

Designing Educational Game to Choose Healthy Snacks for Children

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Abstract Elementary school children like to eat snacks or food which are sold by snack sellers around school. These children do not care whether they are healthy snacks. The children also do not care the hygiene of the snack sellers. Due to this fact, an educational game is designed to educate children about the health and hygiene so that children can pay more attention to choose snack that they will buy. Video games on hygiene and healthy snacks are rarely found. This paper will discuss the habit of children in consuming snacks and the design of educational game based on children habit which can be used to educate children.

Keywords – education, game, snacks, design, hygiene and healthy.

I. INTRODUCTION

Snack is a one of the food types that have a function as one of the energy resource which can be used to fulfil daily nutrient to become healthy [1]. Snack is an option to procrastination hunger [2].

Snacks have some benefits such as the cheap price, ready availability, and the good taste for everyone. Usually, snacks are being sold in the interesting form and has various taste.

One of the snack enthusiasts is children. Children can find and buy snack around their school. Snacks that are usually being sold are varied and they like them.

Children have the high risk to get sick from dangerous snack [3]. They may suffer from the stomach ache or typhus because they eat snacks which are not clean and contain dangerous chemical. Even though not all snacks are dangerous to eat, consumers including children have to pay attention on the hygiene. They always tend to focus on the taste, display, and the price [4].

The healthy life habit must be cultivated from the young generation, including elementary school children. They can start by choosing healthy snacks to be consumed. Because of that, there will be a need to use learning media to educate children about choosing hygiene and healthy snacks.

Learning media is a tool to deliver learning message [5]. Learning media can be a book, presentation using computer, magazine, television, etc. To make learning media becomes more interesting, learning media can be merged with computer technology. One of them is game.

Game is fun and has interesting pictures, colours and visualization, and it is suitable for children's imagination. These facts can make children like games [6]. If game is used properly, it can give a benefit to children.

Learning media using game can be called as educational game. Educational game can give knowledge as game can reduce boredom when studying [7]. With this educational game about hygiene and healthy snacks, healthy life habit can be formed.

II. LITERATURE REVIEW

2.1 *Snack and Children*

Snack can be defined as a food and drink which is delivered in the container and sold in the street side [8]. Snack can be food and drink with various tastes, colours, and varieties.

Snack can easily be found in everywhere, such as street side, settlement, shopping centre, bus stop, and market place [9]. With the high interest from children who like snacks, snack sellers usually sell in the places that are easily found by children.

Food can be divided into some groups, like main food, snack, drink, and fresh fruits. Any kind of snack can easily be found around the schools, for example cake, *onde-onde* (Indonesian's traditional snack), fried food [9].

Snacks have some function like meal breaks [9] and to procrastination hungry [2]. The cheap price of snack is one of the benefits and sometimes snack has a suitable taste for snack enthusiast [10]. But if snacks doesn't have hygiene and health requirement, it can threaten children's health.

Children are used to buying snacks because their parents give them money instead of preparing meal from home [8]. The children like to eat snacks because children like food that colourful [11], delicious, and the cheap price [9].

2.2 *Hygiene and Healthy Standard of Snack*

Children have low immunity level [8]. Because of this reason, hygiene of snacks

which will be eaten by them should be maintained.

Hygiene and healthy principles are healthy and hygiene lifestyle from food manager, cooking appliances, and processing place [12]. The factors of safe food are food variety, and how the food is handled, served, and also the interval of time between the time the food is processed and the time when people eat it, storage temperature, and how people touch the food [12].

When eating snacks that are not clean and healthy, people can suffer from diarrhea, anemia, and hepatitis A [13]. Eating snacks with high calories can cause obesity [14].

Djaja (2003) concluded that street vendors have a higher risk than restaurant and caterers due to the food contamination [9]. One of the reasons is that food that is usually sold in street side can be easily contaminated by dust and vehicle emission. That food cannot be categorized clean and hygiene again. If food or snacks does not meet hygiene and healthy standard or principle (processing, hygiene, and the addition of other substances) which can be dangerous for children's health [9].

2.3 *Educational game*

Game is a multimedia that can be played and it is fun and the role of player is to solve the problem and choosing how the games work is needed [7] [15] [16]. Everyone likes to play games, from children until adult. Besides giving fun, games can be used as learning tool [17].

Games can be divided into some genres, like adventure, arcade, role play, simulation, strategy, education, etc. [17] [18]. One of genre games that will be used is educational game. Educational game is a game that is designed for learning some materials [17] [18].

Educational game is a game that is didactic but fun. Educational games can be used to increase linguistic, motoric, social, thinking abilities [19]. The game can increase children's concentration and abilities to solve problems [20].

Educational game gives benefit to children for problem visualization [5]. The game has another benefit like giving motivation to player to study [21] because the game can add fun in studying [22]. The happier the children are, the more knowledge they can absorb.

Educational game is usually used for children who like to play games better than study [6]. When studying, children have comfortable feeling, they can absorb material and they can study more [6].

Children tend to like games that are more visual [23]. Story content, colours, and pictures are what children like. The more sense are being used to study, the easier the knowledge are received.

III. RESEARCH METHODS

To know what design can be used to educate children to consume or eat healthy snacks, data are collected through library study. The data come from books or journals about primary school children's habit in eating snacks.

Besides that, data were collected through questionnaire. The questionnaire was used to add data in designing game. The questionnaire contains some questions about children's eating snack habit and their knowledge about hygiene and healthy snacks.

IV. RESULTS AND DISCUSSION

4.1 Research Result

Literature on mobile or PC educational game with hygiene and healthy theme is still rare. One of the example that can be found is board game about snacks which can involve children as a team [24].

Game that children like is one with interesting pictures and colours [6] [23]. Therefore, the game is designed with pictures and colors that are suitable for children, so children can have fun playing game and they can absorb the knowledge better.

Snacks that children like based on reference [25] are cheap snacks in small plastic

package, instant noodles, ice, colourful candies, tempura, and fried food. This variety of snacks can be used in educational game to educate children in choosing hygiene and healthy snacks.

Children based on reference [25] rarely wash their hands before and after eating snacks or food with soap. The reason is that they feel that their hands are still clean. Actually if they wash their hands, it can reduce the risk of being sick.

From the same reference [25], children are not really paying attention about hygiene, display, and taste. Children just focus on the delicious taste, interesting colour, and the cheap price. This material can be used in the educational game that will be made, so they will know how to choose a good snacks.

Hygiene and healthy snacks can be determined by hygiene and healthy habit of food manager, cooking appliances, place, ingredients, the way the food is served, and the other appliances [12]. Children are not really sure about hygiene of the seller, so this material can be used in game and make children pay more attentions on seller's hygiene when serving or cooking snacks.

The questionnaire consists of some questions about snacks to 30 elementary school children randomly. After collecting and processing the data, it is found that 70% like to buy snacks outside school and 97% know that before eating they must wash their hands. But just 83% know that to wash hands, they need soap. And 63% children don't know that there are correct steps on how to wash hands.

Beside knowledge about hygiene and healthy snacks, 53% children don't know about the difference of hygiene and healthy snacks from the one which is not hygiene and healthy snacks based on colour and taste. And 27% children don't know the difference based on the hygiene.

4.2 Designing Game Education

From some references that can be found and the result got from the questionnaire, a

game about hygiene and healthy snacks can be designed. It can be described like this.

First stage is an encyclopedia stage which contains of how to wash hands properly with soap, and the variety of snacks with the characteristic of snacks which is dangerous and the effect when they consume it too much. This stage is named as encyclopedia because this stage gives an additional knowledge about hygiene and healthy snacks and the steps to wash hands properly with soap.

The second stage is game stage. This stage contains of 4 mini games, such as trivia games about encyclopedia, games to group snacks based on colour – the dangerous one has a brighter colour than the healthy one, games about choosing good snack sellers based on the characteristic of sellers – there will be provided sellers and their characteristic, and the last one is about choosing the card pair using pictures about good snacks.

This game will be named “Yummy Snack”. This design of game can be drawn with flowchart like the figure below.

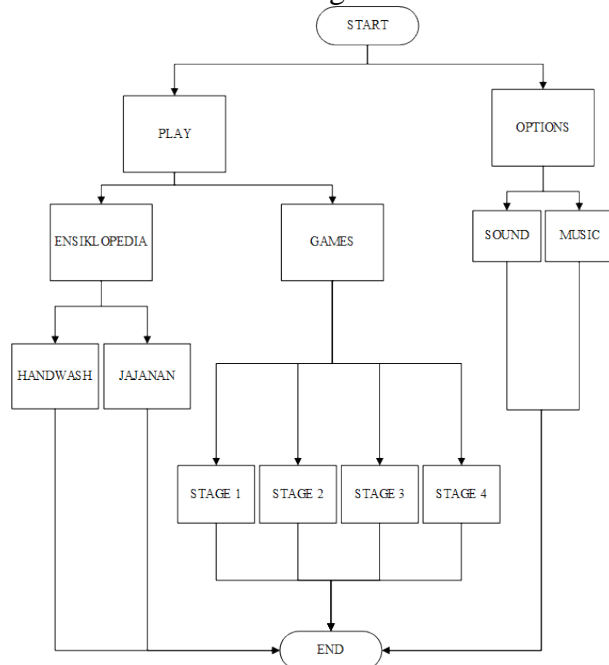


Fig. 1 Flowchart of game design “Yummy Snack”

The plan for assets which will be used in this game consist of GUI assets, characters, objects, and backgrounds.

GUI or Graphical User Interface assets consist of button images and menu. Example of button images and menu which will be used can be seen below.

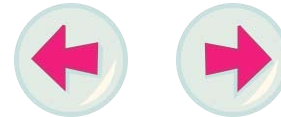


Fig. 4.2 GUI assets buttons (1)



Fig. 4.3 GUI assets buttons (2)



Fig. 4.4 GUI assets buttons (3)

HUD or Head Up Display assets consist of health status, score, and timer bar.



Fig. 4.5 HUD assets: health status



Fig. 4.6 HUD assets: score



Fig. 4.7 HUD assets: timer bar

Character assets that will be used consist of sellers and buyer or student.



Fig. 4.8 Character assets: buyer (left) and seller (center) and seller cart (right)

Object assets consist hands, towel, and water faucet which will be used to for hand washing stage, variety of snacks, picture of the effect of consuming bad snacks, pictures of seller hygiene characteristics, and card pictures which consist of picture of good snacks.



Fig. 4.9 Object assets: hands



Fig. 4.10 Object assets: soap

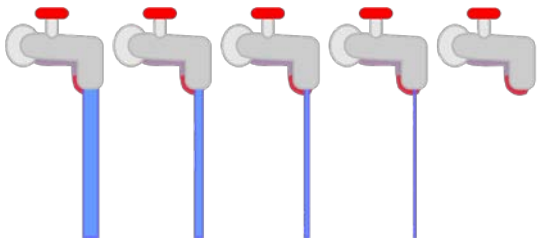


Fig. 4.11 Object assets: water faucet

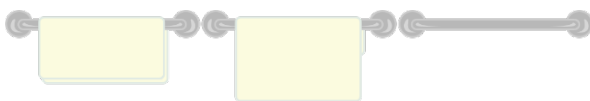


Fig. 4.12 Object assets: towel

Snack pictures that are hygiene and healthy can be illustrated with the colour of snacks. The colour that shows dangerous food is brighter than the safe food colouring.

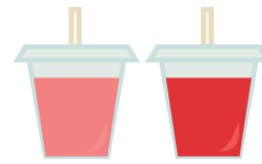


Fig. 4.13 The example of good snack (left) and bad snack (right): iced syrup

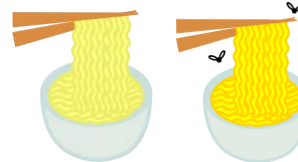


Fig. 4.13 The example of good snack (left) and bad snack (right): iced syru

Beside snack assets, there are other assets that illustrated about characteristic dangerous snack and the effect because of consuming it. The characteristics are such as the colour is bright because of textile colouring. Beside of that, if the taste is sweet then bitter, the snack contains artificial sweeteners. If the snack is chewy, then the snack contains borax and formalin. And if the taste is a bit bitter, then the snack contains preservatives that can be dangerous if it eat multiple times. If the snack is fried using oil that have dark colour, it can be dangerous to eat [26] [27] [28].

The short term effect of consuming the dangerous snacks are cough, sore throat, stomach ache, nausea, and cancer [26] [29].



Fig. 4.15 The characteristics of dangerous snacks and the effect of consuming

The characteristic of the snack sellers can be illustrated by the clean hands and nail of the seller, the clean cooking appliance, the colour

of snacks, and the colour of the cooking oil. This characteristic is based on hygiene and healthy standard of food manager, cooking utensil, place, the ingredients, the way food is served, and other appliances [12].



Fig. 4.16 The example of characteristics of good seller



Fig. 4.17 The example of characteristics from bad seller

The last one is card assets with the picture of good snacks.



Fig. 4.18 Open card (left) and close card (right)

V. CONCLUSIONS

Educational games with the theme of choosing a healthy and hygiene snack for children in elementary school are still rarely found. Unfortunately, children have a habit to buy snacks without taking much attentions on the hygiene of the sellers and healthy snacks.

The design of educational game which can be made is using encyclopedia or additional knowledge on how to wash hands properly with soap and the variety of snacks with characteristics and the effect of consuming unhealthy snacks. Beside encyclopedia, it can be added with games, like the trivia from encyclopedia, grouping the snacks based on the displays, choosing the seller based on the hygiene characteristics and choosing the pairing good snack to help player to remember the image of good snacks.

Educational game about choosing hygiene and healthy snacks for children hopefully can be implemented and be used to educate children and help them understand about good snacks which they will buy and eat.

ACKNOWLEDGEMENT

Vania Wahyu Febriani is a student from Information System department majoring at Game Technology in Soegijapranata Catholic University who received scholarship from Ministry of National Education of Republic Indonesia (Beasiswa Unggulan Kemendikbud Republik Indonesia).

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