

KALO AND SUGA:

A Mobile Game On Awareness Of Calorie and Sugar Intake For Teenagers

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Abstract- Calories and sugar are nutrients that have been provided in almost food. They are important for body because calories give body energy to do physical activities. Nowadays, most of the children are often live unhealthy life such as unhealthy eating habits and stay indoors. This has become a big concern as most of them may or had obesity-related diseases. This research purpose was to spread awareness of calories and sugar intake among teenagers using a mobile game application. The game was developed using UNITY and for Android platform only. ADDIE is used as research model for this project. Online questionnaires were used to evaluate the effectiveness of the product in delivering awareness of calorie and sugar intake among teenagers. The results showed that the objective of this research has been achieved and this product gives knowledge and awareness of calorie and sugar intake among teenagers. This game also can help to promote a healthy lifestyle for the young generation.

Keywords: Educational games, calories and sugar, awareness, teenager, Obesity.

I. INTRODUCTION

Malaysia has been recognized as Asia's fattest country. Many factors have caused this serious problem, especially among teens and young adults, such as unhealthy lifestyle habits. From a survey by UNICEF, 12.7% of the children from ages 5 to 19 years old are mostly obese [2] and this is what we should be worried about because it can lead to many obesity-related diseases and one of the examples of this disease that has become a major concern among us is the fatty liver because it can be a silent killer [4] and according to Liyana Hasnan, the number of deaths due to

obesity-related illness in Malaysia's government hospital is 73 percent.

Several campaigns to raise awareness among Malaysians have been held, such as the International Medical University (IMU) Public Talk on Raising Awareness of Obesity-The Malaysian Epidemic. Unfortunately, we still lack awareness of the consumption of calories and sugar, especially for young people.

The objective of this research is to develop a mobile game that gives awareness of calories and sugar intake among teenagers. The game focuses only for calories and sugar intake. English is the chosen language to deliver the health and education information on the subjects in the game so that it can cater local and international users. The design of the game uses two-dimensional (2D) and suitable for teenagers. The game is available only for Android platform.

II. LITERATURE REVIEW

2.1 Calories and Sugar

Calorie means energy that has been processed in the food and drinks inside. We need that nutrition so that our body gets the energy to use in physical activity [1]. It is natural for every life that needs the energy to be fully functional, without it our body will felt weak, and eventually we will die from hunger. However, there is an average of calories that the human body needs to stay healthy. For a man, it is 2500 calories and 38 grams of sugar per day to maintain their weight and for the women is 2000 calories and 25 grams of sugar, but there is some researcher quoted that according to the United States government, the average man needs 2,700 kcal per day and the average woman needs is 2,200 kcal per day [1].

Having too many calories inside our body is bad and may cause obesity-related disease.

Added sugar and natural sugar are two types of sugar. Both sugars contain calories, but if the user takes too much added sugar, it can cause the consumer to have diabetes. Eating natural sugars is fine because, to produce energy, our body requires sugar. Fruits and vegetables, for instance, are foods that contain natural sugar in them. Unlike added sugars, which have no supplements for calories and can harm your digestive system in the long run [3]. This can lead to needless illnesses, such as heart disease and diabetes. Most added sugars produce simple table sugar (sucrose) and high fructose corn syrup [3].

2.1.1 The effect of overtaking calorie and sugar

Nowadays, most young Malaysian millennials own an obesity issue because when they are young, they lack knowledge of consuming calories with the correct amounts. According to an overview by the Institute of Public Health and the Malaysian Ministry of Health, the average daily sugar consumption among young Malaysians have risen from seven teaspoons in 2012 to 10 teaspoons in 2017, which is more than the grown-up recommended limit of sugar [2].

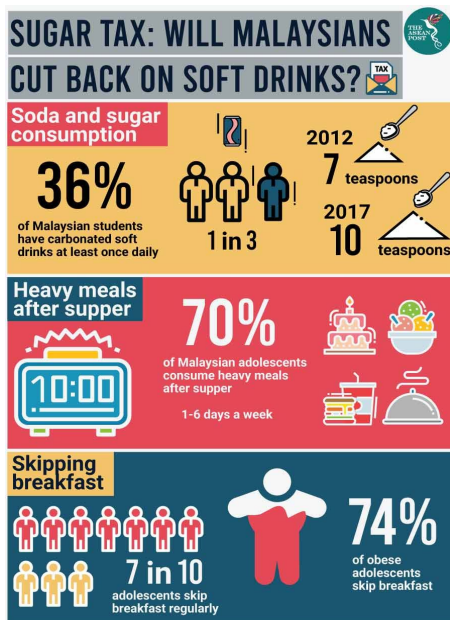


Figure 1: Institute for Public Health, National Institutes of Health, Ministry of Health Malaysia, National Health and Morbidity Survey 2017.

This can lead to extreme obesity-related diseases such as the largest accumulation of waistline and fat in the

liver, driving to the fatty liver that can be a silent death for people who have it, as well as other diseases such as diabetes mellitus, hypertension, and dyslipidemia (abnormal lipid profile) from too much sugar in our body.

2.2 Educational Game

Educational games are also known as serious games that can be defined as video games or interactive applications whose main objective is not only to provide entertainment but also to make preparations in areas such as well-being and health, market promotion, academic education, etc. [5]. The first journalist who used this word in 1970 was Clark Act. For him, in certain cases, a real game is successful in educating and teaching devices for students of all ages because they are strongly motivating as a resulting them communicating the concepts and reality of various subjects very efficiently [5].

Video games have provided an environment where learners are effectively interested in their tasks and can proceed separately with these as well as opportunities to memorize very efficiently [7]. Basically, by playing video games, we learn something. Many studies have reported that serious games have become very useful tools for education, health, and marketing.

2.3 Critical Study of the previous work

Many games provide educational elements, but regrettably, there is no mobile game that provides knowledge of calories and sugar that has been made, only a mobile app that contains this research needs have been found. Most food games are for amusement only and for children, as the game does not provide calorie and sugar intake information.

2.3.1 Food Quest (2010) - Serious hunger games

This interactive game by Una Lee and Stephanie Fisher is intended to increase awareness of food security in Canada. Sponsored by the Public Health Agency of Canada, this project (Food Quest) is hosted by Meal Exchange, a national youth-driven organization that aims to empower and inspire Canadian youth and communities nationwide to eliminate hunger [6]. In the health sector, the game consists of an educational aspect where the player can choose the character with different roles that reflect the challenges faced by individuals across Canada. Via character dialog or body language, this game also offers additional knowledge and feedback. Unfortunately,

a web browser that was used as a medium for this game and it is no longer available.

Table 1 is comparison of the features from 3 games that have similar subjects.

Feature / Title	Food Quest (2010)	Operate Now: Build Your Own Hospital	Calorie Counter Easy Fit
Graphical User Interface (GUI)	✓	✓	✓
Storyline	✗	✓	✗
Spreading Awareness	✓	✗	✗
Character Choice	✓	✗	✗
Collectables contain Information	✗	✗	✓
Information about calorie and sugar intake	✗	✗	✓
Platform	Web Browser	Android	Android
Application Type	Web-Based Game	Mobile Game	Mobile App

Table 1: Previous Project Analysis Table

III. METHODOLOGY

The methodology was the process of the study been executed. The ADDIE Model, which is consists of Analysis, Design, Development, Implementation, and Evaluation, was the research model that was used for the methodology.

3.1 Analysis phase

The phase of analysis is the first and the foundation of the other phase and is the most important aspect. This analysis would focus solely on the respondent's knowledge and understanding of the everyday basics of taking calories and sugar, whether or not they are conscious of the number of calories and sugar they

consume. This analysis would also evaluate whether the respondent is conscious of the possibility of eating too many calories and sugar.

3.2 Design phase

The researcher used proper multimedia elements in this project to create a game design that can attract and collect feedback from the respondents among young people. In ensuring the attention of the target audience, all the interactions, visuals, and animations play very important roles. Using Adobe Illustrator and Adobe Photoshop, the whole design was made in 2D.



Figure 2 Main menu

Figure 2 shows the screenshot of the main menu. In the game cheerful colours have been used to attract the youngsters' attention. Two avatars, a girl and a boy, are provided in the game for players to choose according to their preferences.



Figure 3 Kalo Gameplay (day 1)

Figure 3 shows the screenshot of the gameplay for the game. The game consists of 7 days. All the 7 days have the same outlook of the screenshot above. which the players need to eat and maintain the weight according to the health requirement mentioned in the game.



Figure 4 Player consumes the food and get information.

Figure 4 shows the screenshot of the gameplay for the food consumption of the day. Each of the food consumed by the players showed the total of calories and sugar contained in the food. Player needs to maintain the total of calories and sugar consumed in order to achieve the goal of the day in the game. The challenge is to get the correct calories and sugar intake by the end of the day and get the correct weight at the end of the week.

3.3 Development phase

This is the stage where the production and testing has been conducted. In this phase, the researcher began the development using UNITY and use C# language for the script. During this phase, all the information is animated in the Unity using Unity animator. The game main flow is consisting of 11 main scenes which are introduction of the game, main menu scene, option scene, loading scene, opening of the story scene, tutorial scene, character selection scene, gameplay scene, result scene, punishment scene, and the ending of the story scene. All the scripts were written with care in order for the game application to fully functional.

3.4 Implementation phase

For this phase, the mobile game application was exported as an Android Package Kit (APK) and it can be installed on the smartphone that used the operating system Android. The product was tested and ensured that the product is fully functional and does not have any errors before the product can be distributed to the target audiences.

3.5 Evaluation phase

The goal of this phase is to determine whether the project has met the goal which is to spread awareness and education to the young generation and to collect feedback for the improvement of this project to further the efficiency and effectiveness of the project. The

questionnaire related to the objectives of this project was distributed to the audiences via Google Form. The link to the game is provided in the form so that the respondents can experience it before answering. The questions type that have been used in the questionnaire is multiple-choice and the Likert scale. Due to Covid-19 Pandemic, the total of target respondents was not as expected.

IV. RESULT AND DISCUSSION

Questionnaires were distributed online and 20 respondents gave the feedbacks. The results are as follow:

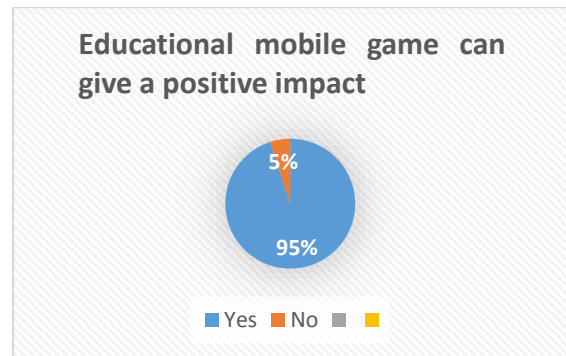


Figure 5 Do you agree that educational mobile game can give a positive impact on society especially among teenagers?

According to Figure 5, 95% of the respondents were agreed that educational mobile game can give positive impacts on society especially among teenagers and 5% of the respondent was not agreed. It shows that game can be an effective medium in delivering information to the young people.



Figure 6 Do you agree that this mobile game help in giving awareness of calories and sugar intake among teenagers?

Figure 6 shows that all the respondents were agreed that this mobile application help in giving awareness of calorie and sugar intake among teenagers. This shows that the objective of this research project has been achieved.



Figure 7 Do you agree that this mobile game can help in promoting educational games among teenagers.

According to Figure 7, shows that all the respondents were agreed that this mobile application can help to promote educational games among teenagers.

In conclusion, most of the respondents agreed that the purpose of the research project was accomplished by this product. This concludes that this mobile application is effective in delivering the message among teenagers about knowledge of calorie and sugar intake and helps promote educational games, particularly for teenagers.

V. CONCLUSION

This research study is important to every teenager among Malaysian as the current state of obesity in Malaysia is in high concern. This project was developed to encourage and guide teenagers as well as increasing their decision making and learning skill to figure out how important to live a healthy lifestyle and eat healthy, also how bad it is to get obesity-related disease. With all the information and education delivered in the mobile game, it could be a future step for a local organisation or any education industry to use this mobile game application as educational material in the future use.

Based on the results of the survey, this mobile game could encourage young adults to receive knowledge and awareness about calories and sugar. The risk of becoming ill due to obesity could also be minimized at a young age. This game can also help encourage a healthier lifestyle for

the younger generation. Finally, it shows that this mobile game will encourage and empower other developers to make a more educational game with a creative concept for the sake of the future.

VI. RECOMMENDATION

For future studies, it is recommended to add Malay language for more attraction among local people and promoting our national language among Malaysians. Future studies also can add more types of Malaysian foods such as Malay traditional foods, Indian traditional foods, and Chinese traditional foods to attract more users while promoting our traditional foods especially among teenagers which is some of them may not know some of the traditional food. For the future also can add more sound such as voice actor for the storytelling so that the game looks more interactive and meet all the requirement in the current game industry.

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