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Application "senyum gigiku" android based media promotion as prevention caries dental knowledge and attitudes toward increasing the mother mother in district banyudono PKK

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ABSTRACT

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Applications "SENYUM GIGIKU" as the android-based caries prevention media campaigns to improve the knowledge and attitude of the PKK in the District Banyudono

Background

Dental caries is one of the problems of the oral cavity which can cause pain and interfere with the activity and reduce the quality of life of patients. Dental caries prevention can be done by improving the knowledge of individuals with dental health education (DHE). The success of dental health education can not be separated from the methods and media used. Application of Augmented Reality is currently under development in the world of education.

Aim

Establishment of Application "SENYUM GIGIKU" As Android-Based Dental Caries Prevention Media Campaign Against Increasing Knowledge and Attitudes Mothers PKK

Method

Quasy experiment with pre-test post-test non-equivalent control group design. 24 research subjects in the intervention group and 24 in the control group. Variables examined knowledge and attitudes. The analysis is, Friedman test, Man Whitney, Repeat Measure Anova, Independent T-test, Manova.

Result

Test the feasibility of application "SENYUM GIGIKU" prosentast results obtained with 85.2% (Good) and material aspects of the due diligence with a percentage of 87% (Good). On the measurement of knowledge using the application "SENYUM GIGIKU" gained a significant difference with p value = 0.000, while the provision of attitude formation Applications "SENYUM GIGIKU" there is a significant difference with p value = 0.000. On the measurement of the use of Application "SENYUM GIGIKU" with the use of methods of demonstration using props, there is a significant difference with p value = 0.000.

Conclusion

It has been composed Applications "SENYUM GIGIKU" android-based and can effectively improve the knowledge and attitude of the PKK in the prevention of cavities. Use of Applications "SENYUM GIGIKU" is more effective than konvensonal health promotion.

Keywords: Knowledge, Attitudes, Augmented reality, Android-based application

INTRODUCTION

caries teeth is one of the problems of the oral cavity which can cause pain and interfere with the activity and reduce the quality of life of patients [1]. Dental caries is a disease of the hard tissues of the tooth that is chronic progressive, which is caused by the activity of microorganisms in fermented carbohydrates that can be characterized by demineralization of hard tissue and followed damage the organic substances that would cause the destruction of enamel and dentin that appear cavities. Dental caries begins with white lesions or often called white spot due to demineralization, if this is allowed to develop into brown or black lesions that will slowly erode teeth. Dental caries if left can cause focal infections such as respiratory system problems, brain or heart. It is caused by bacteria in the tooth into the blood vessels and spread to other organs [2].

*Dental caries*is the most important part of oral disease globally. Based on data from WHO (2012), as many as 60-90% of school children and nearly 100% of adults had cavities (caries) [3]. Found 15-20% in middle-aged adults (35-44 years) have severe periodontal disease, which can cause tooth loss. In addition, about 30% of people aged 65-74 had not had natural teeth.[3]Indonesia's population is still experiencing oral health problems, the data indicated Riskesdas (2007 and 2013) the percentage of the Indonesian population have oral and dental problems increased from 23.2% to 25.9%. Among them, 31.1% are receiving care and treatment of dental medical personnel, while 68.9% are not treated.[4] Overall affordability / ability to mendapakan dental care from medical personnel / EMD (percentage of the population who have oral health problems) only 8.1% [4].

Oral health problems above can be done among other strategic efforts to decrease the incidence of caries in the community. Efforts to reduce the number of caries in the community can be started early, by providing knowledge about oral health, so that public awareness of oral health will increase. Efforts to improve knowledge about dental and oral health maintenance can be done through dental health education (oral health education). Oral health education is an activity or activities that may affect the individual's own oral health behavior was good [5]. The final goal of oral health education namely behavioral change which includes knowledge, attitudes and actions that lead to healthy living efforts.

Educational success in terms of behavior change is influenced by educational methods used. Methods of education using educational tools that engage the senses as possible will influence the success of understanding the educational objectives. Delivery of educational materials will be more effective when delivered in a pleasant atmosphere and using methods that draw attention [6]. Dental health education methods that are now performed by health workers using demonstration method, which can help to more clearly target in receiving information. However, this method has drawbacks, namely the successful delivery of information depends on the skills of a transmitter of information, facilities such as tools, adequate space and cost are not available with either, requires preparation and planning and takes a long time [7].

Android is a collection of software for a smartphone that includes an operating system, middleware and major applications [8]. Android is open source so availability is very wide access that allows users to build applications that are getting better and will continue to expand this platform to build innovative applications.[8] The technology is currently being developed on android that is by applying the Augmented Reality is a new technology that can combine real objects and virtual real environment at a predetermined location with the help of digital devices [9]. Augmented Reality can provide a variety of important information, and the user can use his senses in its application, so that users can more easily in learning and training.

This study aims to determine the Exchange Applications "SENYUM GIGIKU" As Android-Based Dental Caries Prevention Media Campaign Against Increasing Knowledge and Attitudes Mothers PKK in Cangkringan Sub-District, District Banyudono, Boyolali.

METHOD

The design of this study Quasi-experimental research design with pretest and posttest nonequivalent control group design.

Application development method in this study using the software development life cycle (SDLC) models Waterfall which is a structured software

development methods are the most recognized and widely used, not only in the academic sphere but also in industry. The population in this study areadult population in Cangkringan village, District Banyudono, Boyolali incorporated in the parent PKK in Cangkringan village, District Banyudono, Boyolali, amounting to 80 people. The samples in this study using purposive sampling with a sample of 48 subjects of the study, ie 24 in the control group and the intervention group 24.

RESEARCH RESULT

Table 1 Summary of Results of Feasibility Test Application

No.	Test	Result	Interpretation
1.	functionality	78.46%	Well
2.	Reliability	75%	Enough
3.	Usability	92%	Very good
4.	Efficiency	93.75%	Less
5.	Maintability	91.7%	Well
6.	portability	80%	Well

Table 1 shows the results of each aspect being tested which will then be assessed as a whole using the following formula:

$$\text{On average Feasibility} = \frac{78.46\% + 75\% + 92\% + 93.75\% + 91.7\% + 80\%}{6}$$
$$= 85.2\%$$

From the above calculation results of the feasibility of the overall percentage had an average percentage of 85.2% means that the interpretation of "Good", so that it can be concluded that the application of "Smile My teeth are" fit for use.

Table 2 Summary of Material Aspects Feasibility Test Results

No.	validator	Value
1.	validator I	42
2.	validator II	45
Total		87

Known :
Total Overall score = 100
total score = 87

$$\text{Value} = =\% \frac{Total\ skor\ x\ 100\ \%}{Jumlah\ Keseluruhan\ skor} \quad \frac{87 X 100}{100} = 87$$

Based on the results of the assessment of the experts note validator eligibility value score of 87% with good category (without revision). so that the application "SENYUM GIGIKU" unfit for use. However, Validator furnish some input and suggestions to do a bit of improvement can be seen in the annex, and it carried out repairs.

Table 4 Test Pairwise and photo Couple on Knowledge

Knowledge		Control		Intervention		p value
		SD	mean	SD	mean	
pre	mean	1,213	12:42	1,560	11:21	0008 **
	SD		1,213		1,560	
Post1	mean	1,792	11:08	1,116	13:13	0000 **
	SD		1,792		1,116	
post2	mean	1,351	12:46	1,197	13.96	0000 **

SD			1,351		1,197	
Post3	mean	1,268	12.96	0,482	14.83	0000 **
SD			1,268		0482	
p value		0000 *		0000 **		

*Friedman test
** Test Man Whitney

Table 4 shows the results of tests on the knowledge that there is a significant difference, with a p value of <0.05. For unpaired test results obtained in the knowledge that there is a significant difference, with a p value of <0.05

Table 5 Test Pairwise Pairwise and photo on Attitude

Attitude		Control		Intervention		p value
		SD	mean	SD	mean	
pre	mean	4,605	36.42	6694	42.25	0063 **
	SD		4,605		6694	
Post1	mean	4074	35.92	2948	46.92	0091 **
	SD		4074		2948	
post2	mean	4,030	47.63	5,043	49.29	0289 **
	SD		4,030		5,043	
Post3	mean	3,162	48.54	3,635	50.79	0155 **
	SD		3,162		3,635	
p value		0000 *		0000 **		

* Repeat Test Measure Anova
** Test Independent T-Test

Table 5 shows the results of an attitude that's paired test significant difference to the value of p value of <0.05, unpaired while the test showed that there was no significant difference, with a value of p value> 0.05.

Table 6 Test Continue on the Knowledge and Attitudes

	Knowledge		Attitude	
	Control	Intervention	Control	Intervention
	p value	*p value*	*p value*	*p value*
Pre-Post1	0003 *	0000 *	0042 **	1000 **
Post1-post2	0001 *	0001 *	0367 **	0000 **
Post2-Post3	0243 *	0002 *	1000 **	0514 **
Pre-post3	0115 *	0000 *	0000 **	0000 **

*Post-Hoc by Wilcoxon
** Post-hoc Bonferroni test

Table 6 shows the results as follows

- ✓ increased knowledge on the measurement before and after treatment both in the control group (p = 0.003) and intervention (p = 0.000), but for the attitude has not increased either in the control group (p = 0.042) and intervention (p = 1.000).
- ✓ The statistical results for the measurement after intervention 1 day to 3 days after the intervention showed that there are significant differences both in the control group (p = 0.0010 and intervention (p = 0.001), whereas for the attitude there is no difference in the control group (p = 0367) and there is a significant difference in the intervention group (p = 0.000).
- ✓ The statistical results of measurements after the intervention 3 days to 7 days showed in the knowledge there is no significant difference in the control group (p = 0243) and there is a significant difference in the intervention group (p = 0.002), whereas the attitude there is no significant difference either in the control group (p = 1.000) and intervention (p = 0514).
- ✓ The statistical results of measurement before and after the intervention for 7 days showed that

there were significant differences in knowledge of the group of intervention (p = 0.000), there was no significant difference in the control group (p = 0.115), while attitudes have increased both in the control group (p = 0.000) and intervention (p = 0.000), so that there are no significant differences.

DISCUSSION

Feasibility Applications SENYUM GIGIKU Knowledge and Attitudes Toward Improved Mothers PKK

Media development of oral health education is an application "SENYUM GIGIKU" based on Android has been through the stages of development that refers to the provisions of ISO 9126 start of the Test Functionality, Reliability, Usability, Efficiency, Maintability, and Portability. Of all the stages that have been passed showed a mean of 85.2% to the category of "Good". While in terms of the material, the material contained in the application "SENYUM GIGIKUs" has tested the material aspect is done with 2 validator matter experts and showed 87% to the category of "Good".

Influence Analysis Applications "SENYUM GIGIKU" Against Android-Based Knowledge and Attitudes

Knowledge differences before and after intervention

Based on the results of statistical analysis of paired test shows that either the intervention group or the control group there were significant differences in scores before and after treatment in each group with a p value of <0.05.

The success of the intervention using the app "SENYUM GIGIKU" is in line with research Hidayat, the results showed significant differences after the intervention (*pvalue*= 0.002) [10]. Intervention in the form of education recognition of human teeth using Augmented Reality to target children ages 4-7. The results of this study differs from previous studies because the average difference in age of respondents in this study were 20-45 years old, where the older the person, the more physiological changes that will occur and will be difficult to learn, it is caused by a decrease in cognitive abilities of individuals. Adults are indeed slower in terms of performance, but from the standpoint of the use of augmented reality experience of adults able to adapt, Intuit and easy to use augmented reality applications, in addition to the AR has the potential to improve the performance and functional adults [11].

This study is in line with research Jamali, the results showed significant differences after the intervention (p value = 0.000) [12]. Intervention in the form of learning human anatomy by applying the Augmented Reality technology.

Whereas in the control group, individuals receive information through oral and pay attention to the props and found no significant difference in before and after treatment. This is according to research Santoso (2016) [13] use demonstration method can improve individual knowledge, facilitate the demonstration method has the advantage of individuals in receiving the material presented so as to form a good and perfect understanding, as well as making an active participant [13].

The results of the test statistic unpaired group showed p value of <0.05. It means that the knowledge of individuals using the application "SENYUM GIGIKU" is better than the use of demonstration using props. The use of media in the form of application "Smile My teeth" based on Android to implement augmented reality in the delivery of information may affect the individual's knowledge since the submission of information involves the senses in the form of the eyes (75%), ears and hands (15%) so penyampain information can be received by the brain easily and clear. In addition, increase knowledge can not be separated from the excess application of augmented reality to encourage interest and motivation of individuals to participate actively for the information contained in the application and can help improve cognitive abilities of individuals [14]. Broadly speaking, in this study the majority of respondents in the category of adult age, the age, a person will experience a decline in cognitive ability. The decline in cognitive abilities of individuals can be minimized by attention mechanisme that benefit, so as to minimize the performance of the brain [15].

The success of the stimulus provided due to the information given to respondents involve some sensory namely the eyes, ears and other senses. In addition, the use of media in providing oral health education has an important role especially in stimulating memory, interest, and ability to learn,

the more senses by stimuli easier to get absorbed and readily accepted. This is according to research Eriska (2009), a tool in education have a role in increasing the capacity to learn, strengthen memory, increase interest, and facilitate appreciation [16]. The ability of individuals to receive information relating to individual pacaindera, pacaindera widely distribute knowledge to the brain are the eyes (approximately 75% - 87%), while 13% to 25%, human knowledge is acquired and distributed by faculty to another [17].

Increased knowledge in the intervention group were given treatment using the application "Smile My teeth" based on Android which in use will engage the senses of the eyes, ears, besides the media in the application "Smile My teeth" implementing augmented reality technology that allows it to deliver contextualization different information, so it can be encourage individuals to participate actively in the receive and understand the information contained clearly. This is consistent with research Yuen, et al (2011) [18], The ability of AR in realtime can activate sense the presence, proximity, and dives on learners, this addition can help and improve the knowledge and understanding of people about the events that took place around it, mobile AR enables learning anywhere, collaborative and be situated, so as to facilitate learning formal and informal [18]. Another thing also expressed by Jamali, et al (2015), the use of AR can be more effective in motivating learners and maintain their ability to passionately involved in their own learning process, in addition to the AR can stimulate interest and help learners to store more information long [12].

Differences in attitudes before and after intervention

The results showed there are significant stimulus provided in either the intervention or control group. Based on the results of the test statistic in pairs on attitudes to intervention and control groups obtained by value*p value*<0:05, means that there are no significant differences in the intervention and control groups.

The success of the stimulus is given using the application "SENYUM GIGIKU" in the intervention group in line with research Hidayat with the result that the product is able to shape attitudes through the use of augmented reality video stimulus [19]. This study differs from

previous research, the study Hidayat interventions made by looking at two aspects of video playback by displaying a positive example and aspects of the ease of video playback on a junior high school boy then carried out the survey, whereas in this study the intervention was given by educating using augmented reality with a material aspect distinct and targeted at a mature age, so hopefully with increased knowledge will bring changes in individual attitudes.

Attitude is the second stage in the behavior, attitudes components related to each other that is a component of cognitive, affective, and growing tendency to act cultivate an attitude of individuals [20]. According to Bloom in Notoatmodjo (2003) revealed that people will change the attitude, if he is able to change the cognitive component first [21]. In this study, individuals can already cognitive change in the prevention of dental caries, it is evidenced by the increase in average scores before and after the intervention and interpretation statistical test there are significant differences. The information submitted by using augmented reality can give a new cognitive foundation for the formation of attitudes in the prevention of tooth. The information contained in the application "SENYUM GIGIKU" bring suggestive messages thus providing a strong basis in decision-making in addressing the prevention of dental caries. It is caused due to the application of augmented reality can give confidence to the people in decision-making. Elston in Sulistyanto (2017) put forward since the participants are directly involved in the learning process [22].

This study is in line with research that shows Amaliah significant difference to the value of p value = 0.001. interventions were performed using m-health (Healthy Babies) to improve the knowledge and attitude of mothers [23]. In the concept of intervention in this study together with research Amaliah equally apply because m-health, but in this study apart from using m-health also implement augmented reality in the delivery of information. In this study different aspects of the material with previous research. Stimulus using m-health is proven to give effect to the change in attitude on the prevention of dental caries, because m-health has several major benefits, among others, education, data collection remotely, remote monitoring, training and communication of health personnel, tracking cases and outbreaks , support

diagnosis and treatment [23]. The use of augmented reality will encourage pasrtisipan to be more interactive, because to know pasrtisipan information required to interact directly.

The test results unpaired group obtained the value p value> 0.05. it means that the attitudes of individuals using the application "SENYUM GIGIKU" and demonstrations with props no significant difference. So that both the intervention and control groups in terms of attitude there was no significant difference in influencing the attitude improvement.

Based on the analysis of changes in the score of each measurement showed that the measurement values obtained prior to treatment p value> 0.05, means there is no significant difference in the intervention and control. After the treatment one day obtained the value p value> 0.05, means there is no significant difference in the intervention and control. In this case means the individual has not been able to form the knowledge but has not been able to form an attitude. But judging from the attitude Mean values of each group, the use of the application "SENYUM GIGIKU" better value Mean = 46.92, while the use of conventional methods Mean = 35.92.

After 3 days of treatment showed the value of p value> 0.05, means there is no significant difference in the intervention group with the control. On 3 measurement Mean value today obtained the intervention group (49.29) was better than the control group (47.63).

At the last measurement that is on the 7th day after treatment obtained the value p value> 0.05, means there is no difference meaningful. In this last pengkuran results Mean value of the intervention group (50.79) was better than the control group (48.54)

Granting the application "Smile My teeth" may affect the value of the attitude in the prevention of tooth decay (caries), but a statistically significant influence given yet there is a difference with the conventional method, however, based on the analysis of the average value in every measurement application usage "Smile My teeth" better demonstration of the use of the method with props in improving the attitude of the PKK.

Effectiveness Analysis Applications "SENYUM GIGIKU" Knowledge and Attitudes Toward

Based on test analysis has been done, the app "SENYUM GIGIKU" is more effective than the use of conventional methods in improving knowledge and attitudes to the value p value> 0.05. The use of Augmented Reality is considered easier to understand than the conventional media, because in the process of delivering information in real confronted participants with relevant information and AR properties that encourage a willingness to learn can help participants more actively in the process of receiving information. Endarmadi in Wahyudi (2017) [24] suggests the use of Augmented Reality is more easily understood than the conventional teaching aids, through AR students as if faced with a real object studied so that the learning process more fun, even AR can help learners to understand the material easily [24].

The effectiveness of the use of Augmented Reality can not be separated from sensory involvement include the eyes, ears and other sensory perception, the more the senses are used the better the information received can be absorbed by the brain. By involving multiple sensory plus the advantages of using AR to encourage an active participant in the process of receiving information so as to increase the interest of participants to receive information. Maulana (2009) [17] propose to involve a lot of sensory information received will be better.

Judging from the response of participants, Augmented Reality gets a positive impression. Participants assume AR as a new thing in the provision of information, this means that in the beginning of the introduction of AR has been able to encourage the participants so as to stimulate and motivate participants to learn more about the information contained. In a study Bilinghusrt in Hamilton (2010) AR has the potential for a wide range of potential to: stimulate and motivate students to explore the matter from a different angle [25].

CONCLUSION

➢ Applications "SENYUM GIGIKU" android-based proven feasible to use to improve the knowledge and attitude of the PKK.

- ➢ Applications "SENYUM GIGIKU" android-based proved effective in increasing knowledge of the PKK
- ➢ Applications "SENYUM GIGIKU" android-based proved effective in improving the attitude of the PKK.
- ➢ Applications "SENYUM GIGIKU" android-based proven more effective than the conventional health promotion in improving knowledge and as effective as conventional methods to improve the attitude of the PKK

SUGGESTION

Utilization Application "SENYUM GIGIKU" in Health Promotion

This media can be used in outreach to the community (UKGMD) and can be used independently of individuals at home and can be used anywhere and anytime when individuals carryandroid.Sebelum based smartphone using the individual must understand how its use and mendowdload maker that had been prepared in the application.

For further study

- Adding media in 3D (dimension)
- Integrating maker that used directly to real life (real objects).
- Improvements to the more dynamic information display and easy to read.
- The addition of wider material.
- Extra features in user interaction

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