JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

APPLYING USER-CENTERED DESIGN FOR MOBILE APPLICATIONS INTERFACE DESIGN

Fidya Farasalsabila[1*], Verra Budhi Lestari [1], Jangkung Tri Nugroho[1], Arvi Pramudyantoro [1], Ema Utami[1]
[1]Magister of Informatics Engineering, Amikom Yogyakarta University
email: *fidya@students.amikom.ac.id

Abstract: The Healthy Food Supplier App, which introduces groundbreaking innovations to increase public access to and delivery of healthy food, has emerged as a new phenomenon in the food sector. This research intends to examine and describe how the use of healthy food suppliers contributes to improving public health by making healthy food accessible to obtain and deliver it quickly. The development of mobile applications with the aim of providing healthy food and ingredients for the community is the subject of this research. The aim of this app is to provide original responses to issues related to raising awareness of quality of life and the value of nutritious food in everyday life. The User Centered Design (UCD) method needs to be applied to categorize various user information needs and package them into a mobile application design model. The results of the application design showed that the interface design for the pioneer food and health food raw material application was successfully created using the implementation of the UCD method with a number of revisions that have been updated since the evaluation as one of the feature developments in the application. The food recording feature and personalized recommendations implemented in this mobile application provide users with awareness and guidance in adopting healthier eating patterns.

Keywords: Design Interface; Mobile Applications; Requirements Engineering; User-Centered Design

Abstrak: Aplikasi Pemasok Makanan Sehat yang memperkenalkan inovasi terobosan untuk meningkatkan akses publik ke dan pengiriman makanan sehat, telah muncul sebagai fenomena baru di sektor makanan. Penelitian ini bermaksud untuk mengkaji dan mendeskripsikan bagaimana penggunaan pemasok makanan sehat berkontribusi dalam peningkatan kesehatan masyarakat dengan membuat makanan sehat dapat diakses untuk mendapatkan dan mengantarkannya dengan cepat. Pengembangan aplikasi mobile dengan tujuan menyediakan makanan dan bahan makanan sehat bagi masyarakat menjadi pokok bahasan penelitian ini. Tujuan dari aplikasi ini adalah untuk memberikan tanggapan orisinal terhadap masalah yang terkait dengan peningkatan kesadaran kualitas hidup dan nilai makanan bergizi dalam kehidupan sehari-hari. Metode User Centered Design (UCD) perlu diterapkan untuk mengkategorikan berbagai kebutuhan informasi pengguna dan mengemasnya ke dalam model desain aplikasi mobile. Hasil perancangan aplikasi didapatkan bahwa desain antarmuka aplikasi pelopor makanan dan bahan baku makanan kesehatan berhasil dibuat dengan menggunakan implementasi metode UCD dengan sejumlah revisi yang sudah diperbarui sejak evaluasi sebagai salah satu pengembangan fitur pada aplikasi. Fitur pencatatan makanan dan rekomendasi personal yang diterapkan pada aplikasi mobile ini memberikan pengguna kesadaran dan panduan dalam mengadopsi pola makan yang lebih sehat.

Kata Kunci: Design Interface; Mobile Applications; Requirements Engineering; User-Centered Design

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

INTRODUCTION

Being mindful of the food ingested is essential for achieving the goal of a healthy life. In practice, however, finding healthy food and preparing nourishing food might be difficult due to the daily grind. The creation of mobile technology applications has the ability to give creative solutions that will make it simple and practical for the general people to get food and healthy food, which will help to address this difficulty.

One strategy to achieve a healthy body is to monitor and pay attention to it, starting with the optimum body weight, ideal height, and daily calorie requirements [1]. The establishment of various forms of malnutrition is influenced by improper food consumption patterns. This condition is brought on by an imbalance in nutritional intake, including both deficiencies and excesses, which can raise the chance of developing numerous illnesses as well as the danger of passing away [2].

Many previous studies concerning Balanced Nutrition Education for Healthy Eating Patterns have been carried out with different research focuses. Interactive Animation Two-Dimensional Balanced Nutrition Guidelines [3] Using the MDLC (Multimedia Life Cycle) research design it has been able to provide interactive animated learning materials that are appropriate for starting a healthy lifestyle. Another study, namely the Behavior of Implementing Balanced Nutrition in the Community of Binjai City During the 2020 Covid-19 Pandemic [4] used qualitative methods and the conclusion was that they had a caring attitude about the Application of Balanced Nutrition Education for Healthy Eating during the Covid-19 Pandemic. Healthy Eating Patterns During the Covid-19 Pandemic concerning Daily Nutritional Intake.
It has also been tested to see how successful the Android-based Adolescent Nutrition Education Application for Stunting Prevention is [2]. This study's findings include a stunting education app for Android called the EduStunting Application's effectiveness test results on teenagers. Teenagers' understanding and attitudes about stunting and related issues (balanced nutrition and anemia) can be improved with the help of the EduStunting android app.

Their health may be affected by their ignorance of proper food. In another study [5] made an iOS meal planning application with integration of daily calorie data and machine learning-based meal recommendations features. The Challenge Based Learning (CBL) framework and the Swift programming language are used to create applications. The study's [6] findings suggest that using diet/nutrition applications is associated with changes in diet-related behavior. As a result, diet and nutrition-related apps that focus on enhancing motivation, desire, self-efficacy, attitudes, knowledge, and goal setting may be especially beneficial. As the number of diet- and nutrition-related applications grows, developers should consider including relevant theoretical structures for health behavior modification into newly produced mobile apps.

The findings of [7] support the notion that family and friends play a role in the preference for healthy eating habits. This implies that when analyzing the efficiency of application of nutritional information, additional

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

theoretical structures, such as social and family influence factors, should be considered. to improve the efficacy of nutritional information applications. Only two trials (n = 18) included a personal digital assistant as part of the intervention. The findings revealed that, to varying degrees, a technology-integration-based intervention promoted positive modifications in household food purchases, as well as improved consumption of healthy foods and healthy eating outcomes. Overall, technology apps are practical and user-friendly tools for encouraging people to improve their attitudes toward healthy food buying and consumption [8].

The high number of installs in the study [9] demonstrates that there is a considerable desire and possibility for nutritional monitoring and suggestions via mobile applications. All apps that gather food intake use the same nutritional evaluation methodologies (i.e., food diary recordings) and data input technology (i.e., text search and barcode scanning). Nutrichef developed the usability of BOT algorithms close to Maximum Marginal Relevance (MMR) in order to summarize the chat history between the consumer and nutritionist. Emerging technologies such as image recognition, natural language processing, and artificial intelligence went undetected. Neither app has a decision engine capable of offering individualized dietary guidance.

METHOD

The procedure used in this study as problem-solving steps is as follows:

Literature Study

In this phase, an analysis of various references is conducted to serve as the foundation for this research. The literature review focuses on the following topics: Nutrichef application; User- Centered Design; Usability Testing; User Interface.

User Centered Design Concept Analysis

This phase of analysis seeks to identify the user, process, data, and technology employed. The following is a detailed explanation of each stage.

User Context Analysis

This step completes the user identification process by focusing on what circumstances may cause users to use the application [10]. To do a context analysis, users want some user-related data, such as the user's characteristics and tasks when visiting the program. The end result of this user context analysis is a description of the user's attributes and tasks. The characteristics of users when using the application are presented in Table 1.

Table 1. User Context

User	Characteristics
Customer	Users who can use available features, such as transactions, consultations, etc.
Restaurant	Users who provide and sell ready-to-eat food products.
Supplier	Users who provide and sell quality raw food materials.
Nutritionist	Specialists who are tasked with providing advice and information to patients regarding the implementation of nutrition and nutrition in relation to diagnoses or health problems.
Courier	Users who provide services to deliver products.
Admin	The user in charge of managing the data on the platform.

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

User Requirement Analysis

This phase involves gathering, analyzing, and prioritizing user needs and expectations to define the functional and non-functional requirements of the application. The features required by users in the application and user requirements are presented in Table 2 and Table 3.

Table 2. Feature Requirements

Feature	Requirement
Online Order	Provides services for customers to easily browse products, place orders, and make online transactions.
Consultation	Provide and manage the availability of consulting services through the application.
Delivery	Delivery process can be accessed in real-time through a delivery tracking system.
Partnership	The application must allow partners to access the features according to their access rights.
Chatbot	BOT can summarize the history of consultations and can be accessed by nutritionists when the user wants to do a paid consultation.
Product Offer	Apply the association method to provide offers based on previous transaction history.
Smart Alternative	Provide alternative products, restaurants or similar suppliers based on the closest distance to the user
Special Advertising	Create special advertising options pages that can help increase sales and be profitable for partners in the Nutrichef application

Table 3. User Requirements

User	Requirement
Customer	Create an account; Login; Manage customer profiles; Conduct consultations; Make food orders; Place an order for raw materials; Give ratings; Access history.
Restaurant	Create an account; Login; Manage restaurant profiles; Provide food products; Make sales; Get ratings; Access history.
Supplier	Create an account; Login; Manage supplier profiles; Manage product raw materials; Make sales; Get ratings; Access history.
Nutritionist	Create an account; Login; Manage nutritionist profiles; Provide consulting services; Determine the nutritional value of food; Get ratings; Access history.
Courier	Create an account; Login; Manage courier profiles; Provide delivery services; Pick-up and delivery of food and raw materials; Get ratings; Access history.
Admin	Login; Manage consumer data; Manage supplier data; Manage restaurant data; Manage nutritionist data; Manage courier data; Perform verification.

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

Requirement Categorization

During this phase, the collected user needs and expectations are organized and classified into different categories to facilitate better management and implementation of the requirements. Here are several key steps in requirement categorization for NutriChef before launch which can be seen in Table 4.

Table 4. Requirement Categorization

Steps in Requirement Categorization	
Review and Validation of Requirements	Before categorization, the gathered user requirements from the User Requirement Analysis phase are reviewed and validated to ensure accuracy and relevance.
Identify Common Themes	Analyze the user requirements to identify common themes and patterns. Group similar requirements together based on their shared characteristics and functionalities.
Functional Requirements	Categorize requirements that describe the specific functionalities and features the NutriChef mobile application must possess. This category typically includes tasks, actions, and operations that the application should perform to meet user needs.
User Interface (UI) and User Experience (UX) Requirements	Organize the requirements related to the visual design, layout, and user interaction of the NutriChef application. These requirements focus on providing a seamless and intuitive user experience.
Usability and User Feedback Requirements	Categorize requirements related to usability testing, user feedback mechanisms, and iterative design improvements based on user input.

Conceptual Modeling

The application functionality flow is as follows: Users open the Nutrichef app on their mobile device; Users can register or log in to their existing Nutrichef account; After logging in, the user selects their preferred food category, such as healthy, vegetarian, or gluten-free options; The user can browse through menus and available restaurants on Nutrichef, complete with nutritional information and user reviews; Once the menu is selected, the user adds the chosen food items to their shopping cart; The user proceeds to make the payment and selects their preferred delivery method; After the transaction is completed, the user receives an order confirmation and a tracking number for their order; Nutrichef's courier picks up the order from the restaurant and delivers it to the user's address; The user receives their order and can provide feedback on their Nutrichef experience.

Design Solution and Prototyping

The display design development process is carried out at this point as a solution for the application being produced. We use software prototypes or mock-ups in solution design utilizing a requirements engineering methodology, this is our effort in providing design solutions in developing NutriChef software.

Usability Testing

Usability testing is a method of evaluating an application in relation to user demands. The application is said to be usable if the functions in it can be carried out successfully, efficiently, and satisfactorily [11]. It is regarded to be effective if the user achieves the

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

application's aim. The smooth operation of users to attain these aims is referred to as efficiency that can be shown on Image 2. Concerning the attitude of user acceptance of application satisfaction.

Following the development of the NutriChef prototype, usability testing was conducted with a group of expert users. The usability testing aimed to gather feedback and validate design choices, ensuring that the application meets high standards of user experience and functionality.

RESULT AND DISCUSSION

Implementation

Implementing the UCD approach to pioneering health food and ingredient applications results in the following interface.

Splash Screen Page Design

The splash screen is the initial thing seen when launching an application or visiting a website/application. This view is typically displayed for a few seconds before being transferred to the application's or site's main page or home page. A splash screen's objective is to provide users with an interesting and professional first experience while an app or site is loading or preparing information as shown in image 1.

Image 1. Splash Screen Page

Login Page Design

The login page design for the Nutrichef mobile application was meticulously crafted following a user-centered approach, ensuring a seamless and secure entry point for users to access their personalized accounts and unlock a world of culinary experiences. Both users as consumers and partners were made as shown in image 2.

Image 2. Login Page User Interface

The login page design for the Nutrichef mobile application was a result of in-depth research and iterative design processes, focusing on delivering an exceptional user experience for both consumers and partners. By applying a user-centered approach, the development team prioritized the needs and preferences of the target users, aiming to create an intuitive and engaging login experience.

Image 3. Sign In and Sign Up User Page Interface

For consumers, the login page

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

was designed with simplicity and convenience in mind. A clear and concise layout allowed users to quickly find the login fields and access their accounts. The team implemented various usability testing sessions to optimize the placement of the login form and to ensure that it was easily discoverable for users of all levels of tech-savviness.

For partners, who could be suppliers, drivers, nutritionists, or restaurant owners, the login page was tailored to accommodate their specific requirements. The team conducted surveys with potential partners to gather insights into their expectations and pain points when accessing the Nutrichef platform. As a result, the login page for partners was designed to offer a seamless onboarding process, guiding them through necessary account setup steps while providing clear instructions and resources.

Image 3, which depicts the login page design, showcased a visually appealing and cohesive interface. The color scheme and branding elements were thoughtfully chosen to reflect the Nutrichef's identity and values. A combination of enticing food imagery and enticing taglines conveyed the essence of the culinary experiences that awaited users once they logged in.

Throughout the design process, continuous user feedback was gathered and incorporated into subsequent iterations. The A/B usability testing were conducted to validate design decisions and optimize the login page for maximum usability and user satisfaction.

Main Page Design

The main page is the first page that is displayed when a user opens a NutriChef application. This is the initial screen that displays information and serves as the main gateway for users to access content, features or services provided by the NutriChef application.

Image 4. The User Interface of Main Page

Profile User Page Design

User profile pages play an important role in providing a personalized experience and providing users with control over their personal information on NutriChef. Good design helps NutriChef users feel comfortable and confident in managing their accounts and personal data, and increases overall user engagement and satisfaction.

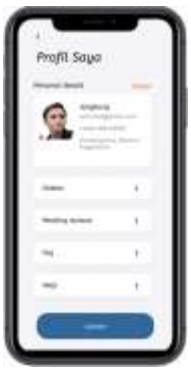

Image 5. The User Interface of Profile User

Health Consultation Page View

The Health Consultation page plays an important role in providing easily accessible and convenient health services for NutriChef users. This page aims to provide easy access for

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

NutriChef users to consult medical personnel or health professionals for advice, diagnosis or treatment regarding their health problems.

Image 6. The User Interface of Health Consultation

Catalog Page Design

Catalog Page Design is a layout or page layout that is used to display a detailed list of products or services in catalog form in applications on NutriChef. The catalog page on NutriChef is designed to provide a good user experience by presenting product information in a systematic, easy to read and attractive way.

Image 7. The User Interface of Catalog

Transaction Page Design

Payment Page is a layout or page layout used to facilitate the payment process in the NutriChef application. This page aims to enable users to complete purchase transactions by entering required payment information, such as credit card details, shipping address, and other payment methods in the NutriChef application.

Image 8. The User Interface of Transaction

Delivery Page Design

Delivery page is a page layout that is used to present information related to product delivery or delivery in the NutriChef application. This page aims to provide details and choices regarding delivery options, estimated delivery times, shipping costs, and delivery status for users who have made purchases on the NutriChef application.

Image 9. The User Interface of Delivery

Evaluation

At this stage, it will check the functionality needed for the purposes of system improvement (formative) based on input from end-users. In addition, at this stage it will provide checks and assessments of whether it has achieved the user's goals. From the results of the evaluation of the system, several things will be observed, described in table 5.

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 1, Desember 2023, hlm. 43 - 52 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v10i1.2619
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

Table 5. Evaluation from End-User

Feature	Clear	Not
Able to provide services for customers to easily browse products, place orders, and make online transactions.	√	
Able to provide and manage the availability of consulting services through the application.	√	
Delivery process can be accessed in real-time through a delivery tracking system.	√	
The application is able to allow partners to access the features according to their access rights.	√	
Able to implement BOT which can summarize the history of consultations and can be accessed by nutritionists when the user wants to do a paid consultation	√	
Apply the association method to provide offers based on previous transaction history	√	
Able to provide alternative products, restaurants or similar suppliers based on the closest distance to the user	√	
Able to create special advertising options pages that can help increase sales and be profitable for partners in the nutrichef application	√	

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that User Centered Design has been successfully applied to the mobile application that will be built. The design of the mobile application interface for the pioneer of healthy food is an application designed using a mobile display to help users manage a healthy lifestyle by eating healthy foods and cooking with healthy and measurable food ingredients. There is a consultation feature related to experts that will help users get accurate information regarding their health.

A software product's usability is a crucial feature. It refers to the level of efficacy, efficiency, and user pleasure that a particular user can obtain when utilizing a software product in a particular setting.

BIBLIOGRAPHY

[1] A. Dwi Suryani and Q. Jafar Ardian, "RANCANG BANGUN IDENTIFIKASI KEBUTUHAN KALORI DENGAN APLIKASI GO HEALTHY LIFE," 2020. [Online]. Available: http://jim.teknokrat.ac.id/index.php/sisteminformasi

[2] N. R. Lumentut, S. T. G. Kaunang, and Brave. A. Sugiarso, "Balanced Nutrition Education Applicationfor Healthy Eating during the Covid-19 Pandemic," *Jurnal Teknik Informatika*.

[3] A. Fudholi, "ANIMASI INTERAKTIF PEMBELAJARAN PENGENALAN DAN PERANCANGANJARINGAN KOMPUTER," *Jurnal Penelitian Ilmu Komputer, System Embedded & Logic*, pp. 28–40, 2015.

[4] D. Maulidini Akbar and Z. Aidha, "Perilaku Penerapan Gizi Seimbang Masyarakat Kota Binjai Pada Masa Pandemi Covid-19 Tahun 2020," *Jurnal Menara Medika*, vol. 3, no. 1, 2020, [Online]. Available: https://jurnal.umsb.ac.id/index.php/menaramedika/index

[5] Dayton, S. Anas, and Aklani, "Analisis Dan Pengembangan Aplikasi Mobile Diet Artificial Intelligence Dengan Pendekatan Challenge Based," *Jurnal Sistem Informasi dan Informatika (Simika)*, vol. 6, pp. 49–58, 2023.

[6]J. H. West, L. M. Belvedere, R. Andreasen, C. Frandsen, P. Cougar Hall, and B. T. Crookston,

"Controlling your 'app'etite: How diet and nutrition-related mobile apps lead to behavior change," *JMIR Mhealth Uhealth*, vol. 5, no. 7, Jul. 2017, doi: 10.2196/mhealth.7410.

[7] A. Samoggia and B. Riedel, "Assessment of nutrition-focused mobile apps' influence on consumers' healthy food behaviour and nutrition knowledge," *Food Research International*, vol. 128, Feb. 2020, doi: 10.1016/j.foodres.2019.108766.

[8] S. Y. Lim, K. W. Lee, W. L. Seow, N. A. Mohamed, N. K. Devaraj, and S. Amin-Nordin, "Effectiveness of integrated technology apps for supporting healthy food purchasing and consumption: A systematic review," *Foods*, vol. 10, no. 8. MDPI AG, Aug. 01, 2021. doi: 10.3390/foods10081861.

[9] R. Z. Franco, R. Fallaize, J. A. Lovegrove, and F. Hwang, "Popular nutrition-related mobile apps: A feature assessment," *JMIR Mhealth Uhealth*, vol. 4, no. 3, Jul. 2016, doi: 10.2196/mhealth.5846.

[10] D. Larson Kaligis and R. R. Fatri, "PENGEMBANGAN TAMPILAN ANTARMUKA APLIKASI SURVEI BERBASIS WEB DENGAN METODE USER CENTERED DESIGN," 2020. [Online]. Available: https://jurnal.umj.ac.id/index.php/just-it

[11] M. Puspita Eugenia, M. Abdurrofi, B. Almahenzar, and A. Khoirunnisa, "Pendekatan Metode User-Centered Design dan System Usability Scale dalam Redesain dan Evaluasi Antarmuka Website Studi Kasus Website Diseminasi Sensus Pertanian (User-Centered Design and System Usability Scale Method Approach in Website Interface Redesign and Evaluation: A Case Study of the Dissemination Agricultural Census Website)," 2022. [Online]. Available: https://st2013.bps.go.id/.

[12] M. Ehn, M. Derneborg, Å. Revenäs, and A. Cicchetti, "User-centered requirements engineering to manage the fuzzy front-end of open innovation in e-health: A study on support systems for seniors' physical activity," Int J Med Inform, vol. 154, Oct. 2021, doi: 10.1016/j.ijmedinf.2021.104547

[13] A. Lopes, N. Valentim, B. Moraes, R. Zilse, and T. Conte, "Applying user-centered techniques to analyze and design a mobile application," Journal of Software Engineering Research and Development, vol. 6, no. 1, Dec. 2018, doi: 10.1186/s40411-018-0049-1.

[14] Cahyo, D. D. N., Farasalsabila, F., Lestari, V. B., Lestari, T., Al Islami, F. R., & Maulana, M. A. (2023). Sentiment Analysis for IMDb Movie Review Using Support Vector Machine (SVM) Method. Inform: Jurnal Ilmiah Bidang Teknologi Informasi dan Komunikasi, 8(2), 90-95.

[15] Ritha, N., Hayaty, N., Matulatan, T., Uperiati, A., Rathomi, M., Bettiza, M., & Farasalsabila, F. (2023, January). Sentiment Analysis of Health Protocol Policy Using K-Nearest Neighbor and Cosine Similarity. In ICSEDTI 2022: Proceedings of the 1st International Conference on Sustainable Engineering Development and Technological Innovation, ICSEDTI 2022, 11-13 October 2022, Tanjungpinang, Indonesia (p. 195). European Alliance for Innovation.

[16] B. Xiao, K. Su, and X. Su, "A Requirement Engineering Approach to User-Centered Design," in Journal of Physics: Conference Series, Institute of Physics Publishing, Mar. 2020. doi: 10.1088/1742-6596/1453/1/012032.

[17] L. Teixeira, C. Ferreira, and B. S. Santos, "User-centered requirements engineering in health information systems: A study in the hemophilia field," Comput Methods Programs Biomed, vol. 106, no. 3, pp. 160–174, Jun. 2012, doi: 10.1016/j.cmpb.2010.10.007.