

# Website-Based Infographic Dental Health Educational Media to Improve Oral and Dental Health Behavior Elementary School Students

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**Abstract:** Dental and oral health problems in elementary school students belong to the high category. Website-based infographic media is an educational media packaged on a website that contains information about maintaining oral and dental health that aimed to make it easier for children to receive and understand information clearly and can be solved independently so that it can change behavior. The purpose of this study was to produce a website-based infographic dental and oral health education media that is feasible and effective against changes in brushing behavior in elementary school students. This study used R&D methods and product/model trials (study true experimental control group pretest and posttest design). The subjects of this study were elementary school students aged 10-11 years divided into 2 groups, namely website-based infographics as an intervention group and animated videos as a control group, and the duration of treatment for 21 days. The data were tested using the Wilcoxon and Mann-Whitney tests. The results of the website-based infographic expert validation research averaged 87.17 (very feasible) as a medium for promoting dental health in elementary school students were shown with a p-value of 0.000. This medium was effective in increasing knowledge  $p=0.000$ , attitude  $p=0.000$ , action  $p=0.000$ , and debris index score  $p=0.000$  compared to the control group. This study concluded that the application of a website-based infographic conducted for 21 days was effective in improving dental and oral health behaviors in elementary school students compared to the control group.

**Keywords:** Infographics, websites, debris indexes, behavior

## I. INTRODUCTION

Health is one of the markers of a prosperous society, characterized by the achievement of the right to a healthy life with the existence of a health system that can prove the protection of the community from various aspects. In accordance with the development goals in Indonesia, namely toward a Healthy Indonesia 2025, namely fostering a sense of awareness, desire, and skills to live a healthy life in each individual (Depkes RI, 2009).

The results of Riskesdas 2018 showed that children aged 5-14 years who experienced dental and oral health problems totaled 182,252 children. Dental and oral health problems that occur in children aged 5-14 years were 47.7% caries teeth, teeth lost due to avulsion loss 26.6%, mobile teeth 17.35%, and filled teeth 3%. The most common dental and oral disease experienced by children is dental caries. The

prevalence of caries in the age group of 5-9 years was 92.6% and in the age of 10-14 years was 73.4%. In general, the prevalence of dental and oral problems in the age group of 5-9 years and 10-14 is 67.3% and 55.6% but in the age group of 5-9 years who receive treatment from dental medical personnel only 14.6% and in the age group of 10-14 years by 9.4% (Kemenkes RI, 2018).

At primary school age, more efforts are needed to maintain and prevent tooth decay so that the teeth last longer in the mouth. The consequences that can result from dental and oral diseases are that they can affect the quality of life of school-age children where they will experience pain, acute and chronic infections, eating and sleep disorders, and can reduce study time at school. Dental health problems can be caused by poor dental hygiene (Kemenkes RI, 2018). The dental health maintenance program implemented in schools through UKGS has not been able to change the behavior of students in brushing their teeth for the better and correctly, because it is only carried out once a year. The habit of maintaining healthy teeth and oral cavity can be started from behaviors developed since childhood (E. Sari et al., 2019) (Santoso et al., 2020).

Learning media is something that can guide and convey information that can stimulate thoughts, feelings, and willingness to learn to encourage the creation of a learning process (E. Sari et al., 2019). With the help of interesting media, students will be more motivated to learn. The development of Science and Technology (IPTEK) today is very useful for more effective learning. One of the media being developed is infographic interactive media which is an innovative and interesting way to convey information intuitively, colorfully, and concisely. Infographic media includes visual media that is channeled to stimulate the sense of sight because the message conveyed is poured into symbols and image (Siricharoen & Siricharoen, 2018). Infographics can present information interestingly and visualize complex data and information to be easy to read and understand which can make students more enthusiastic in understanding the material. Interactive infographics are infographics displayed on the website. users can interact with the information communicated through the user regarding the data that

appears through the user's interface design (Shafipoor et al., 2016).

## II. RESEARCH METHODS

This research is a *Research and Development (R&D)* that aims to develop a learning model for dental and oral health in elementary school students. The Research and Development (R&D) procedure consists of 5 main steps, namely: 1) information collection, 2) model design, 3) expert validation and revision, 4) model testing, and 5) model results.

Products that have been designed will be experimented. The type of experiment used is a true experiment (pre and post-test with control group design). The research was conducted at SDN Pedalangan 1 and SDN Kramas Kota Semarang Indonesia in March-April 2022. Students were given informed consent for the consent form to become research respondents. Students who agree by signing the informed consent are then selected using random sampling. The data collection technique used random sampling, with as many as 33 students for the intervention group and 33 students for the control group. The study was carried out for 21 days. The pretest is carried out on the 1st day and the post-test is carried out on the 21st day.

## III. RESULTS

### Collection of Information

The results of information collection carried out by the interview method obtained conclusions to form the independence of elementary school students in changing health behaviors, efforts are needed to provide appropriate educational methods and are supported by various learning media that can attract attention so that elementary school students can understand and carry out the intentions of the media. To support learning success, learning media is needed. Because, with the availability of learning media, students may think more concretely and can reduce verbalism students. Learning media when designed properly is an effective learning media and can facilitate and improve the quality of learning. A learning medium for changing dental and oral health behaviors suitable for improving dental and oral health behaviors is a website-based dental and oral health infographic (Aisyah et al., 2020). The display of the infographic interactive helps to attract attention and understanding of specific and complex information. Infographics and graphic videos displayed on websites are acceptable and tend to be easier to understand images than text that can change behavior for the better (Rejeki et al., 2020).

### Expert Validation

Table 1. Expert Validation Results

Expert Validation				
No.	Name	Score	Average	P-Value
1.	IT Expert	84,61%		
2.	Media Expert	84,61%		
3.	Health Promotion Expert	92,30%	87,17%	0,000

\*Intraclass Correlation Coefficient

Table 1 is the result of expert validators, it is known that the feasibility score of 0.971 and a p-value value= 0.000 which means that website-based dental and oral health infographic interactive educational media is feasible as a model for dental and oral health education in elementary school students.

### Model Trials

Table 2. Normality Test of Primary School Student Data in Intervention Group and Control Group

Variable	Intervention Group			Control Group		
	Mean	SD	P-Value	Mean	SD	P-Value
<b>Knowledge</b>						
Pre-test	5,73	0,911	0,000	4,58	1,370	0,023
Post-test	8,82	0,950		6,76	0,957	
<b>Attitude</b>						
Pre-test	27,12	5,819	0,000	23,03	5,850	0,001
Post-test	43,97	1,741		32,39	6,490	
<b>Action</b>						
Pre-test	5,55	1,034	0,000	4,85	1,302	0,012
Post-test	8,85	2,093		6,82	1,014	
<b>Debris index score</b>						
Pre-test	2,497	0,3405	0,000	2,245	0,4651	0,024
Post-test	0,576	0,2000		0,973	0,2719	

\*Statistical Test: Wilcoxon test: Paired Data Test

Table 2 shows the results of the data normality test of elementary school students in the intervention group and the control group shows that the p-value of <0.05, so that it can be concluded that the data is not normally distributed, then using a non-parametric test, namely the *Wilcoxon test* (paired data effectiveness test).

Table 3. Effectiveness of Paired Data Website-Based Infographics in Intervention Groups and Control Groups

Variable	Intervention Group			Control Group		
	Mean	SD	P-Value	Mean	SD	P-Value
<b>Knowledge</b>						
Pre-test	5,73	0,911	0,004	4,58	1,370	0,001
Post-test	8,82	0,950	0,001	6,76	0,957	0,002
<b>Attitude</b>						
Pre-test	27,12	5,819	0,003	23,03	5,850	0,002
Post-test	43,97	1,741	0,011	32,39	6,490	0,010
<b>Action</b>						
Pre-test	5,55	1,034	0,009	4,85	1,302	0,009
Post-test	8,85	2,093	0,000	6,82	1,014	0,007
<b>Debris index score</b>						
Pre-test	2,497	0,340	0,001	2,245	0,465	0,009
Post-test	0,576	0,200	0,029	0,973	0,271	0,000

Table 3 shows that the results of the paired Wilcoxon test for oral health knowledge, dental and oral health attitudes, tooth brushing actions, and debris index scores in the *intervention group p-value* 0.000 (p<0.05) meaning that website-based dental and oral health infographic interactive educational media effectively increase knowledge, attitudes, actions, and reduce the debris index score of elementary

school students. The *p-value* in the control group of the knowledge variable *p-value* of 0.023, the *p-value* attitude of 0.001, the *p-value* action of 0.012, and the *debris index score* of *p-value* 0.024 means that the animated video improves dental and oral health knowledge, dental and oral health attitudes, brushing actions, and debris index scores of elementary school students.

Table 4. Effectiveness of Website-Based Infographics and Animated Videos On Knowledge, Attitudes, Actions, And Debris Index Scores In Intervention Groups And Control Groups

Variable	Intervention Group		Group Control		P-Value
	Δ Delta	SD	Δ Delta	SD	
<b>Knowledge</b>					
Pretest-Posttest	3,09	1,691	2,18	1,691	0,032
<b>Attitude</b>					
Pretest-Posttest	16,85	8,552	9,36	8,552	0,000
<b>Action</b>					
Pretest-Posttest	3,3	1,679	1,97	1,679	0,001
<b>Debris index score</b>					
Pretest-Posttest	-1,921	0,5560	-1,272	0,5560	0,000

\*Statistical Test: Mann-Whitney; Unpaired Test.

Table 4 shows that the test results are not paired with knowledge variable *p-value* 0.032, *p-value* attitude 0.000, *p-value* action 0.001, and debris index *p-value* score 0.000 that the *p-value* between intervention and control groups ( $p < 0.05$ ) there is a significant difference between intervention and control groups, meaning that website-based dental and oral health education media is effective in increasing the dental and oral health knowledge of elementary school students compared to animated video.

The product is a website-based dental and oral health education media which is the output of the development of dental health promotion media. This media contains material in the form of how to brush your teeth, food and drinks that can nourish and damage teeth, tools used to clean teeth, and dental and oral diseases.



Picture 1. Cover Website



Picture 2. Content Page

#### IV. DISCUSSION

The results of the paired data effectiveness test in table 4 of the variable dental and oral health knowledge of the *intervention group p-value* 0.000 ( $p < 0.05$ ) means that the use of website-based dental health infographic media is effective in increasing knowledge and the control group *p-value* 0.023 ( $p < 0.05$ ), it means that the use of animated video media in the control group is effective in increasing knowledge, but the *p-value* in the control group is lower than the *p-value* of the interventions group, which means that educational media interventions infographics on oral and dental health are more effective at improving the knowledge of primary school students.

Knowledge is a cognitive domain that is one of the main causative factors for changes in individual behavior, in order to form actions as a result of these changes. To support the improvement of knowledge, you can use media as a learning tool (Aulia et al., 2021).

To increase knowledge, students can use media in the learning process, one of the media that can be used is website-based infographic media. Infographic media Infographics can help visualize complex information into easy-to-read and easy to understand [10]. In line with other studies, that the use of infographics is effective at improving students' intellectual and skill skills (Senjaya et al., 2019).

The results of the effectiveness test paired data on the intervention group's attitude variable *p-value* 0.000 ( $p < 0.05$ ) means that the use of website-based dental health infographic media is effective in improving dental and oral health attitudes and in the control group *p-value* 0.001 ( $p < 0.05$ ), meaning that the use of animated video media in the control group is effective in increasing knowledge, but the *p-value* in the control group is lower than the *p-value* intervention groups that mean educational media interventions infographics on oral and dental health are more effective in improving the attitudes of primary school students.

According to Notoatmodjo in 2012, attitudes were formed through many levels, including accepting, responding, respecting, and being responsible. Attitude is an individual's reaction to a stimulus from a certain object that can cause opinions and emotions. Attitude is a stimulus to an object that has been known by showing a certain attitude of both positive and negative nature. Revealed that health education is one of the efforts of health education or promotion aimed at increasing a person's level of knowledge and attitudes, in other words counseling can have a positive effect on the health maintenance and improvement (Notoatmodjo, 2012).

Supported by previous research, suggests that children with good knowledge of how to maintain dental health, will have a good attitude as well. Attitudes are influenced by knowledge, as well as in this study when children's knowledge increases, there is also an increase in children's attitudes towards how to brush their teeth properly (Aulia et al., 2021).

The results of the effectiveness test paired data on the action variable in the intervention group in the *p-value* of 0.000 ( $p < 0.05$ ), meaning that the dental and oral health infographic educational media was effective in improving the teeth brushing skills of elementary school students, meaning that the use of website-based dental health infographic media is effective in increasing actions and in the *p-value* control group 0.012 ( $p < 0.05$ ), meaning that the use of animated video media in the control group was effective in improving actions, but the *p-value* in the control group was lower than the *p-value* of the intervention group which means that dental and oral health infographic educational media interventions were more effective at improving the actions of elementary school students.

Brushing skills can also affect the hygiene and health of oral teeth. Brushing teeth is a fine motor activity that can be applied to children so that the role of parents or educators is still very large in determining success in maintaining children's dental health (S. A. N. Sari et al., 2019). Leighbody explained that skills trained through practice over and over again will become habitual or automatic. In accordance with the research of Latuconsina, R and Maelissa in 2019 that audio-visual media can improve students' teeth brushing skills (Latuconsina et al., 2019).

The results of the paired data effectiveness test for the variable debris index score of the *intervention group p-value* 0.000 ( $p < 0.05$ ), meaning that the dental and oral health infographic educational media effectively lowered the debris index score of elementary school students and the *p-value* control group of 0.024 ( $p < 0.05$ ), meaning that the use of animated video media in the control group was effective in lowering the debris index score, but the *p-value* in the control group was lower than the *p-value of the control group*. intervention groups that mean dental and oral health infographic educational media interventions are more effective at lowering primary school students' debris index scores. The debris index score decreased after being given dental and oral health education through website-based infographics.

Other studies have shown that the practice of brushing teeth with the correct technique will improve the hygiene of the child's teeth and mouth (Bestfy Anitasari & Ramadhan, 2020). Changes in behavior are influenced by changes in knowledge. The better the knowledge, the better a person's *personal hygiene* (Hidayah, 2020).

The unpaired test of table 5 of the control and intervention groups showed that the *p-value* of  $< 0.05$ , meaning that the educational media infographics on dental and oral health was more effective in increasing knowledge, attitudes, and skills and skills of dental and oral health as well as reducing the debris index score of elementary school students compared to with animated videos. This is indicated by the average value of knowledge from 5.73 to 8.82, the average attitude of 27.12 to 43.97, the average action of 5.55

to 8.85, and the average debris index score of 2.4 to 0.5 with the good category. This is because website-based dental and oral health infographics have advantages including providing more concise information in the form of visual images and explained using videos. This infographic is packaged in the form of a website so that students can read and learn this infographic anywhere. The website serves to display documents on a web that allows users to access the internet through software connected to the internet (Destiningrum & Adrian, 2017).

## V. CONCLUSION

The website-based dental and oral health infographic educational media is feasible and its application is effective in improving dental and oral health maintenance behavior in elementary school students, this is evidenced by the results of research. Website-based infographic media is feasible as a medium for dental and oral health education in elementary school students with a score ( $p = 0.000$ ). The website-based dental health infographic educational media is effective as an educational medium for elementary school students towards increasing dental health knowledge, dental health attitudes, brushing skills, and decreasing debris index scores compared to the control group with ( $p < 0.005$ ). Website-based infographic education media is effective in improving dental and oral health maintenance behavior compared to animated videos with ( $p < 0.05$ ).

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