

# Tr's Dental Pop-Up Education Model Based on Gamification on Improving Teeth-Brushing Behavior in Children with Impossibleness

Tiara Rozaria

Postgraduate

Poltekkes Kemenkes Semarang

Lanny Sunarjo

Postgraduate

Poltekkes Kemenkes Semarang

Bedjo Santoso

Postgraduate

Poltekkes Kemenkes Semarang

**Abstract:- Background:** Dental and oral health problems in mentally retarded children are higher than normal children. The problem experienced by mentally retarded children is the difficulty in carrying out independent activities in the behavior of maintaining dental and oral health. To overcome this problem, media aids are used to improve tooth brushing behavior in mentally retarded children, namely TR'S dental media pop-up is a form in which there are procedures for brushing teeth that are good and right. **Purpose:** Producing TRS Dental Pop-up media as a learning media to improve teeth brushing behavior of mentally retarded children. **Method:** Research and development (R&D) and product/model trials (Study true experiment test with control group design). The subjects of this study were 15 intervention groups with the application of the TR'S Dental Pop-up educational model and 15 control groups with the application of the 3D boo pop-up educational model without audio. Sampling using the Lemeshow formula. Data were tested using the Paired test and independent sample test. **Results:** TR'S Dental Pop-up is appropriate as a learning media about brushing teeth. The implementation of this media is effective in increasing teacher knowledge ( $\Delta$ ) intervention 2.67 control 1.66, teacher attitude ( $\Delta$ ) intervention 3 control 1.67, teacher action ( $\Delta$ ) intervention 4 control 3, children's actions ( $\Delta$ ) intervention 5.8 control 3.8, intervention debris ( $\Delta$ ) 0.97 control 0.86. **Conclusion:** 3D pop-up book audio educational model is effective as a learning medium to improve teeth brushing behavior in mentally retarded children.

**Keywords:-** TR'S Dental Pop-up, Children with Mental Disabilities, Index Debris.

## I. INTRODUCTION

Health is a state where there is not only freedom from disease or infirmity, but also a balance between physical, mental and social functions.<sup>1</sup>Dental and oral health is the main indicator of overall health which can interfere with the health of other organs of the body.<sup>2</sup>Dental health problems that many Indonesian people suffer from are dental caries and periodontal disease. The 2018 Basic Health Research shows that 57.6% of

Indonesian people experience dental and oral health problems.<sup>2</sup> According to The Global Burden of Disease Study 2016, dental and oral health problems, more specifically dental caries, are a disease experienced by almost half of the world's population (3.58 billion people). This condition is reinforced by data World Health Organization (WHO) that 90% of school-age children worldwide experience dental caries.

The prevalence of caries in normal school-aged children in Indonesia is 89%, while the prevalence of caries in Central Java is 43.4%. Based on WHO recommendations, The Ministry of Health targets Indonesia to be free of caries in 2030.<sup>3</sup> Historically, dental caries is still the most widespread dental and oral health problem in the world, affecting more than 80% of the human population.<sup>4</sup>DiseaseDental caries that occurs in children will result in the appearance of pain, thereby reducing appetite and causing the child's weight to decrease.<sup>5</sup> More than 50 million school hours are lost per year due to dental and oral diseases experienced by children so that children are often excused from attending school, where this can lead to decreased performance in children for a long time.<sup>6</sup>

Dental health problems are not only suffered by normal children, but also suffered by children with special needs who are categorized as mentally retarded (mental development disorder), blind (visual impairment), deaf (hearing impaired), quadriplegic (limb disorder), gifted children. (ability and extraordinary intelligence), mute speech (impaired ability to speak), disabled (mangalamai emotional or behavioral disorders).<sup>7</sup>

One example of a child with special needs is a mentally retarded child. *American Association on Intellectual and Developmental Disabilities* created a concept of intellectual disability. The association defines such a concept as "a disability characterized by significant limitations in terms of intellectual functioning as well as in terms of adaptive behavior as expressed in conceptual, social, and practical adaptive skills."<sup>8</sup> According to the results of the National Socio-Economic Survey (Susenas) conducted by the Central Bureau of Statistics (BPS), data on the population of persons with disabilities in Indonesia is 6,008,661 people. From this total

data, there are around 402,817 people with intellectual disabilities or mental retardation.<sup>9</sup>

The characteristics of mentally retarded children are experiencing a decrease in intellectual function, namely having physical limitations in terms of behavior, development, communication difficulties so that they have a long adaptation time. From these characteristics, it can be concluded that mentally retarded children cannot carry out activities independently but need help from others.<sup>10</sup>

Dental and oral health problems that are often experienced by mentally retarded children are cavities, tartar, irregular tooth position and poor dental and oral hygiene.<sup>11</sup> The prevalence of caries in mentally retarded children is still quite high, reaching 82.6%.<sup>12</sup> This condition was strengthened by research conducted by experts who conducted on 101 respondents, there were 83.2% mentally retarded children who experienced dental caries in SLB C Semarang city.<sup>13</sup> Research by experts on 27 mentally retarded children showed an OHI-S score of 14.81% in the good category, 73.37% in the moderate category, and 14.81% in the bad category at Widiasih Parigi State SLB.<sup>14</sup>

Mentally retarded children have a higher risk of dental and oral health, because they have mental deficiencies and limitations to perform optimal cleaning of their own teeth. The differences in limitations that they have, affect behavior in maintaining dental and oral hygiene.<sup>15</sup> Behavior is an act or activity of a human being that has a very wide range that can be observed directly and indirectly, behavior results from the relationship between stimulus and response. Human behavior is divided into three domains according to educational goals namely, cognitive, affective, and psychomotor, to measure the results of health education, namely through knowledge, attitudes, and actions.<sup>16</sup>

One of the efforts made by the Indonesian government to address dental health problems and prevent dental and oral diseases in school-age children and those with special needs is through dental and oral health activities in schools through the School Dental Health Program (UKGS). The UKGS program is not only for normal children but also applies to children with special needs. Health services in the UKGS program include promotive, preventive and curative efforts for students in the school environment.<sup>17</sup>

The UKGS program and dental and oral health service programs launched by the Indonesian and international governments have not produced results, it has been proven that no country is free from dental caries<sup>18</sup> evidenced by Tafzani's research which shows that the number of SD/MI that receive the UKGS program, promotive services are carried out once a month 80% and 50% preventive, these figures have not reached the target set by the government, namely 100% promotive and 80% preventive.<sup>19</sup>

Efforts to increase maintenance behavior in mentally retarded children through dental and oral health education, namely by counseling activities aimed at increasing the ability to carry out dental health maintenance.<sup>15</sup> Children's knowledge

is very important in underlying the formation of behavior that supports dental and oral hygiene.<sup>18</sup> The education received at SLB is made so that children with special needs can carry out their daily activities well, in providing dental health education it is better to use interesting media and methods so that mentally retarded children do not get bored during the learning process.<sup>20</sup> One of the media that has been used for mentally retarded children is Widi's puzzle media. Research conducted by Nurwanti Widi shows that there is an increase in the teeth brushing skills of mentally retarded children.<sup>21</sup>

Another interesting media that can be used is using gamification-based 3D pop-up book audio media. Media pop-up book is three-dimensional book displays containing pieces of paper that appear or move when the book is opened and folded. Pop-up books include unique and interesting learning media to help understand the material that has been provided.<sup>22</sup>

This printed material media will present its message through illustrated letters and pictures to further clarify the message or information to be presented or to be conveyed.<sup>23</sup> The advantage of the Pop Up Book media is that it provides a special experience for the reader because it involves the reader in the story such as sliding, opening and folding the Pop Up Book sections. This will make a distinct impression on students so that students who read later will more easily enter into memory when using this media.<sup>24</sup>

Based on the characteristics of mentally retarded children to improve their teeth brushing skills, a 3D pop-up book will be created in which there are good and correct procedures for brushing their teeth so that it will stimulate children's thoughts, interests and attention to start improving their teeth brushing skills. Audio models This 3D book pop-up will train the hand and mind coordination of mentally retarded children, dental health messages will be conveyed in the form of 3D images and there will be audio explaining each material presented, so that it will provide an experience because it involves the reader in the story such as sliding, opening, and folding parts pop-up book.

## II. MATERIALS AND METHODS

Research and development (R&D) and product/model trials (Study true experiment test with control group design). The subjects of this study were 15 intervention groups with the application of the TR'S Dental Pop-up educational model and 15 control groups with the application of the 3D boo pop-up educational model without audio. Sampling using the Lemeshow formula. Data were tested using the Paired test and independent sample test.

## III. RESULTS AND DISCUSSION

### A. Univariate analysis

Respondents in this study consisted of 30 SLB teachers and mentally retarded children consisting of the intervention group and the control group, the number of SLB teachers consisted of 6 teachers consisting of the intervention group and the control group.

**Table 1.** Characteristics of Respondents in the Intervention Group and Control Group

Variable	intervention		Control		Homogeneity Test
	n	%	N	%	
<b>Teacher</b>					
Gender					
Man	1	30	1	30	1,000*
Woman	2	70	2	70	
<b>Employment status</b>					
civil servant	2	70	2	70	1,000*
Non civil servants	1	30	1	30	
<b>Mentally Disabled Children</b>					
Gender					
Man	9	60	7	47	1,000*
Woman	6	40	8	53	
<b>Age</b>					
9 years	9	60	10	67	1,000*
10 years	6	40	5	33	

\*Levene Statistics

Based on the table above, it can be seen the characteristics of teacher respondents and mentally retarded children. The homogeneity test results show that the  $p$ -value is  $> 0.05$ , so it can be concluded that the variance of the two sample groups is homogeneous or the same.

**B. Bivariate Analysis**

Bivariate analysis was performed to examine differences between the two variables. In the early stages of testing the model, a normality test was carried out, then a test was carried out to test the effectiveness of paired and unpaired data. The results of the normality test show that the  $p$ -value is  $> 0.05$  so it can be concluded that the data is normally distributed.

**Table 2.** Test the effectiveness of Paired and Unpaired Data for SLB Teacher Knowledge

Variable			Test Paired data		Unpaired Data Test	
	n		Mean+SD	P-Value*	Delta+SD $\Delta$	P-Value**
Knowledge						
Intervention	Pre	3	6.00+1.000	0.015	2.67+0.577	0.047
	Post	3	8.67+1.528			
Control	Pre	3	4.67+1.528	0.038	1.66+0.577	
	Post	3	6.33+1.528			

\*Paired Sample Test \*\*Independent Sample Test

Testing the effectiveness of paired data on the knowledge of SLB teachers showed that the  $p$ -value in the intervention group was 0.015 ( $p < 0.05$ ) this means that the TR'S dental pop-up media was effective in increasing teacher knowledge. The  $p$ -value in the control group was 0.038 ( $p < 0.05$ ) meaning that pop-up book media was effective in increasing teacher knowledge. There was an increase before and after being given treatment, where before being given treatment the average value of teacher knowledge was 6.00 in the intervention group increased to 8.67, in the control group the average value before

being given treatment was 5.00 increased to 6.33. The results of the effectiveness test of the value of change ( $\Delta$ ) pre-post test there was a significant change in teacher knowledge in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group of 2.67 and in the control group of 1.66. The effectiveness test of the unpaired data on the knowledge of SLB teachers showed that the  $p$ -value was 0.047 ( $p < 0.05$ ). This means that the TR'S dental pop-up media is more effective in increasing teacher knowledge than the pop-up book media.

**Table 3.** Test the effectiveness of Paired and Unpaired Data for SLB Teacher Attitudes

Variable			Test Paired data		Unpaired Data Test	
	n		Mean+SD	P-Value*	Delta+SD $\Delta$	P-Value**
Attitude						
Intervention	Pre	3	38.00+3.606	0.032	3+0.577	0.024
	Post	3	41.00+3.606			
Control	Pre	3	33.00+3.000	0.038	1.67+0.577	
	Post	3	34.67+3.512			

\*Paired Sample Test \*\*Independent Sample Test

Test the effectiveness of paired data on attitudes of SLB teachers showing the p-value in the intervention group was 0.032 ( $p < 0.05$ ) this means that the media TR'S dental pop-ups are effective in improving teachers' attitudes. The p-value in the control group was 0.038 ( $p < 0.05$ ) meaning that pop-up book media was effective in increasing teacher attitudes. There was an increase before and after being given treatment, where before being given treatment the average value of the teacher's attitude was 38.00 in the intervention group increased to 41.00, in the control group the average value before being given treatment was 33.00 increased to 34.67.

Results the effectiveness test of the value of change ( $\Delta$ ) pre-post test there was a significant change in teacher attitudes in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group of 3 and in the control group of 1.67.

The effectiveness test of the unpaired data on the attitudes of SLB teachers showed a p-value of 0.024 ( $p < 0.05$ ). This means that the TR'S dental pop-up media is effective in improving teacher attitudes compared to the pop-up book media.

**Table 4.** Test the effectiveness of Paired and Unpaired Data for SLB Teacher Actions

Variable			Test Paired data		Unpaired Data Test	
		n	Mean+SD	P-Value*	Delta+SD $\Delta$	P-Value**
Action						
Intervention	Pre	3	14.00+2.000	0.020	4+0.577	0.013
	Post	3	18.00+1.000			
Control	Pre	3	12.67+1.528	0.035	3+0.577	
	Post	3	15.67+2.082			

\*Paired Sample Test \*\*Independent Sample Test

The test of the effectiveness of paired data on the actions of SLB teachers showed that the p-value in the intervention group was 0.020 ( $p < 0.05$ ), which meant that the media TR'S dental pop-up effectively improves teachers' brushing skills. The p-value in the control group was 0.035 ( $p < 0.05$ ) meaning that the pop-up book media was effective in improving the teacher's brushing skills. There was an increase before and after being given treatment, where before being given treatment the average value of the teacher's tooth brushing action was 14.00 in the intervention group increased to 18.00, in the control group the average value before being given treatment was 12.67 increased to 15, 67.

Results the effectiveness test of the change value ( $\Delta$ ) pre-post test there was a significant change in the teacher's tooth brushing behavior in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group of 4 and in the control group of 3.

The effectiveness test for unpaired data on the act of brushing the teeth of SLB teachers showed a p-value of 0.013 ( $p < 0.05$ ). This means that the TR'S dental pop-up media is more effective in increasing the teacher's brushing teeth compared to the pop-up book media.

**Table 5.** Teacher Compliance with the Pop-up Audio Model Book 3D.

Teacher compliance			
	n	F (%)	P-Value
Relevant	21	100	0.000
Irrelevant	0	0	

\*Interclass Correlation Coffecient

Teacher compliance with the model was carried out for 21 days using a checklist sheet. The result of the p-value test for Intraclass coreation confidence is 0.000 indicating that TR'S

dental pop-up educational media is implemented by SLB teachers in the learning process for mentally retarded children.

**Table 6.** Paired and Unpaired Data Effectiveness Test for the Actions of Mentally Disabled Children

Variable		Paired data test			Unpaired Data Test	
		n	Mean+SD	p-Value*	Delta+SD $\Delta$	p-Value**
Action						
Intervention	Pre	15	10.27+2.154	0.000	5.8+2.344	0.002
	Post	15	16.07+2.344			
Control	Pre	15	9.60+2.197	0.000	3.8+1,767	
	Post	15	13.47+1.767			

\*Paired Sample Test \*\*Independent Sample Test

Testing the effectiveness of brushing teeth in mentally retarded children showed that the p-value in the intervention group was 0.000 ( $p < 0.05$ ). The p-value in the control group was 0.000 ( $p < 0.05$ ) meaning that the pop-up book media was effective in increasing the action of brushing the teeth of mentally retarded children.

There was an increase before and after being given treatment, where before being given treatment the average value of brushing students' teeth was 10.27 in the intervention group increasing to 16.07, in the control group the average value before being given treatment was 9.60 increasing to 13

,7.The results of the effectiveness test for the value of change ( $\Delta$ ) pre-post test showed a significant change in the act of brushing the teeth of mentally retarded children in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group of 5.8 and in the control group of 3.8.

Test the effectiveness of unpaired data brushing teeth in mentally retarded children showed a p-value of 0.002 ( $p < 0.05$ ) this means that the mediaTR'S dental pop-up is more effective in increasing the brushing action of mentally retarded students compared to pop-up book media without audio.

**Table 7.** Paired and unpaired Data Effectiveness Test for Debris of Mentally Disabled Children

Variable		Paired data test			Unpaired Data Test	
		n	Means+SD	p-Value*	Delta+SD $\Delta$	p-Value**
Debris						
Intervention	Pre	15	1.780+0.6505	0.000	0.97+0.807	0.012
	Post	15	0.807+0.3788			
Control	Pre	15	2.007+0.3432	0.000	0.86+1.147	
	Post	15	1.147+0.3067			

\*Paired Sample Test \*\*Independent Sample Test

Testing the effectiveness of the index data debris for mentally retarded children showed that the p-value in the intervention group was 0.000 ( $p < 0.05$ ) which means that the TR'S dental pop-up media was effective in reducing index debris for mentally retarded children. The p-value in the control group was 0.000 ( $p < 0.05$ ) meaning that pop-up book media was effective in reducing the index debris of mentally retarded children.

There was a decrease in index debris before and after being given treatment, where before being given treatment the average value of debris index students was 1,780 in the intervention group decreased to 0.807, in the control group the average value before being given treatment was 2.007 decreased to 1.147

The results of the effectiveness test for the value of change ( $\Delta$ ) in the pre-post test showed a significant change in the reduction of index debris for mentally retarded children in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group was 0.97 and the control group was 0.86.

The effectiveness test of debris unpaired data on mentally retarded children showed that the p-value was 0.012 ( $p < 0.05$ ) meaning that the mediaTR'S dental pop-up is more effective in reducing index debris in mentally retarded children than pop-up book media without audio.

*C. Models/Outputs*

The results of the model are gamification-based TR'S dental pop-up educational media for increasing the tooth brushing behavior of mentally retarded children, this media contains material on how to maintain healthy teeth and mouth.



Fig 1 Main page display (book cover)



Fig 2 First page



Fig 3 Second page



Fig 4 Third page



Fig 5 Fourth page



Fig 6 Fifth page

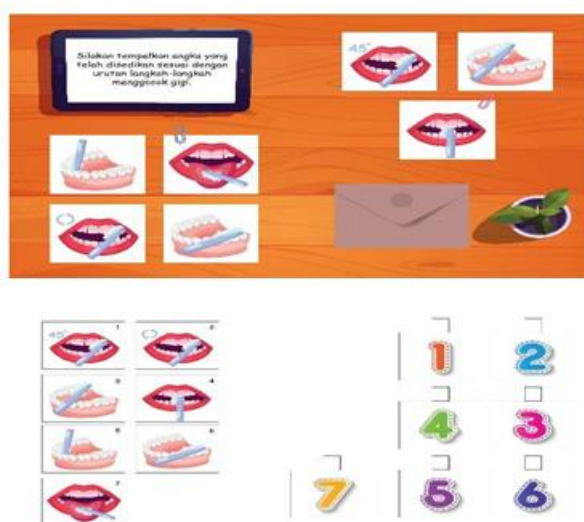


Fig 7 Pages six and seven



Fig 8 Front and side view

*D. Model TR'S Dental Pop-up Media*

Information collection was carried out at the information gathering stage through interviews with the head of the puskesmas, the head of the SLB, the SLB teacher and parents. From 6 pointsquestion, it was concluded that in order to form the independence of mentally retarded children in changing dental and oral health behavior, efforts to provide education using appropriate learning media are needed, namely media that are interesting and can stimulate the hands and minds of mentally retarded children. Technological developments can be used as a solution to innovate in the field of learning, especially in the manufacture and development of learning media so that the learning process is more interesting which has an impact on student learning interest.<sup>61</sup> Learning media if designed properly will be an effective medium and improve the quality of learning. Learning for children with special needs certainly has its own strategy according to their individual needs.

One of the media that can be used is TR'S Dental Pop-up media, which is a learning media that can be seen and heard, on TR'S dental pop-up media, it will present pictures and audio so that it can stimulate attention, thoughts and feelings in mentally retarded children. Audio visual media is a combination of sound and image media, this type of media will provide complete information so that students will easily observe every step that is conveyed, audio visual media is very suitable for learning in the classroom and is used in moderately mentally retarded children because more likely to be able to capture material through sight and hearing this makes it easier for students to observe something so that children will begin to improve their teeth brushing skills.<sup>62</sup> The implementation of this media is also supported by teacher training, education, demonstrations and evaluations.

The design of the TR'S dental pop-up educational media model is adapted to the characteristics of mentally retarded children, Dental and oral health education interventions can be given by teachers at school to mentally retarded children, in the learning process teachers need to be given training first because with knowledge, attitudes and actions to maintain dental and oral hygiene owned by teachers are able to transfer knowledge

and transfer skills to children mentally disabled. Dental health education for mentally retarded children is not much different from normal children, but in each process it requires the role of parents/teachers because mentally retarded children are children who have characteristics that still need the help of others.<sup>10</sup>

The results of expert validation of several media service assessment indicators show that TR'S dental pop-up media is appropriate as a learning medium to improve tooth brushing behavior in mentally retarded children. Educational media are facilities and infrastructure to support the implementation of learning activities. Good media will be useful in learning activities.<sup>63</sup>

#### E. Model Test on Teachers

##### ➤ Teacher Knowledge Test

In this study, there were 6 teacher respondents consisting of the intervention group and the control group. Based on gender is not the same. The sex of the teachers in the study in the intervention group was 1 male and 2 female, while in the control group there were 1 male and 2 female.

Teacher knowledge was measured using a questionnaire with a total of 10 questions in the form of multiple choices which were given during the pre-test and post-test after 21 days of intervention. When observed from the results of the questionnaire, most of the teachers were aware of the dental health problems that often occur in mentally retarded children such as dental caries and poor dental and oral hygiene. Based on the results of the assessment of the teacher's knowledge questionnaire about oral and dental health before and after being given training, there was a significant change, namely the results of the delta test stated in the intervention group with a difference value ( $\Delta$  2.67) and the control group with a different value ( $\Delta$  1.3). There was an increase before and after being given treatment, where before being given treatment the average value of teacher knowledge was 6.00 in the intervention group increased to 8.67, in the control group the average value before being given treatment was 5.00 increased to 6.33 .

Training on the TR'S dental pop-up educational media model was carried out to increase the knowledge, attitudes and actions of maintaining teacher dental and oral hygiene. When observed from the results of the questionnaire, most of the teachers were aware of the dental health problems that often occur in mentally retarded children such as dental caries and poor dental and oral hygiene. Increased knowledge is due to the fact that teachers have educational backgrounds and abilities in their respective areas of expertise, teachers are able to transfer knowledge and skills to mentally retarded children. In the intervention group and the control group the teacher was given the same dental and oral health education but the media used were different. Dental and oral diseases such as caries or we are familiar with cavities, can be prevented if brushing your teeth is done correctly.

Teacher behavior, awareness, and knowledge about dental and oral health maintenance in Indonesia is still lacking. This is influenced by various education, environment,

economy, traditions and others. Efforts to increase dental and oral health knowledge can be done with counseling.<sup>64</sup> Health counseling or promotion is one of the programs being intensively implemented by the World Health Organization (WHO) implemented by governments in various parts of the world, including Indonesia, to improve the quality of Indonesian public health. Dental and oral health education is an effort to influence someone to behave well and motivate them to maintain dental and oral health and provide an understanding of ways to maintain dental and oral health.<sup>65</sup>

Children spend most of their time at school, so one of the closest people who must obtain information about dental and oral health is the teacher. This intervention at school was carried out with the aim that learning about dental health can be carried out at school and also at home where mentally retarded children still really need assistance or assistance from other people, especially those closest to them both at school and at home.

In this study teachers also need learning related to dental and oral health in order to increase teacher knowledge using the TR'S Dental Pop-up model. In this study, teacher training has been carried out in order to increase the knowledge, attitudes and actions of teachers related to dental and oral health. The results showed that TR'S Dental Pop-up was effective in increasing the knowledge, attitudes and actions of teachers regarding dental and oral health. easy to operate for students.

##### ➤ Attitude Test on Teachers

The teacher's attitude was measured using a questionnaire with a total of 10 questions using a Likert scale, namely a score of 5 strongly agree, a value of 4 agrees, a value of 3 disagrees, a value of 2 disagrees and a value of 1 strongly disagrees which is given during the pre-test and post- test after 21 days of intervention. The improvement in teacher attitudes occurred in the process of implementing the media which was carried out 10 minutes before class started, this was carried out continuously for 21 days. Attitudes are formed when a person has received information and will take action after being given the information. Based on the results of the questionnaire assessment, most of the teachers have been supportive, such as the teacher has accompanied the child to brush their teeth, brush their teeth using toothpaste that contains flour and the teacher supports brushing their teeth at least 2 times a day.

The teacher's attitude about dental and oral health before and after being given training experienced a significant change, namely the results of the delta test stated in the intervention group with a difference value ( $\Delta$  3) and the control group with a different value ( $\Delta$  1.67). There was an increase before and after being given treatment, where before being given treatment the average value of the teacher's attitude was 38.00 in the intervention group increased to 41.00, in the control group the average value before being given treatment was 33.00 increased to 34.67.

Dental health in mentally retarded children is found to be in poor condition where mentally retarded children do not maintain good dental and oral hygiene because they have limitations in carrying out their own dental and oral health

maintenance so that the role of the closest people such as teachers and parents is needed. Poor dental hygiene is one of the causes of dental and oral health problems, a collection of debris or plaque will cause the salivary pH to decrease, if the salivary pH drops to a critical threshold it will cause tooth demineralization which will then cause dental caries. One of the factors causing dental caries in children is lack of knowledge about when and how to brush their teeth properly.

65

This intervention is carried out in schools so that learning about dental and oral hygiene can be conveyed properly so that it can improve children's behavior in maintaining dental and oral hygiene. Teachers can act as counselors, instructors, and motivators in showing something good, for example in maintaining dental health. Teachers who are actively involved, focused and positive have a very strong influence on student achievement.

#### ➤ *Teacher Action Test*

The teacher's actions were measured using a questionnaire with a total of 20 statements in the form of a choice of doing or not doing that is if you do a score of 1 and if you don't do a score of 0 which is given during the pre-test and post-test after 21 days of intervention. The teacher's actions regarding procedures for brushing teeth that are good and right experience changes before and after being given training. Before being given the training there were still many stages of brushing teeth that were skipped but after being given the training the stages that were not initially carried out were carried out. Based on the results of the assessment of the teacher's action questionnaire about dental and oral health before and after being given training there was a significant change, namely the results of the delta test stated in the intervention group with a difference value ( $\Delta 4$ ) and the control group with a difference value ( $\Delta 3$ ).

There was an increase before and after being given treatment, where before being given treatment the average value of the teacher's actions was 14.00 in the intervention group increased to 18.00, in the control group the average value before being given treatment was 12.67 increased to 15.67. The increase in teachers brushing their teeth occurred because during the training the teachers were given material about brushing their teeth properly and correctly. Therefore, the act of brushing the teeth of teachers is very important as one of the community empowerment efforts which can indirectly improve dental and oral health in mentally retarded children. Through teacher empowerment, education can be carried out in a sustainable manner.

Dental and oral health education is an effort to influence someone to behave well and motivate them to maintain dental and oral health and provide an understanding of ways to maintain dental and oral health.<sup>65</sup> Mentally retarded children are very vulnerable to various dental and oral health problems, such as dental caries, tartar and poor dental hygiene status. Therefore, the period of entering school is the most important stage for developing children's habits to always maintain healthy teeth and mouth through dental health education programs.

In this study teachers also need learning related to dental and oral health in order to increase the knowledge, attitudes and actions of teachers using the TR'S Dental Pop-up model. The results showed that TR'S Dental Pop-up was effective in increasing the knowledge, attitudes and actions of teachers regarding dental and oral health. easy to operate for students.

The implementation of the TR'S dental pop-up educational media was declared successful because the teacher had attended training and was given knowledge about dental and oral health maintenance, on the teacher compliance checklist sheet it was proven that the teacher was obedient in implementing it every 10 minutes before class started. The success of learning in schools depends on the role of the teacher. Teachers can act as counselors, instructors, and motivators in showing something good, for example in maintaining dental health. Teachers who are actively involved, focused and positive have a very strong influence on student achievement.

#### ➤ *Model Test on Mentally Disabled Children*

In this study, the number of respondents was 30 students consisting of the intervention group and the control group. Based on gender is not the same. Gender in the intervention group were 9 men and 6 women, while in the control group there were 7 men and 8 women. The ages of the respondents in the study were 9 people in the 9-year intervention group and 6 people in 10 years, while in the 9-year control group there were 10 people and 5 people in 10 years of age. The age in this study was grade 4 elementary school which was in the age range of 9 years to 10 years.

The characteristics of mentally retarded children are experiencing a decrease in intellectual function, namely having physical limitations in terms of behavior, development, communication difficulties so that they have a long adaptation time. From these characteristics, it can be concluded that mentally retarded children cannot carry out activities independently but need help from others.

Dental health problems are not only suffered by normal children, but also suffered by children with special needs, one of which is categorized as mentally retarded. To overcome this problem, a TR'S dental pop-up educational media was created for mentally retarded children as a learning medium to increase teeth brushing knowledge and reduce the debris index of mentally retarded children. Dental and oral health problems that are often experienced by mentally retarded children are cavities, tartar, irregular tooth position and poor dental and oral hygiene.<sup>11</sup>

In mentally retarded children, dental health problems are the responsibility of a mother. This is understandable because in general the person closest to the child is the mother. Mentally retarded children do require strict guidance from both teachers at school and parents at home who require extraordinary patience. The role of teachers and parents is very decisive.

Dental and oral health knowledge is important in forming a healthy attitude. Good knowledge will have an impact on the behavior of caring for good dental and oral health as well. Oral



health is a fundamental part of general health and well-being. Dental and oral health is the main indicator of overall health which can interfere with the health of other organs of the body.<sup>2</sup>

Dental and oral health education is an effort made to improve a person's habits, namely habits for healthy living in the field of dental and oral health. Dental health education is not only the responsibility of the government but the responsibility of all parties, with counseling it will increase one's knowledge and abilities through learning practice techniques that aim to change human attitudes both individually and in groups so as to increase awareness to always maintain oral hygiene.

Technological developments can be used as a solution to innovate in the field of learning, especially in the manufacture and development of learning media so that the learning process is more interesting which has an impact on student learning interest.<sup>61</sup> TR'S Dental Pop-up is a learning medium that can be seen and heard, on TR'S dental pop-up media it will present pictures and audio so that it can stimulate attention, thoughts and feelings in mentally retarded children. Audio visual media is a combination of sound and image media, this type of media will provide complete information so that students will easily observe every step that is delivered, audio visual media is very suitable for learning in the classroom and is used in moderately mentally retarded children because are more likely to be able to perceive material through sight and hearing.

Everyone has a different attitude towards certain things, attitudes show judgments, feelings and actions towards an object. Different attitudes occur because of the understanding, experience, and considerations that have been experienced by someone in an object. After being given treatment and being trained to brush their teeth for 21 days, most of the children began to understand how to brush their teeth properly and correctly and use the right toothbrush and toothpaste because mentally retarded children in this category are mentally retarded children who are able to train.

The most important thing in maintaining dental and oral hygiene is awareness and behavior in maintaining dental and oral hygiene. One of the efforts to prevent dental and oral health problems in children is the need for continuous dental health education in schools which will become an oral health program. Dental health education through counseling which is carried out on an ongoing basis aims to change behavior from unhealthy aspects of knowledge, attitudes, and actions towards healthy behavior.

The emphasis on the concept of health education is to improve the target's behavior so that it behaves healthily, especially the cognitive aspect, so that the target knowledge of the counseling is as expected by the health instructor, so the next instructor will be carried out in accordance with the program that has been planned.

The act of brushing the teeth of mentally retarded children underwent changes before the intervention and after the intervention was carried out. Tooth brushing skills were assessed through a checklist consisting of 20 assessment points.

Before the intervention, there were still many stages of brushing teeth that were not carried out, but after the intervention, the points increased from each stage. what to do when brushing your teeth. The act of brushing teeth in mentally retarded children has increased because TR'S dental pop-up educational media has many advantages, namely having attractiveness because it involves the senses of sight and hearing so that it can stimulate the minds of mentally retarded children.

There was an increase before and after being given treatment, where before being given treatment the average value of student action was 10.27 in the intervention group increased to 16.07, in the control group the average value before being given treatment was 9.60 increased to 13.7. The results of the effectiveness test of the value of change ( $\Delta$ ) pre-post test there was a significant change in the actions of mentally retarded children in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group of 5.8 and in the control group of 4.1. The more often the child performs dental and oral health maintenance, the better the health condition of his teeth and mouth will be.

Based on the results of the effectiveness test of paired variable data, it was shown that the data on brushing teeth in mentally retarded children showed a p-value in the intervention group of 0.000 ( $p < 0.005$ ), meaning that the TR'S dental pop-up educational model was effective in increasing the action of brushing teeth in mentally retarded children. This is in line with research conducted by Latuconsina, R and Maelissa in 2019 that audio-visual media improves teeth brushing skills.<sup>66</sup>

Mentally retarded children are children who have physical limitations in terms of behavior, development, difficulty communicating so that they have a long adaptation time. From these characteristics, it can be concluded that mentally retarded children cannot carry out activities independently but need help from others.<sup>10</sup> In this study students will get learning from the teacher about dental and oral health using TR'S Dental Pop-up media, the learning process at school is implemented by the teacher every 10 minutes before class begins as evidenced by filling in the teacher's obedience sheet for 21 days, while at home the parents always guiding children to brush their teeth 2 times a day as evidenced by filling in the tooth brushing checklist given. Stage by stage has had a meaningful change because learning how to brush your teeth is given continuously so that it will change one's behavior in a better direction.

Debris measurements in this study were carried out during the pre-test and post-test. Debris is a soft deposit resulting from food residue and will soon be liquefied by bacterial enzymes and clean 5-30 minutes after eating, but there is a possibility that some may still remain on the surface of the teeth and mucous membranes. as well as the shape and arrangement of the teeth and jaw will affect the speed of cleaning food residue so that it will stick tightly to the surface of the teeth which over time will harden and be called calculus.

Based on the results of the effectiveness test of the paired variable data, it was shown that the debris data on mentally retarded children showed a p-value of the intervention group of 0.000 ( $p < 0.005$ ). The debris index score for mentally retarded children has decreased because mentally retarded children have been taught how to brush their teeth properly and correctly. The practice of brushing teeth with good and correct techniques will improve dental and oral hygiene in mentally retarded children.<sup>67</sup> the index debris score decreased after being given dental and oral health education through the TR'S dental pop-up educational model. This is in line with previous research which stated that brushing your teeth with good and correct techniques will improve dental and oral hygiene<sup>68</sup>

The results of the effectiveness test for the value of change ( $\Delta$ ) in the pre-post test showed a significant change in the reduction of index debris for mentally retarded children in the control and intervention groups with a difference value ( $\Delta$ ) in the intervention group was 0.97 and the control group was 0.86. The effectiveness test of debris unpaired data in mentally retarded children showed a p-value of 0.012 ( $p < 0.05$ ) meaning that TR'S dental pop-up media was more effective in reducing index debris in mentally retarded children than pop-up book media without audio.

The TR'S dental pop-up educational model was declared successful in changing the habit of brushing the teeth of mentally retarded children. It can be seen that after 21 days mentally retarded children are able to do proper tooth brushing thereby reducing the index debris number in mentally retarded children. The success of TR'S dental pop-up educational media is due to its 21-day implementation of the learning process by involving teachers in guiding and accompanying children in brushing their teeth. Mentally retarded children can practice brushing their teeth by teaching them repeatedly and direct instructions.<sup>68</sup> This is in accordance with the theory of stimulus-response behavior change (SOR) which states that changes in behavior depend on the stimulus or stimulus given. CHAPTER IV Using the Template.

#### IV. CONCLUSION

Based on the results of this study it can be concluded that the TR'S dental educational model gamification-based pop-ups are feasible and their application is effective in increasing tooth brushing behavior in mentally retarded children, this is evidenced by:

- The TR'S dental pop-up educational model is appropriate as a learning medium to improve the tooth brushing behavior of mentally retarded children.
- Its application is effective in increasing the knowledge of SLB teachers about how to brush their teeth compared to the control group. This is statistically proven by the p-value of 0.047.
- The application of the TR'S dental pop-up educational model is effective in increasing the attitudes of SLB teachers about how to brush their teeth compared to the control group, this is statistically proven by the p-value of 0.024
- The application of the TR'S dental pop-up educational model effectively increases the actions of SLB teachers on

how to brush their teeth compared to the control group, this is statistically proven by the p-value of 0.013 The TR'S dental pop-up educational model effectively increases the actions of mentally retarded children on how to brush their teeth compared to the control group, this was statistically proven by the p-value of 0.002

- The TR'S dental pop-up education model is effective in reducing debris scores for mentally retarded children compared to the control group, this is statistically proven by the p-value of 0.012

#### REFERENCES

- [1]. Jacob de, sandjaya. Faktor faktor yang mempengaruhi kualitas hidup masyarakat karubaga district sub district tolikara propinsi papua. *J nas ilmu kesehat*. 2018;1(69):1–16.
- [2]. Kementerian kesehatan republik indonesia. *Risikesdas* 2018. Kementerian kesehat republik indones. 2018;
- [3]. Kementerian kesehatan ri. Faktor risiko kesehatan gigi dan mulut. *Pus data dan inf kementeri kesehat ri*. 2019;1–10.
- [4]. Belda-ferre p, alcaraz ld, cabrera-rubio r, romero h, simón-soro a, pignatelli m, et al. The oral metagenome in health and disease. *Isme j*. 2012;6(1):46–56.
- [5]. Rohmawati n. Karies gigi dan status gizi anak. *Stomatognatic (jkg unej)*. 2016;13(1):32–6.
- [6]. Santoso b, gejr n, fatmasari d. Information system monitoring model implemented in school health dental unit. *Arc j dent sci*. 2017;2(4):8–11.
- [7]. Wardani k. Hakikat pendidikan khusus. *Penagantar pendidik anak berkebutuhan khusus*. 2017;1–51.
- [8]. Weckwerth sam, weckwerth gm, ferrairo bm, chicala gm, ambrosio amn, toyoshima ghl, et al. Parents' perception of dental caries in intellectually disabled children. *Spec care dent*. 2016;36(6):300–6.
- [9]. Nawang palupi d, rachmawati r, octarina angraini z. Peran perawat dalam meningkatkan kebersihan gigi dan mulut anak tunagrahita. *E-prodenta j dent*. 2017;1(1):32–44.
- [10]. Santoso b. The effect of dental health education methods through teacher training to the behaviors of the teachers and dental hygiene of children with intellectual disability. *J med sci clin res*. 2018;6(5):952–6.
- [11]. Kencana igs. Peranan perawat gigi dalam pemeliharaan kesehatan gigi dan mulut pada anak berkebutuhan khusus (disabled children). *J kesehat gigi [internet]*. 2014;2(2):261–2. Available from: <http://www.poltekkes-denpasar.ac.id/keperawatangigi/wp-content/uploads/2017/01/8-peranan-perawat-gigi-dalam-pemeliharaan-kesehatan-gigi-dan-mulut-pada-anak-berkebutuhan-khusus-i-gede-surya-kencana-jkg-denpasar.pdf>
- [12]. Atyanta a, hanum f, amurwaningsih m. Hubungan tingkat pengetahuan ibu tentang karies dan peran ibu dalam mencegah karies pada anak tunagrahita. *Medali j*. 2012;2(1):48–52.
- [13]. Istiqomah f, susanto h, udiyono a, adi m. Gambaran karies gigi pada anak tunagrahita di slb c kota semarang. *J kesehat masy*. 2016;4(4):359–62.

- [14]. Triyanto r. Gambaran status kesehatan gigi dan mulut pada anak tunagrahita usia 12-18 tahun di slb negeri widiasih kecamatan pari kabupaten pangandaran kesimpulan gambaran kebersihan gigi dan mulut pada anak tunagrahita di slbn widiasih kecamatan parigi kabupaten pan. *Indones oral heal j.* 2015;2(1):24–30.
- [15]. Julia dr, yani rwe, budirahardjo r. Hubungan jenjang pendidikan terhadap perilaku menjaga kesehatan gigi dan mulut anak tunagrahita di slb kota sidoarjo (the correlation between education level and oral health behavior of intellectual disability children in slb sidoarjo). *Pustaka kesehat [internet]*. 2018;6(2):371–7. Available from: <file:///c:/users/acer/appdata/local/temp/document.pdf>
- [16]. Notoatmodjo. Notoatmodjo. Pengetah sikap dan perilaku. 2014;2(1):1–7.
- [17]. Kemenkes ri. Pedoman usaha kesehatan gigi sekolah (ukgs) [internet]. 2012. 2 p. Available from: <http://pdgi.or.id/wp-content/uploads/2015/04/ukgs.pdf>
- [18]. Santoso b, susanto e, widyawati mn, rasipin, rahman wa, rajiani i. Revitalizing school dental health effort through “model 222” as a strategy to achieve caries free indonesia 2030. *Syst rev pharm.* 2020;11(2):658–62.
- [19]. Taftazani rz, rismayani l, santoso b, wiyatini t. Analisis program kegiatan usaha kesehatan gigi sekolah (ukgs) di puskesmas halmahera. *J kesehat gigi.* 2015;02(1):25–31.
- [20]. Rosmaya i, sulaeman s, purwati nh. Pengaruh video interaktif dan media gambar terhadap kemampuan merawat diri pada anak tunagrahita. *J telenursing.* 2019;
- [21]. Nurwanti; w, nurwanti; w. Model media widi’s puzzle modifikasi 3d gosgi sebagai upaya peningkatan keterampilan menggosok gigi anak tunagrahita. 2019 [cited 2021 jul 22]; available from: [http://repository.poltekkes-smg.ac.id/index.php?p=show\\_detail&id=17830&keywords=](http://repository.poltekkes-smg.ac.id/index.php?p=show_detail&id=17830&keywords=)
- [22]. Akbar, hasrul n, day ak, baharuddin vi, lenggany wf, asmawati. Pengaruh media pop-up terhadap peningkatan pengetahuan dan kesehatan gigi dan mulut siswa-siswi di sekolah dasar no.19 limboro, majene. 2020;2(1):104–8.
- [23]. Dari h, randum b, dan sh, studi p, biologi p, pmipa j. Kelayakan pop up book materi keanekaragaman artikel penelitian oleh : 2018;
- [24]. Putri qk, pratjojo p, wijayanti a. Pengembangan media buku pop-up untuk meningkatkan kemampuan menyimak tema menyayangi tumbuhan dan hewan di sekitar. *J pedagog dan pembelajaran.* 2019;2(2):169.
- [25]. Suyami, purnomo rt, sutantri r. Edukasi menggosok gigi terhadap kemampuan anak menggosok gigi pada anak tunagrahita di slb shanti yoga klaten. *J ilmu kesehat.* 2019;14(1):93–112.
- [26]. Rizkika n, christiono s. Efektivitas buku pop-up terhadap pemahaman kesehatan gigi anak berkebutuhan khusus. 2018;1(1):22–5.
- [27]. Lestari rd, irawati n, murniwati m. Efektivitas media pop-up card terhadap pengetahuan kesehatan gigi dan mulut anak usia 8-9 tahun. *Andalas dent j.* 2017;5(1):31–9.
- [28]. Notoatmodjo s. Promosi kesehatan dan perilaku kesehatan. Rineka cipta; 2012.
- [29]. Sulistyowati s, rachman a. Pemanfaatan teknologi 3d virtual reality pada pembelajaran matematika tingkat sekolah dasar. *J ilm nero [internet]*. 2017;3(1):37–44. Available from: <http://nero.trunojoyo.ac.id/index.php/nero/article/download/71/77>
- [30]. Munadi y. Media pembelajaran sebuah pendekatan baru. Jakarta selatan: gp press group; 2013.
- [31]. Manshur u, ramdlani m. Media audio visual dalam pembelajaran pai. *Al murabbi.* 2020;5(1):1–8.
- [32]. S karo-karo irsyah rasyin. Manfaa media dalam pembelajaran. *Axiom j pendidik dan mat.* 2018;vii, no. 1.
- [33]. Dewanti h, toenlioe aje, soepriyanto y. Pengembangan media pop-up book untuk pembelajaran lingkungan tempat tinggalku kelas iv sdn 1 pakuaden kabupaten ponorogo. *J kaji teknol pendidik [internet]*. 2018;1:221–8. Available from: <http://journal2.um.ac.id/index.php/jktp/article/viewfile/4551/3408>
- [34]. Desta setyawan uhm. Penerapan media pop up book untuk meningkatkan keterampilan berbicara. *J didakt dwija indria.* 2014;2(11).
- [35]. Noviyanti l, santoso k, habibah na. Keefektifan penggunaan kartu bergambar berbentuk pop up card pada pembelajaran siswa smp. *Lembaran ilmu kependidikan.* 2013;42(2):76–83.
- [36]. Sukmawarti e. Pengembangan media pop up book pada pembelajaran pkn di sd. *Abil j educ soc anal.* 2021;110–22.
- [37]. Winarsih s, hendra j, idris fh, adnan e. Panduan penanganan nak berkebutuhan khusus bagi pendamping (orang tua, keluarga, dan masyarakat). Kementerian pemberdaya peremp dan perlindungan anak republik indones [internet]. 2013;1–17. Available from: [https://www.kemenpppa.go.id/lib/uploads/list/b3401-panduan-penanganan-abk-bagi-pendamping-\\_orang-tua-keluarga-dan-masyarakat.pdf](https://www.kemenpppa.go.id/lib/uploads/list/b3401-panduan-penanganan-abk-bagi-pendamping-_orang-tua-keluarga-dan-masyarakat.pdf)
- [38]. Novita y. Relasi karakteristik anak tunagrahita dengan pola tata ruang belajar di sekolah luar biasa. *E-journal grad unpar.* 2014;1(2):111–24.
- [39]. Widiastuti nlgk, winaya ima. Prinsip khusus dan jenis layanan pendidikan bagi anak tunagrahita. *J santiaji pendidik.* 2019;9(2):116–26.
- [40]. Listrianah. Indeks karies gigi ditinjau dari penyakit umum dan sekresi saliva pada anak di sekolah dasar negeri 30 Palembang 2017. *Jpp (jurnal kesehat Palembang).* 2017;12(2):136–48.
- [41]. Tulangow gj, pangemanan dhc, parengkuan wg. Gambaran status karies pada anak berkebutuhan khusus di slb ypac manado. *E-gigi.* 2015;3(2).
- [42]. Arini nw. Perilaku pasien terhadap upaya pembersihan karang gigi. Vol. 1, *jurnal kesehatan gigi.* 2013. P. 16–21.
- [43]. Ratya utari t, kurnia putri m. Orthodontic treatment needs in adolescents aged 13-15 years using orthodontic treatment needs indicators. *J indones dent assoc.* 2019;2(2):49.
- [44]. Aida borges-yanez s, castrejón-pérez rc, camacho mei. Effect of a school-based supervised tooth brushing program in mexico city: a cluster randomized intervention. *J clin pediater dent.* 2017;

- [45]. Rams te, alwaqyan ay. In vitro performance of diagnodont laser fluorescence device for dental calculus detection on human tooth root surfaces. *Saudi dent j* [internet]. 2017;29(4):171–8. Available from: <http://dx.doi.org/10.1016/j.sdentj.2017.08.001>
- [46]. Fatmasari d, sunarjo l. Floride absord on extracted teeth after immersing in flouride tablet, fluocol solution and flouride dentrifice ( in vitro test). *Odonto dental journal*. 2016;3:42–7.
- [47]. Ariyanto a. Faktor - faktor yang berhubungan dengan perilaku pemeliharaan kebersihan gigi dan mulut di kelurahan wonoharjo kabupaten tanggamus. *J anal kesehat*. 2019;7(2):744.
- [48]. Motto cj, mintjelungan cn, ticoalu shr. Gambaran kebersihan gigi dan mulut pada siswa berkebutuhan khusus di slb ypac manado. *E-gigi*. 2017;5(1).
- [49]. Hanif f, sunarjo l, santoso b, djamil m, suwondo a, fatmasari d. 3d braille as media in improving tooth brushing skill for blind children. *Int j innov sci res technol*. 2020;5(6):1414–7.
- [50]. Siwiendrayanti a, pawenang et, indarjo s. Changes in knowledge, behavior, and environmental control for filariasis prevention with “mandiri” pocket book in pekalongan city society: a longitudinal study. *J pendidik ipa indones*. 2019;8(2):177–84.
- [51]. Syamsuddin abubakar m. Gambaran teknik menyikat gigi terhadap terbentuknya karang gigi supra gingival pada masyarakat desa botto kecamatan takkalalla kabupaten wajo. 2018;17(1):20–4.
- [52]. Listriana h. Hubungan menyikat gigi dengan pasta gigi yang mengandung herbal terhadap penurunan skor debris pada pasien klinik gigi an-nisa palembang. *Jur keperawatan gigi poltekkes kemenkes palembang*. 2017;12:83–94.
- [53]. Van leeuwen mpc, van der weijden fa, slot de, rosema mam. Toothbrush wear in relation to toothbrushing effectiveness. *Int j dent hyg*. 2019;17(1):77–84.
- [54]. Shaluhayah z, nugraha p, tanjungkarang pk, promosi m, universitas k, semarang d, et al. Perilaku menggosok gigi pada siswa sekolah dasar kelas v dan vi di kecamatan sumberejo. *J promosi kesehat indones*. 2016;9(2):127–35.
- [55]. Suryani l. Gambaran menyikat gigi terhadap tingkat kebersihan gigi dan mulut pada murid kelas v di min 9 kecamatan ulee kareng kota banda aceh. *Biot j ilm biol teknol dan kependidikan*. 2018;5(2):149.
- [56]. Kantohe zr, wowor vns, gunawan pn. Perbandingan efektivitas pendidikan kesehatan gigi menggunakan media video dan flip chart terhadap peningkatan pengetahuan kesehatan gigi dan mulut anak. *E-gigi*. 2016;4(2):7–12.
- [57]. Asio. Pengaruh pelatihan menggunakan modul cara menyikat gigi terhadap pengetahuan guru sd unggul sakti kota jambi. *J kesehat gigi*. 2016;03(1):1–4.
- [58]. Mu gm, hu y, wang y. Building resilience of students with disabilities in china: the role of inclusive education teachers. *Teach teach educ*. 2017;
- [59]. Putri mh, herijulianti eliza nn. Ilmu pencegahan penyakit jaringan keras dan jaringan pendukung gigi. Jakarta: egc penerbit buku kedokteran. 2010.
- [60]. Sijabat psb, hatta i, sari gd. Hubungan pengetahuan, sikap, dan tindakan lansia dengan status kebersihan gigi dan mulut (tinjauan pada panti sosial tresna werdha di kalimantan selatan). *Dentin (jur ked gigi)*. 2020;iv(2):32–8.
- [61]. Saputra vh, febriyanto e. Media pembelajaran berbasis multimedia untuk anak tuna grahita. *J pendidik mat* [internet]. 2019;1(1):15. Available from: <https://ejournal.teknokrat.ac.id/index.php/jurnalmathema/article/view/350/247>
- [62]. Penelitian j, indonesia p, cetak m, online m, negeri smp, prov ks, et al. Menyimak berita dengan menggunakan media endah kusumoningrum. 2022;7(1):1–10.
- [63]. Astutik s, prahani bk. The practicality and effectiveness of collaborative creativity learning (ccl) model by using phet simulation to increase students’ scientific creativity. *Int j instr*. 2018;11(4):409–24.
- [64]. Gumilar ms, kurnianti r, sari d. Pendidikan kesehatan gigi dan pelatihan kartu terampil menyikat gigi berbasis inter professional coloboration ( ipc ) pada guru dan murid di sekolah luar biasa negeri ( slbn ) muaro jambi. 2022;4(3):753–61.
- [65]. Riolina a. Peran guru dalam meningkatkan kesehatan gigi dan mulut siswa di sekolah dasar. *J ilmu kedokt gigi*. 2017;1(2):51–4.
- [66]. Latuconsina r, maelissa sr, noya i. Metode penyuluhan audiovisual dan simulasi efektif meningkatkan keterampilan menggosok gigi siswa. *Moluccas heal j*. 2019;1(1):30–6.
- [67]. Liu hy, chen cc, hu wc, tang rc, chen cc, tsai cc, et al. The impact of dietary and tooth-brushing habits to dental caries of special school children with disability. *Res dev disabil*. 2010;31(6):1160–9.
- [68]. Arifian e, chairanna i, prasetyowati s. Hubungan praktik menyikat gigi dengan debris index siswa tunagrahita di slb b-c optimal surabaya. *J skala kesehat*. 2022;13(2):113–21.