

# Gamification-based 3d Puzzle as an Effort to Improve Knowledge and Skills in Early Agencying Dental Health Maintenance at Widuri Kindergarten, Semarang

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**Abstract:-** Interesting media that needs to be introduced to early childhood is 3D puzzle media, namely a media that has parts that can be attached and removed and has 3-dimensional elements and provides an interesting story visualization, starting from displaying images of various shapes and types. The purpose media puzzle which is carried out through dental health promotion activities in schools. This research is a *Research and Development (R&D)* study. The *Research and Development* is one of the research processes in developing a new product or perfecting an existing product and can be accounted for. Research and development procedures include 5 main steps including: 1) Gathering information, 2) Product or model design, 3) expert validation and revision, 4) product or model testing and 5) Product or model results. The research sample was 50 children at WiduriBanyumanik Kindergarten, Semarang City.

The results of *Wilcoxon* for *p-value* children's knowledge before and after the intervention with 3D puzzle media is 0.001 while for the children's skills before and after the intervention with 3D puzzles is 0.001, so it can be concluded that  $H_a$  is accepted, meaning that there is a significant change between the value of knowledge and children's skills before and after the intervention in the form of interventions with gamification-based 3D puzzle media.

Mediapuzzles -based 3D gamification as education to increase knowledge and skills in maintaining early childhood dental health. With the puzzle as a method for educating early childhood about how to maintain dental health it is hoped that dental health educators can apply it to the target so that they can increase knowledge and skills in maintaining dental health.

**Keywords:-** 3D Puzzle Media, knowledge and skills in brushing teeth.

## I. INTRODUCTION

The high number of oral health problems is influenced by internal and external factors. Internal factors include 1) Host, namely physical, biological and social conditions. 2) Agent, namely *Streptococcus mutans* 3) Environmental, namely the quality of drinking water used by the community. The external factor is the behavior of maintaining oral health. According to Notoatmodjo (2012), behavior has an influence of 30% -35% on health status. Behavior is a person's reaction to stimuli received from outside, which has the realm of knowledge, attitudes, and actions. Research by Aprilaz, I. (2016) and Sari (2015) proves that increased knowledge, attitudes and skills affect the status of children's dental and oral hygiene. These two studies prove that the behavior of maintaining dental and oral health affects a person's actions to maintain dental and oral health, therefore efforts are needed to shape behavior from an early age.

Efforts to change the behavior of maintaining dental and oral health can be done through dental health education with various methods and media that are fun, entertaining and attract attention, to avoid feeling bored in children. Interesting educational media can help and accelerate the process of children's understanding of the substance of the material. Dental health education media is adapted to the target characteristics, namely game-based dental health education (gammificasy, Community culture, audio-visual and *edu tour*.

Types of learning media are classified into audio, visual, audio-visual, presenters, media objects and computer-based interactive media. Presenter media consists of seven groups, namely: graphic group, printed materials and still images, still projection media group, audio media group, audio visual media group, live image or film media group, television media group, multimedia group introduced to early childhood is 3D puzzle media, which is media that has parts that can be attached and removed and has 3-dimensional elements and provides an interesting visualization of stories, starting from displaying images of various shapes and types. Therefore 3D puzzle media as an effort improvement of health care knowledge and skills g teeth at an early age. Research objectives to produce 3D puzzle media as education in increasing knowledge and skills in maintaining dental health at an early age.

## II. RESEARCH METHODS

The method used in research is *Research and Development* (R&D). This study aims to create puzzle which is carried out through dental health promotion activities in schools. The R&D method is one of the research processes in developing a new product or improving existing products and can be accounted for. Research and development procedures include 5 main steps including: 1) Information gathering, 2) Product or model design, 3) Expert validation and revision, 4) Product or model testing 5) The result of the product or model. The research sample was 50 children at WiduriBanyumanik Kindergarten, Semarang City.

## RESULTS AND DISCUSSION

No.	Criteria	Frequency	%
1.	Good	14	28%
2.	Enough	8	16%
3.	Less	28	56%
<b>Total</b>		50	100%

Table 1: Frequency Distribution of Knowledge Before Extension Treatment

Based on Table 1 it can be seen that the frequency of knowledge before counseling treatment with 14 respondents (28% ) in good criteria, then 8 respondents (16%) in sufficient criteria, and 28 respondents (56%) in less criteria.

No.	Criteria	Frequency	%
1.	Good	27	54%
2.	Enough	17	34%
3.	Less	6	12%
<b>Total</b>		50	100%

Table 2: Distribution of Knowledge Frequency After Extension Treatment

Based on Table 2 it can be seen that the frequency of knowledge after counseling treatment with 27 respondents (54 %) in good criteria, then 17 respondents (34%) in sufficient criteria and 6 respondents (12%) in less criteria. This shows that there is an increase in knowledge after being given counseling treatment.

No.	Criteria	Frequency	%
1.	Good	0	0%
2.	Enough	14	28%
3.	Less	36	72%
<b>Total</b>		50	100%

Table 3: Frequency Distribution of Skills Before Extension Treatment

Based on Table 3 it can be seen that the frequency of skills before counseling treatment with 14 respondents (28 %) in the sufficient criteria and 36 respondents (72%) in the less criteria.

No	Criteria	Frequency	%
1.	Good	11	22%
2.	Enough	39	78%
3.	Less	0	0%
<b>Total</b>		50	100%

Table 4: Frequency distribution of skills after counseling treatment

Based on Table 4 it can be seen that the frequency of skills after counseling treatment with 11 respondents (22 %) in good criteria and 39 respondents (78%) in sufficient criteria. This shows that there was an increase in skills after being given counseling treatment.

### A. Bivariate analysis

Table 5. Results of the Test of Differences in Knowledge Before and After the Extension Treatment to Widuri Banyumanik Kindergarten children, Semarang City.

Dental and Oral Health Knowledge of the Treatment Group	p value	Interpretation
	0.000	Ha accepted

Table that the result of Wilcoxon's p-value is 0.000. So it can be concluded that Ha is accepted, meaning that there is a significant change between the value of knowledge before and after treatment in the form of counseling with Puzzle -based 3D gamification.

Table 6. Result of the different skills test before and after the extension treatment at Widuri Banyumanik Kindergarten, Semarang City.

Skills of the treatment group	Z	p value	Interpretation
	-6.046	0.000	Ha is accepted

Based on table 6 it can be seen that the p-value of wilcoxon testis 0.000. So it can be concluded that Ha is accepted, meaning that there is a significant change between the skill scores before and after treatment in the form of counseling with gamification-based 3D Puzzle media.

### B. Discussion

Early dental care is very important to avoid tooth decay. One of the easy and widely practiced preventive measures is brushing a child's teeth every day using fluoride-containing toothpaste, with the aim of keeping the teeth and mouth clean so they can avoid dental caries. Children who are not accustomed to brushing their teeth from an early age by their parents so that there is no awareness and motivation from children to maintain the cleanliness and health of their teeth and mouth.

The results of collecting information that has been carried out by researchers in the conclusion that school children have a habit of happy moving, happy to play, happy in groups, like hands-on practice. To shape changes in the behavior of maintaining dental health in elementary school children, appropriate, interesting, fun learning methods and media are needed, in accordance with the characteristics of elementary school children and involving children in their

implementation, the appropriate method used is a game-based learning method.<sup>6</sup> Because by using game-based learning methods, the learning process will be more active, interesting and fun.

The media that is suitable for realizing this is Gamification 3D Puzzle as an Effort to Increase Knowledge and Skills in Dental Health Maintenance at an Early Age. The design and development of Gamification 3D Puzzle media as an effort to increase knowledge and skills in maintaining dental health at an early age is made based on the results of gathering information that is adapted to the characteristics and learning models for school children, using the Dick and Carey theory approach.

Learning media is a component of learning resources in determining success, this is in accordance with the function of learning media as a means of conveying messages and good communication tools between two parties and is a tool that can stimulate thoughts, feelings, interests as well as with the right methods and media to make children better understand and practice in their daily lives.

The value of knowledge in the intervention group increased because for 21 days the respondents were given intervention in the form of counseling with Gamification 3D Puzzles as an Effort to Increase Knowledge and Skills in Dental Health Care at an Early Age. To create independence and awareness for children, students are given counseling methods using Gamification 3D Puzzles. The next day students will directly play the Gasification 3D Puzzle media, followed by students brushing their teeth together.

Increased knowledge, in the intervention group. This is because the learning achievement scores of children in the intervention group are better than the learning achievement scores in the control group. In addition to learning achievement scores, children receive counseling about dental and oral health. Retnaningsih (2016), knowledge is a learning result that is obtained after the person is exposed to certain objects, knowledge is very closely related to education where someone with high knowledge.

The value of the action in the intervention group after counseling increased from before counseling, this proves that the Gamification 3D Puzzle media is proven because the existence of new media in health promotion and counseling can influence children's actions in maintaining dental and oral health, and is able to grow children's independence in maintaining health teeth and mouth. The most important thing in maintaining dental and oral health is awareness and personal oral health maintenance actions, the delivery of dental health material is delivered in an interesting and attractive way without reducing the content of the material.

### III. CONCLUSION

#### A. *The conclusion*

of the research with the theme "gamification-based 3D puzzle as an effort to increase knowledge and skills in maintaining early childhood dental health can be concluded as follows:

- Puzzle 3D Gamification as an Effort to Increase Knowledge and Skills of Dental Health Care at an Early Age is relevant as a model of dental health education for improve knowledge and skills in maintaining dental health. This is statistically proven to be significantly
- Puzzle 3D Gamification as an Effort to Increase Knowledge and Skills in Dental Health Care at an Early Age is effective in increasing knowledge and skills in maintaining dental and oralhealth. This has been proven to be statistically significant.

#### B. *Suggestion*

With the existence of 3D puzzle media as a method for educating early childhood about how to maintain dental health, it is hoped that dental health educators can apply it to the target so that they can increase knowledge.

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