

## Original Research

# Smartphone-Based Early Child Dection To Monitor Children's Growth And Development

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## ABSTRACT

**Background:** Communication technologies, especially smartphones, offer great potential in improving health education by providing easily accessible information. Provide knowledge and understanding as well as attention to the child's developmental conditions, namely the physical and motor conditions that exist within the individual to avoid and overcome the occurrence of disorders.

**Methods:** This type of research uses Research and Development (R&D) research and development methods. To produce certain products, research is used in the nature of needs analysis and to test the effectiveness of the product so that it can function in the wider community, research is needed to test the effectiveness of the product.

**Results:** These test results are important for further improvements and for future research. Users say that this application is very helpful in monitoring children's growth and development and can be accessed at any time.

**Conclusion:** This application about child growth and development is quite suitable for use. although it still requires further improvements and development so that the application is better used in the future.

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## INTRODUCTION

Children are in a phase of growth and development that involves various important aspects, including physical, mental and emotional. This process occurs in stages covering ages 0 to 28 days, then infancy from 0 to 2 years old, and continues into the preschool period between 2 to 6 years old. In these periods, gross motor, fine motor and cognitive development are very important to pay attention to. Gross motor skills, for example, involve a child's ability to perform large movements such as sitting, standing, walking, and jumping. This ability is an important basis for healthy child development and needs to be carefully monitored by parents (Hijriati, 2021).

In Indonesia, attention to the quality of children's growth and development must be a top priority. Parents play an important role in monitoring children's development and providing the stimulation needed to support overall physical, mental and social development. Delays in growth and development often occur due to lack of stimulation, which can hinder children's optimal development. The role of parents in the first year of a child's life is a very important period and determines the success of subsequent development. Therefore, early detection and appropriate intervention are essential. This involves providing adequate stimulation and access to quality health services to ensure that each child can develop well according to their stage (Kemenkes, 2015; Wahono, 2022).

With the rapid development of technology, especially in the fields of communication and information, access to information regarding stimulating children's growth and development is becoming increasingly easier. Devices such as smartphones can play an important role in improving health education by providing personally relevant and easily accessible information. This can be monitored to monitor development so that it is appropriate to the child's age stages. Before providing appropriate stimulation to children, early detection needs to be assessed, the first step in the assessment process. The aspects measured start with measuring body weight, height and head circumference, which are the basic principles in assessing growth and comparing them with growth standards. Information technology available on mobile devices offers great opportunities to create innovative solutions, such as applications specifically designed to monitor and support the growth and development of pre-school children. With smartphone-based applications, parents can obtain the information needed to help their children's development in a more efficient and practical way (Izah *et al.*, 2018).

Through this research application, it is hoped that it can become a reference for information, knowledge and education for the public, especially parents regarding disturbances or delays in children's growth and development and The Posyandu program can help effectively socialize the use of this application and is assisted by posyandu cadres.

## MATERIALS AND METHOD

This type of research uses Research and Development (R&D) research and development methods. Research and Development (R&D) research method is a research method used to produce certain products and test the effectiveness of these products. To produce certain products, research is used in the nature of needs analysis and to test the

effectiveness of the product so that it can function in the wider community, research is needed to test the effectiveness of the product. (Sugiyono 2011).

The findings from this research cover several important aspects in the application design process, starting with making a prototype which will go through a series of trials, evaluations and improvements. This application prototype has been assessed by two leading experts who have special expertise in the fields of physiotherapy services and information technology. The selection of these two experts was based on certain criteria, namely their education which includes master's degrees in physiotherapy and information technology, as well as their experience in application development.

The evaluation process involves in-depth assessment by experts to assess the suitability and effectiveness of the prototype. In this research, Posyandu is carried out from 8 am to 12 am, activities carried out include measuring head circumference, measuring body weight and measuring height, then counseling is carried out on the application of growth and development assisted by posyandu cadres. we have successfully completed the development phase which includes creating an application prototype and testing its features. In addition to evaluation from experts, the prototype has also been tested by several posyandu cadres to assess the feasibility of the application in the context of their practical use. There are six posyandu cadres who take part in this activity and are selected based on the criteria of those who are most active in participating in posyandu activities. Based on feedback from posyandu cadres, it was identified that the application was generally suitable for use, but there were several features that needed improvement to increase the functionality and effectiveness of the application. This description clarifies the prototype evaluation and testing process, states the qualifications of the experts involved, and details feedback from posyandu cadres.

## RESULTS

The preparation of this application has several stages, such as design creation, coding and data input. The author is assisted by a programmer at a company. The application creation was carried out from July 2024 to August 2024, which went through the stages of survey collection, application design, expert judgment, database planning, product review, and product revision. This development is a smartphone-based physiotherapy service in a mobile application which is intended for monitoring children's growth and development. In this application, there are several features to determine the child's weight, head circumference and height, which function to determine the normal level of posture according to his age. The KMS (Kartu Menuju Sehat) or Card to Health graphic feature is like in the toddler Posyandu book and the data entered will be stored in the application which can be accessed via the internet network.

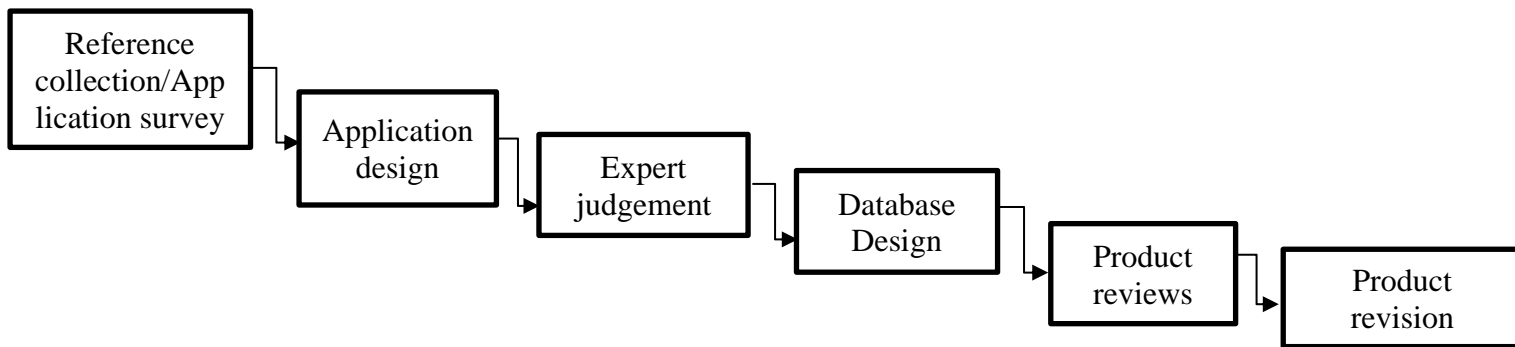


Figure 1. Flow of Website Creation Stages

Mobile applications or often abbreviated as Mobile Apps are software applications whose operations can run on mobile devices (Smartphones, Tablets, iPods, etc.), and have an operating system that supports the software, there are the following features:

Table 1. Feature Application

Website Page	Explanation
Application cover	The first appearance of this application is as a welcome page, then the user is presented with a click "start" on the application to enter their personal identity.
Login display	This Log in display is intended to manage the identification process. The login process consists of a minimum username/user account and password to obtain access rights.
Entering data	This display includes data such as the baby's name, weight (birth), body length (birth), head circumference (birth), and special conditions at birth in order to monitor the child's normal growth in the future.
KMS Graphic Display	KMS graph as a record for monitoring the growth of toddlers and children. To be more accurate, children's weight and height measurements must be taken every month. The color of toddlers' KMS is differentiated based on gender, namely blue for boys and pink for girls.
Display of progress data	The development of children's gross, fine and cognitive motor skills will be clearly visible through the various movements and games they can do.
Profile display and logout	There are several menu features to display

the parent profile and logout display.



Figure 2. Application cover



Figure 4. Entering data



Figure 6 . Gross Motor

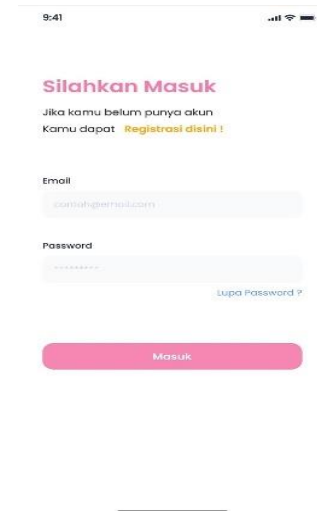


Figure 3. Login display

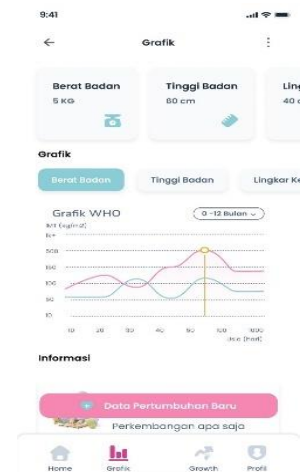


Figure 5.KMS Graphic

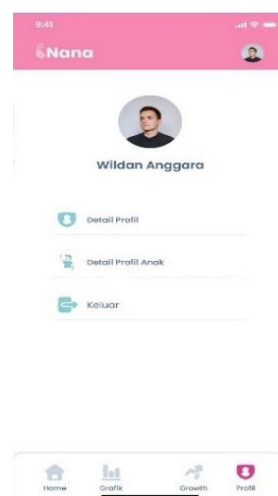


Figure 7. Profile display and logout

## DISCUSSION

This study is in line with previous studies, for example, a study entitled "Chai's Play, Parenting Application and Millennial Games for Early Childhood Development Activities" concluded that the application is useful for content game features for child development (Indrayasa & Suryanti, 2023). Another study "Design and Development of Early Childhood Development Intervention Detection Stimulation Application (SDIDTK) for midwives at integrated health posts" concluded that it was categorized as a tool to detect developmental delays (Windiyani et al., 2019). Growth and development monitoring recorded manually provides information more slowly and cannot be stored efficiently and slows down the information process. Seeing previous research using applications for child growth and development monitoring can make it easier to store data and make it easier to access information. Based on a thorough evaluation conducted by experts specializing in child development and information technology, this child development application has demonstrated significant potential in aiding the monitoring and planning of comprehensive child development. Experts have praised the application for its intuitively designed user interface, which enhances usability for both parents and educators. Key features, such as tracking physical growth, cognitive development, and the social and emotional aspects of children, are viewed as invaluable resources that provide holistic insights into a child's progress.

Nevertheless, the evaluation also identified several areas for improvement. There is a pressing need to expand the educational content offered within the app, ensuring it encompasses a wider variety of topics and activities that cater to diverse developmental stages. Additionally, experts highlighted the necessity for enhancements in the reporting functionalities to guarantee that the data presented is both accurate and precise.

Moreover, it is crucial for the application developers to actively seek and incorporate user feedback. Regular updates addressing the identified shortcomings would not only enhance the user experience but also ensure that the application remains responsive to the evolving needs of parents and educators. By implementing these recommendations, the application is poised to become an even more effective tool for supporting the holistic growth and development of children, aligning closely with their changing developmental requirements. This proactive approach will ultimately empower families and educators to foster an enriching environment for children's growth.

## CONCLUSION

Based on in-depth assessment and evaluation conducted by experts on the application, it was found that this growth and development application generally functions according to its intended purpose and function. However, although the website has met the basic criteria for functionality, there are still a number of shortcomings and areas that require significant improvement, such as adding more in-depth educational content and improving functionality for more accurate development reporting.

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