



Mobile Application for Stunting Recognition Education Using Video-Based Learning Method

Khoirunnisa Larasati*, Faisal Reza Pradhana, Dihin Muriyatmoko, Muhammad Alwi Yusron and Lulu' Luthfiyah

University of Darussalam Gontor, Ponorogo, Indonesia

ARTICLE INFO

Article history:

Received 30 April 2024

Revised 31 August 2024

Accepted 30 September 2024

Online first

Published 28 October 2024

Keywords:

Stunting

Android

Video-Based Learning

Education mobile app

DOI:

10.24191/scl.v18i4.9692

ABSTRACT

Stunting is a nutritional problem in Indonesia that negatively impacts children's capacity for growth and development. The importance of stunting education in Indonesia is highly emphasized because stunting is very prevalent in Indonesia. The observation activities found that many parents did not know about the use of stunting applications, and 98 children experienced stunting. This research aims to design mobile android-based stunting learning media using material sources taken from stunting books and journals. The learning media concept is created in the form of video-based learning. The waterfall research model includes requirements, design, implementation, testing, and maintenance. The testing carried out in this research consisted of black box testing, and software functionality was able to run well and was declared successful. In contrast, for material testing, after being calculated on a Likert scale, the result was 96,9% and got an excellent score, same as learning media testing, which reached a mark of 94,8% and got an excellent score, same integrated healthcare center (posyandu) mothers for user testing. It received a score of 95.8% based on the results, which concluded that the testing of this application was excellent and was used as a learning medium for parents to understand stunting.

INTRODUCTION

Indonesia looks at a child's nutritional status as an essential influencing factor in the growth and development of the child. One of the nutrition problems in Indonesia that hurt the ability to grow a flower child is stunting. In Indonesia, stunting will still be decreasing by 21.6% in 2022. Far from WHO standards, it is still enough that stunting should be below 20%. Stimulation in childhood is a problem in Indonesian society. Stunting is a disturbance of a growth-marked child with a height shorter than usual for his age [1].

* Corresponding author. E-mail address: khoirunnisalarasati45@mhs.unida.gontor.ac.id
<https://doi.org/10.24191/scl.v18i4.9692>

by contextualizing the development and implementation of mobile apps within existing literature, researchers can identify gaps and opportunities for innovation.

One method for disconnecting the stunting chain is to get the bride young, mother pregnant, and breastfeeding mothers material about nutrition balance, pattern nurturing, and preparation for the wedding to improve what they should do. Several efforts are required to prevent stunting. Parental knowledge about patterns influences the development of a child. Parental contribution to the child for fulfilling needs, nutrition is essential to prevent stunting, and providing food complementary breastfeeding (MP-ASI) too early or late impacts the growing flower child. In this modern era, stunting education is given with stunting applications. Based on the results of an interview conducted with 21 respondents, mothers who have a child get results with 57% less understanding of stunting applications. This shows that much of society still needs to understand stunting applications. Many stunting applications circulate in a community only from text, so they become not interactive enough in the stunting learning media process. With method video, video-based application learning without depending on space and time. This method becomes active learning for parents and teenagers so that they become more interested in studying stunting [2].

It reviewed several assessments previously that have applied educational media introduction of stunting to mobile-based media using method video-based learning research. This research aims to create educational media recognition of active stunting for teenagers and parents and add knowledge of stunting that is not known previously. This method uses a video showing attractive visual images and is interested in studying stunting for teenagers and parents. This research aims to develop a mobile application to educate caregivers and healthcare professionals about stunting recognition using a video-based learning method [3].

MATERIALS AND METHODS

Waterfall model

This Research uses the waterfall Model. The waterfall model is one of the models of the SDLC methodology often used for developing device software or system information. The system approach in development device software used from this model is systematic and sequential.[4] The model can integrate with existing healthcare systems for users requiring medical intervention or specialized care to provide seamless referrals, appointment scheduling, and follow-up support. This integration can ensure continuity of care and maximize the app's impact on improving health outcomes related to stunting. The waterfall model is shown in Fig. 1.

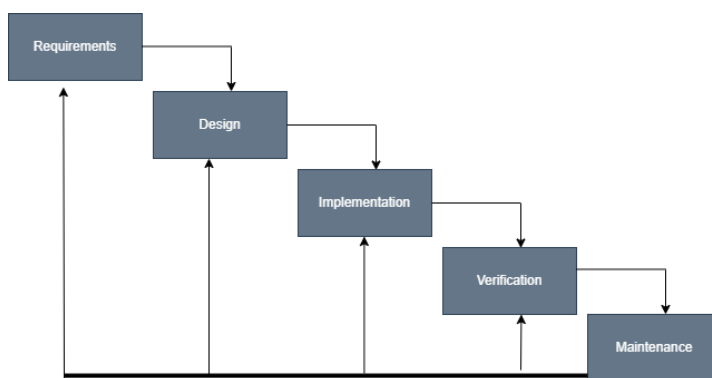


Fig. 1. Waterfall model

Requirements

At stage analysis, researchers identify problems that occur until they find the solution offered in the form of educational media Android-based stunting recognition using video-based learning. Educational media This was developed based on the research results and the percentage of checking in the Ngawi region to increase the effectiveness of stunting education. The development applications requirement as described in Table 1.

Table 1. Needs development application

Activity	Results
Identification Problem	Percentage in Ngawi, as many as 98 children and 57% of mothers do Not yet know how to use Stunting and lack application socialization or knowledge about Stunting.
Content of Application	Stunting material was taken from several stunting books and journals health.
Teaching Methods	The method used is Video Based Learning
Solutions Offered	Made material video-based in the digital era so that it is more efficient and displays more interesting for studied

Design

At this stage, the design system is created based on the needs analysis of existing applications designed. The system design consists of Use case Diagrams and Flowcharts.

Use Case Diagram

Use case diagrams, which are helpful for visual diagram developers. To reach a general understanding with user final and domain experts. The flow of a use case can be defined by describing channel events in the text so that everyone can easily understand it. Restricted use case event flow in text's structure informal use case diagram from the application as described in Fig. 2 [5].

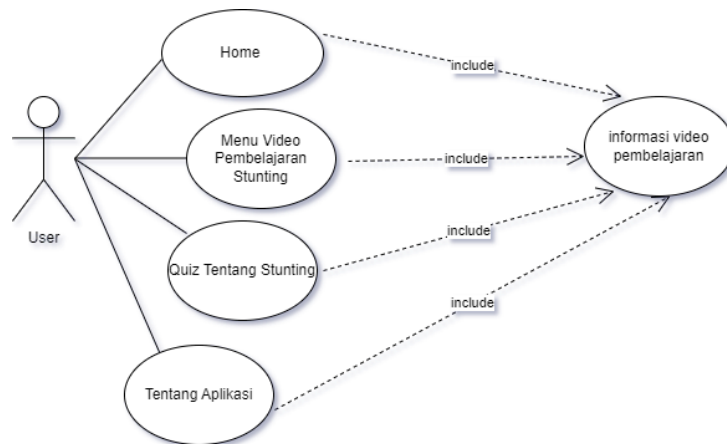


Fig. 2. Use case X-Stunting

Flowchart

Flowcharts have many other names, including block diagrams, flow diagrams, system diagrams, process diagrams, run diagrams, chart logic, and iteration diagrams. Flowcharts are graphic tools for documenting Suite activity and function as visual means for communicating one person's temporal sequence of events or actions to another. In the form of images, flow diagrams have become the subject standard in international and national America [6]. The flowchart from the application is described in Fig. 3.

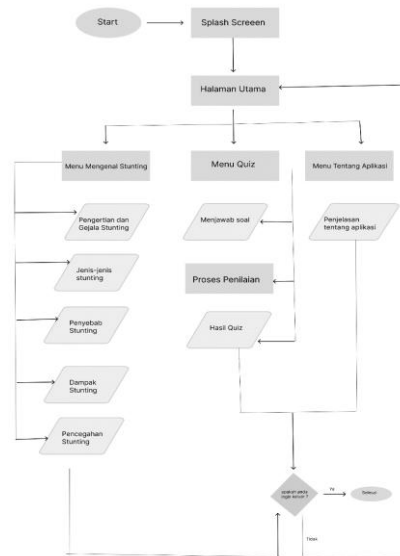


Fig. 3. *X-Stunting* flowchart

Implementation

At this stage, this is done by coding or programming from a system previously designed in phases. The software used for coding is Android Studio 4.4

Testing

Testing application This is through 5 stages of testing: black box testing, software functionality testing, material testing, media testing, and testing user. Test data processing will be calculated using a Likert scale. The Likert scale is the amount of positive or negative statements about an object's attitude [7]. Test effectiveness: A research instrument can declare validity if item questions on the questionnaire state something measured by a questionnaire. The indicator questionnaire is good if the r-value count exceeds the table [7]. Criteria interpretation score based on existing intervals determined, i.e., range 0%-19.99%: Not agree, 20%-39.99%: Disagree, 40%-59.99%: Fair, 60%-79.99%: Agree, 80%-100%: Strongly Agree.

Maintenance Stage

This is the last stage in the development system. Applications that have been tested will be subjected to maintenance procedure. In settings, any errors was identified and corrected as shown the previously reported methodology [8].

RESULTS AND DISCUSSION

<https://doi.org/10.24191/sl.v18i4.27964>

Design Result

This researcher makes program code from the designed existing system explained at this stage. Making programs on applications: This is done in Android Studio using Java [9].

Home Page

The page that displays the knob Getting to Know Stunting, Quiz, and About, as shown in Fig. 4, is the appearance home page. Knob Getting to Know Stunting contains a menu of stunting videos that can be selected by the user for watching, a Button Quiz holding quiz for know level User understanding about stunting after watching the video, as well knob which has information about applications that include an introduction about applications and sources material.



Fig. 4. Home page

Page Getting to Know Stunting

Getting to Know Page Application This contains 5 video menus about Stunting. Users are required to watch the video shown inside the application. The material displayed in the video is Introduction to Stunting, Stunting Factors, Stunting Symptoms, Stunting Prevention, and Balanced Nutrition. Appearance page Recognizing Stunting in Fig. 5. Each video lasts 2-5 minutes and has pictures, Attractive animation, and an easy-to-read appearance stunting video page in Fig. 6.

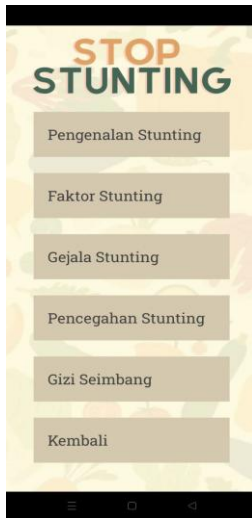


Fig. 5. Recognizing Stunting menu



Fig. 6. Stunting video display

Quiz Page

This Quiz page displays some quizzes that will be shown by material in the previous video. The quiz page consists of 20 questions and a choice answer appearance. The Quiz page is in Fig. 7.



Fig. 7. Stunting quiz



Fig. 8. Score display

The stunting quiz is also accompanied by a Bintang score displayed on the Star score page in Fig. 8. So, it becomes a reference until the level of user understanding after learning stunting learning video material. The score page contains correct and incorrect answers and the Star from Star quiz score.

About Page

The About page displays information about the application, captured video references, name developer, and name filler voice. About display in Fig. 9.



Fig. 9. About page

Testing

Black Box Test

In the Black Box trial, tests were carried out on the feature's application, covering the process flow from the first time it is opened; it displays a splash screen, Getting to Know Stunting, Quiz Stunting, and About. Shows videos about stunting and discusses quizzes, displays the score on the quiz, assesses success, and can walk fluently [10]. The design of this application has gone through several tests and assessments, showing that the success of the application it presents is 100 % in software functionality testing.

Software Functionality Testing

Testing existing software functionality was done using multiple smartphones to try applications that can be executed with the Android system's operation, with the conclusion that the application can walk excellently and smoothly on Android smartphones. Details from testing are contained in Table 2.

Material Expert Test

The stunting learning material was created from several reference journals and books by a nutrition lecturer at Universitas Darussalam Gontor. The expert material learning was the nutrition science lecturer. Assessment results obtained from expert material based on calculation with a scale Likert get a percentage of 96.9%. So, the stunting application can be approved and signed in in the Very Good category. That shows that the application is by the material created. High scores in material testing indicate that the educational materials provided in the app, such as articles, videos, and interactive modules, are accurate, engaging, and informative. This ensures that users receive quality information about stunting, its causes, and prevention strategies, contributing to increased awareness and knowledge.

Table 2. Software functionality testing

Brand and Type Software	Android Version	Size (Inches)	Conformity Results
Oppo A92020	Android 11.0	6.5 inches	Yes
Oppo A54	Android 12.0	6.51 inches	Yes
Realm 10	Android 13.0	6.4 inches	Yes
Redmi Note 9	Android 13.0	6.53 inches	Yes
Realme 8 5G	Android 13.0	6.5 inches	Yes
Samsung s10 Lite	Android 10.0	6.7 inches	Yes
Oppo Reno 8	Android 14.0	6.4 inches	Yes
Realme c31	Android 11.0	6.5 inches	Yes
Vivo v20 SE	Android 13.0	6.44 inches	Yes
Vivo y12	Android 12.0	6.35 inches	Yes

Learning Media Expert Test

This study is also aimed to check the application's media in terms of various indicator aspects: design, writing, learning, and programming. Testing media expert was carried out by a lecturer in Islamic religious education at Darussalam Gontor University. The results of media trials are calculated with a scale Likert get a percentage of 94.8% with a criteria interpretation score based on existing intervals determined. It can concluded that the application education introduction of this Stunting can approved and signed in in the Very Good category. It shows that the application is worthy of being published and used.

Test Against User

Testing on users has been conducted through research by parents and mothers with children. The result of testing the user calculated with a Likert scale is that a percentage amounting to 95.8% with criteria interpreted based on existing intervals determined, then can conclude that the application education introduction of this Stunting entered the outstanding category.

Maintenance

This repair error is based on user suggestions for the application as listed in Table 3. The maintenance process and repair application are done with base criticism and suggestions from participating parties and in the testing application. Maintenance is carried out to handle correction, error, and functional defects in applications. Apart from that, it also includes design maintenance, coding, and logic application.

Table 3. User suggestions for the application

No	Suggestion	Status
1.	There needs to be a button to exit/return	Already implemented
2.	Front on the section to be enlarged	Already implemented
3.	The tempo of the voice may be accelerated	Not yet Implemented
4.	It would be better to have additional stunting calculation features	Not yet Implemented
5.	Equalization of material time in the application	Not yet Implemented

CONCLUSION

Application StopStunting, which contains material learning about stunting with a video-based learning method, can walk smoothly on Android smartphones with at least Android 11.0 OS and a screen of 6.4 inches. Application This has been tested by expert material with an average score of 96.9%, media experts of 94.8 %, and mothers of the Integrated Healthcare Center amounting to 95.8%. The study is furthermore expected to develop material in the application that is more diverse and can be a more supportive, practical, and interactive learning medium. High-quality educational content and engaging multimedia resources provided by the app lead to increased awareness and knowledge about stunting among users. By understanding the causes, effects, and prevention strategies associated with stunting, individuals and communities can take proactive steps to address the issue, designing targeted interventions within the app to address specific risk factors or determinants of stunting prevalent in Indonesia, such as maternal nutrition, access to healthcare services, and sanitation practices. Tailoring educational content to address context-specific challenges can enhance the app's relevance and effectiveness in addressing stunting in Indonesia.

ACKNOWLEDGEMENT

Thanks to Universitas Darussalam Gontor for funding this research.

CONFLICT OF INTEREST STATEMENT

The authors affirm that there are no conflicts of interest related to the publication of this manuscript.

AUTHOR'S CONTRIBUTION

Khoirunnisa Larasati carried out the research, and Faisal Reza Pradhana, Dihin Muriyatmoko, Muhammad Alwi Yusron, and Lulu' Luthfiyah as supervisors in this research.

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