

# The Influence of Android Game in Improving Knowledge, Attitude and Behaviour of Tooth Brushing

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**ABSTRACT:** The prevalence of dental and oral health problems in Indonesia mostly occurs among children. The behaviour of brushing teeth properly of children in Bali who aged > 10 years is 4.1%. One of the promotional media to increase knowledge, attitude, and behaviour is using interactive media based on games because an animation can improve memory compared to conventional education method so that the children can store learning material for a longer time. The purpose of this study is to determine the influence of game learning media by android to improve oral hygiene knowledge, attitude, behaviour and status of elementary school students in the working area of Puskesmas (Health Centre) North Kuta, Bali, Indonesia in 2018. The type of this quasi-experimental study was a pre-test post-test control group design. The total samples were divided into 75 students in the control group and 75 students in the experiment group. The differences between pre-test and post-test data in the experiment and control group were analysed by the Wilcoxon test. The data on differences between experiment and control group were analysed using the Mann-Whitney test. The results show that there are significant differences between pre-test and post-test on tooth brushing knowledge, attitude and behaviour with  $p$  value = 0.000 ( $p < 0.05$ ), thus there is an increase in tooth brushing knowledge, attitude and behaviour between the pre-test and post-test in the experiment group. The game learning media by android has an influence to improve oral hygiene knowledge, attitude, behaviour and status of elementary school students in the working area of Puskesmas North Kuta in 2018

**KEYWORDS:** Android game, Attitude, Behaviour, Knowledge, Tooth brushing.

## I. INTRODUCTION

Tooth brushing behaviour is one of the most important and effective health behaviours for the dental and oral health maintenance by preventing plaque on teeth. Changing the behaviour of brushing the teeth into proper brushing habit is quite difficult [1], but the research result of [2] for Grade VI students at SDN 6 Mas, Ubud, Gianyar shows that with counselling accompanied by instruction and monitoring from the parents, it can effectively change the respondents' behaviour of brushing. Dental and oral health services as an integral part of the overall health service have established indicators of the dental and oral health status of the community in reference to the Global Goals for Oral Health 2020. One of the technical programs of the Department of Non-communicable Disease Prevention and Health Promotion which is a global dental and oral health programme is the WHO Global Oral Health Programme (GOHP) by advising countries in the world to develop dental and oral disease prevention policies as well as promotion of dental and oral health. This policy also supports the integration of dental and oral health programs with general health programs. One of GOHP's priority actions, especially for schoolchildren and adolescents, is the promotion of dental hygiene at schools [3].

There is a relationship between knowledge of dental and oral health to the incidence of dental and oral disease, especially dental caries. If the knowledge is not good in maintaining dental and oral health, then there will be a risk of easily attacked by dental caries [4]. This statement is made clear by the high number of caries prevalence numbers at the age of 10 years and above that have not been treated [5]. To improve the knowledge, attitudes, and behaviour of a person or community, it is necessary to send a medical material and message called a Method in health promotion [6].

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Health promotion at school seeks to improve the health of the students and community environment by using the potential or available resources and policy support [7].

## II. RELATED WORK

The generation of digital alternative that is happening today makes it important to think about one way to deliver education, especially dental and oral education for children, so it is acceptable and effective. The life habits of children that cannot be separated from communication tools are such as gadget, tablets and computers. Application of information and communication technology to the world of education is a real and factual challenge. The importance of media that helps learning has begun to be felt by teachers and learners. Management of learning aids is needed. One good learning medium is to use interactive media-based games. As we know together, the majority of children love games. Based on data from [8] it shows that the number of games on Google Play i.e. puzzle Games 59,283, casual Games 51,458, arcade games 47,283, action games 17,853, educational games 14,180 and adventure games 10,018. Based on the previous research, there is no doubt that educational games can support the educational process [9]. Educational Game excels in several aspects when compared to other conventional learning, one of the advantages is the presence of animation that can improve the memory so that the child can keep the learning materials in more time Conventional education Methods [9].

Based on the preliminary data collection at Puskesmas (Dental Health) in Kuta Utara, the report of dental patient visits in January-December 2016, it is known that school-age children who did dental care and treatment was as much as 24% from 287 visitors of Puskesmas. Details of school-age children who did dental care and treatment are as follows: 26 children aged 6-7 years, 27 children aged 7-8 years, 21 children aged 8-9 years, 13 children aged 9-10, 7 children aged 10-11, and 6 children aged 11-12 years. Preliminary data retrieval at SDN 1 Mudingkelod on October 21, 2017, Grade II student who amounted to 20 persons, 80% of students stated that it did not know how to brush tooth properly, 95% of students had caries, and 55% of students brushed teeth 2 times a day, in the morning and afternoon bath.

## III. METHODOLOGY

This type of research is quasi experiment with the equivalent design of pre-test and post-test with control group. The research was conducted on students of Fifth Grade in 4 state elementary schools in the working area of Puskesmas of North Kuta District of Badung Regency, Bali province which amounted to 1,424 students, in July to August 2018. The intervention was a way of education to maintain dental and oral hygiene with the method of Android game play and the use of Leaflet. Before the intervention or counselling activities, there were pre-test by using questionnaires to know the knowledge, attitudes and behaviour of respondents in maintaining the dental and oral hygiene. The intervention is done by using the media learning games Android games and the respondent is given leaflets to be read at home or elsewhere on other occasions.

The frequency distribution of research subject was by sex and age group in which for age 10 years old, the frequency was 90 and the percentage was 60 % and for age 11 years old, the frequency was 60 and the percentage was 40%. Thus, the total frequency was 150. On the gender-based distribution, we divided into male with frequency 84 and the percentage was 56% while female with the frequency 56 and the percentage was 44%. Thus, the total frequency was 150.

## IV. RESULTS

The results for this research are first grouped into univariate analysis and bivariate analysis. In univariate analysis, it is grouped into the frequency distribution of knowledge, attitude and behaviour of brushing teeth.

### 4.1 Univariate Analysis

Table 1 shows the knowledge frequency distribution of brushing teeth on the control group while Table 2 shows the knowledge frequency distribution of brushing teeth on the experiment group.

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Table 1. Knowledge frequency distribution of brushing teeth on control group

No.	Category	Pre-test		Post-test	
		Frequency	%	Frequency	%
1.	Poor	56	74,7	20	27,0
2.	Enough	16	21,3	51	68,0
3.	Good	3	4,0	3	4,7
4.	Excellent	0	0	1	1,3
Total		75	100	75	100

Based on the Table 1, it can be seen the level of knowledge of respondents before being given treatment with leaflets about toothbrushing, most respondents have poor knowledge in 56 respondents (74.7%) and after being given the treatment most respondents have enough knowledge that is as many as 51 respondents (68.0%)

Table 2. Knowledge frequency distribution of brushing teeth on experiment group

No.	Category	Pre-test		Post-test	
		Frequency	%	frekuensi	%
1.	Poor	67	89,3	0	0
2.	Enough	8	10,7	1	1,3
3.	Good	0	0	70	93,3
4.	Excellent	0	0	4	5,3
Total		75	100	75	100

Based on Table 1 and 2, it can be seen the level of knowledge of respondents before being given treatment with android games about brushing teeth, most respondents have poor knowledge as much as 67 respondents (89.3%) and after being given the treatment the most respondents have good knowledge of 70 respondents (93.3 %).

Table 3 and 4 shows the frequency distribution of the respondents' brushing attitude on control and experiment group. Based on the table 3, it can be seen the attitude of respondents before being given the treatment with leaflets about brushing teeth at most respondents had less attitudes as many as 55 respondents (73.3%) and after being given the treatment most respondents had sufficient attitudes that were as many as 51 respondents (68.0%)

Table 3 Frequency distribution of respondents' brushing attitude on control group

No.	Category	Pretest		Posttest	
		Frequency	%	Frequency	%
1.	Poor	55	73,7	20	27,0
2.	Enough	17	22,7	51	68,0
3.	Good	3	4,0	3	4,7
4.	Excellent	0	0	1	1,3
Total		75	100	100	75

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Table 4 Frequency distribution of the respondent's brushing attitude on experiment group

No.	Category	Pretest		Posttest	
		Frequency	%	Frequency	%
1.	Poor	71	94,7	0	0
2.	Enough	4	5,3	1	1,3
3.	Good	0	0	34	93,4
4.	Excellent	0	0	40	53,3
Total			75	100	75

Based on the table above can be seen the attitude of respondents before being given treatment with android games about brushing teeth most respondents have less knowledge as much as 71 respondents (94.7%) and after being given the treatment most respondents have good attitudes as many as 34 respondents (93.4% ).

Table 5 and 6 show the respondents' skill of brushing. Based on table 5, it can be seen the respondent's skills before being given treatment with leaflets about tooth brushing. Most respondents have less knowledge as many as 54 respondents (72.0%) and after being given the treatment the most respondents have less knowledge, as many as 46 respondents (61.3%).

Table 5 Frequency distribution of respondents' brushing skill on control group

No.	Category	Pretest		Posttest	
		Frequency	%	Frequency	%
1.	Poor	54	72,0	46	61,3
2.	Enough	18	24,0	25	33,3
3.	Good	3	4,0	4	5,4
4.	Excellent	0	0	0	0
Total			75	100	75

Table 6 Frequency distribution of respondents' brushing skill on experiment group

No.	Category	Pretest		Posttest	
		Frequency	%	Frequency	%
1.	Poor	61	81,3	0	0
2.	Enough	14	18,7	1	1,3
3.	Good	0	0	44	58,7
4.	Excellent	0	0	30	40
Total			75	100	75

Based on the Table 5 and 6, it can be seen the respondent's skills before being given treatment with android games about brushing teeth, the most respondents have less knowledge as many as 61 respondents (81.3%) and after being given the treatment the most respondents have good skills as many as 44 respondents (58.7%).

#### 4.2 Bivariate Analysis

Differences in the knowledge, attitudes and skills in brushing elementary school students in the work area of the North Kuta Health Center before and after being given the game learning media using Android games are shown in Table 7 and 8.

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Table 7 Wilcoxon Statistical test on experiment group

Variable	<i>p-value</i>
<b>Knowledge</b>	0,000
<b>Attitude</b>	0,000
<b>Skill</b>	0,000

From the Wilcoxon test it can be concluded that there is a significant difference in the knowledge of tooth brushing between pre-test and post-test. In the experimental group p value = 0.000 was generated ( $p < 0.05$ ), thus it can be concluded that there was an increase in knowledge of brushing between pre-test and post-test in the experimental group.

From the Wilcoxon test it can be concluded that there are significant differences in the brushing attitude between the pre-test and post-test. In the experimental group p value = 0.000 was generated ( $p < 0.05$ ), thus it can be concluded that there was an increase in tooth brushing between the pre-test and post-test in the experimental group.

From the Wilcoxon test it can be concluded that there are significant differences in tooth brushing skills between pre-test and post-test. In the experimental group p value = 0.000 was generated ( $p < 0.05$ ), thus it can be concluded that there was an increase in tooth brushing skills between the pre-test and post-test in the experimental group.

The Influence of media learning game play using Android against increased knowledge of brushing teeth are shown in table 8.

Table 8 Man- whitney statistical test

Variable	<i>p-value</i>
Media influence on knowledge	0,000
Media influence on attitude	0,000
Media influence on skill	0,000

All the Man-whitney statistical test shown  $p < 0.005$  meaning that there is a significant difference on brushing between experiment and control group either in knowledge, attitude and skill. It shows that there is an influence of media use of android game towards the increase of knowledge, attitude and skill of elementary school students in Puskesmas North Kuta in 2018.

The result of knowledge level difference between pre-test and post-test in experimental group and based on the result of Wilcoxon test statistical test indicates there is a difference of knowledge of brushing teeth before and after giving game media Android obtained the value of p value = 0.000 ( $P < 0.05$ ), which means there is a meaningful difference between the knowledge of brushing teeth before and after giving the media games android games. The results of this research in accordance with the research of [10] which states that the development of media learning using educational games, can help in improving the knowledge that has been studied. According to [11] educational games are being proposed in improving learning technology as a strategy that can lead to decent learning outcomes. The results of knowledge-level research before given game treatment with Android level of knowledge respondents have improved. The results of the respondent's knowledge rate prior to treatment with Android games on brushing most of the respondents had a knowledge of less than 67 respondents (89.3%) And after the treatment of respondents have a good knowledge of 93.3%, very good knowledge is 5.3% and sufficient knowledge is 1.3%. Unlike the research conducted by [12] at Bodhihiccita High school students, that the level of dental and oral health knowledge using Android gadgets shows 57.8% of students have good knowledge, 28.9% of students have knowledge Medium and 13.3% of students have bad knowledge.

Health education is an implementation of the concept of education in the field of health [13]. Health education is a learning process that is shown to individuals and communities to achieve the degree of highest health [14]. Health education can be assisted by tools or media one of them is the media game using Android, which is generally liked by children especially those aged 7-12 years. In [15] it is stated, knowledge is obtained from the planned and well-structured education through formal training and education. Knowledge can be defined as a set of information

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understood, derived from the learning process during life and can be used at any time as a means of self-adjustment, both on oneself and in the environment.

The result of the difference between the pre-test and post test in the experimental group and based on the results of the test statistics Wilcoxon shows that there is a difference in tooth brushing before and after giving the media game Android games obtained p value = 0.000 ( $P < 0.05$ ), which means there is a meaningful difference between the attitude before and after the giving of media games android games. The results of the study showed Android gaming media more effective than media leaflets in improving dental and oral health knowledge. The same results show the provision of health education through visual audio is better than the print media in improving knowledge and changing the behaviour of a person [16]. One of the efforts that can be done to improve the independence of the child's teeth rub is through health counselling that ensures the material is properly transmitted and oriented to changes in the child's self-reliance attitude and behaviour after following Extension. Health counselling is an effort to enhance optimal health skills or behaviours[13].

The knowledge that a person receives in the learning process will be closely related to the emergence of a positive attitude and behaviour. The effort to improve dental and oral health knowledge is required by a medium that corresponds to the intended target[17]. Media is a tool or means that is used to convey a message to the target or intended person. One of the positive impacts can make it easier for children to communicate and learn, while the information technology we can search by using gadgets is a branch of technology that develops information management in the form of numerical data, Texts, pictures, and sounds that make it easier for a person to obtain information about the health and hygiene of each individual's teeth and mouth [18].

The result of the difference in brushing skills between pre-test and post-test in the experimental group and based on the results of the test statistics Wilcoxon shows that there is a difference in brushing skills before and after the delivery of game play media Android obtained the value of p value = 0.000 ( $P < 0.05$ ), which means there is a meaningful difference between the skills before and after the giving of media games android games. One of the efforts that can be done to improve the independence of the child's teeth rub is through health counselling which guarantees the correct content of the material that is oriented to changes in attitudes and the independence behaviour of the child after following Extension. Health counselling is an effort to enhance optimal health skills or behaviours[13]. The results of this research in line with the study conducted by[19], obtained from 31 respondents conducted pre-test and Post-test, before the health education of hand washing there are 1 student who hand washing skills in the category and none of his handwashing skills were low.

According to the results of the study of [20]States, from the results of the research known that the practice of brushing the teeth of a good elementary school students as much as 52.2% and the less 47.8%. Dental hygiene can be done with a habit of brushing a minimum of two times a day after meals and before bedtime so it can inhibit the development of bacteria in the mouth. The technique/How to brush the tooth is not correct/less thorough causes the hygiene of the teeth and mouth becomes less so that the infection of the periodontal is easy. Some students say they brush their teeth twice together with a bath.

Action is the realization of knowledge and attitude to be a real deed. The practice of brushing teeth is strongly influenced by the knowledge factor, students' attitudes about the importance of brushing teeth to reduce dental plaque formation. Thus, the knowledge of good respondents and a supportive attitude towards good practice will have a tendency to be better in the prevention of dental and oral diseases. Therefore, children are more likely to be taught how to maintain the health of teeth and mouth in more detail, so that will lead to a sense of responsibility for the cleanliness of itself [21]. The enhancement of tooth brushing behaviour is based on knowledge and application in the form of positive attitudes and actions that can last a long time [22].

## V. CONCLUSION

The results showed that there were significant differences between pre-test and post-test on tooth brushing knowledge, attitude and skills,  $p = 0.000$  ( $P < 0.05$ ), thus there was an increase in tooth brushing knowledge, attitudes and skills between the pre-test and post-test in the treatment group. In addition, the game learning media by android have an influence to improve oral hygiene knowledge, attitudes, behavior and status of elementary school students in the working area of Puskesmas North Kuta in 2018

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