

Educational Media "Dende Mission" Traditional Android-Based Game to Improve Toothbrushing Behavior in Elementary School Students

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Abstract: The most commonly experienced dental health problems in elementary school students are related to caries and periodontal disease. This is due to the condition of dental and oral hygiene which is classified as poor which is influenced by dental and oral maintenance behavior that is still lacking. Children are basically easily saturated or bored, so the strategy to overcome this problem is that media that matches the child's character is needed, namely with "Dende Mission educational media based on Android" providing children's education with the game method can increase children's interest because it is considered interesting and fun. The purpose to produce alternative behavior change through the Dende Mission models of traditional Android-based games that are effective for improving the brushing behavior of elementary school students. The research method use Android-based games that are effective for improving the brushing behavior of elementary school students.

➤ Results:

The feasibility test of the Dende Mission model of a traditional Android-based game obtained an average score of 95% (very feasible). In the delta change test (Δ) of the knowledge of the intervention group 2,68 & control group 1,64 ($p=0,020$), the attitude of the intervention group 7,64 & the control group 3,68 ($p=0,008$), the intervention group action 2,92 & the control group 1,64 ($p=0,046$), and the debris score of the intervention group index 0,61 & control group 0,35 ($p=0,035$) which means that education using Dende Mission android-based traditional games is more effective than counseling with demonstration methods in improving behavior brushing the teeth of an elementary school child.

Keywords: Dende Mission, Android, Brushing Behavior, Elementary School Student.

I. INTRODUCTION

Dental and oral health is part of overall general health, which means that if a person is faced with pain in the teeth it will cause an influence on general health as well. Common dental and oral health problems include cavities in the teeth

and periodontal-related diseases.^{1,2} Although they do not cause death, dental and oral health problems can reduce the level of work productivity to have an effect on quality of life.³ One of the factors that contribute to the formation of tartar, caries or dental disease is debris food waste that can be physiologically cleaned with saliva and movement by the oral cavity. But it can also be taken by other ways, namely brushing teeth or using flossing.

Efforts to improve behavior related to maintaining oral hygiene can begin with behavioral health promotion approaches that require educational programs, or also preventive.^{4,5} Dental and oral health education is an activity that can influence the dental and oral health behavior of the person himself. Elementary age is children aged 7-12 years which is a time when children can gain a foundation of knowledge to acquire skills and successful adjustment. At this age, children are in a period of growth and development, so it is easier to be guided and planted good habits.⁶

Media is part of the factors that can affect the course of health education, because it is a tool that can facilitate the delivery of material, which is well packaged, attractive and includes many senses that make it easier for participants to remember the material that has been delivered.⁴ The game method is one of the stimuli that can be applied to improve children's health knowledge, because the learning process with this technique is considered fun for children.⁷ Traditional games, which are increasingly disappearing, actually retain some of the originality, artistry and great benefit.⁸ One of the traditional games that has ever been popular is the ak-dende-dende game originating from South Sulawesi. In the Bugis-Makassar language, akdende-dende is a game that can be played by jumping around. One of the expected benefits of play activities for children, is to develop children's ability to learn where teachers can use traditional games as innovative mathematics learning media and can be used to improve students' thought processes, because students tend to like games.^{9,10}

In the world of children's education, the use of games as a medium in IT-based health has been widely used, for example, monopoly games as Android-based dental health education media.⁴ Local culture has been widely applied and developed for innovation in the learning process, namely by

involving local culture in the application of learning methods,¹¹ In this case, there is a need for development related to traditional games that can provide knowledge when doing game, handling this then with the use of technology, which is packaged in the form of an Android-based game application as an innovation in dental and oral health education that can be used independently by users in circumstances that require limiting socialization which is expected to shape toothbrushing behavior where it is expected to decrease the debris index in children or users.⁴

II. METHODS

The research method used is Research and Development (R&D) which is used to produce educational media Dende Mission, a traditional Android-based game as a promotive and preventive media in the field of dental health and testing the effectiveness of teeth brushing behavior of elementary school children. The research and development procedure includes 5 steps, namely: 1) information collection, 2) model design, 3) expert validation and revision, 4) model testing, and 5) model results.

The design of this study was a true-experiment (pretest and posttest with control group design). Respondents consisted of 50 elementary school children aged 8-9 years. The minimum sample size is calculated based on the sample size by Sumantri, with $\alpha = 0.05$ and $\beta = 0.10$. The minimum sample size required is 49.33 rounded to 50. The

➤ *Expert Validation:*

Table 1 Expert Validation

Expert Validation				
No	Name	Skor	Average	p-value
1	HL	93,75 %	95%	0,00
2	ISE	96,25 %		
3	AS	95 %		

Intraclass Correlation Coefficient

The results of expert validation have a feasibility score of 95% with a very decent category with a value of p-value = 0.00, which means that Dende Mission's educational media, a traditional Android-based game, is worthy as a medium for improving toothbrushing behavior in elementary school students.

➤ *Model Test:*

Table 2 Respondent Characteristic Data

No	characteristics	Variable				p-value
		Intervention		Control		
		n	%	n	%	
1	Gender					1,00
	Male	11	44	11	44	
	Female	14	56	14	56	
2	Learning Achievement					0,07
	< 80	9	36	6	24	
	> 80	16	64	19	76	

Table 2 shows that there were 50 elementary school children in this study with male gender, namely 11 (44%) and 14 (56%) in the intervention group and the control group. The level of achievement in the intervention group, children who had an average score of <80 was 36% and >80 showed 66%, while in the control group it was 24% with a score of <80 and 76% who had an

samples were divided into two groups, namely 25 intervention groups and 25 control groups. Children in this study involved SDN 02 Pedalangan and SDN 03 Pedalangan in Semarang city.

Instruments to measure knowledge, attitudes, actions using questionnaires and index debris scores using observation sheets. The research data used an interval scale, an interclass correlation coefficient statistical test to test the feasibility of the model, while the normality test used the Shapiro Wilk test because the number of respondents was not more than 50. Test effectiveness on normal data using Paired Sample Test and Independent Sample Test.

III. RESULT

➤ *Information Collection:*

The collection of information was carried out through the interview method which concluded that forming the ability of skills in improving behavior in brushing the teeth of elementary school students, efforts are needed to provide correct and appropriate education according to the child's character.

➤ *Design and Build:*

The design of Design of dental and oral health education model based on Android through the development of the ADDIE method system (Analysis, Design, Development, Implementatin, and Evaluations.

average score > 80. Table 2 shows that there is no significant difference between the two groups in the characteristic data ($p > 0.05$).

Table 3 Test of Effectiveness of Traditional Android-Based Dende Mission Games against Intervention Group and Control Group Knowledge

Kelompok	Uji data berpasangan			
		N	Mean±SD	p-value
Intervensi	Pre	25	4,84±1,90	0,00
	Post	25	7,52±1,63	
Kontrol	Pre	25	4,60±1,75	0,00
	Post	25	6,24±1,71	
Uji data tidak berpasangan nilai perubahan (Δ)				
Mean±SD				
Pre-Post Test				
Intervensi	2,68±1,62			0,02
Kontrol	1,64±1,41			
*Paired Sample Test			**Independent Sample Test	

Based on the table above, it is explained that the results of the pairwise data effectiveness test have the p-value of the intervention group is 0.00 ($p < 0.05$) which means that the traditional Android-based game dende mission is effective in increasing the knowledge of elementary school students, then in the control group get a p-value of 0.00 ($p < 0.05$) which means it can also increase children's knowledge.

Based on unpaired data tests, the delta (Δ) pre-post test showed a significant difference, seen from the p-value was 0.02 ($p < 0.05$), meaning that there was a difference in increasing knowledge related to dental and oral health in the intervention group and the control group. The delta (Δ) value in the intervention group was 2.68 while in the kontrol group it was 1.64.

Table 4 Dende Mission, A Traditional Android-Based Game towards Intervention and Control Group Attitudes

Kelompok	Uji data berpasangan			
		N	Mean±SD	p-value
Intervensi	Pre	25	31,44±5,67	0,00
	Post	25	39,08±6,33	
Kontrol	Pre	25	31,48±5,94	0,00
	Post	25	35,16±6,55	
Uji data tidak berpasangan nilai perubahan (Δ)				
Mean±SD				
Pre-Post Test				
Intervensi	7,64±6,08			0,01
Kontrol	3,68±3,84			
*Paired Sample Test			**Independent Sample Test	

Based on table 4 explains that the results of the paired data effectiveness test have the p-value of the intervention group is 0.00 ($p < 0.05$) which means Dende Mission traditional Android-based game is effective in improving the attitude of elementary school students, then in the control group get a p-value of 0.00 ($p < 0.05$) which means it can also improve children's attitude.

The results of the unpaired data effectiveness test of the delta change value (Δ) showed the p-value was at 0.01 ($p < 0.05$), meaning that the Dende Mission model Traditional Android-based games based on Android were more effective at improving toothbrushing attitudes in elementary school students than the control group. This is evidenced by the average value of change (Δ) of the intervention group is better than the control group, namely in the intervention group it gets a value of 7.88 while in the controversy group it gets a value of 3.84.

Table 5 Test the Effectiveness of Traditional Android-Based Game Dende Mission against Intervention Group and Control Group Actions

Kelompok	Uji data berpasangan			
		N	Mean±SD	p-value
Intervensi	Pre	25	4,84±1,90	0,00
	Post	25	7,76±1,69	
Kontrol	Pre	25	4,60±1,75	0,00
	Post	25	6,24±1,66	
Uji data tidak berpasangan nilai perubahan (Δ)				

Mean±SD Pre-Post Test		0,04
Intervensi	2,92±2,25	
Kontrol	1,64±2,15	

*Paired Sample Test

**Independent Sample Test

Based on the table above, it is explained that the results of the pairwise data effectiveness test have the p-value of the intervention group is 0.00 ($p < 0.05$) which means Dende Mission traditional Android-based game is effective in improving the actions of elementary school students, then in the control group get a p-value of 0.00 ($p < 0.05$) which means it can also improve children's actions.

The results of the unpaired data effectiveness test had a p-value between the intervention group and the control group was 0.03 ($p < 0.05$) which means that Dende Mission, a traditional Android-based game used by the intervention and counseling group with demonstrations in the control group, was declared effective in improving actions in children, then in the unpaired data effectiveness test, the delta change value (Δ) showed the p-value was at 0.04 ($p < 0.05$) means that there is a significant difference related to the increase in tooth brushing in the intervention group and the control group so that it can be said that Dende Mission is effective in increasing the action in children which can be seen from delta (Δ) in the intervention group is 2.92 while in the kontrol group it is 1.64

Table 6 Test of the Effectiveness of Traditional Android-Based Game Dende Mission against the Debris Index Scores of the Intervention Group and Control Group

Kelompok	Uji data berpasangan			p-value
		n	Mean±SD	
Intervensi	Pre	25	1,18±0,60	0,00
	Post	25	0,57±0,31	
Kontrol	Pre	25	1,21±0,48	0,00
	Post	25	0,864±0,34	
Uji data tidak berpasangan nilai perubahan (Δ)				
Mean±SD Pre-Post Test				
Intervensi	0,61±0,41			0,03
Kontrol	0,35±0,44			

*Paired Sample Test

**Independent Sample Test

Based on the table, it is explained that the results of the pairwise data effectiveness test have the p-value of the intervention group is 0.00 ($p < 0.05$) which means that Dende Mission traditional Android-based game is effective in reducing the debris index score of elementary school students, then in the control group get a p-value of 0.00 ($p < 0.05$) which means it can also reduce the index debris score in elementary school students.

Dende Mission, a traditional Android-based game used by the intervention group, was declared effective in reducing the index debris score in children compared to the control group using counseling, as evidenced by the results of the unpaired data effectiveness test, the delta change value (Δ) showed the p-value was at 0.03 ($p < 0.05$), meaning that there was a significant difference related to the decrease in index debris scores in the intervention group and the control group, as for the average value delta (Δ) change in the intervention group was 0.61 while in the kontrol group it was 0.35.

➤ **Product Results:**

The Dende Mission game itself is a replication of a traditional game from South Sulawesi which was changed in the form of an Android game application that has several features in improving toothbrushing behavior, among others, carrying out the first mission in the form of a toothbrushing command given a certain period of time to give users time to brush their teeth which will later get clues in the form of dental and oral health information that can be used on missions Next, which will then proceed to the main mission, namely the Dende game where the user will be directed to throw pieces on the flat board / build contained in the application, followed by jumping the user's avatar or character (persona) on a flat wake where the pieces stop which will then get questions related to dental and oral health where the answers to these questions are obtained from the missions that have been passed.

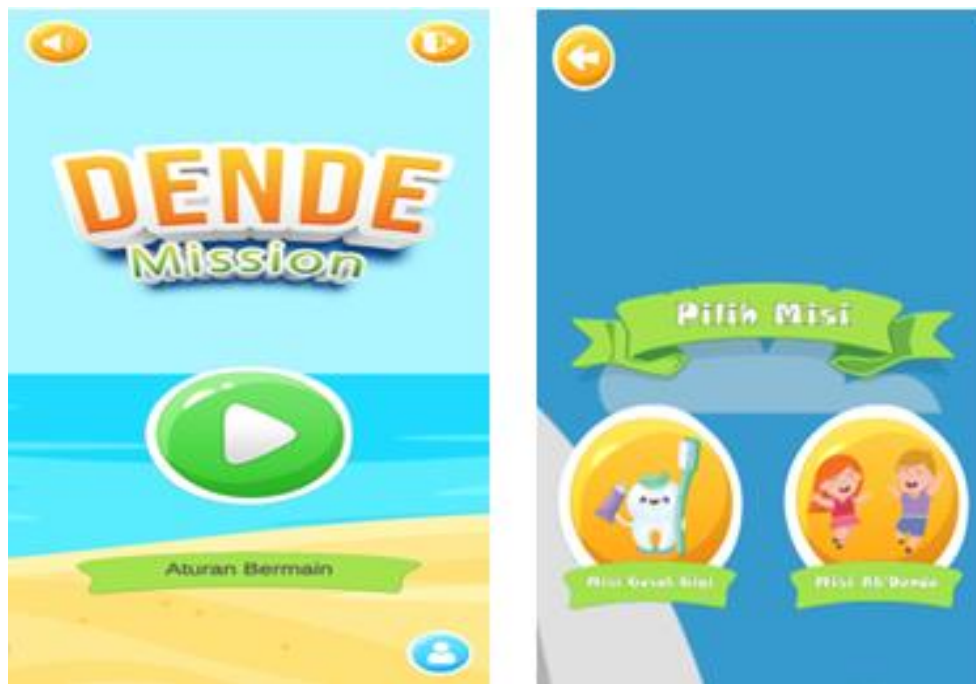


Fig 1 Homepage

IV. DISCUSSION

Forming the ability of skills in brushing the teeth of elementary school students, it takes efforts to provide correct and appropriate education according to the child's character. Children at elementary school age are very vulnerable to health problems as for problems that are often faced related to personal and environmental hygiene such as brushing teeth properly and correctly, besides that they are also sensitive to change. Based on the character of children who are easily bored with monotonous learning methods, this can be helped by learning media that attract children's attention and interest so as to increase children's independence in line with the knowledge received.¹² Educational media that use games or known as educational games which have the aim of provoking children's interest in learning, the advantages of this method can eliminate boredom and motivate students in learning so that it makes it easier for students to understand and remember the learning material presented.^{13,14}

Knowledge is the result of knowing and it happens after people have sensed a particular object. Knowledge is the impression made in the human mind using the five senses, or perhaps all that is known is formed from repeated experience.¹⁵ In line with research conducted in 2019 on the use of traditional games as a concrete and innovative learning medium and can improve students' thought processes,¹¹ then there is also research in 2019 by raising Android games that show an increase in knowledge related to dental and oral health using Android in students,^{16,4} while in a 2013 study, which states through dental educational games can have an influence in increasing knowledge of dental and oral health so that it can be one of the methods to be applied to elementary school students.¹⁷

This attitude cannot be separated from the process of knowledge that increases from ignorance to know,¹⁸ changes in respondents' attitudes after treatment are influenced by the methods used, Dende Mission is effective because the educational game method used is fun for respondents so as to facilitate the process of receiving information.⁶ Based on research conducted in 2021, revealed that attitudes in respondents who use Android media have increased towards the better,¹⁹ In line with research conducted in 2012 which revealed that the majority of respondents who were given treatment with the game method experienced an increase in attitude and Most respondents had a positive attitude after being given health education with the game method, this applies because respondents have captured the positive things they get from the treatment given after their knowledge increases emotionally, they react with The stimulus is present so as to form a positive attitude.⁷

An attitude does not always have to be embodied in an action, it must have supporting factors or supporting conditions, such as facilities. Horsland argues that the process of behavior change is essentially the same as the process of learning. The increase in actions in children who received treatment for Dende Mission educational media is in line with a 2012 study, stating that health education brushing teeth with game methods can increase the value of the application of brushing teeth in treatment group respondents, after people know the stimulus or object, then hold an assessment or opinion on what they know, the next process is expected that he will be able to do or practice what he knew then was that the measures already adopted were preserved.⁷

Debris or plaque on the surface of the teeth can be used as an indicator of oral dental hygiene. A way to improve dental and oral health by measuring oral and dental hygiene.²⁰ The success of the traditional Android-based

game Dende Mission model in an effort to reduce the index's debris score is supported by previous research in 2019 which found that educational media based on Android technology can or can improve dental and oral hygiene scores compared to using conventional media.²¹

V. CONCLUSION

Forming the ability of skills in brushing the teeth of elementary school students, it takes efforts to provide correct and appropriate education according to the child's character. Within the limitations and based on the results of this study, it can be concluded that Dende Mission educational media traditional Android-based games are effective in increasing knowledge, attitudes, actions, and lowering index debris scores in elementary school students.

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