



Development of Educational Media for Introducing Nutritious Foods to School-Age Children

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ABSTRACT

One nutritional problem in school-age children is the low intake of nutritious foods, and too many eat unhealthy snacks. Therefore, it is necessary to develop educational media to introduce nutritious food to school-age children to prevent the nutritional problem. This study aims to develop interactive media exploring nutrition as an educational medium for introducing nutritious food to school-age children. The method used in this research is Research and Development (R&D) using the ADDIE model (Analyze, Design, Development, Implementation, Evaluation). The research was conducted from January to May 2022. The initial step taken in media development was a needs analysis. The analysis results show that the media to be developed is an interactive media using the Articulate Storyline 3 Application. The second step is to design by making storyboards. Then, media, material, and language experts validate the storyboard before use. The next step is media development. Finally, experts test the validity of the media. In addition, trials on media use also involve elementary school students (individual trials, limited trials, field trials). The test results show that "Jelajah Gizi" media is suitable for introducing nutritious food to school-age children. However, the effectiveness of using nutritional exploration interactive media needs further research.

Keywords: *Educational Media, Nutritious Food, School-age Children.*

1. INTRODUCTION

Human resources' quality depends on their growth and development from the prenatal period to old age. Each stage of development is essential because it impacts the next stage of development. School age is a period that receives less attention in terms of nutrition and health [1]. School age is also rarely the target of nutritional status surveys, even though nutritional status significantly impacts the quality of health, cognitive development, achievement, and future economic productivity [2].

Nutritional intake plays an essential role in the growth and development of children. Providing food that is not for the needs of children will cause developmental problems in children [3]. Many factors lead to nutritional status problems. One of the factors that causes nutritional status problems in children is unhealthy eating habits. Giving freedom to children to get snacks can also make children have bad and

unhealthy eating behaviours [4]. Another factor is persuasive food advertising. Many food advertisements promote unhealthy food, affect children's preferences and habits, and are a factor that causes the problem of obesity in children [5].

The results of health research conducted by the Ministry of Health of the Republic of Indonesia in 2018 showed that the number of children experiencing nutritional problems (malnutrition and undernutrition) was 17.7% [6]. The study results show that children in India experience nutritional problems, such as being severely underweight, stunted and thin [2]. Problems of nutritional status also occur in Indonesia. The results showed that school-age children at Sonosewu Bantul Elementary School had a low intake of carbohydrates, fats, vitamins and minerals while excessive protein intake [7].

Changing eating habits in children requires intervention from the environment around the child,

such as the family, school and community environment. The habits of children who need intervention are consuming fruits and vegetables and increasing knowledge about healthy food [8]. Schools can play an essential role in the education and promotion of healthy eating among children [9]. There are many successful nutrition intervention programs in schools, including the Food Dudes programme. The Food Dudes program has succeeded in increasing fruit and vegetable consumption in school-age children [10]. This program has a positive impact both in the short term and the long term. The School-Based Culinary Program also shows the same results. Students participating in the School-Based Culinary Program have better vegetable and fruit consumption, cooking skills, food skills, and food knowledge [11]. School interventions regarding nutrition can improve the nutritional status of school-age children. The Systematic Review and Meta-Analysis results show that school nutrition interventions are implemented in Asia and quantify their effects on school-aged children's nutritional status [12].

Intervention can be done in various forms, including using media through videos and posters. The results showed that using media in videos and posters significantly positively affected students' knowledge, attitudes and actions in choosing healthy foods and snacks [13], [14]. Media use also increases fruit and vegetable consumption in school-age children [15].

Based on this explanation, the nutritional status of school-age children is essential. Nutritional status impacts school-age children's health conditions, cognitive development, and academic achievement. One of the problems that occurs is that there are still many school-age children who experience nutritional problems. Therefore, it is necessary to develop educational media to introduce nutritious food to school-age children. This study aims to develop a media called "exploring nutrition" as an educational medium to introduce nutritious food to school-age children.

2. METHOD

This study aims to develop a media called "Jelajah Gizi" as an educational medium to introduce nutritious food to school-age children. The method used is Research and Development (R&D) research using the ADDIE model (Analyze, Design, Development, Implementation, and Evaluation). Media using Indonesian language and development by using the Articulate Storyline 3 Application.

The researcher carried out research from January to May 2022. The research location was one of the elementary schools in North Jakarta City, DKI Jakarta Province, Indonesia. This research involved material experts, media experts, linguists and 26 elementary school students in grades 4, 5 and 6. Media experts

assess aspects of communication, technical design, and packaging formats. Material experts evaluate content, education, interaction, and display quality. Linguists evaluate the feasibility of language and communication. Students involved in this study also assessed the "Exploring Nutrition" media in terms of appearance, material, objectives and benefits for learning.

The stages of media development consist of three stages: Analyze, Design, and Development (Figure 1). The stages of media development using the ADDIE model are as follows:

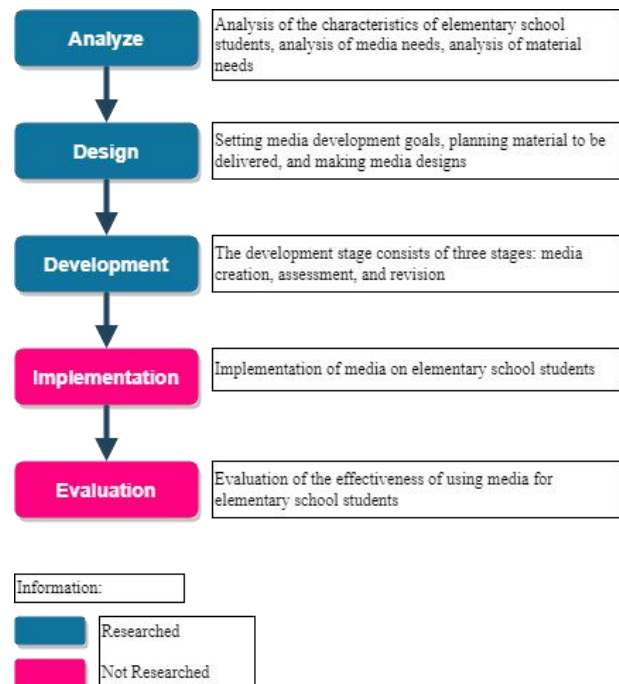


Figure 1 Stages of media development using the ADDIE model.

After developing the media, the researcher needs to evaluate the media. The media is assessed first by media experts, material experts, and linguists. Researchers use a questionnaire to collect scores from each expert. Processing results of the questionnaire use percentage. Furthermore, the data use three categories very good (75<percentage≤100), good (50<percentage≤75), below average (25<percentage≤50), and failing (percentage ≤ 25). Apart from being experts, students also filled out a questionnaire to assess the feasibility of the media. Presentation of data from experts and students in the form of a percentage and the category data consist of very good (85-100), good (70-84), average (55-69), below average (40-54), and failing (0-39). Media with very good grades means it is feasible and does not need revision. Media that gets good grades means it is feasible and does not need revision. Media that get a good enough score means it is not feasible and needs revision. Media that gets a bad score means it is not feasible and needs revision. Media with an inferior score means it is not feasible and needs revision.

3. RESULT AND DISCUSSION

3.1. Analysis Stage

The analysis phase is the initial stage in media development. Researchers conducted interviews with teachers and elementary school students to identify problems. The results of the interviews indicated that one of the problems was a problem with nutritional status (undernutrition and overnutrition). Elementary school students tend to have a habit of consuming unhealthy foods and snacks. Many factors affect food consumption in children. One of the factors comes from the family environment because the family environment plays a role in shaping eating habits in children at home. The results showed that parents' food habits and feeding strategies were the dominant determinants of children's eating behaviour and food choices [16]. In addition, an increase in unhealthy food consumption can also come from the external environment, such as the availability of unhealthy food around children, the promotion of unhealthy food by the media, etc. The availability of unhealthy food and snacks in the environment around children, both around the house and school, increases students' purchases of unhealthy food and snacks [17].

To prevent nutritional problems from arising due to unhealthy food consumption necessary to develop media for introducing nutritious food for school-age children. Nutritional knowledge is a strategy that can help children choose healthy and nutritious food [18]. Media development must pay attention to the characteristics of school-age children. Schools have programs to teach about nutrition and health for children. The media is widely used in education orally and by using books. Providing material through books or orally is considered easy to forget and less attractive to students. The media developed is different from media that has been developed by previous researchers, such as nutritional education media based on Android and websites [19], cards [20], and educational games [21], [22], [23]. Based on this explanation, researchers are interested in creating interactive media to introduce nutritious foods that attract students to learn about nutritious foods.

3.2. Design Stage

After using the nutritional exploration interactive media, students are expected to be able to recognize and add to their knowledge about nutritious foods. In the second stage, the researcher designed the media design. The material in the Jelajah Gizi media is in the form of sound recordings introducing nutritious foods. The hope is that the use of media will enable children to understand and understand nutritious food.

After setting goals, researchers create media plans or known as storyboards. At the storyboard design stage, interactive media exploring nutrition was designed based on the results of the needs analysis that had been obtained. The storyboard contains an overview of the media design to be developed. The thing to do after making a storyboard is to make or compile a questionnaire that becomes a benchmark in assessing the feasibility of the media. The assessment questionnaire consists of questionnaires for material experts, media experts, and linguists. And a trial questionnaire on elementary school students. Before developing the media, material experts, media experts, and language experts assess the feasibility of storyboards. The results of the assessment determine the continuation of media development. The researcher revised the storyboard based on the results of the expert's assessment.

The results of the expert's assessment of storyboards are as follows:

1. changing the nutrition symbol with the new jargon, namely "Isi Piringku"
2. Added some sounds to suit the material better
3. added age-appropriate games for grades 4, 5 and 6 because puzzle games for children aged 4, 5 and 6 are too easy
4. Consider using foreign languages like hello, welcome, star, next, and thank you.
5. Consider the characteristics of elementary school children who prefer colours and animations around them or are currently in trend.

3.3. Development Stage

The development of interactive media exploring nutrition as an introduction to nutritious food is part of a form of nutrition education for school-age children. Engaging in educational media can increase children's curiosity about the contents of the media itself. Media development refers to guidelines for balanced nutrition in Indonesia. Balanced Nutrition Guidelines aim to provide guidelines for daily food consumption and healthy behaviour based on consuming various foods, clean living habits, physical activity, and monitoring body weight regularly to maintain normal weight [24].

The third stage carried out is the development stage. Researchers make media based on storyboards. This media is packaged in a website application format for 50 minutes or as a link that can be used freely and practically without the Internet. This nutrition-roaming interactive media requires the help of additional devices, namely computers or laptops, capable of producing images (visual) and sound (audio). This nutritional exploration interactive media contains four main page sections, namely: opening page, material page, games page, and closing page.

3.3.1. Opening Page

The first part of the media is the opening page. This section displays a welcoming page for media users in the form of presentations in the form of written animations and audio music instruments. Figure 2 is an example of the opening page.



Figure 2 Opening Page.

3.3.2. Material Page

The material page is a page that contains material "introduction to nutritious food". This page consists of several sections, namely: Introduction to the list of materials (Figure 3), Introduction to balanced nutrition foods (Figure 4), Introduction to new jargon, namely "Fill my plate" (Figure 5), Introduction of ten guidelines for balanced nutrition (Figure 6), Introduction of three habits that must be considered and applied in daily life (Figure 7), Introduction to the component "Fill in My Plate" (Figure 8), Explanation of the Definition Guidelines for Balanced Nutrition (Figure 9), and an introduction to a list of stories related to the Introduction of nutritious foods (Figure 10).



Figure 3 Introduction to the list of materials.



Figure 4 Introduction to balanced nutrition foods.



Figure 5 Introduction to new jargon, namely "Fill in My Plate or Isi Piringku."



Figure 6 Introduction of ten guidelines for balanced nutrition.

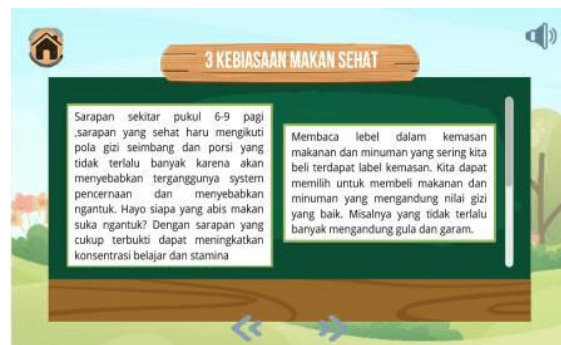


Figure 7 Introduction of three habits that must be considered and applied in daily life.



Figure 8 Introduction to the component "Fill in My Plate."

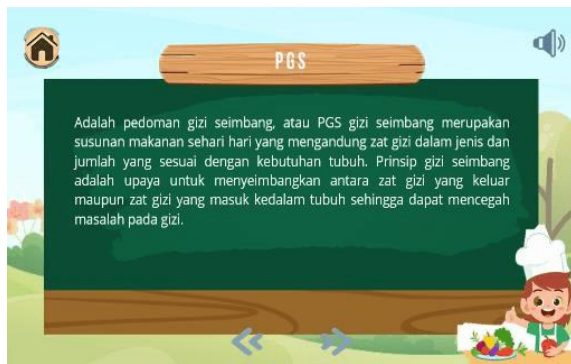


Figure 9 Explanation of the definition guidelines for balanced nutrition.



Figure 10 Introduction to a list of stories related to the introduction of nutritious foods.

3.3.3. Games Page

This media also provides games and quizzes for users. There are several sections in the games and quiz pages, namely: Game Instructions (Figure 11), Nutritious food puzzle games (Figure 12), Quiz Instructions (Figure 13), Example quiz pages (Figure 14), and Final score after doing the quiz (Figure 15).



Figure 11 Game Instructions.



Figure 12 Nutritious food puzzle games.



Figure 13 Quiz Instructions.

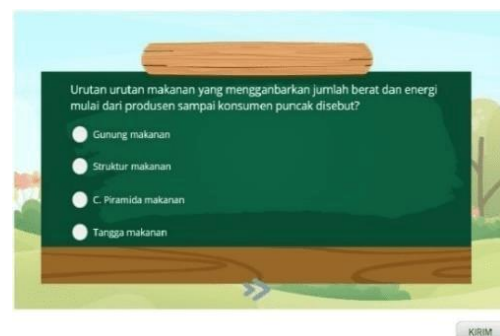


Figure 14 Example quiz pages.



Figure 15 Final score after doing the quiz.

3.3.4. Closing Page

This closing page is the final part of interactive media. This page allows repeating interactive media exploring nutrition or end-using media. Figure 16 is an example of the closing page.

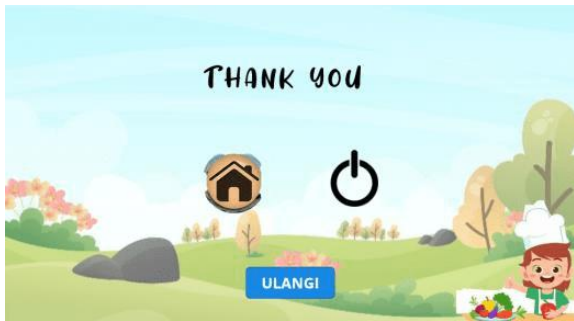


Figure 16 Closing Page.

3.4. Media Feasibility Assessment

The media feasibility assessment involved three experts: media, material, and language experts. The study results show that the media is in the excellent category based on assessments by media experts, material experts, and linguists (Figure 17). This result means this media is suitable for introducing nutritious food to school-age children.

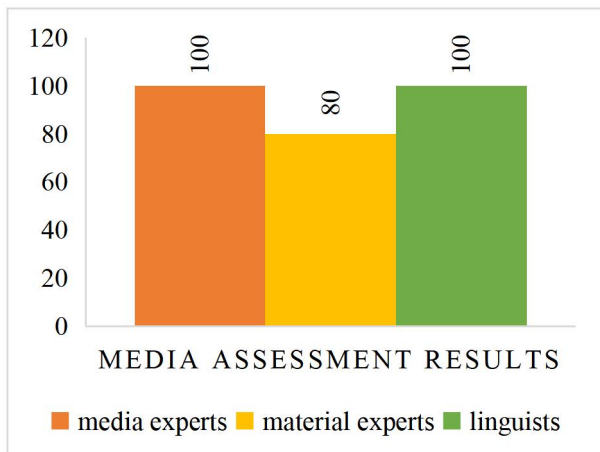


Figure 17 Media Assessment Results (Experts).

After conducting media adequacy assessments by experts, researchers conducted media adequacy assessments on elementary school students through individual, limited, and field trials. The study results show that the media is in the excellent category based on the assessment by elementary school students (Figure 18). This result means this media is suitable for introducing nutritious food to school-age children.

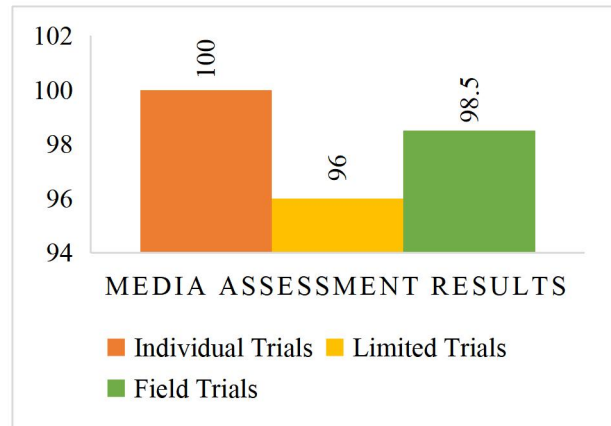


Figure 18 Media Assessment Results (Students).

4. CONCLUSION

The stages of developing educational media for introducing nutritious food for school-age children consist of three stages: Analyze, Design and Development. To determine the media's feasibility, three experts assessed media, material and language aspects. In addition, researchers also conducted trials on the use of media involving elementary school students (individual trials, limited trials, and field trials). The test results show that "Jelajah Gizi" media is suitable for introducing nutritious food to school-age children. For further research, it is expected to measure the effectiveness of the use of interactive media exploring nutrition.

ACKNOWLEDGMENTS

Researchers thank Dr. Nur Riska, S.Pd., M.Si., Murien Nugraheni, S.T., M.Cs., and Hilman Yusra, S.Pd., M.Pd. who helped carry out the media feasibility assessment as experts. The researchers also thank the principals, teachers, and elementary school students involved in this research.

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