# DESIGNING LEARNING MEDIA APPLICATIONS ABOUT NUTRITION FOR PREVENTING STUNTING IN CHILDREN BASED ON ANDROID

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**Abstract:** Stunting is a serious problem in children's growth and development which can have a negative impact on quality of life and productivity in the future. This research aims to develop and evaluate an Android-based nutrition learning media application designed specifically to prevent stunting in children. The design of this application will aim to provide information that is easy to access and understand regarding proper nutrition for optimal growth of children, as well as providing practical guidance for parents in providing a balanced diet. This application development method involves the design stage of an intuitive and attractive user interface, as well as learning content supported by the latest information regarding nutrition and stunting prevention. The design of this application also provides interactive features such as knowledge quizzes and balanced meal plans, which can help parents understand and apply correct nutritional concepts. It is hoped that the results of this research will be able to contribute to efforts to prevent stunting in children through an information technology-based learning media approach.

## INTRODUCTION

Stunting or growth failure is a serious problem in children's health that has a long-term impact on the quality of life and development of children (Nirmalasari, 2020). Children who experience stunting tend to have a higher risk of health problems, reduced educational achievement, and low productivity in adulthood .

The background to the creation of an Android-based design for a learning media application about nutrition to prevent stunting in children is a response to the stunting situation that needs to be addressed effectively(Tech, 2022). Some of the background factors that drive the design of this application include:

1. Statistical data shows that there is a relatively high stunting rate in society.

2. Village communities may face obstacles in accessing information about proper nutrition and preventing stunting.

3. Education and increasing knowledge about proper nutrition are the keys to preventing stunting.

4. Village communities are increasingly familiar with technology, especially

Android-based devices.

Based on the explanation above, innovative solutions are needed that can overcome existing obstacles. The design of an Android-based learning media application about nutrition to prevent stunting in children aims to provide easy, interactive and educational access to the community (Magdalena et al., 2021).

## RESEARCH METHODS

In research regarding the title "Designing Learning Media Applications about Nutrition to Prevent Stunting in Children based on Android", there are several data collection techniques that can be used to understand the impact of the application and public perceptions(Asmawati et al., 2017). The following are relevant data collection techniques:

1. In-Depth Interviews: In-depth interviews with various related parties can provide an in-depth understanding of their experiences, perceptions and views on the application.

2. Participatory Observation: Researchers can participate in the daily life of the community in Secanggang Village, including events related to child nutrition.

3. Focus Group Discussions (FGD): Hold FGDs with groups of participants from Secanggang Village. This group discussion can provide insight into shared perceptions and experiences in using the application.

4. Surveys: Surveys can be used to collect quantitative data about people's knowledge, attitudes and behavior regarding child nutrition and application use.

5. Knowledge and Behavior Measurement: Researchers can use knowledge tests or behavior measurements to assess the extent to which nutritional knowledge and stunting prevention measures have improved after application use.

6. Application Content Analysis: Evaluation of application content can be done by analyzing the material in the application, identifying available nutritional information, and examining interactive features such as quizzes and learning modules.

7. Visual Data Collection Approach: Ask participants to create pictures, diagrams, or visualizations that illustrate their understanding of child nutrition and the changes they feel after using the application.(Andi, 2015)

The research method describes the research design to be carried out, namely consisting of procedures or steps that must be taken. The research method carried out by the author is the SDLC Waterfall model method (Susilo, 2018). Where the Waterfall(Supiyandi, Rizal, et al., 2022) Method is a software development method that focuses on linear and sequential processes. The waterfall model is often also called the linear sequential model or classic life flow model (Hermansyah et al., 2022). The waterfall model provides a sequential or sequential approach to software life flow. In this method, each stage must be completed before starting the next stage. The following is a general description of the Waterfall method(Supiyandi, Zen, et al., 2022) in designing learning media applications about nutrition to prevent stunting in children based on Android:
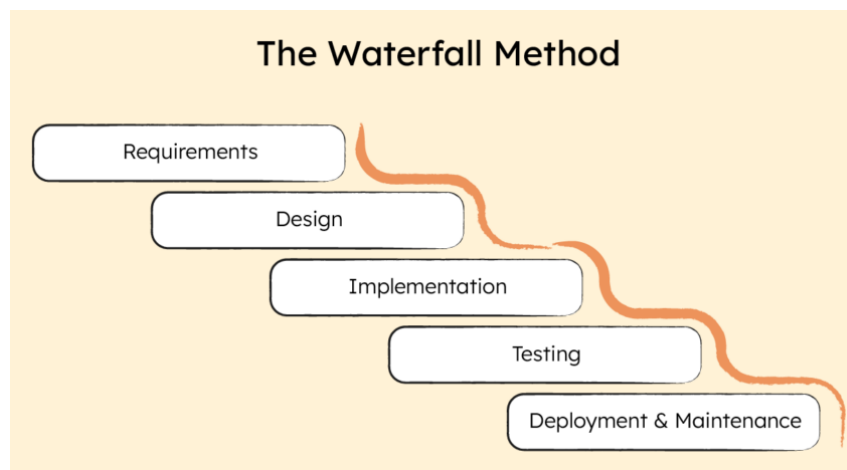


**Figure 1.** Research Flow

a.  Requirements: This stage involves gathering information about user needs and expectations related to the application to be created. Here, the author carries out the needs analysis process, first the researcher collects data using research observations carried out directly by the village community to collect data on stunting children(Berbasis Web Pada Budiman Joko S Dwi Raharjo et al., 2019). Second, with interviews, namely a technique carried out face to face and direct question and answer between the researcher and the resource person, the interview process is carried out directly with the village community.

b.  Design: This stage involves system planning and design, including technology selection, and user interface design. To make it easier for researchers to build systems, several designs are needed, including creating designs and designing systems using Unified Modeling Language (UML) diagrams .

c. Implementation: This stage involves coding and implementing the system according to the design.

d. Testing: This stage involves testing the system to ensure that the system functions according to specifications and user expectations.

e. Deployment and Maintenance: This stage involves installing the system and migrating data to a production environment with system maintenance to ensure that the system remains functional and meets changing user needs.

**RESULTS AND DISCUSSION**

The results of this study are system design in the form of system design using Unified Modeling Language consisting of use case diagrams, activity diagrams, squency diagrams and interface designs.

**A. Design System Use Case Diagram**

In application design, to obtain information from a system being created, the author uses a use case diagram (Sonata, 2019). With this diagram, the processes that occur in an application can be known. The waste bank use case can be seen below:
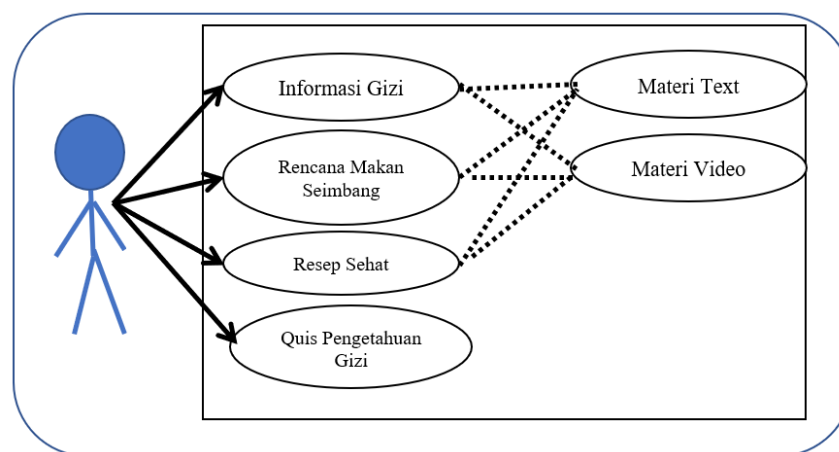


**Figure 2.** Use Case Diagrams

1. Use Case: Accessing Nutrition Information
    a. Actors: Parents / Child Caregivers
    b. Description: Users open the application to access information about balanced nutrition for children and how to prevent stunting.
    c. Steps:
        i.  Users open the app on their Android device.

      ii.   Users select the "Nutritional Information" menu from the interface.

      iii.  The application displays content in the form of articles, images and videos about balanced nutrition and stunting prevention.

      iv.  Users read and watch these materials to gain better understanding.

2. Use Case: Balanced Meal Plan

   a.  Actor: Pregnant Mother

   b.  Description: Pregnant women use the app to create a balanced meal plan that supports fetal growth and health during pregnancy.

   c.  Steps:

      i.   Pregnant woman opens application on Android device.

      ii.  Pregnant women select the "Balanced Meal Plan" menu from the interface.

      iii.  The app offers guidance on essential nutritional intake during pregnancy, including recommended foods and appropriate portions.

      iv.  Pregnant women choose appropriate foods and add them to their daily meal plan.

      v.   The app creates a balanced daily meal plan and can be printed for reference.

3. Use Case: Healthy Recipes

   a.  Actors: Family Members

   b.  Description: Family members are looking for healthy and nutritious food recipes for children.

   c.  Steps:

      i.   Family member opens app on Android device.

      ii.  Family members select the "Healthy Recipes" menu from the interface.

      iii.  The application displays a list of healthy food recipes that are suitable for children. Users select recipes of interest.

      iv.  The app displays detailed recipes, ingredients and step-by-step instructions for cooking the food.

4. Use Case: Nutrition Knowledge Quiz

   a.  Actor: Teacher / Lecturer

   b.  Description: Teachers use the application to quiz students on nutrition knowledge as part of class learning.

   c.  Steps:

    i.   The teacher opens the application on the Android device.

   ii.   The teacher selects the "Knowledge Quiz" menu from the interface.

  iii.   The application displays various questions about nutrition and stunting.

## B. Design Activity Diagram

Activity diagrams are used to provide an overview of the flow of activities in the system.
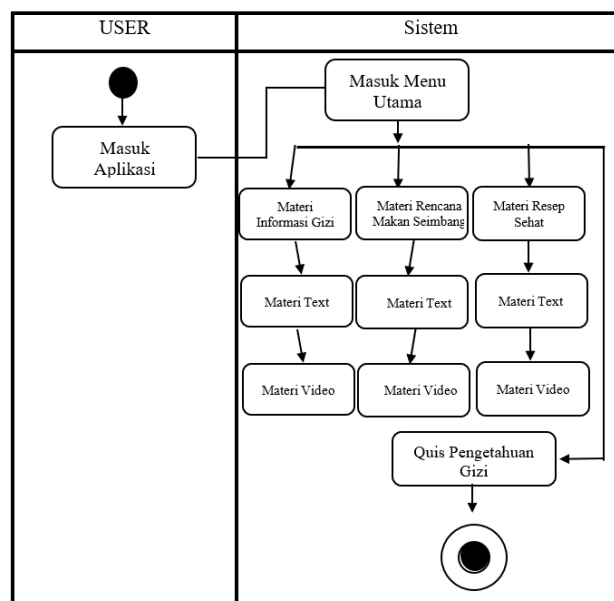
*1. Activity* Diagrams Materi



**Figure 3.** *Activity* Diagrams Materi

Material activity diagram description:

a) User enters the main menu.

b) The first step is that the user clicks on the material menu to be selected.

c) After that, enter the text and video material menu.

d) Then there is text & video content and you can move pages sequentially.

e) Users can also choose a Quiz about Nutrition knowledge.

f) Users can return to the application's main menu.
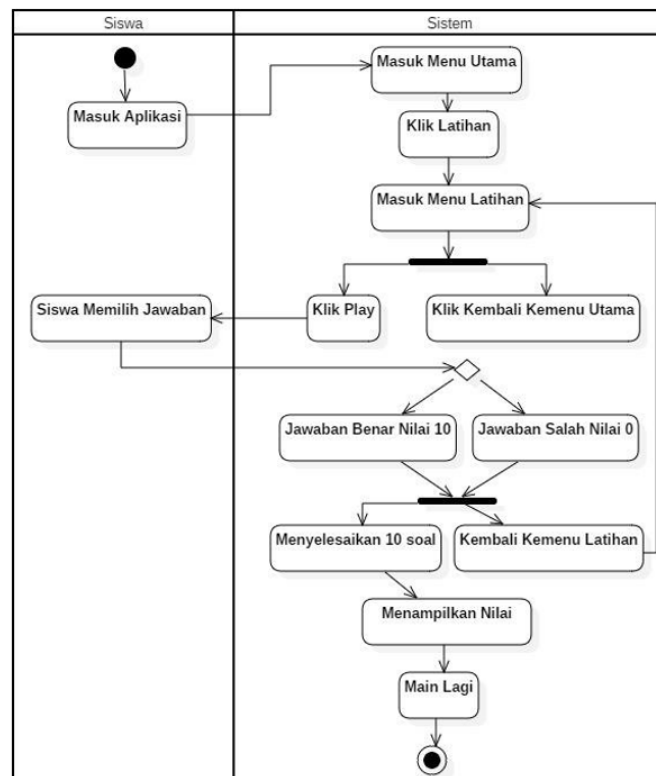
2. Activity Diagram Quiz Nutrition Knowledge

**Figure 4.** Activity Diagrams Quiz Nutrition Knowledge

Activity diagram quiz description:

a) The user enters the main menu.

b) The first step is for the user to click on the Nutrition Knowledge Quiz menu

c) After that, enter the Nutrition Knowledge Quiz menu by clicking "Play" in the practice menu, there is also a button to return to the main menu.

d) Then the user chooses the answer, correct then the value is +10, if wrong +0, the question consists of 10 questions.

e) After completing 10 questions, the score will come out. And the user can play again.

**C. Design Sequence Diagrams**

Sequence diagrams explain object interactions arranged based on time sequence. For every use case there is a sequence diagram.
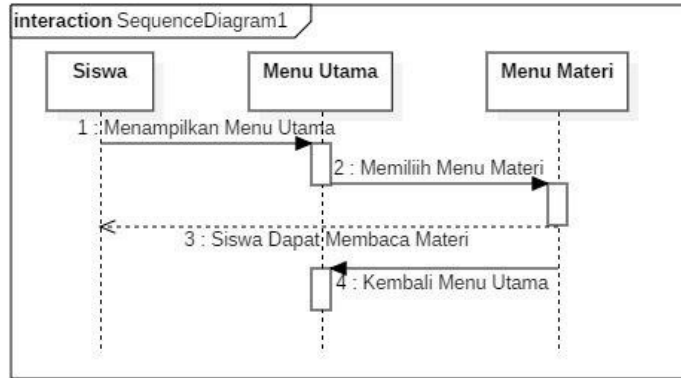
1. Sequence Diagram Material



**Figure 5.** Sequence Diagram Material

Material sequence diagram description:

a) The first step the user is taken to the main menu.

b) The user selects the material menu, the user is given the option to select the material that has been provided.

c) After the user selects the material menu, the tutorial menu presents material about nutrition

d) In the menu there is a button to return to the main menu.
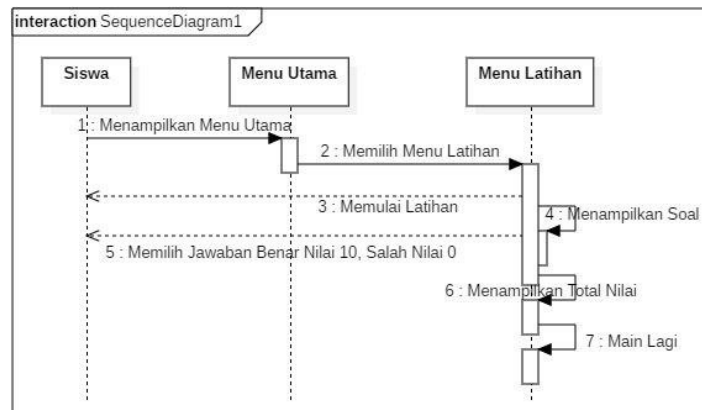

2. Sequence Diagram Nutrition Knowledge Quiz



**Figure 6.** Sequence Diagrams Quiz Nutrition Knowledge

Description of the exercise sequence diagram:

a) The first step the user is taken to the main menu.

b) User selects the training menu.

c) After the user selects the menu in the practice menu, the user is given the option to work on multiple choice questions.

d) After completing 10 questions, the total score will come out, and students can play again.

**D. User Interface Design**

The design that will be implemented is to create a user interface for introducing the solar system for elementary school (SD) students. The following is a display plan divided into several pages:

a) Main Menu Display

b) Text Material Form

c) Video Material Form

d) Nutrition Knowledge Quiz Form

This device uses components from Adobe Animate, such as option buttons as selection options and other components.
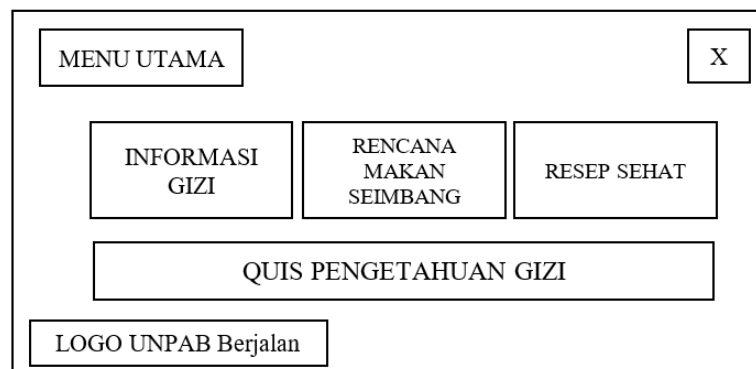
a. Menu Forms



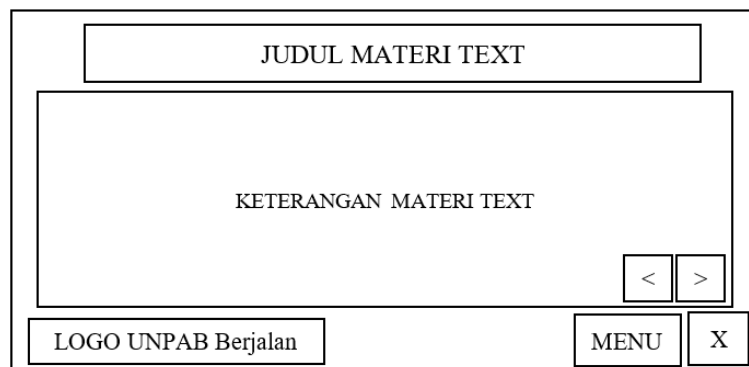**Figure 7.** Main Menu Display Design

b. Text Material Form



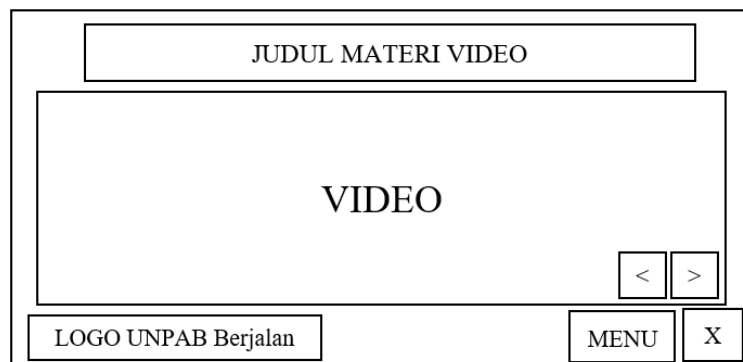**Figure 8.** Text Material Form Design

c. Video Material Form



**Figure 9.** Video Material Form Design
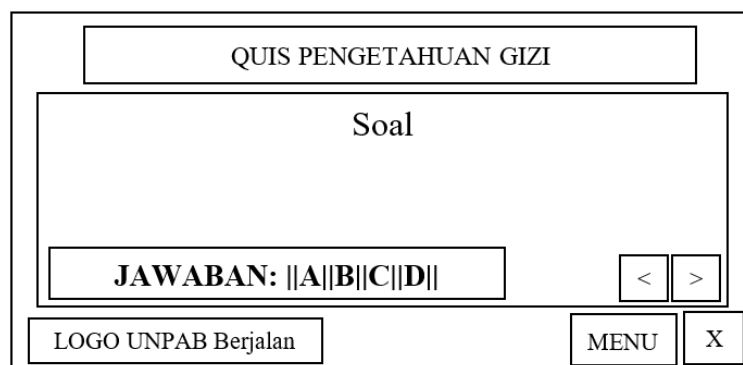
d. Nutrition Knowledge Quiz Form



**Figure 10.** Nutrition Knowledge Quiz Form Design

**CONCLUSION**

This research has the main aim of developing a learning media application which aims to provide knowledge about nutrition and how to prevent stunting in children. In the era of information technology that continues to develop, Android applications have become a potential means of providing information and education to the public, especially parents and children. Apart from that, this application can also help children understand the concept of nutrition in an interesting and easy to understand way, so that they can actively participate in maintaining their own health. In this way, this research contributes to efforts to prevent stunting through better nutrition education and awareness.

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