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Designing Multimedia Applications for Nutrition Education and Managing Stress

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ABSTRACT

This research is a project, which is a multimedia application design that aims to provide education about the importance of balanced nutrition and stress management during the COVID-19 pandemic. The design is divided into several menus in applications that contain multimedia elements in the form of text, images, sound, animation, and video. Data obtained through a qualitative approach were taken by taking and analysing existing data to resolve the situation from interviews with participants as a user and informants. The multimedia development method used is the Multimedia Development Life Cycle (MDLC), which consists of the concept, design, material collection, manufacture, testing, and distribution stages. The design results show that collaboration between communication considerations, design, and information system structuring is required in the process. This multimedia application's design can support the process of providing education, increase interest in better understanding the behaviour of balanced nutrition, and deal with stress during the Covid-19 pandemic for users.

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1. INTRODUCTION

Multimedia interacts with users through 3D sound perception and media (Chirivella & Gagliardo, 2016). This multimedia design application refers to a collection of computer-based media with communication system features to build, store, convey, and receive information in the form of audio, video, text, and graphics (Pringsewu, 2018). In this multimedia application, nutrition education and dealing with stress are obtained based on health experts' information. Nutrition education is designed to facilitate a series of nutritional learning conducive to health and well-being with the desired results (Murimi *et al.*, 2017). Meanwhile, prolonged stress causes poor physical and mental health. Understanding personality and stress is important for avoiding stress during a pandemic. An online survey conducted by Liu et al. found that neuroticism and extroversion were higher in association with higher stress levels during a pandemic (Liu *et al.*, 2020).

Previous research that discusses technology shows that technological developments with computer applications have become a viable medium for gathering information and disseminating information in recent years. Information is provided on nutrition training to provide education that makes information more accessible (Kolasa *et al.*, 1996). Other research supporters use multimedia as an attractive educational medium with high effectiveness for various groups, especially children in delivering health messages. This study focuses on the use of nutrition education using multimedia technology to educate students to observe behaviour towards food to be consumed (Hedaoo & Vali, 2015). In another case, multimedia is also used as a medium for providing calorie systems that can classify food objects on a plate by calculating the overall calories of each object produced at a high level of accuracy (Peddi *et al.*, 2017). One example of a health problem caused by food is obesity because it is influenced by irregular lifestyle behaviour and generally occurs throughout the world (Wyatt *et al.*, 2006). Based on research conducted by Tallon et al., obesity is a serious problem because it is increasing in society due to a lack of malnutrition literacy to help prevent it by evaluating the use of multimedia in implementing multimedia as a medium for nutrition education for Portuguese adolescents and Portuguese society. The result was an 85.5% increase in knowledge identified through a questionnaire (Tallon *et al.*, 2020).

This research aims to design a multimedia application prototype for balanced nutrition education and stress management. The research method used qualitative methods by taking and analysing existing data to resolve the situation. The multimedia development method used is the Multimedia Development Life Cycle (MDLC), which consists of six stages. The interview data collection method was carried out by asking questions to informants related to the research topic.

2. METHOD

The research method used qualitative methods, namely taking and analysing existing data to solve the situation from health experts' data. The data collection method is carried out by interview by asking questions to sources or informants related to the research topic. The multimedia development method used is the Multimedia Development Life Cycle (MDLC), which consists of six stages: concept, design, material collection, application development, testing, and distribution. With an explanation of the two initial stages of multimedia development at the concept and design stages as follows:

(i) Concept

Learning media is made with the concept of presenting nutritional education learning materials and dealing with stress in an interactive form that can help the learning process.

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Creating a multimedia application for nutrition education and dealing with stress can increase interest because the material presented is more interesting.

(ii) Design

The learning companion application's design stage starts with designing the application through the application menu's structure uses case, sequence, and activity diagrams. Then, create a design nutrition learning and stress application management of interface display.

(iii) Testing

The results of application testing using the Black Box Test technique, all menu functions in the application have been successful following their respective functions.

3. RESULTS AND DISCUSSION

In the early stages, content material related to stress management was collected through interviews with resource persons. Besides, literature studies were conducted to complement the data. Existing data are selected and sorted according to their usefulness, analysed, and then adjusted according to content needs. It means that there is a data reduction process, data simplification. However, it does not reduce the comprehensive side of the material to be delivered.

The data is then mapped by doing a mind mapping navigation system, which presents a system map to be created. This is closely related to the user interface that will be created. After completing the system design process followed. The process is as follows:

(i) Application design with use case diagrams

Use case diagrams are used to model and state the functions of the system's services to users. In this nutrition education and stress management application, there is only one user, namely the user. Users can interact and take action on a system that has a scenario in it. The following is a use case diagram of a multimedia application for nutrition education and stress management, which is depicted in **Figure 1**.

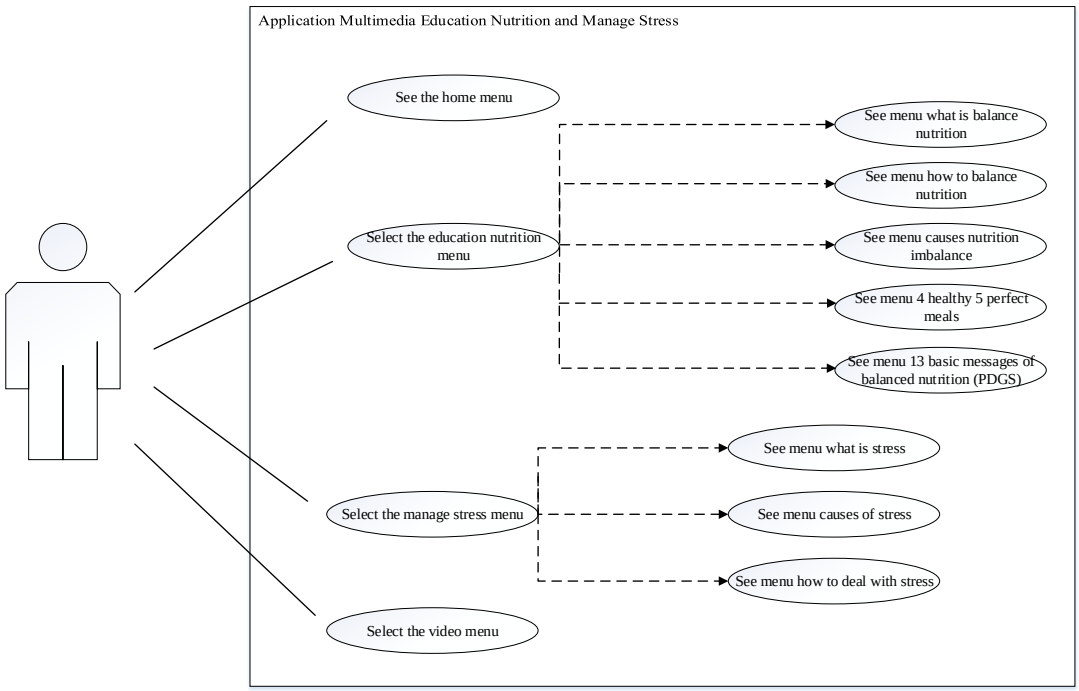

Figure 1. Use case diagram.

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(ii) Application design with sequence diagrams

Sequence diagrams are used to illustrate the interaction of objects and people in the form of messages depicted with time. The order is from the vertical dimension (time) and the horizontal dimension (related object). The following is a sequence diagram of the use case sequence used in the multimedia application nutrition education and dealing with stress, the sequence diagram of selecting the Home menu is shown in **Figure 2**.

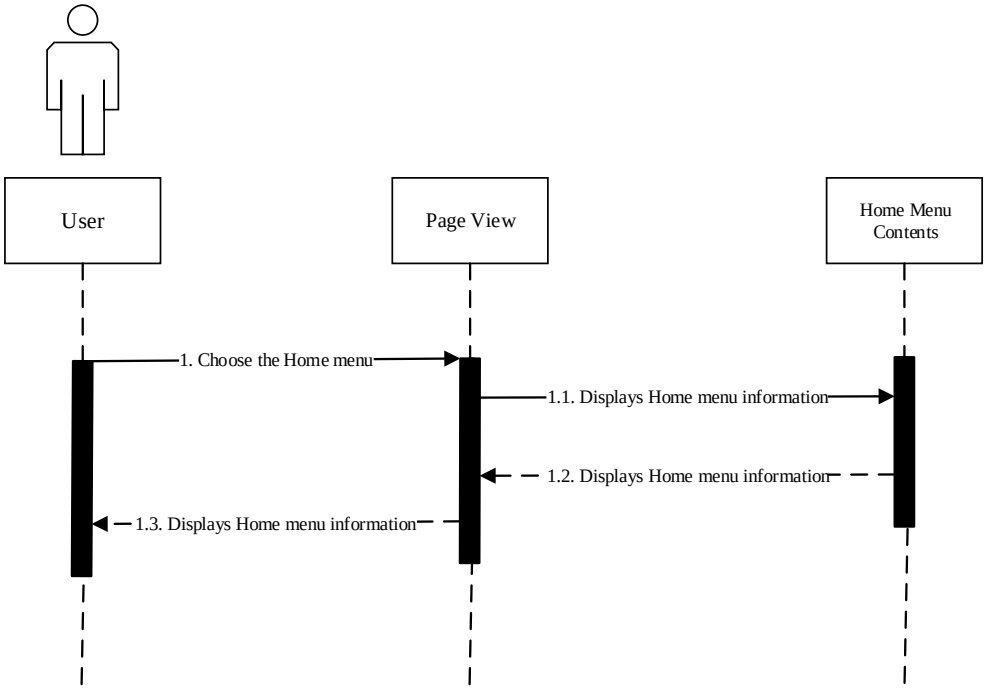

Figure 2. Sequence diagram home menu.

(iii) The sequence diagram of selecting the Education Nutrition menu is shown in **Figure 3**.

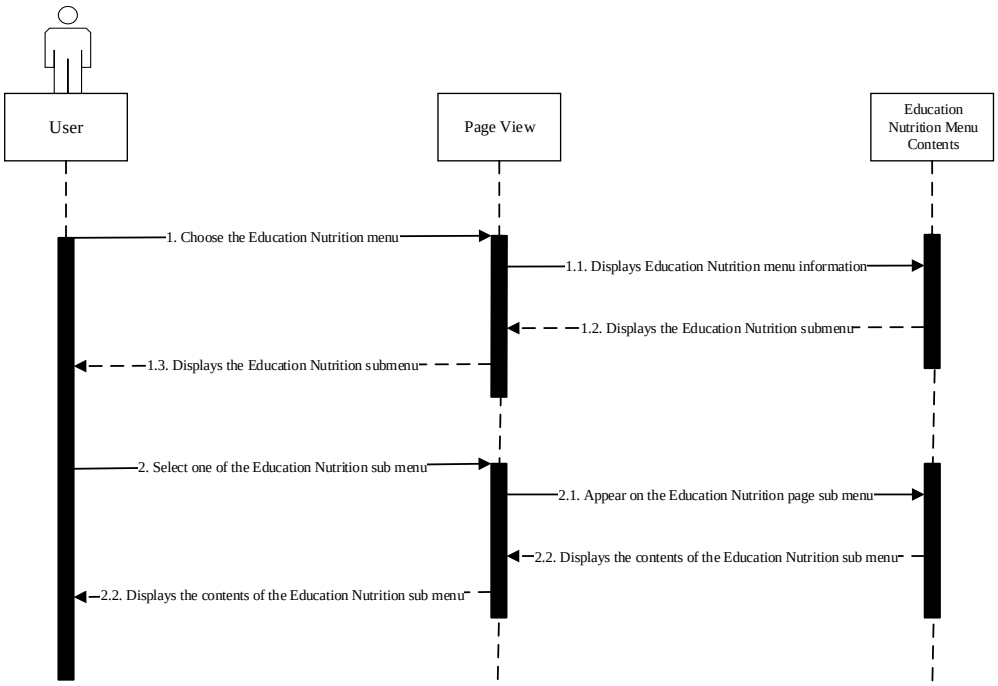

Figure 3. Sequence diagram education nutrition menu.

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(iv) The sequence diagram of selecting the manage stress menu is shown in **Figure 4**.

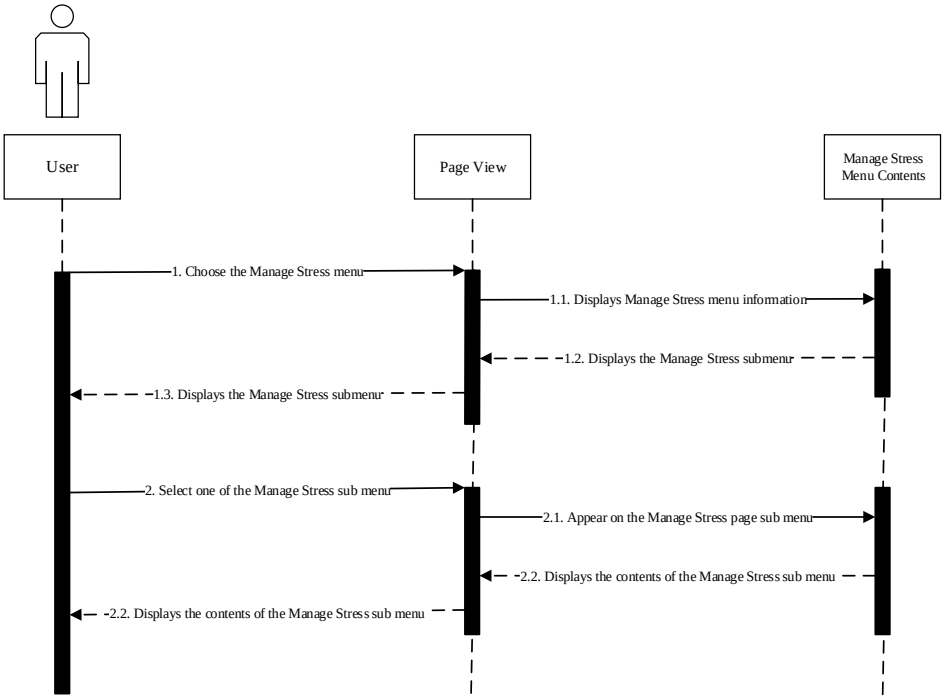

Figure 4. Sequence diagram manage stress menu.

(v) The sequence diagram of selecting the video menu is shown in **Figure 5**.

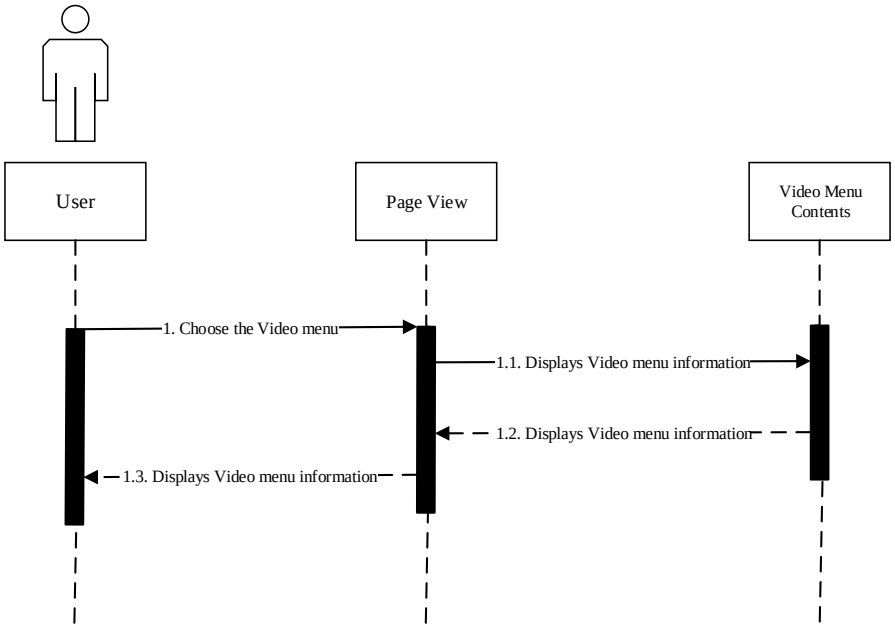

Figure 5. Sequence diagram video menu.

The next step is application design with activity diagrams. Activity diagrams are used to explain the sequence of activities in this Application Multimedia Nutrition Education and Stress Management. There are several components, namely the Action state to represent the process carried out by an element, with the following explanation:

(i) Action state for the first action executed.

(ii) Action state final for the last action executed.

(iii)Swimlane for the visual area in the activity diagram.

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(iv) Decision making is done to select the control flow according to the conditions.
(v) Concurrency selects multiple transitions at once.

3.1 Home Menu Display

In **Figure 6**, the display of the home menu in this application shows a picture of a person with food, which characterizes the application and the name of the application learning about Nutrition Education and Managing Stress.

3.2 Education Nutrition Menu Display

This menu contains a basic explanation of the balanced nutritional material packaged in the application. This nutrition menu display is divided into five sub-menu sections that explain nutrition education. The display of the sub-menu as follows. Display sub-menu one what balance nutrition is (see **Figure 7**).

3.3 Display Sub Menu 2 How to Balance Nutrition

In **Figure 8**, the display of sub-menu two on the Education Nutrition menu explains how to balance nutrients and what to do to balanced nutrition.

3.4 Display Sub Menu 3 Causes of Unbalanced Nutrition

Figure 9 displays sub-menu three on the Education Nutrition menu and explains nutrition's impact if nutrition is not balanced. There are several examples of diseases caused by unbalanced nutrition.

3.5 Display Sub Menu 4

Menu display contains pictures 4 healthy 5 perfect foods that must be consumed. In **Figure 10**, sub-menu 4 on the Education Nutrition menu explains what food examples are nutrition can be balanced as shown by the picture of the food.

3.6 Displays Sub Menu 5

13 main messages about balanced nutrition (PDGS) from the Ministry of Health of the Republic of Indonesia. In **Figure 11**, sub-menu 5 of the Education Nutrition menu describes the important points of balanced nutrition from the Ministry of Health to balance nutrition.

3.7 Manage Stress Menu Display

The Stress menu display is divided into three sections that explain stress management. Explaining the sub-menu as follows: Display sub-menu 1 what is stress is about with several explanations (see **Figure 12**).

3.8 Display Sub Menu 2 Causes of Stress

In **Figure 13** sub menu 2 the Manage Stress menu explains some of the causes of experiencing stress.

3.9 Display Sub Menu 3 How to Deal with Stress

In **Figure 14**, sub-menu 3 displays on the Manage Stress menu, which contains an explanation of how to deal with stress and what to do to avoid stress.

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3.10 Video Menu Display

In **Figure 15**, there is an example of a video in this application. This video contains the 4 pillars of balanced nutrition that can prevent the risk of stunting.

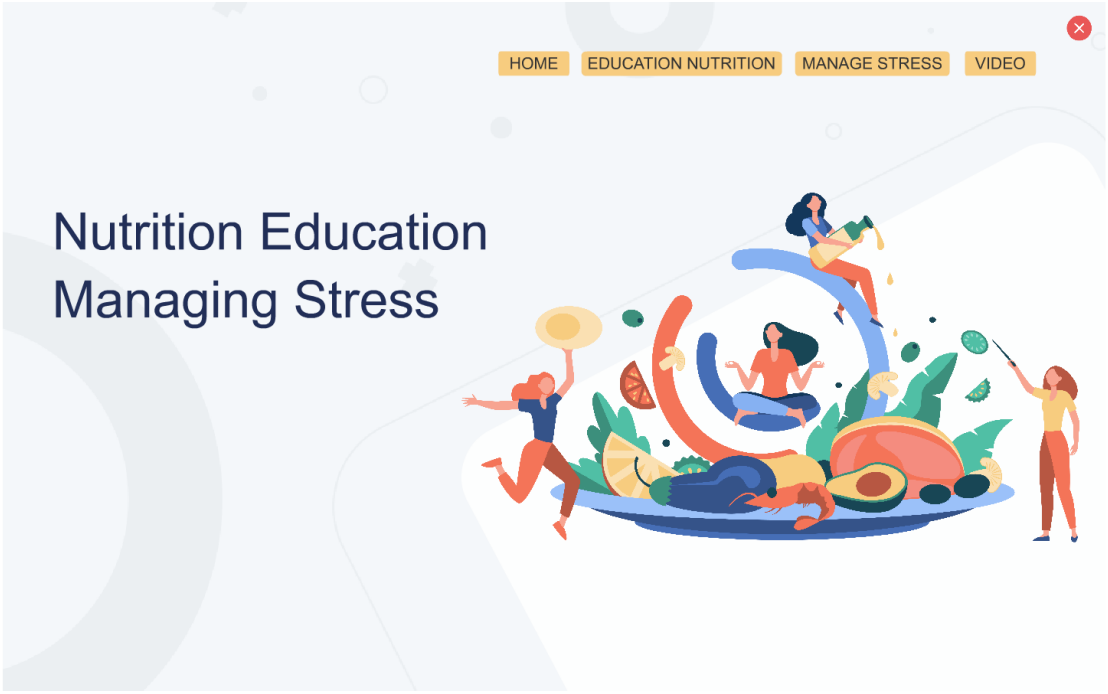

Figure 6. Home menu display.

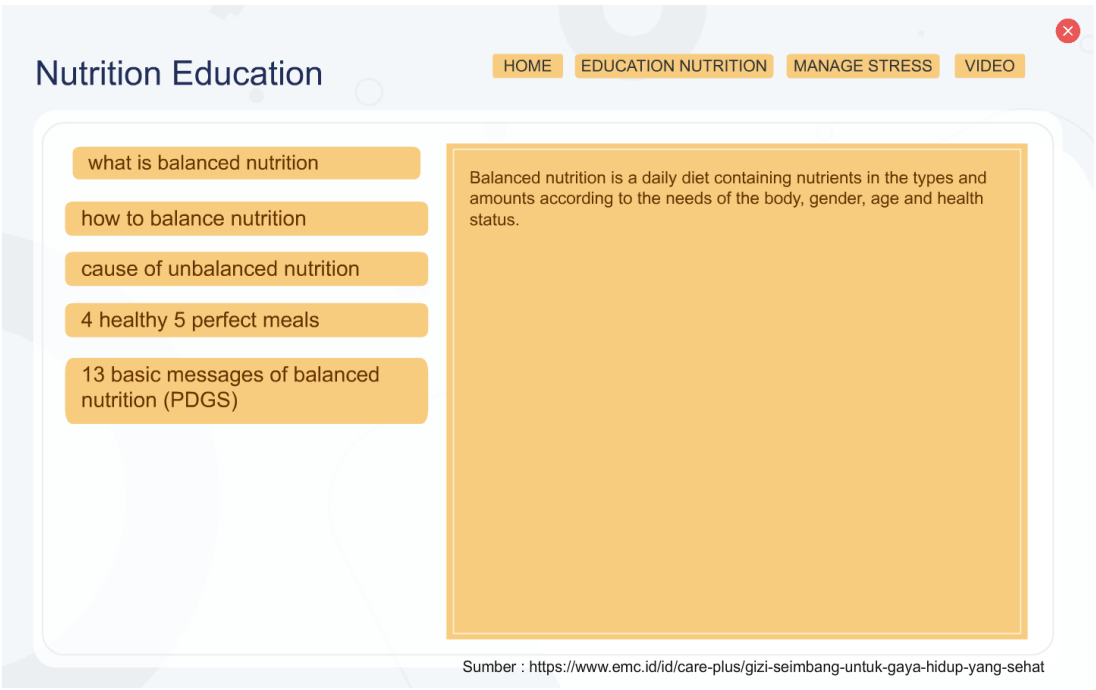

Figure 7. Display sub menu 1 what is balance nutrition.

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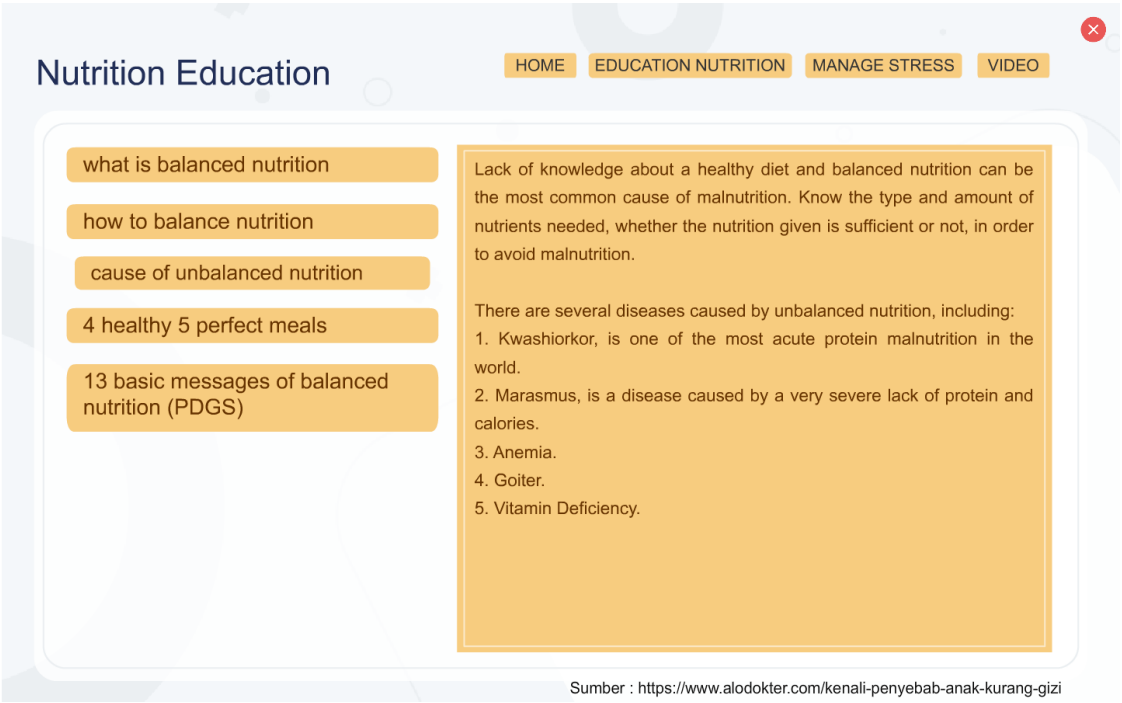

Figure 8. Display sub menu 2 how to balance nutrition.

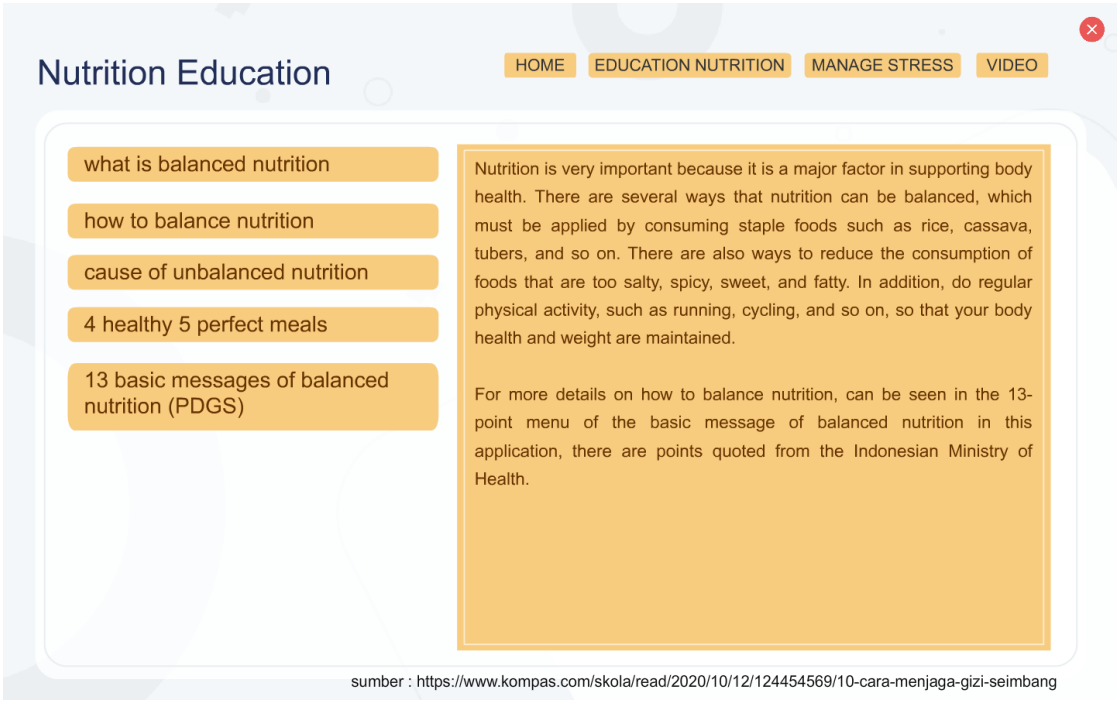

Figure 9. Display menu 3 cause of unbalance nutrition.

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Figure 10. Display menu 4, 4 healthy 5 perfect meals.

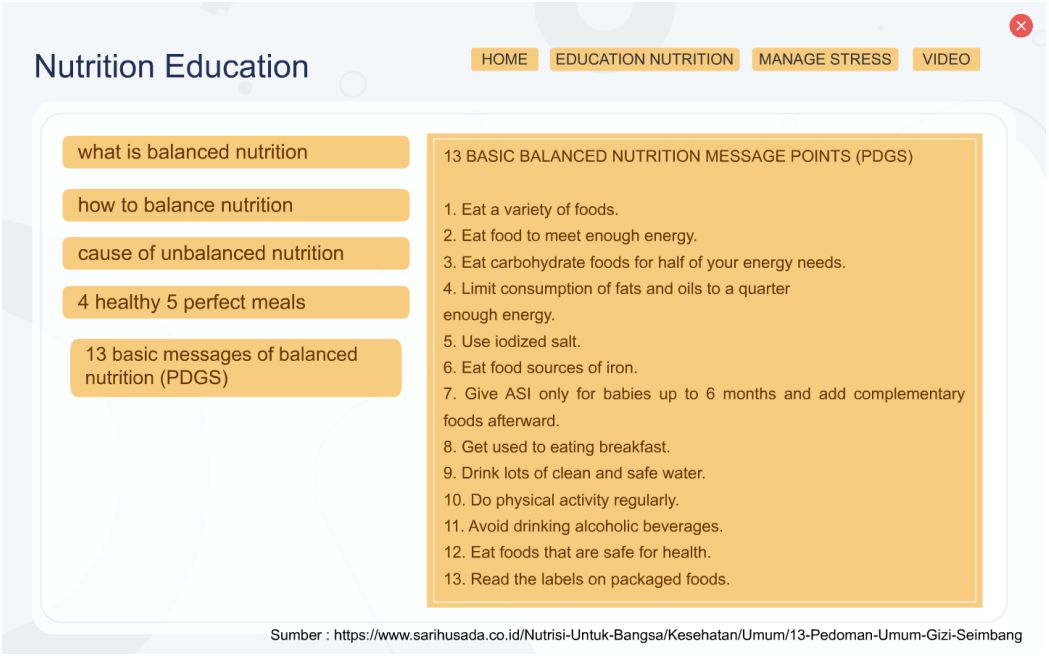

Figure 11. Display sub menu 5, 13 basic messages of balance nutrition.

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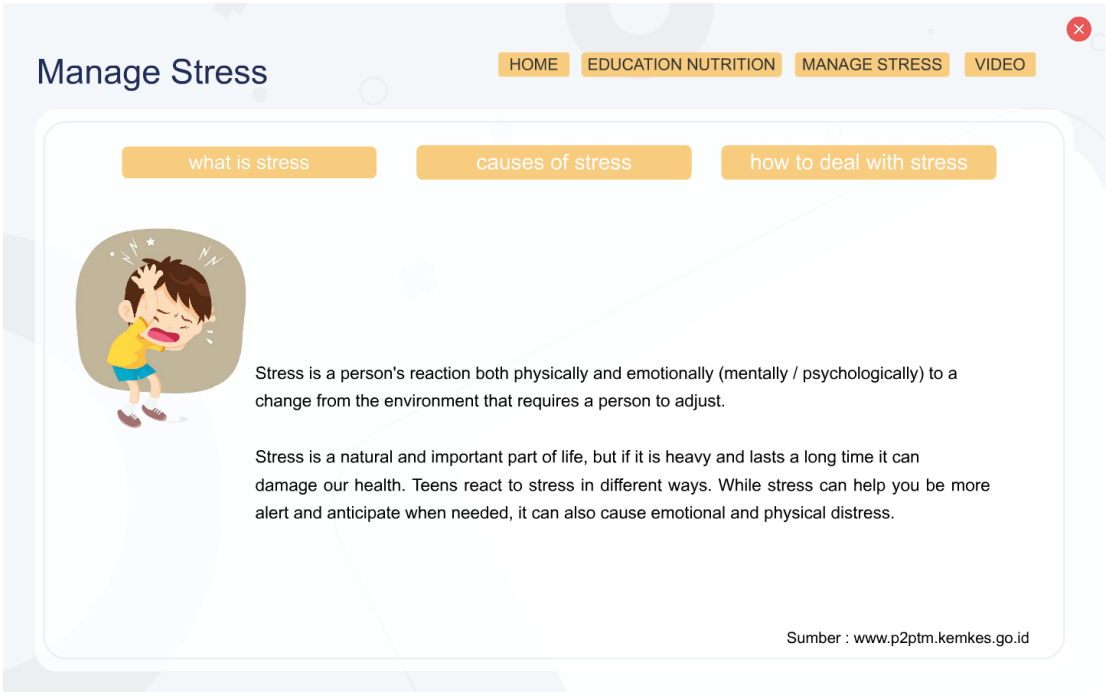

Figure 12. Display sub menu 1 what is stress.

Figure 13. Display sub menu 2 causes of stress.

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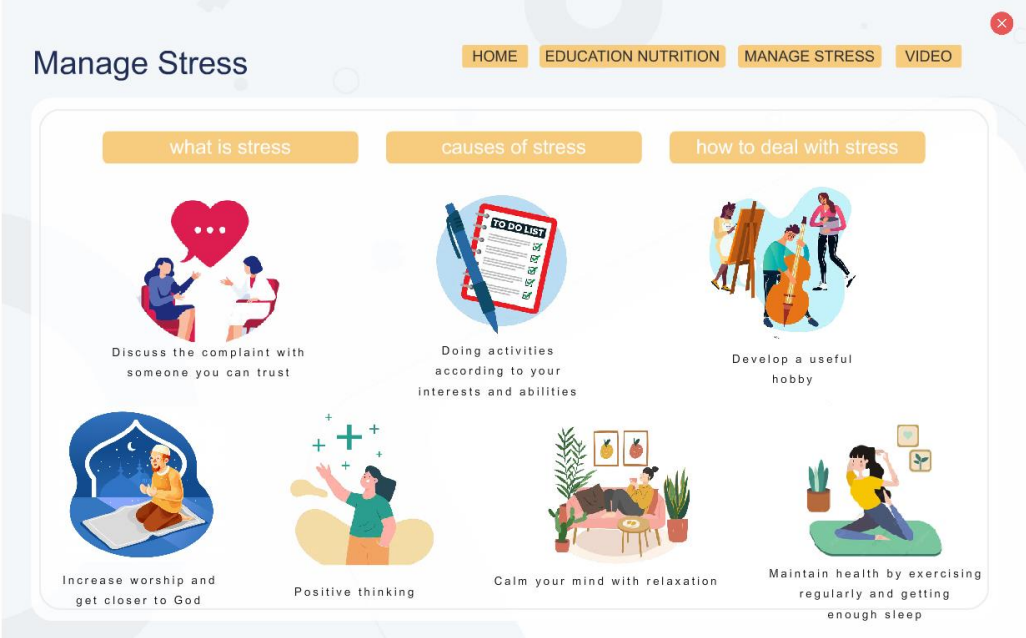

Figure 14. Display sub menu 3 how to deal with stress.

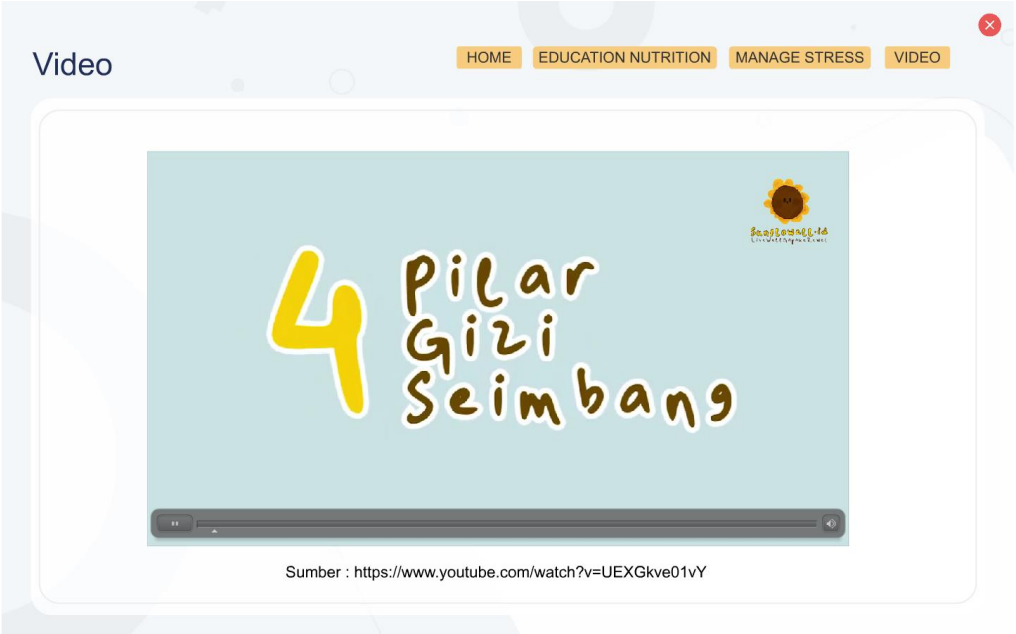

Figure 15. Video menu display.

4. CONCLUSION

Multimedia is a means that bridges the delivery of messages to the public through various stimuli to be easily accepted. In the manufacturing process, aspects of navigation, system, communication, and design have interdependent roles. The success of multimedia cannot be separated from user experience and user interface because humans/audiences tend to like something that has been patterned. Designing this multimedia application as an interactive learning media to provide education about the importance of balanced nutrition and stress management, with the hope of overcoming the problem of increased stress due to the Covid-19 pandemic.

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5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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