

The Use of Android Apps to Promote Healthy Lifestyle

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Abstract. *The rapid evolution of mobile technologies offers new and low-cost opportunities to improve including in public health, particularly food literacy for students, that remains challenging in many schools today. Limited information displayed at the food labels often causes health problems that can impact both short and long term. Therefore, this study aims to propose mobile application called NutriBuddy, that works based on Android which is designed to allow students to retrieve nutrition information through barcode scan including protein, sugar, salt, and saturated fat content, for each of food products. This study followed a systematic structure that includes analysis, literature review, system design, development, and testing. From the test result it's confirmed that accurate barcode decoding, reliable database retrieval, and history data persistence are successfully performed, while usability feedback indicated that the application is intuitive, engaging, and useful as an educational nutrition aid. Thus, with this NutriBuddy application, hope it can serve as a digital tool that can be used by students to enhance their awareness and support healthier food choices.*

Keywords: *Mobile Health, Nutritional Literacy, Barcode Scanning, Android Application*

1. Introduction

The rapid advancement of mobile technology has significantly changed the way information is accessed and utilized in various sectors, including health and education. Mobile health (mHealth) apps have emerged as effective digital tools to support health promotion by providing users with easily accessible, interactive, and real-time information (Laksmiwati, 2023). In the context of nutrition, mobile apps play a crucial role in raising awareness and making healthier food choices, particularly among children and adolescents (Werle et al., 2024).

One of the major challenges in school environments is the low level of nutritional literacy among students. Packaged food products are widely consumed because of their convenience and affordability. Although nutrition labels are included in food packaging, it is difficult for many students to understand and interpret the information properly. As a result, food choices are often based on flavor, appearance or the design of the package rather than on nutritional value. This condition can contribute to unhealthy eating habits and increase the risk of long-term health problems linked to nutrition (Inkud et al., 2025).

Observations conducted in a school environment indicate that most students consume packaged foods without considering their nutritional content. Educators have also reported the absence of practical and engaging educational media that can help students understand nutritional information in a simple and accessible manner. This situation highlights the need for an innovative digital solution that bridges the gap between available nutritional information and students' comprehension (Lin et al., 2023).

Mobile applications offer several advantages for addressing this issue, including portability, interactivity, and integration with device hardware such as cameras. Barcode technology enables rapid retrieval of product information by scanning codes printed on

food packaging (Hamdani et al., 2024). Compared to manual interpretation of nutrition labels, barcode-based systems provide faster and more accurate access to standardized nutritional data, making them suitable for daily use in educational settings (Muhammad Hasyim, 2024).

Several previous studies have explored the use of digital applications to support nutrition education and health awareness. However, many of these studies rely on image recognition, manual data entry, or gamified learning approaches, each of which has specific limitations. A comparison of related studies and the position of this research is presented in Table 1.

Table 1. Summary of previous studies

Previous Study	Method	Technology	Key Strengths	Limitations
MyDietCam (Kong et al., 2023)	Image Recognition & Machine Learning	Camera + ML model	Automatically identifies food items and estimates nutritional values	High dependency on internet connection and poor support for local foods
Nutrief (Ainun Nisa Sofia Nur Rohma Faiza et al., 2024)	Waterfall; manual input model	Android app; manual data entry	Calculates daily nutritional needs based on user input	High user input burden; manual entry prone to inconsistency.
Health Heroes Nutrihunt (Armando et al., 2024)	Gamified learning; barcode basics	Gamification and basic barcode features	Engaging for children; promotes awareness through play	Does not analyze real packaged food products
NutriBuddy (this study)	Research and Development (R&D); SDLC approach	Android app + ZXing + SQLite	Provides instant nutritional information from registered product labels; offline capability; simple user interface	Limited to 1D barcode scanning and Android platform

Based on Table 1, previous studies have applied various approaches to nutrition-related applications, each with specific advantages and limitations. Compared to image recognition and manual input systems, NutriBuddy offers a more practical and reliable approach by utilizing barcode scanning technology. This method minimizes user input errors and ensures consistent data retrieval from actual packaged food products. Consequently, NutriBuddy addresses usability and accuracy limitations found in earlier studies and contributes a context-aware solution for nutrition education.

2. Method

This study employed a design and development research approach focusing on the creation, implementation, and evaluation of a mobile application. The research methodology was structured into several sequential stages to ensure systematic development and in line with the objectives.

2.1 Research Flow

The research flow included needs analysis, literature review, system analysis and design, application development, testing, and evaluation. This structured approach

ensured that the application met user requirements and functioned effectively in real usage scenarios Figure 1.

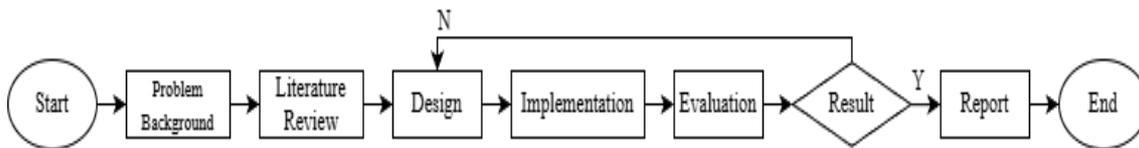


Figure 1. Research flowchart

The research process began with analysis to identify issues related to students' snack consumption behavior and their limited awareness of nutritional information. This stage was supported by a literature study reviewing previous research on mobile health applications, nutrition education, barcode technology, and android application development to establish a strong conceptual and technical foundation. Based on these findings, system analysis and design were conducted to define functional requirements, user roles, data flow, and database structure using various modeling tools. The application was then developed using Android Studio and the Java programming language, with the ZXing library integrated to support barcode scanning functionality. Nutritional data and scan history were stored in a local database to enable efficient data retrieval and offline access. Finally, testing was carried out through functional and usability testing to evaluate system performance, ease of use, and overall user experience.

2.2 Data Collection Methods

Data collection was conducted through observation and literature study. Observation focused on identifying students' snack consumption patterns and their level of awareness regarding nutritional information. The literature study involved reviewing previous research related to mobile health applications, nutrition education, barcode technology, and Android application development to support the conceptual and technical foundation of the system.

2.3 System Design

The system design phase focused on defining application functionality, user roles, and data flow. The NutriBuddy system supports two primary roles: admin and user. Admins are responsible for managing product data and nutritional information, while users access nutritional information through barcode scanning. As shown in Figure 2. and 3, the proposed system flow map was designed to clarify the system workflow and data flow within the NutriBuddy application.

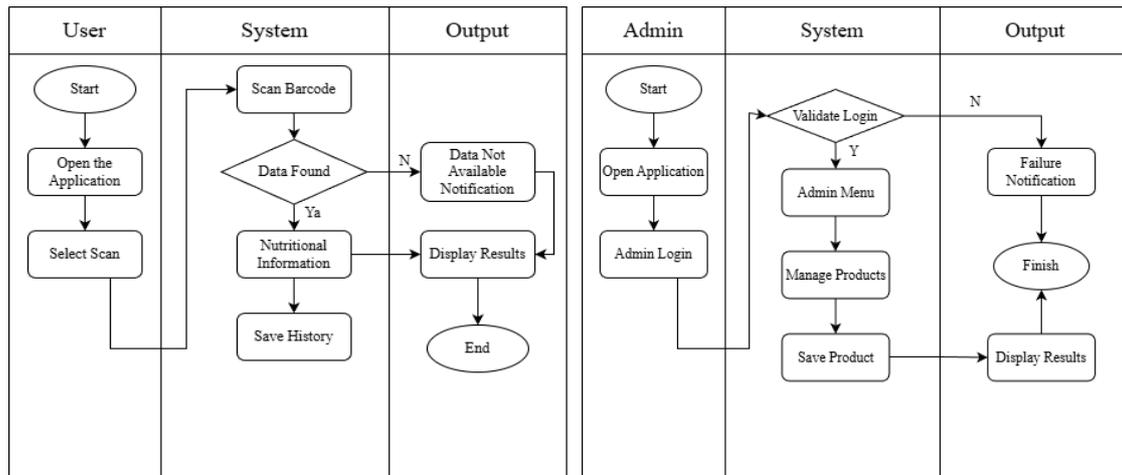


Figure 2. User Process Flow

Figure 1. Administrator Process Flow

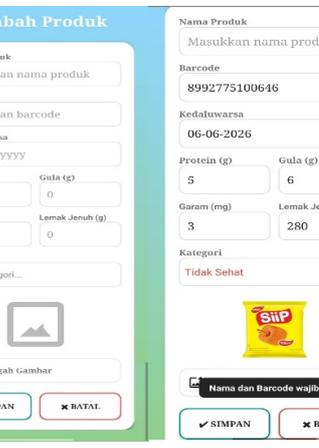
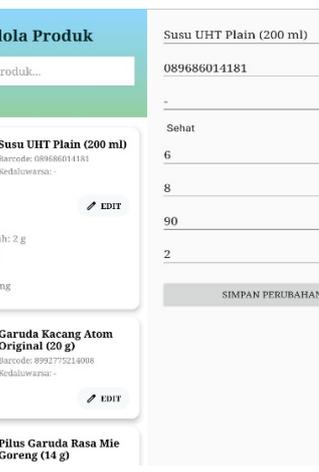
3. Results and Discussions

The implementation of the NutriBuddy app resulted in a fully functional Android-based nutrition scanning system. Functional testing demonstrated that the barcode scanning feature was capable of capturing nutritional data and recording scan results in the app's database. The admin interface supports product and nutrition data management, as presented in Table 2, while the user interface allows access to nutrition information through barcode scanning, as shown in Table 3.

Usability testing demonstrated that the application can be operated with minimal guidance due to its simple interface and clear presentation of information. The user interface, as illustrated in Table 3, provides easy navigation for accessing nutritional information for packaged food products. Overall, the results indicate that NutriBuddy meets its development objectives as an efficient and user-friendly app to support healthy eating.

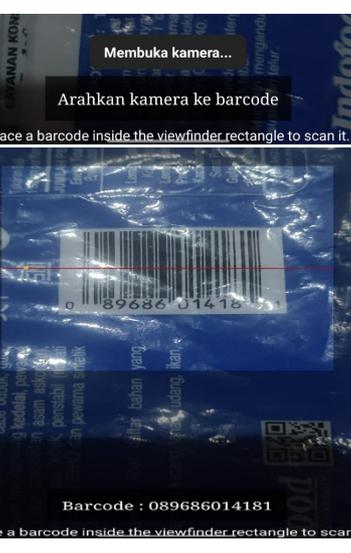
Table 2. Admin interface on NutriBuddy Application

Interface	Figure	Description
Admin login page		Displays the administrator authentication interface for accessing the system.

Interface	Figure	Description
Admin home page		Presents the main administrator page as a central interface for managing products.
Add product page		Displays the interface for adding new products.
Product edit page		Displays an interface for updating product information that has been stored in the system.

The admin interface of the NutriBuddy application provides a structured ways for system access and data management. It includes a login mechanism to control access through authentication, followed by a dashboard that presents an overview of product data and recent activities. Through this interface, administrators can add new products including nutritional information with data validation, as well as update existing product records using search and selection features. Overall, the admin interface supports efficient and controlled management of products and nutritional data within the system.

Table 3. User interface on the NutriBuddy App

Interface	Figure	Description
User home page		The main screen displayed after logging in provides direct access to the Scan feature for viewing product nutritional information and the History feature for reviewing previous scan results.
Barcode scanning page		Provides scanning feature to read barcodes.
History page		Displays user scan activity log.

The NutriBuddy user interface provides a simple and interactive environment for accessing nutritional information. Upon opening the application, users are directed to the home page, which allows quick access to the scanning feature or scan history. The

scanning page reads product barcodes via the device camera and displays nutritional details upon successful detection, while notifying the user if the product is not registered. The history page allows users to save and review previous scan results, facilitating monitoring of scanned products. Overall, the interface supports efficient and intuitive access to nutritional data.

4. Conclusions

This study successfully designed and developed an Android-based nutrition application using barcode technology called NutriBuddy. The application demonstrates reliable functionality, high usability, and effectiveness in presenting nutritional information from packaged food products. The findings indicate that the application can assist users in understanding nutritional content and encourage healthier food choices.

By integrating mobile technology with nutritional education, NutriBuddy contributes to improving nutritional literacy from early age, by providing a practical solution to support healthy lifestyle promotion especially in the school environments, in which this solution can be enhanced for broader implementation.

5. Acknowledgements

The authors would like to express their appreciation to all participants who contributed to the observation and evaluation stages of this study. Their feedback was valuable in improving the quality and usability of the application.

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