



Sahabat Terbaik Anak Application (Nutritional Information for Children Stunting Prevention in the first 1000 days based on Android) using the Waterfall Method

Andy Paul Harianja¹, Bunga Apriana Gultom², Faustina Winda Samosir³, Ruth Jesika Nainggolan⁴, Riski Sandi Januar Larosa⁵, Risbelina Br Sitepu⁶

¹Information Engineering Study Program, Saint Thomas Catholic University, Indonesia, apharianja@gmail.com

²Information Systems Study Program, Saint Thomas Catholic University, Indonesia, bungagultom8@gmail.com

³Information Systems Study Program, Saint Thomas Catholic University, Indonesia, faustinasamosir88215@gmail.com

⁴Information Engineering Study Program, Saint Thomas Catholic University Indonesia, ruthjesikanainggolan@gmail.com

⁵Information Engineering Study Program, Saint Thomas Catholic University, Indonesia, sandilarosa29@gmail.com

⁶Information Systems Study Program, Saint Thomas Catholic University, Indonesia, ibelpahaganta@gmail.com

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ABSTRACT

This research aims to help the community in providing information on good nutritional intake to children. By using this application, it is hoped that the community can monitor and optimize children's growth during the first 1000 days, with a focus on stunting prevention. This Sahabat Terbaik Anak app (information about the importance of good nutrition and helps in monitoring children's growth) uses a waterfall model. The system includes an Android mobile app, which allows users to search for articles about children's growth and development according to the month and efficiency while traveling. The four phases of this system are data collection, design, implementation, and testing. The system provides an easy-to-use interface to provide nutrition monitoring, physical growth, and education for parents on the importance of balanced nutritional intake. Children's friends can provide solutions to reduce stunting in children.

Key words: Stunting, Waterfall Method, Mobile Application, Nutrition.

1. INTRODUCTION

Stunting is a condition in which children experience linear growth failure caused by chronic malnutrition, recurrent infections, and inadequate psychosocial stimulation. The problem of stunting in children is still a significant public health challenge, especially in developing countries such as Indonesia. Based on data from the World Health Organization (WHO), around 22% of children under the age of five worldwide were stunted in 2020. In Indonesia itself, the prevalence of stunting reached around 27.7% in the same year, according to the Ministry of Health of the Republic of Indonesia.

The first 1000 days of life, which includes 270 days of pregnancy and the first 730 days after birth, are critical phases for a child's growth and development. Adequate and balanced nutrition during this period is essential to support optimal growth and prevent stunting. Inadequate nutrient intake during this period can lead to irreparable growth disorders later in life, even if nutritional conditions improve.

2. METHOD

The method used in creating the Sahabat Terbaik Anak app is the *Waterfall* (Waterfall) Method. The *waterfall* method is a development that emphasizes systematic steps so that each process in website development must be carried out sequentially at each stage. The stages that must be carried out start from identifying website needs, design, design implementation, and testing. The advantage of using the waterfall method is that it can identify the needs of the website long before the program starts so as to minimize errors due to the workflow that has been programmed. The research stages in writing this research:

A. Data Collection

Data collection techniques consist of:

1. Literature Review.

A thorough literature review of relevant materials such as books, journals, articles, and online resources.

2. Observation.

It was carried out directly at the location, namely the Medan City Health Center, to identify application design needs and collect data on system design needs.

3. Design Needs.

The design phase involves determining the requirements required for the design of the application, including the devices used, the database, and the team involved in the design process.

4. System Analysis and Design.

Crunch the data collected from the previous phase and turn it into a prototype. This phase includes designing the interaction of system functions and objects, creating schemas and databases, and designing user interfaces.

5. Implementation.

In the implementation stage, the design is transformed into code using several programming languages to create an interoperable application system.

6. Application Testing

At this stage, the application is tested to direct the user to find out the errors that exist in the system. If the system runs smoothly, it means that a function is declared feasible or valid, and vice versa if a function is not as expected, then there is an error in coding.

7. Report Writing

A final report is written detailing the methodology and theory.

B. Application Modeling Tools

Flowchart modeling is an effective visualization technique in designing software systems. Using symbols and lines, a flowchart clearly represents a workflow or process from one stage to another. This helps to understand the relationships between processes, identify potential problems, and find opportunities for improvements.

Each flowchart depicts the process from start to finish, allowing developers to visualize the overall design of the app. Through this modeling, the application development process becomes more efficient because the design can be analyzed and optimized before implementation.[5].

3. RESULTS AND DISCUSSION

A. Communication

The communication stage in the "Sahabat Terbaik Anak" application is an important stage in collecting information about child growth and development, nutrition guidelines, the process of monitoring child growth, and health education. Effective communication between the app and the user (parents) is key in ensuring that the information received and provided can be optimally utilized to support children's health and development.

1. Nutrition Guide

- This app provides nutritional guidance tailored to the child's age and nutritional needs. Parents can access information about the different types of foods that are recommended, including the right portions and frequency of feeding.
- It also includes easy-to-understand and easy-to-apply food recipes, as well as information on the nutritional benefits of various food ingredients. Thus, parents can make better decisions regarding their children's diets, ensuring that their children's daily nutritional intake is optimally met.

2. Child Growth Monitoring Process

This routine and structured monitoring is very important to detect the risk of stunting early. With timely and accurate information, nutrition and health interventions can be carried out immediately to prevent more serious conditions.

3. Health Education

- This application provides a variety of educational materials in the form of articles, videos, and infographics designed to increase parents' knowledge about children's health. This material covers topics such as the importance of balanced nutrition, good hygiene practices, and how to provide positive psychosocial stimulation to support children's cognitive and emotional development.
- The education provided not only helps parents in understanding the nutritional needs of their children, but also equips them with knowledge on how to overcome various challenges that may be faced in parenting. This creates a more supportive and informative environment for parents to care for their children.

B. Planning

The planning stage in system development focuses on technical planning and the necessary resources. At this stage, a needs analysis is carried out, including functional needs related to system features, and non-functional needs that include aspects such as performance and security. System requirements are depicted using a use case diagram (Figure 1_ to show the interaction between actors and the system, providing a thorough understanding of how the system will be used and ensuring the design meets user needs.

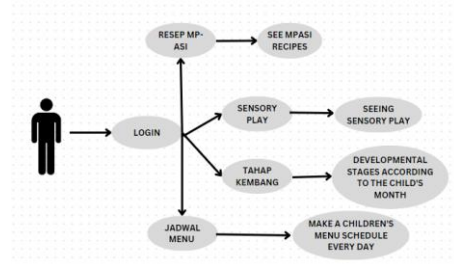


Figure 1: User use case

C. Modeling

Modeling aims to simplify the process by studying the specifications of the requirements and designing the design of the system. At this stage, the system is designed to define the hardware, system requirements, and overall architecture. The prototype design is then classified according to the needs that have been identified. Prototype designs are classified into:

a) User homepage

This view is the main page of the app (figure 2)



Figure 2: Homepage

b) User home page view

On the main display there is a complementary recipe feature. This can be seen in figure 3.



Figure 3: user homepage

c) Application Development Stage Menu Display

There is a flowering stage feature. This can be seen in figure 4.



Figure 4: Flower Stage Menu

d) Display of the Sensory Play Menu of the Application

There is a Sensory Play feature. This can be seen in figure 5.



Figure 5: Sensory Play Menu

e) Display of the Application Schedule Menu Feature

There is a Schedule Menu feature. This can be seen in figure 6.



Figure 6: Schedule Menu Feature

D. Building





The construction stage is an important process where the planned system design is translated into code so that it can be executed by a computer. At this stage, developers are in charge of writing code according to the specifications set to meet the needs and demands of users. This process involves using Android Studio as the primary development environment (IDE), while MySQL is used for database management. The app is built for the Android platform using the dart programming language with the Flutter framework, which allows for the creation of efficient and responsive interfaces and functionalities by modern standards.

E. Spread

The deployment stage aims to implement the system to users after development is complete. At this stage, the the "Sahabat Terbaik Anak" application will help parents choose nutritious food for children according to their age

and can help in the development of children's motor sensors. The success of implementation is assessed based on the suitability of the output with the functional needs that have been determined. If the results match, then the functionality is considered valid. However, if the output doesn't match, it means that there are still errors that occurred during coding. Blackbox testing is used to detect any loss of functionality or errors in the process. Table 1 shows some of the test results that use the Blackbox method.

Table 1: Blackbox Test Results

Feature	Testing steps	Expected results	See	Condition
Side Meal Recipes	Choose MP-ASI recipes according to your child's month	displays MP-ASI recipes according to the month you want to access		Succes
Flower Stage	Select the stage of development that has occurred in the child	displays the stages of development that occur according to the child's month		Succes
Sensory Games	Choose the appropriate sensory play for your child	Displays Sensory Play videos that children can do at home according to their age		Succes
Menu Schedule	Choose a daily food menu for children	Displaying a child's menu schedule		Succes

4.CONCLUSION

Responding to community problems in preventing stunting in children, the development and implementation of the “Sahabat Terbaik Anak” application has shown positive results in monitoring children's growth during the first 1000 days and preventing stunting. This app not only assists parents in ensuring their child gets enough nutrition, but it also provides the necessary educational support. Thus, this application has great potential to be applied more widely as a stunting prevention tool in the community.

The success of this project can be attributed to the collaborative efforts of all stakeholders involved, including developers, end-users. The iterative approach allows for continuous feedback and improvement, resulting in a system that accurately meets the needs of its users.

This project is an excellent example of the importance of involving end-users in the development process, as well as the importance of using an iterative approach in software development. Thus, this application can benefit the community in the coming years.

Confession

Praise and praise to God Almighty for giving us the opportunity to complete the journal SAHABAT TERBAIK ANAK (Monitoring Growth in the First 1000 Days to Prevent Stunting). With His grace and grace we were able to complete this application on time. This journal not only provides an in-depth insight into the application development process, but also provides a clear view of how this application can provide real benefits to society.

We would like to thank our supervisor, Mr. Andy Paul Harianja ST, M.Kom. Through the advice given, we can add insight and knowledge related to the creation of this application.

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