Article

Design of Delivery NCC-Food Apps to Encourage Purchases of Nutrition Care Center Products

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Abstract: Jember Regency was in the spotlight for the prevalence of stunted toddlers, reaching the highest rank in East Java with a figure of 34.9% in 2022. Teaching Factory Nutrition Care Center (NCC) has nutritional catering services with Managed Health Meal and Kids Meal packages. However, the ordering process was still done via telephone or chat from social media groups. The research objective was to generate an online application for Nutrition Care Center (NCC) called NCC-Food to encourage purchases of Nutrition Care Center products. It used the waterfall method, consisting of system investigation, system analysis, system design, system implementation, and system maintenance. Meanwhile, this article is limited to system design. The results showed that Delivery NCC Food Apps facilitates clients/ patients to order nutritious food online according to nutritional adequacy rate needs, particularly for stunted toddlers. The research is expected to promote and improve the accessibility of healthy foods, in particular for stunted toddlers; therefore, the prevalence of stunting is expected to decrease significantly.

Keywords: Stunting, Nutrition, Application

1. Introduction

Jember Regency is in the spotlight because the prevalence of stunted toddlers has reached the highest level in East Java, with a figure of 34.9% (20,506 toddlers) in 2022 [1]. Reducing stunting in toddlers is the main target of the National Mid-Term Development Plan 2020-2024 Plan with a target of 14% by 2024 [2]. Stunting can hinder labor market productivity, resulting in a loss of 11% of GDP and contributing to widening inequality, thereby reducing 10% of total lifetime income and causing intergenerational poverty [3].

Nutrition Care Center (NCC) is one of the Teaching Factories owned by the Jember State Polytechnic. NCC is pioneering nutritional consultation services and catering for patients with special dietary needs, such as stunted toddlers [4]. However, the resources available are still very limited because no application that facilitates nutritional consultations and food ordering via online applications.

Nowadays, the usage of online services through mobile applications has increased tremendously over the past decade [6], [10]. People tend to use telehealth to easily connect with health services because it can reduce costs, energy, time constraints, and distance [5]. Apart from telehealth, the trend of ordering food via online delivery applications is also widely chosen [6], [7], [8]. However, most of the food offered in online food delivery applications has low nutritional quality [9] for those who follow a certain diet [8], and is not based on nutritional consultation. The application model that will be designed will integrate Telehealth with Healthy Meal Delivery Services, replacing nutritional

consultations and manual food ordering, and facilitating clients/patients to directly order nutritious food online according to Recommended Dietary Allowance (RDA) needs based on the results of diagnostic examinations of nutritional status, especially for stunted toddlers. The proposed application integrates diagnostic assessment and telehealth consultation through a structured and interactive system designed for caregivers of stunted or at-risk toddlers.

Registration for nutrition consultations at NCC is still done manually. Often, patients who come to NCC have not been able to meet with a nutritionist because they are busy. Apart from that, the nutritional catering business is not yet widely known. This is evident that food purchases are still small. The ordering process is still done via telephone or WhatsApp chat. The promotion is only from personal acquaintances and people who have interacted with NCC customers and are interested in ordering. Developing an application model for integrating telehealth and healthy meal delivery services to accelerate zero stunting in Jember Regency.

Previously, the team had conducted research, namely "Designing the NCC-Food Application at the Teaching Factory Nutrition Care Center". However, in the NCC-Food application, there is no feature for couriers who deliver the orders. This research is a downstream of previous research. The novelty in this research is the Mobile Delivery Food named Delivery NCC Food application model that will facilitate couriers to receive, track, and deliver healthy food to customers.

2. Materials and Methods

This is a research and development (R&D) study. Information system development is carried out based on the Waterfall stages, including communication, planning, modelling, construction, and deployment.

a. Communication

This step is an analysis of software needs and a stage for collecting data by holding meetings with customers, as well as collecting additional data in journals, articles, and from the internet. In this communication phase, functional requirements were gathered from health professionals, nutritionists, and the target user. Functional Requirements: user account creation and role-based access, Input and visualization of child growth data (height, weight, age), Personalized nutrition recommendations, educational modules on child nutrition and stunting prevention, push notifications for reminders and tips.

b. Planning

This process is a continuation of the communication stage (requirements analysis). The requirement analysis was conducted by interviewing potential users of the system, such as students of Politeknik Negeri Jember. Moreover, focus group discussion was carried out by nutritionists and the chief of NCC to collect the data required for the application. This stage produces a user requirements document, or can be said to be data related to the user's desires in creating software, including plans to be carried out.

c. Modelling

This model translates requirements into a software design that can be estimated before coding. This process focuses on data structure design, software architecture, interface representation, and procedural (algorithmic) details. This stage will produce a document called the software requirements.

d. Construction

This stage is the stage of actually working on the software, meaning that computer use will be maximized in this stage. After coding is complete, testing is carried out, which aims to find errors in the system so that they can then be corrected.

e. Deployment

This is the final stage in software creation. After carrying out analysis, design, and coding, the finished system will be used by the user. Then the software that has been created must be maintained regularly.

3. Results and Discussion

Delivery NCC Food is an application that facilitates customers to reserve healthy food in the Teaching Factory Nutrition Care Center (TEFA NCC). The Nutrition Catering Service in NCC is the activity of designing each menu intended for clients/patients with or without special needs. The food menu is designed to take into account the nutritional needs of clients/patients, referring to a balanced menu based on nutritional status examination (anthropometric, biochemical/laboratory, clinical, and dietary) and the results of nutritional consultations, which include dietary prescriptions.

Customers are able to access and order their food from TEFA NCC at times and locations convenient to the users. Such apps also provide customers with more comprehensive, up-to-date, and accurate information about TEFA NCC and the menu options. The Data Flow Diagram of NCC-food Apps for a healthy food delivery service is defined as follows.
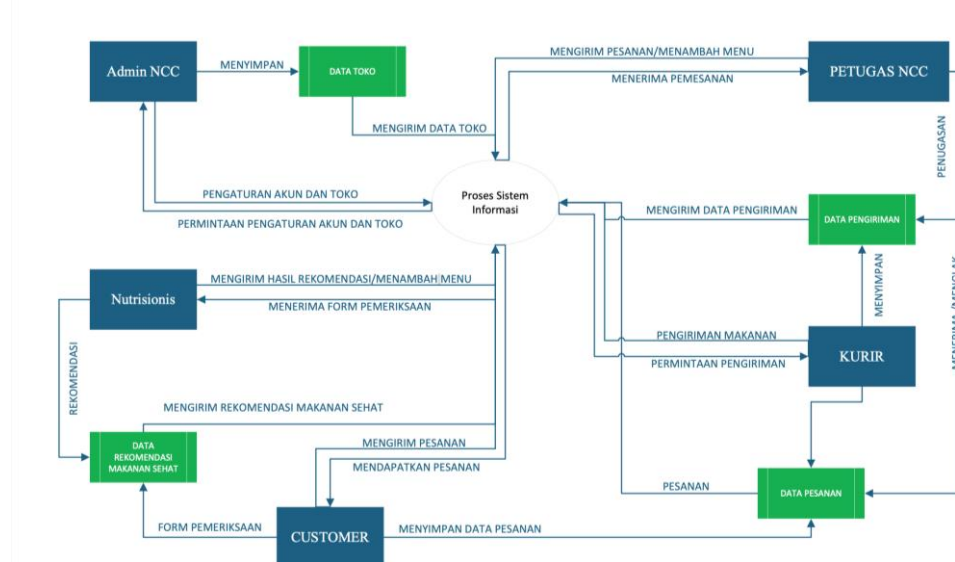

Figure 1. Data Flow Diagram of NCC Apps

This application is available on both web and mobile platforms. The website is developed using HTML, CSS, and JavaScript, while the mobile app uses React and Node.js, and MySQL is used as the database. The role of the app is available for admin NCC, nutritionist, NCC officer/ chef, customer, and food delivery couriers. The application for admin NCC, nutritionist, NCC officer/ chef to manage the ordering is a web-based system. Meanwhile, the apps for customers and food delivery couriers are mobile apps. The app for customers, which facilitates food ordering, is called NCC-Food. On the other hand, the app for couriers, which facilitates couriers to receive, track, and deliver food, is called Delivery NCC-Food. In this paper, we will discuss Delivery NCC-Food apps as follows.
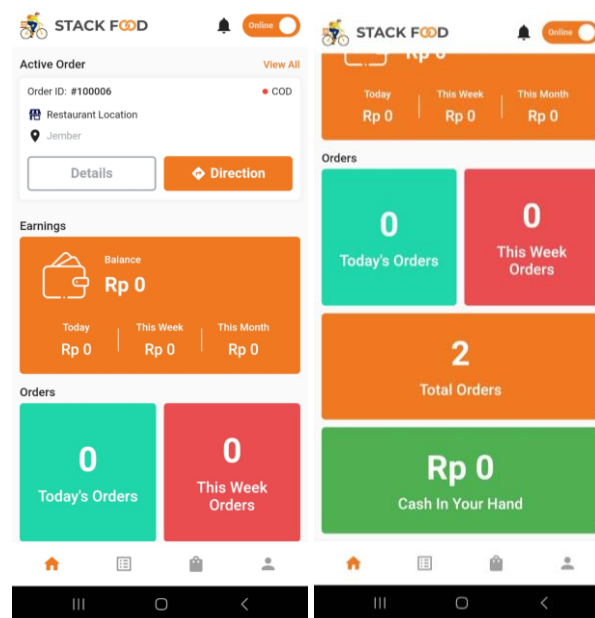
Figure 2. The front page of Delivery NCC-Food

The front page of the Delivery NCC-Food application shows the information about the restaurant location, direction, the amount of balance (daily, weekly, and monthly), the number of today's orders, and this week's orders. It also shows the total orders which has been handled by courier and cash in your hand.
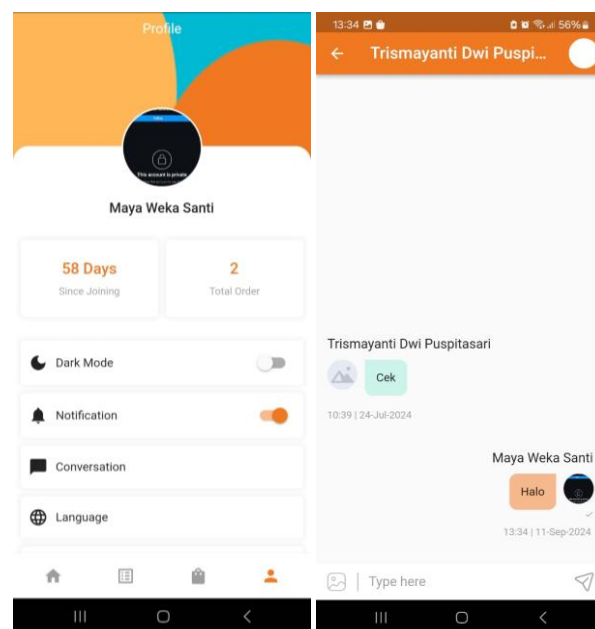

Figure 3. Profile of Courier and Conversation Screen Display of Delivery NCC Food

Figure 3. explicates the display of profile's courier which shows name of courier, the number of days has become a courier, total order, and the other options i.e., conversation menu, language, change password, edit profile, incentive offers, terms and condition, privacy policy, delete account and logout. Moreover, the conversation between the customer and the courier is shown in the image above.
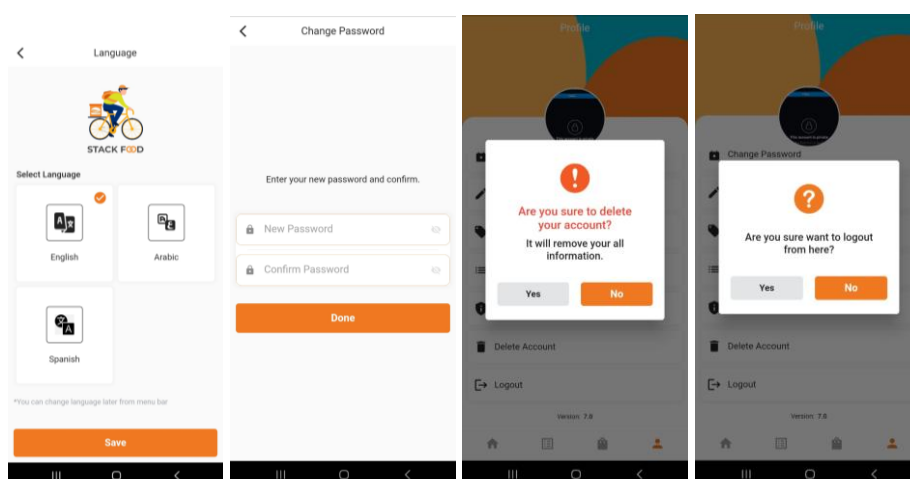
Figure 4. Language, change password, delete account, and logout menus

Telehealth is a subset of e-health and is the use of telecommunications technology in health care delivery, information, and education, according to the Health Resources and Services Administration. Increasingly, telehealth technologies are being adopted and implemented as an efficient and cost-effective means for delivering and accessing quality health care services and outcomes [11]. Digital-based family empowerment interventions have been identified as a promising approach to prevent stunting, for instance, digital-based nutrition counselling programs in preventing stunting [12].

One of the nutritional problems that often occurs in toddlers is stunting. Stunting in children under five shows poor linear growth during the critical period and is diagnosed as height for age less than −2 standard deviations from the median World Health Organization (WHO) child growth standard [13], [14], [15], [16]. Fulfilling nutrition from nutritious foods, such as providing healthy supplementary food, which can help meet the nutritional needs of toddlers, is necessary to prevent stunting. Lack of protein consumption can increase the incidence of stunting 1.6 times greater than adequate protein intake [17], [18], [19].

Some features of the food environment have been digitalized to improve food production and distribution. Digital food environment is defined as the online setting that provides a variety of services and information, through which consumers' food and nutrition choices and behaviors are influenced and directed. The digital food environment includes social media, digital food marketing, online food retail, and digital health promotion interventions. Estimates show that the top ten downloaded applications by Google Play and Apple App Store users were related to food delivery [8]. Mobile food ordering apps (MFOAs) have been widely considered in the restaurant sector as innovative channels to reach customers and provide them with high-quality services [20].

Initial system testing of the digital-based family empowerment intervention yielded promising results in terms of usability, engagement, and user satisfaction. Users reported that the platform was easy to navigate, with an intuitive design and accessible content tailored to parents and caregivers of toddler stunting. Nutrition counseling modules, particularly those offering culturally appropriate dietary recommendations and protein-rich meal planning, were well-received. However, several challenges and barriers were identified during implementation and testing phases: Digital Literacy and Access Disparities: One significant barrier was the varying levels of digital literacy among target users, particularly in rural or low-resource settings. Some caregivers had difficulty navigating the platform or understanding technical terms, which hindered effective engagement with the intervention. Additionally, limited internet connectivity and lack of access to smartphones were reported in certain regions, reducing the reach of the program. Content Comprehension and Cultural Relevance: Although the platform included localized content, some users expressed difficulty understanding health and

nutrition terminology, especially when translated into regional dialects. This underscores the need for more user-centered content development, including visual aids and simplified language to improve comprehension and relevance. User Retention and Motivation: While initial engagement was high, sustaining user interest over time proved challenging. Users indicated that reminders, gamification elements, or incentive systems might improve long-term adherence to the app's recommendations. The absence of social features (e.g., community forums or peer support) was also noted as a limitation in maintaining motivation. Integration with Health Systems: The system's lack of seamless integration with local health information systems and frontline health workers' activities limited its potential for broader impact. Health workers noted difficulty in tracking real-time user progress and integrating digital recommendations with in-person counseling sessions. Privacy and Data Concerns: Some users raised concerns about the safety of their personal and health data. Transparent data policies and better communication about how user information is stored and used are critical to building trust and increasing participation.

4. Conclusions

The app for couriers, which facilitates couriers to receive, track, and deliver food, is called Delivery NCC-Food. It facilitates the delivery, tracking, and receipt of food by couriers. The prevalence of stunting is predicted to drop considerably as a result of the research's promotion and improvement of healthy food accessibility, especially for toddlers who are stunted. The Delivery NCC-Food. This app is expected to promote and improve the accessibility of healthy foods, in particular for stunted toddlers; therefore, the prevalence of stunting is expected to decrease significantly. Interoperability with local and national health information systems is crucial. Future development should enable the platform to share nutrition data, growth monitoring records, and intervention outcomes with existing EHRs, enabling health workers to deliver more coordinated and data-driven care.

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