

## EFFECTIVENESS OF ONLINE-BASED SCHOOL-AGE LEARNING MODEL: GAME QUIDENT MY TEETH IS HEALTHY

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### Abstract

*Dental caries in children are still often ignored by parents due to lack of knowledge about the importance of maintaining healthy teeth and mouth. In obtaining knowledge, people can use various media, the media that is widely used by society today is gadgets. Apart from being used as a medium of information, gadgets can also be used as a medium of entertainment and learning. Purpose: to create a Quident game application that can be used to increase children's dental health knowledge in the 9-11 year old group. Method: Design and Creation with the following steps Awareness, Suggestion, Development, Evaluation, and Conclusion. The research sample used random sampling. A total of 10 people tested the Quident game application. Research Results: The Quident game application has been created which is equipped with an animated video with a mascot that was created to educate and motivate users and can evaluate the increase in user knowledge with questionnaires on games, 10 sample people who use the application have no difficulty playing and can complete the game to the last level. Conclusion: Quident games can be used to motivate and increase children's dental health knowledge with Android-based games Suggestion: For future development, games are made more varied and published on the Google Play Store.*

**Keywords:** Caries, Knowledge, Games

### INTRODUCTION

The high prevalence of dental and oral disease is strongly influenced by many factors, one of which is the behavior of people who are not yet aware of the importance of maintaining healthy teeth and mouth. The 2018 Basic Health Research (Riskesdas) results state that the largest proportion of dental problems in Indonesia are damaged/cavities/sick teeth (45.3%). Fernandes IB, et al stated that most of the children suffering from caries (53.5%) showed severe dental caries. Untreated dental caries is closely related to a decrease in the quality of life of sufferers and their families (Mitayani, 2019).

Dental caries in children is still often ignored by parents due to lack of knowledge about the importance of maintaining healthy teeth and mouth. Behavior has an important role to influence dental and oral health standards. behavior in maintaining health is influenced by factors of knowledge, attitudes and actions or practices (Notoadmodjo, 2007). Research conducted by Smyth, et al (2007), people who have high knowledge about dental and oral health have good attitudes and practices or actions in maintaining dental and oral hygiene (Ariyanto, 2018).

In the era of the millennial generation, gadgets have become an inseparable part of people's social life. Based on statista data, smartphone users in Indonesia in 2015 only made up 28.6% of the population. As time goes by, smartphones are becoming more affordable,

thereby increasing their users as well. More than half of the population in Indonesia or 56.2% used smartphones in 2018. A year later, 63.3% used smartphones.

According to Samuel Henry in Fithri (2017), games are often accused of having a negative influence on children. In fact, playing games can be used as a healing therapy, establishing communication between children and parents while playing together.

One type of game played by children as a learning medium is educational games. According to Kuswardayan (2012), an educational game is a game that seeks to provide educational value so that games that originally function as entertainment media can also be used as learning media. One of the advantages of educational games lies in the visualization of problems in the environment (Sussi, 2019).

Learning media in the form of games helps support teaching and learning activities, but not many games are used for learning functions. The phenomenon is that children often forget to learn, because the time that should be spent on learning is spent playing games. It would be nice if the games created and played by children were used by the world of education to support teaching and learning activities and to attract student learning motivation (Baiq, 2019).

## **LITERATURE REVIEW**

### **Dental and Oral Health**

According to the Regulation of the Minister of Health Number 89 of 2015 concerning Dental and Oral Health Efforts, dental and oral health is a state of health of the hard and soft tissues of the teeth and related elements in the oral cavity that allows individuals to eat, speak and interact socially without dysfunction, aesthetic disturbances, and discomfort due to disease, occlusion deviation and loss of teeth so as to be able to live productively socially and economically. Dental and oral health is part of overall body health. Dental and oral health can reflect the health of the body as a whole, including if there is a lack of nutrition and symptoms of other diseases in the body. Disorders of dental and oral health can have a negative impact on daily life, including a decrease in general health.

### **Dental caries**

Sumawinata (2009) in Mukhbitin (2018) explains that dental caries in Latin means decay caused by *Streptococcus* germs which erode the tooth enamel area. When the tooth enamel area has cavities, oral bacteria, especially *Lactobacterius* and others, will easily break through to the dentin below and cause further tooth destruction (Mukhbitin, 2018). Caries is a pathological process in the form of damage to the hard tissue of the teeth starting from the enamel, dentine and cementum caused by the activity of microorganisms in fermentable carbohydrates. Its characteristics are demineralization of hard tooth tissue which is then followed by breakdown of organic matter. Caries can affect both primary and permanent teeth, but the process of damage to primary teeth spreads more quickly and is more severe than permanent teeth. The reason for this difference is that the enamel structure of milk teeth

is less dense and thinner than permanent teeth. (Mariati, 2015) Dental caries is caused by several factors, including the age period, the susceptibility of the tooth surface, bacteria and dental plaque. Dental caries can be prevented by brushing your teeth regularly, rinsing your mouth with mouthwash, using dental floss, consuming healthy foods and drinks and having regular checkups at the dentist at least once every 6 months. The way to deal with dental caries is to do cleaning at the dentist, do flourie therapy, repair root canals, make fillings and do tooth extraction. 2015) Dental caries is caused by several factors, including age period, susceptibility of the tooth surface, bacteria and dental plaque. Dental caries can be prevented by brushing your teeth regularly, rinsing your mouth with mouthwash, using dental floss, consuming healthy foods and drinks and having regular checkups at the dentist at least once every 6 months. The way to deal with dental caries is to do cleaning at the dentist, do flourie therapy, repair root canals, make fillings and do tooth extraction. 2015) Dental caries is caused by several factors, including age period, susceptibility of the tooth surface, bacteria and dental plaque. Dental caries can be prevented by brushing your teeth regularly, rinsing your mouth with mouthwash, using dental floss, consuming healthy foods and drinks and having regular checkups at the dentist at least once every 6 months. The way to deal with dental caries is to do cleaning at the dentist, do flourie therapy, repair root canals, make fillings and do tooth extraction. consuming healthy foods and drinks and having regular check-ups at the dentist at least once every 6 months. The way to deal with dental caries is to do cleaning at the dentist, do flourie therapy, repair root canals, make fillings and do tooth extraction. consuming healthy foods and drinks and having regular check-ups at the dentist at least once every 6 months. The way to deal with dental caries is to do cleaning at the dentist, do flourie therapy, repair root canals, make fillings and do tooth extraction.

## Dental Health Education

According to Anwaz in Arsyad (2013) health counseling is an educational activity carried out by disseminating messages, instilling confidence so that people are not only aware, know and understand, but are also willing and able to carry out recommendations related to health. Health education is synonymous with health education because both are oriented towards changing behavior (Arsyad, 2013). Dental and oral health education is an effort to improve children's dental and oral health. Counseling can be done using a variety of methods, including lecture and demonstration methods (Bany, 2014). Success in dental health education efforts for school children is inseparable from educational methods and the important role of the media because it can support the learning process. and make it easier for students to understand learning material. Through the media, the messages conveyed can be more interesting and easy to understand (Hamsar, 2019). Media is one of the things that need to be considered in health promotion. The media commonly used in health promotion are audio media, visual media and audio-visual media. Audio-visual media is a good medium to use, because it involves more senses in the learning process. Animated video is an example of audio-visual media (Rahayu RD. 2013). visual media and audio-visual media. Audio-

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## **Games**

Game is a game that uses electronic media, in the form of multimedia which is made as attractive as possible so that players can get inner satisfaction. Games have become part of the culture and daily activities of the people. The culture of playing games is a lifestyle that is much loved by people, especially the younger generation and even children at elementary school age, both in rural and urban areas. Types of game devices, from simple models such as gamewatches to sophisticated games such as the Playstation console or the like, are recognized by today's children (Samuel Henry, 2010). Judging from the game model specifically, Ulicsak & Williamson (2011) in Clark (2011) provides categories in detail into 20 types. Examples include platform games, sports games, serious games, casual games, edutainment (educational games), RPG (role playing games), etc. This type of educational game actually places more emphasis on functional design, not on technical design. Educational games are a form of play designed to help students achieve certain learning goals and at the same time provide motivation (Clark, 2011). Android smartphone games developed as digital educational games can contain features that have the potential to provide an interesting and sustainable gaming and learning experience.

Blumberg & Fisch (2013) in Filsecker (2014) summarizes some of these features, including:

- 1) Make curious (curiosity),
- 2) There are challenges
- 3) Include fantasy
- 4) There is reciprocity (interactivity),
- 5) The existence of directive control (agency or control),
- 6) There is a relationship between the character and the player (identity),
- 7) There is feedback from the activity (feedback),
- 8) There is personal involvement (immersion).

The design of strategies for using educational games is usually done in two ways, namely playing games in learning settings or learning directly through games (Filsecker, 2014). Utilization of games can help design parables or design games in learning (Darmawan, 2015).

In a game must have certain elements to make the game more interesting. The game elements are:

- 1) Pictures or graphics are an important part of making games, because pictures can convey the atmosphere and even the meaning of words.



- 2) Sound, is an important part of the game elements, because audio can increase the vitality of the game.
- 3) Text, this part of the game displays text on the screen, which is also very important for a game. Text is an integral part of information dissemination, and is always accompanied by program code.
- 4) Animation The use of animation in game technology is a good additional point of using animation will change from one image to the next to form a complete action (Asrori, 2012)

## METHOD

The research method used is Design and Creation. The steps of this method are: Awareness, Suggestion, Development, Evaluation and Conclusion. The design used is GDLC (Game Development Life Cycle) with 6 development phases, starting from the Initiation, Pre-Production, Production, Testing and Release phases. The research sample used random sampling. A total of 10 people tested the Quident game application

### a. Initiation

At this stage is the first process in the form of a game draft, identifying trends, themes, game target groups. The output of the initiation stage is a very simple game concept and game description. It consists of: Type of game made, game scenario, game character, game story, target user/user and game platform used.

### b. Pre-Production

Pre-production is an important step in the production cycle. Prior to production includes the creation and revision of game designs and game prototypes.

- 1) The genre that will be used in this game is a platform game.
- 2) The game scenario is a dental health quiz which consists of several levels. The characters in the game consist of Molaria (the main character, Molaria's mother, Molaria's father, Premoca, Sero and Nurse.



Figure 2.1 Characters in games

- 3) The dental character scenario in the game gives a quiz about "Let's get to know your teeth" before that there is an educational video about dental health. The quiz in the game consists of several levels.
- 4) The target players in this game are children as learning models for school-age children
- 5) Researchers use the Construct 2D engine game and use

Corel and Photoshop to create assets that will be applied to games.

c. Production

Production is the core process of game design and prototyping and other points at *playpre-production* which is perfected at this stage. This means that at this stage the author has a focus on translating the design of collecting data, game design, creating game scenarios, creating assets for player and enemy characters, trees, food for players in the game, and other aspects into the building blocks of the game. This stage includes *asset creation*, *programming* and *integration* between assets and *source code*.

d. Testing

"Testing in this context means both internal and external testing is carried out to test the usability of the game. Specific test methods for each stage of the prototype.

1) *Alpha Testing*

After carrying out production, this test is carried out by researchers to check whether there are still bugs or not and there will be a possibility of reducing or adding features. If there are bugs/errors and feature additions, the researcher will fix them.

2) *Beta Testing*

After the game is finished, it does not mean that the game will be accepted by the community. Researchers do *external testing*, known as beta testing will be carried out by researchers to test the acceptability of the game and to detect various errors and complaints thrown by third party testers. Beta is outside the production cycle, but if the results of this test have the potential to still have errors, the researcher will repeat *production cycle*.

e. Release

At this stage the games are finished and pass beta testing indicating the game is ready for release.

The flow of research that has been done is as follows:

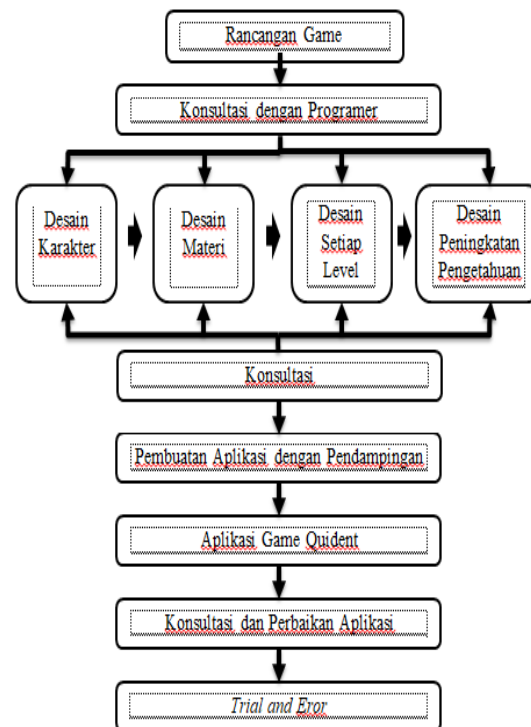


Figure 2.2 Research Flow

## RESULTS AND DISCUSSION

### Contents Results and Discussion

Completion of the Quident game application design as a research medium has reached its final stage and has been tested by researchers with slight modifications to achieve optimal results before being used to the sample. The features of the Quident application as entertainment and learning media have also been designed. After the last test.

How to Play Quident game:

- 1) The goal is to first download the Quident game application
- 2) The initial appearance of the game displays an animated video containing learning material
- 3) After the animated video finishes playing, the game will display a quiz with multiple choice answers
- 4) There are 5 levels in the game with multilevel material weights
- 5) After completing the quiz, the game will display the score obtained
- 6) Goals are required to play the game in order of their level
- 7) Games are also equipped with additional games as entertainment.

It is hoped that the Quident game application can be directly used in the sample and can practice using the Quident game features so that it is hoped that the sample can understand Quident features, functions and how to use them and increase knowledge about dental and oral health.

**Table 1.** Trial Results Using Game Quident

Respondents	Achievements (Levels)				
	1	2	3	4	5
1					√
2					√
3			√		
4					√
5					√
6				√	
7					√
8					√
9					√
10					√

Here are the displays in the game:



Figure 3.1 Initial View



Figure 3.2 Animated video display



Figure 3.3 Display quiz





Figure 3.4 Display to the next level



Figure 3.5 Display after completing the last level

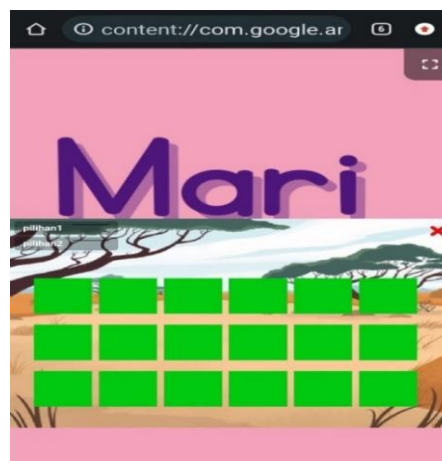


Figure 3.6 Interlude game display

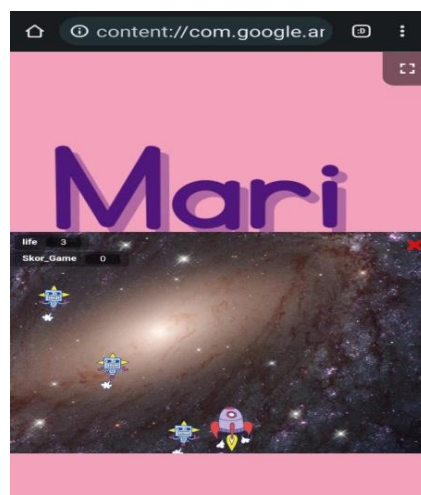


Figure 3.6 Display of entertainment games

### Contents of Discussion Results

The Quident game application is a game application designed as an online-based learning media about oral health for school-age children. This game displays a quiz with multiple choice options, before starting the quiz the game will provide a brief explanation with an interesting animation regarding the material that will be displayed in the questions. This game functions as a virtual counseling medium for health workers because it can still be done without having to meet face to face.

This game is equipped with a sound system and animation as well as the addition of an Alien shooter game, background music, and text to provide visual support in the game. The Quident game application is equipped with a special mascot that is designed to be attractive and interactive according to the overall value criteria of educational games. The colors used in the game are relevant according to the user's age target. The Quident game app has special sound effects that provide feedback on the user's interest. The material in the game is according to the target age and the topic of the game. Game Quident is equipped with 5 levels, each level has a different level of difficulty. This is in accordance with the criteria of educational games according to Widiastuti (2012), namely, overall value, usability, accuracy, appropriateness, relevance, objectivity and feedback.

### CLOSING

#### Conclusion

Quident games can be used to motivate and increase children's dental health knowledge with Android-based games.

#### Suggestions and Acknowledgments (if any)

For future development, games are made more varied and published on Google Playstore.

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