with background sound, image illustrations, the voice of the narrator reading the story, and there is also a moral message at the end of the story. This game is also equipped with games that can hone children's logical and visual-spatial intelligence, namely counting pictures, puzzles, and memory matches.

Based on this analysis, the android-based Jambi folklore educational game is appropriate for the characteristics of children in which playing is an approach in early childhood education, children will gain some skills through games. From the result of interviews with teachers, it is also known that children are already familiar with using Android smartphone devices to play games.

**Designing**

Based on the result of the analysis from the previous phase, an Android-based Jambi

folklore educational game would be built with 2D images and the target demographic of the *game* would be focused on children and the public who want to know about the Orang Kayo Hitam Jambi folklore. Players are given the content of the Orang Kayo Hitam Jambi folklore with the illustrations, background sounds, and a narrator who can read automatically for the children. There is a moral value given at the end of the story. The game menu has three options of games such as puzzle games, memory matches, and image counting games. In the content of the Jambi folklore, Orang Kayo Hitam uses illustrations of local wisdom of Jambi cultures, such as traditional houses, Kajang lako boats, Siginjai kris, Jambi batik, and Jambi Malay musical instruments. In order to make it easier in creating the application, researchers made storyboards that could be used as references or descriptions of the Orang Kayo Hitam Jambi folklore educational game application. The following is a storyboard that describes the plot of the Orang Kayo Hitam Jambi folklore educational game application.





	<p>The main menu page display contains the Folklore and Games menus.</p> <p> : Games</p> <p> : Folklore</p>
	<p>Page 1 view of the Jambi Orang Kayo Hitam folklore. On this page there are buttons next, previous, home, containing folklore content equipped with background sound, voice of the narrator, and also story text.</p>

Figure 1. Storyboard

## Development

The development stage is the stage of realizing the design that had been planned in the previous stage into an educational game product. The development stage began with the creation of the initial product by entering the designed assets into the Godot Engine according to the initial design. Then, coding was done to provide logic for the buttons and assets that had been entered. The development of this application used Godot Engine as a game engine, GDScript programming language, Adobe Photoshop CS3 for creating 2-dimensional images, and Audacity for sound editing. The minimum specifications for smartphones that can be used for Jambi folklore educational game applications are memory (RAM) of 1 GB, Android Nougat operating system, or newer. This game is a single-player game.

After the educational game was built, the next step is to check the feasibility of the Orang Kayo Hitam Jambi folklore educational game as a learning medium. This assessment was carried out by media experts and materials experts. The validator provided an assessment and gave responses which were then revised. The validator provided an assessment and gave responses which were then revised. Suggestions from media expert validators are extending the duration of the memory match game because the time given for the user to remember the position of the image was too fast, only 3 seconds, it should be extended because the user's target is children that surely will find difficulty in memorizing quickly. After the media was revised, the validator gave a final assessment using the media feasibility assessment instrument. Figure 1 is the display of the educational game after being revised.



Figure 1. The educational game display after being revised



**Table 1.** Assessment of media experts

Assessment Aspects	Assessment Validator
Color	3.8
Typography	3.7
Illustration	3.9
Layout	3.8
Display of the User Guide	3.8
Total	18.8
Average	3.80
Category	Very Feasible

Based on Table 1, the average score of all aspects of the assessment by media experts is 3.80 which falls into the very feasible category. The highest score is in the illustration aspect, while the lowest score is in the typography aspect, which is 3.7.

**Table 2.** Assessment of material experts

Assessment Aspects	Assessment Validator
Content	3.8
Language	3.9
Total	7.7
Average	3.85
Category	Very Feasible

Based on the result of the material expert assessment, it is concluded that the product of the android based educational game is very

**Table 3.** Descriptive Statistics

	N	mean	Std. Deviation	Maximum	Minimum
Pretest	30	17.23	3.16972	24	10
Posttest	30	22.4	2.5	26	16

Before conducting the hypothesis test, the analysis requirements test was carried out in the form of a normality test. The normality test was done using one sample of the Kolmogorov-Smirnov test. A normality test is a test carried out to test whether the data is normally distributed. This is the criteria of decision making: if the score of Sig. is < 0.05, it means that the data is not normal, if the score of Sig. is > 0.05, it means that the data is normal. The results of the normality test are: the normality score of the pre-test data is 0.2299. The normality score is higher than the significance score (0.2299 > 0.05) thus it can be said that it is

feasible to be tested with revisions as suggested. The average score of all aspects obtained was a perfect score of 3.85 which qualitatively falls into the Very Feasible category ( $x \geq 3.1$ ).

After the Jambi folklore educational game was deemed appropriate to be used as a learning medium, the next step was to test its effectiveness. The operational trial aimed to see the effect of using the educational game in increasing the motivation of kindergarten students in learning. In this study, there was an increase in students' learning motivation in folklore activities that could be seen from the observation. The observation was conducted to see the behavior of students before and after using the educational game. The result of the study consists of a description of the empirical data regarding the data studied, namely pretest and posttest data. The result of the research data is the result of the observation that is contained in the observation sheet on students at Al-Falah Kindergarten with the amount of 30 people. Pre-test data was obtained before using the educational game while post-test data was obtained after using the educational game. The results of the pre-test and post-test are in the form of the average value, standard deviation, maximum, and minimum data which are shown in the following table.

normally distributed. Furthermore, the normality score of the post-test data was obtained at 0.3614, the normality score is higher than the significance score (0.3614 > 0.05) thus the data was normally distributed.

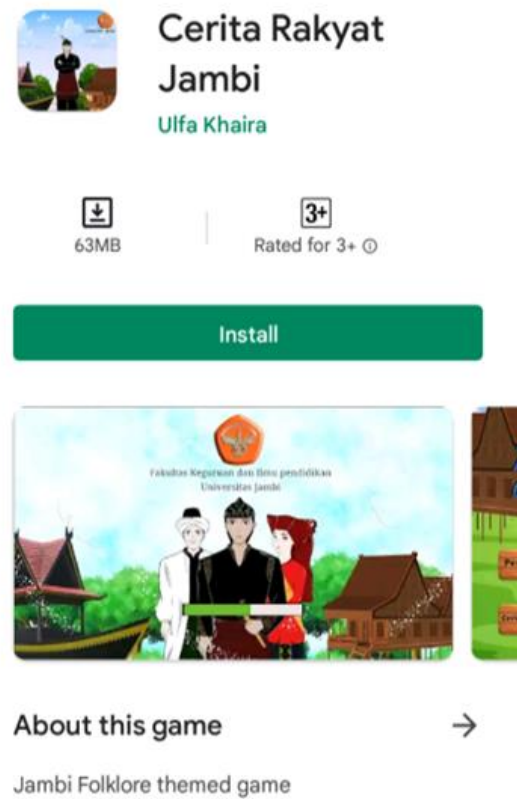
Furthermore, the hypothesis test was carried out with the t-test. The hypothesis test used in this research is a paired-sample t-test. The level of significance is = 0.05. The hypothesis test of the paired-sample t-test is:  $H_0$  is rejected if the score of (Sig.) is < 0.05 or  $H_0$  is accepted if the score of (Sig.) is > 0.05. It obtained a significance score of 0.000 where the score of sig. 0.000 < 0.05, then  $H_0$  is rejected and

H<sub>1</sub> is accepted. It can be concluded that there is an effect of using an educational game in learning towards the students' motivation. The effect size calculation was used to find out the effect of using android-based Jambi folklore educational game towards the motivation of Al-Falah Kindergarten students. Based on the result of the effect size test, it was found that Cohen's d Effect size was 2.15. Then it can be concluded that the effect of using Android-based Jambi folklore educational game on the learning motivation of Al-Falah Kindergarten students is very strong. This can be seen from the interpretation of Cohen's value, which is 2.15 > 1.00, thus, it falls under the strong effect criteria.

After carrying out the defining stage, designing and development, the last stage the researcher did was the disseminating stage. The distribution of the educational game that has been developed was conducted in this phase. The condition for dissemination is the educational game that has been developed has to be proven valid and effective by the validator and the trials. The disseminating stage was carried out by uploading the Jambi folklore educational game application to the Google Play Store. To be available on the Play Store, approval from Google has to be obtained first. If the application is accepted, it will automatically be available on the Google Play Store. The Orang Kayo Hitam Jambi folklore educational game application received a rating of 3+ from the Google Play console the IARC (International Age Rating Coalition) standard rating. Therefore, The Orang Kayo Hitam Jambi folklore educational game is considered suitable for all ages to be run and play. Users can search up the application on the google play store with the keyword of Jambi Folklore, the following is the display of the application on the google play store.

In general, this android-based Jambi folklore educational game is such an attractive visual media. This application not only presents folklore content equipped with audio visuals but also presents several games that can hone children's logical and visual-spatial intelligence such as puzzle game, memory match, and

picture counting game. The content of the Orang Kayo Hitam Jambi folklore contains illustrations of local wisdom of Jambi's culture, such as traditional houses, Kajang lako boats, signjai kris, Jambi batik, and Jambi Malay musical instruments. So that it can attract children's interest and attention to recognizing the cultural history of Jambi.



**Figure 2.** Jambi Folklore Application on google play store

In general, this android-based Jambi folklore educational game is such an attractive visual media. This application not only presents folklore content equipped with audio visuals but also presents several games that can hone children's logical and visual-spatial intelligence such as puzzle game, memory match, and picture counting game. The content of the Orang Kayo Hitam Jambi folklore contains illustrations of local wisdom of Jambi's culture, such as traditional houses, Kajang lako boats, signjai kris, Jambi batik, and Jambi Malay musical instruments. So that it can attract children's interest and attention to recognizing the cultural history of Jambi.



Students are less interested in conventional media, hence other alternatives are necessary to increase their motivation, one of which is using technology (Puspitarini & Hanif, 2019). Several studies related to increasing student motivation through learning media have been carried out. Trisyagil et al. (2020) conducted research on the effectiveness of ICT media in increasing student motivation and learning outcomes. It was found that there were differences in the learning motivation of students who were taught using ICT media with students who were taught using conventional learning.

The right integrated technology has to be used in children's learning process. An android-based educational game media is such a new experience for children. Teachers usually use story books or hand puppets to support the learning process. The result of this study indicates that the android-based Jambi folklore educational game media can increase children's motivation in learning. This is in line with the finding of Liu et al. (2014) that shows the use of technology in children in the preschool environment has a positive contribution to their learning and development, which is confirmed in various fields and subjects. There are many software applications that are suitable for preschoolers that are educational, interactive, and able to support the collaboration between teachers, children, and parents. A study conducted by Masoumi (2015) shows that preschool ICT lessons have been adapted in different ways which are used as objects to enrich existing practices, as cultural mediators, as a way to entertain children; and as a means of communication and documentation.

## CONCLUSION

The android-based Jambi folklore educational game is an attractive visual media. This application does not only present the folklore content equipped with audio visuals but also presents several games that can hone children's logical and visual-spatial intelligence such as puzzle game, memory match, and picture counting game. Based on the assessment

of material experts and media experts, the Jambi folklore educational game was proven to be feasible and it contains very good criteria. Based on the result of data analysis, it is found that the Jambi folklore educational game has an influence on the learning motivation of Al-Falah Kindergarten students. In addition, based on the effect size analysis, this educational game has a strong influence on the children learning motivation.

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