

Designing User Experience Design of the Healthy Diet Mobile Application Using the Fives Planes Framework

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Abstract. Obesity and overweight are becoming increasingly common conditions. On the other hand, the rapid development of technology shows by the increasing number of smartphone users. M-health application can be a solution to the burden of existing health problems. In line with that, the research focused on the quality improvement of user experience in m-Health, especially diet-related apps widely conducted. This study aims to design user experience in a diet-support mobile application called Health-Key using the five planes framework by evaluating usability aspects using the User Acceptance Test. The result of this study is prototype design. Evaluation shows that the designed prototype has good interface, practicality, and efficiency indicator, and 76.9% of respondents stated that the application is feasible, appropriate, useful, and it potentially developed in further iteration with improvements according to the respondents' suggestions.

Keywords: m-health, healthy diet, user experience, five planes framework, user acceptance test.

Abstrak. Designing User Experience Design of The Healthy Diet Mobile Application Using The Fives Planes Framework. Obesitas dan kelebihan berat badan menjadi kondisi gangguan kesehatan yang umum dialami. Di sisi lain, perkembangan teknologi yang kian pesat ditunjukkan dengan semakin banyaknya pengguna smartphone. Aplikasi M-Health (Mobile Health) dapat menjadi solusi dari beban permasalahan kesehatan yang ada. Sejalan dengan itu, penelitian yang berfokus pada peningkatan kualitas pengalaman pengguna M-Health, khususnya aplikasi pendukung diet, banyak dilakukan. Penelitian ini bertujuan untuk merancang desain pengalaman pengguna dalam aplikasi mobile yang mendukung pola diet sehat bernama Health-Key menggunakan The Fine Planes Framework serta mengkombinasikannya dengan mengevaluasi aspek kegunaan dengan User Acceptance Test. Hasil dari penelitian ini adalah desain prototipe. Evaluasi menunjukkan bahwa prototipe yang dirancang memiliki indikator antarmuka, kepraktisan, dan efisiensi yang baik, serta 76,9% responden menyatakan bahwa aplikasi layak, tepat-guna, bermanfaat, dan berpotensi dikembangkan dalam iterasi perancangan lebih lanjut dengan perbaikan sesuai saran responden.

Kata Kunci: m-health, healthy diet, user experience, five planes framework, user acceptance test.

1. Introduction

Obesity and overweight are now becoming increasingly common conditions. In 2016, 1.9 million people over the age of 18 were overweight [1]. Along with that, the development of technology over time has progressed rapidly. It is evident with the owners and users of Smartphones that continue to increase, until in 2016 by 2.562 million [2] Utilizing smartphone characteristics that can be easily accessed everywhere and applications related to these benefits, mobile health strategy (m-Health) potentially provides efficient and measurable health services and be a solution to the burden of existing health problems [3]. In early 2015, there were 58,000

m-health apps available [4], of which two-thirds focused on physically and mentally healthy users, including diet, fitness, and other lifestyles, including stress management apps [3].

Diet-related apps are currently available in large quantities. Usually, e-Health and m-Health, particularly applications that support diet programs, are for professional or personal needs [2], of which 62% use m-Health applications as a source of information and monitoring tools. The usefulness of m-Health or e-Health optimization, especially diet-related application, are widely carried out in research. Besides credibility, the Smartphone Health App value depends on usability and easy-to-use factor [3]. Poor usability can be a key factor stopping the use of the app. It is critical to consider aspects of usability in developing dietary applications. Applications with good user experience can increase their preferences with other similar applications [2].

In acknowledging the various user experience design methods, the chosen method is the Five Planes of User Experience. This method contains five phases to design a user experience[5] that is easy to understand. The user needs and product perspectives along with strategy analysis are also considered in this method [6].

The Five Planes method is already becoming a topic in various research related to the User Experience. For example, the Five Planes method proved to ensure the user needs and adjust to product objectives in B2B Textile e-Commerce UX Design. Furthermore, in other research with the object of designing website profile, the Five Planes method can increase usability quality, proven by 86.22% of the test tasks successfully performed. However, the phases introduced in this method do not include the testing step. To ensure the performance, examine the design with various relevant parameters testing, and testing methods is needed [7]–[9].

This study aims to design a user experience on a diet supporting mobile application called Health-Key. The design using the Five Planes method will end with the user acceptance test process. This research will also include the test and analysis of the prototype to measure the level of Health-Key usability. The test will also indicate the success rate of the methodology used.

2. Literature Review

2.1. User Experience

The experience that occurs during the use of the software can be seen as a comprehensive experience that was influenced by some factors such as software product functionality, engagement, and attractiveness [10]. Besides, Hassan cites from the ISO, the draft definition reads, stated that User Experience is defined as a person's perceptions and responses that result from the use or anticipated use of a product, system, or service [11]. The user experience can also be considered as a feeling that perceived by using the product or services, as it can be look at the simple and general point of view [11] [12]. Specifically, in the information and technology subject, user experience is an important factor [13], that will be focused on the human-computer interaction domain and user-centered design practices. It can be concluded that the user experience concept can be seen as the potential beneficial effect acquired from the product in dynamic, context-dependent, and subjective characteristics [11], [12].

2.2. User Acceptance Testing

The growth of the user experience domain recently has escalated to the evaluation process. It can be shown in the number of evaluation methods for the user experience that exists. The evaluation method can be conducted throughout the design process. This action can involve experts and/or recruit the end-user representative [14]. There are several alternatives to conduct the user experience design evaluation and one of those methods is the User Acceptance Test (UAT). This testing process usually becomes the final stage of the design process. The UAT can be implemented in function, prototype, or final product. The goal is to gain earlier feedback, as well as to fix the problem, and to decide based on some alternatives [14]. Besides, the focus is

to verify the product readiness and make sure that the product deliverability has already fulfilled the user needs along with the product objective perspective [15] [16].

2.3. The Five Plane Framework

The five plane framework is a conceptual framework for breaking down the task of designing experiences into component elements [17]. The model simplifies user experience into five interdependent planes to help phase design decisions and design the whole user experience [5]. According to J.J. Garrett [17], a digital product will have a good User Experience if it is built based on the five elements in the five plane framework which consists several phases : (1) surface plane, (2) skeleton plane, (3) structure plane, (4) strategy plane, and (5) scope plane. The development of user experience using this framework should be built gradually from the bottom to the top, because each phase has a correlation between one and another [17].

2.4. M-health

M-health or mobile health is an innovative form of advancement in technology that supports the health sector. Mobile health is the creative use of emerging mobile devices to deliver and improve healthcare practices[18]. The improvement of efficiency, accessibility, and quality, within the future health care system, has been potentially ensured by the current Mobile Health growth. This service proposes the idea of having effective, convenient, and accessible health facilities at affordable costs [18] [19].

M-health is used in healthcare with a health focus with various types, one of which focuses on health related to weight management or healthy diet. Many of these apps have a favorable consumer rating [20].

3. Research Method

The Five Planes of User Experience presents a conceptual framework for defining user experience problems and how to solve them. This method consists of several phases: (1) Strategy Plane, (2) Scope Plane, (3) Structure Plane, (4) Skeleton Plane, and (5) Surface Plane [17]. Each component is at a structural level, where one is interconnected and dependent on each other as shown in Figure 1. The process flows from the lowest level to the highest level. The higher level, the more concrete the problem will be. Besides, the lower level, the more abstract the problem will be. This method considers the duality of a product, namely functionality and information. In terms of functionality, the product is a tool used by users to complete one or more tasks. Product information is about the information offers and what is given value to users through that information [17].

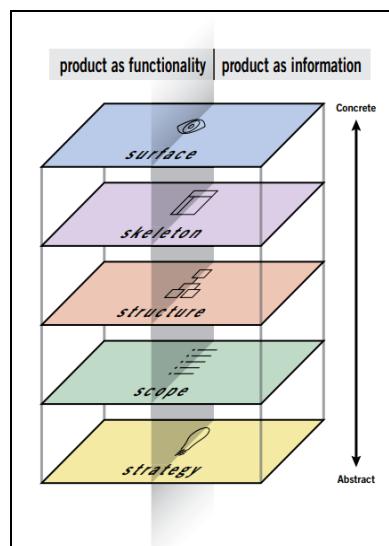


Figure 1. The Five Planes of User Experience

3.1.Strategy Plane

This phase will analyze the user needs and stakeholder (business scope) interests related to the developed product [6]. Few techniques can be used in this phase to acquire the data. Examples given: (1) interviews, (2) surveys, and (3) focus groups. The result is an integration between product objective that represents the stakeholder interest and user need that represents user expectation [17].

3.2.Scope Plane

Starting from the strategy plane that has been designed, from a functionality point of view, this phase interprets the strategy into functional specifications [17] that describe the feature sets in the product. Besides, from a product as information point of view, this phase transforms the strategy plane output into content requirements [17].

3.3.Structure Plane

This phase transforms the functional specifications and content requirements defined in the scope plane into the arrangement of interaction between user and system, represented in interaction design and information architecture [17].

3.4.Skeleton Plane

In the skeleton plane phase, the structure plane output transforms into interaction design and information design. Both transformations will consider several aspects: information design, interface design, and navigation design [17].

3.5.Surface Plane

The last phase is the surface plane. In this phase, both sides will be interpreted in a concrete sensory design. Therefore, this phase focuses on the visualization designs [6]. The result of the Five Planes method is a prototype. In this research, after the entire design process complete, the prototype is tested with User Acceptance Test. The aim is to assess the design results and to analyze the effectiveness and the success of the method used [13], as well as to accommodate the strategic objectives defined in the early stages of design or strategic plane [7].

4. Result and Discussion

4.1. Strategy Plane

At the stage of the Strategy Plane, the product objectives and the user need will be formulated and identified.

1) Product Objective

Product objective was captured from the misperception related to the diet. The background of the product objective came from the issues observed, that many people wanted to achieve healthy life by doing the diet, but in an unhealthy way such as without the work-out and exercise. On the other side, many people had already followed a healthy diet, but they found it difficult or struggling to achieve the target or kept up with the program. The platform which had been designed helped the user to do a fun-healthy-diet that resulted in a healthy lifestyle.

2) User Needs

The process of identifying the user needs was carried out through several stages, namely user segmentation and creating personas. The first step in defining user needs is to specify the user segments of the developed product. The segmentation type has been chosen as the suitable market representation for the product object. The result is teenage-women with the age range of 12-25 years. The creation of user persona based on analysis of interviews of four personalized candidates compatible with user segmentation. One of the complemented personas had shown in Figure 2.

4.2.Scope Plane

The scope plane described the functionality of the program, along with the main feature detailed identification that was constructed based on the previous stage output. There were two user types, registered user and operator (admin). The registered user was someone who had a verified account and logged in into the system successfully. This type of user also had the privilege to enjoy all the features available in the system. The operator (admin) was someone in charge of adjusting and posting to the available contents from the contributor into the system.

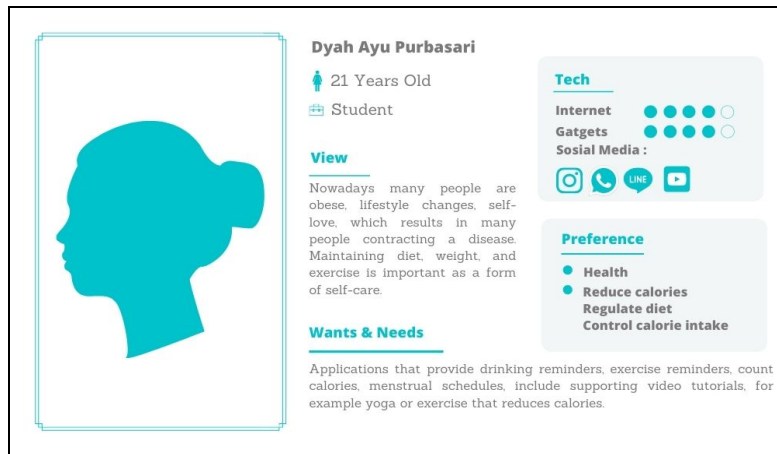


Figure 2. User Persona of Healthy Diet Application Mobile

4.3.Structure Plane

This structure plan phase conducted to identify the Interaction Design and Information Architecture. The first concern about Interaction Design is related to how the user and system interact with each other, as well as how the scenario can be drawn through the Conceptual Model and Error Handling scenario as the final results. The Conceptual Model figures in the task flow and interaction diagram. The first interaction diagram is in general form, containing the interaction between the registered user with the system and between the operator with the system. Then, it breaks down into a more specific flow diagram. The Information Architecture classifies the information group and defines how information interacts with others. The final output of The Information Architecture is Structural Model, Sitemap Navigation, and Information Labeling. Below, attached models that represent the Information Architecture in Figure 3, and Interaction Design in Figure 8.

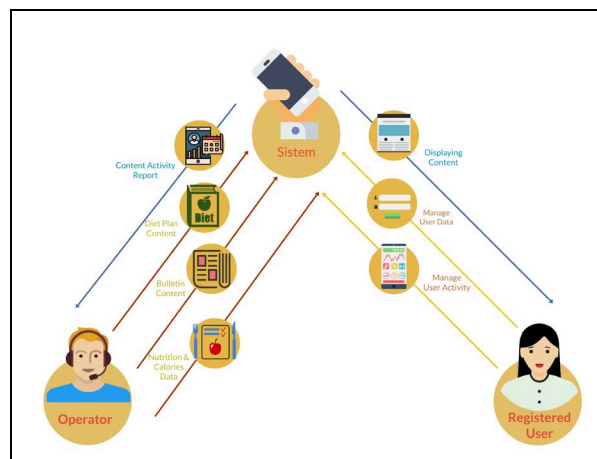


Figure 3. Interaction Design: General Conceptual Model

4.4. Skeleton Plane

This stage explained the relation between the structure plane and the more detailed design by creating a sketch and a wireframe design. The sketch was designed with manual drawing as a basic concept from the comprehensive design development on wireframe using Balsamiq tools. The wireframe design implemented three navigation types. There were global, local, and contextual navigation. The implemented information way-finding design was menu categorization, search features, and breadcrumb. The implemented interaction designs were such as checkbox, drop-down list, and action button.

4.5. Surface Plane

The surface plan is the final step of the design process, produced a Mockup and a Prototype. Mockup is a visualization of a basic design that applies to the diet application design. Prototype is basic design visualization defined in Mockup with more attractive, interactive, and clickable so that the user could interact with the actual user interface. Documenting the design process is also done by creating a useful style guide to maintain design consistency. The final action is testing the Prototype design using User Acceptance Test Method. The User Acceptance Test Method began with determining the indicator as the basis of measurement, compiling the description of assessment categorized based on indicators, conducting a questionnaire survey, then analyzing data from the results of the User Acceptance Test questionnaire.

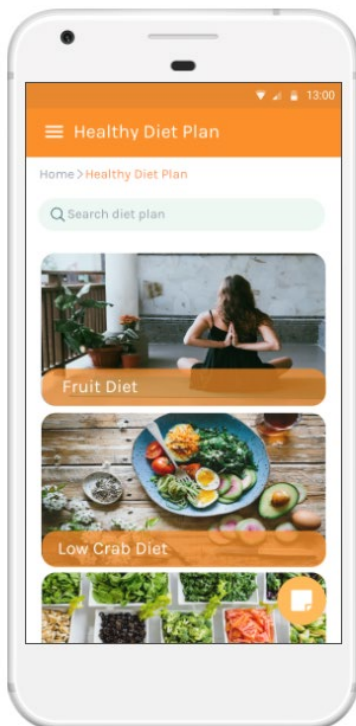


Figure 4. Prototype Diet Plan

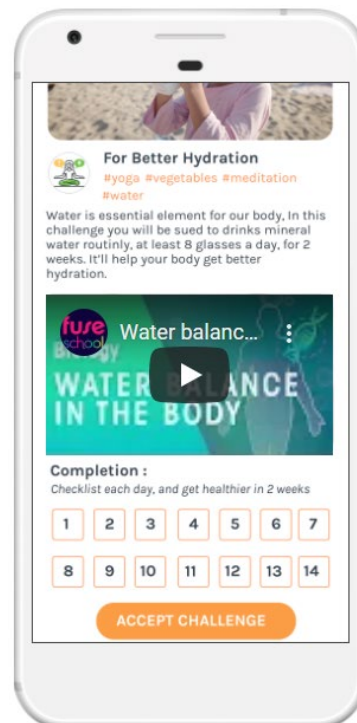


Figure 5. Prototype Challenge Healthy Lifestyle

Based on the mock-up, a dynamic-clickable design prototype was created. In this section, the prototype was documented on 2D version, so it contained flow of picture/model that represented the navigation, action, and interaction of the prototype. The sample prototype displayed some functionality representing the Diet Plan page in Figure 4 and Challenge Healthy Lifestyle page in Figure 5. Along with that, there are Calories Calculator page in Figure 6, and Profile page prototype in Figure 7.

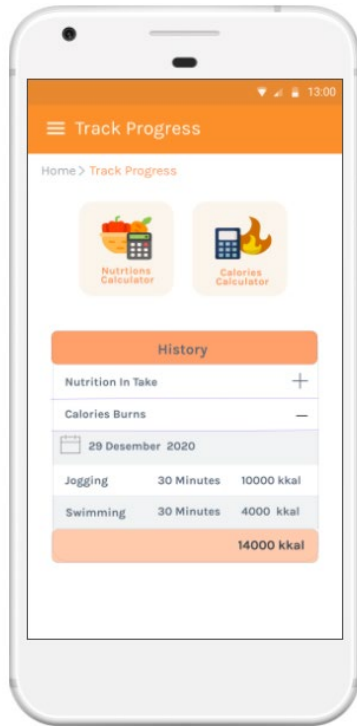


Figure 6. Prototype Track Progress Page

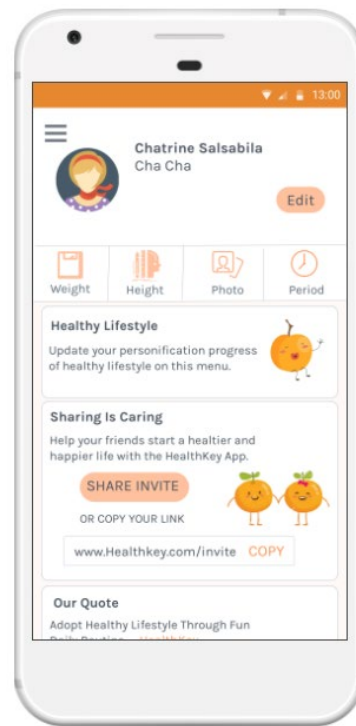


Figure 7. Prototype User Profile Page

This research evaluated the final design from the Five Planes method that was applied. The prototype was the final output from the surface plane, tested by 13 respondents using the User Acceptance Test (UAT). Testing in the Five Planes method was necessary to ensure whether the result achieved the initial goal on the strategy plane. UAT survey used a questionnaire with three assessment indicators, namely interface, practicality, and efficiency.

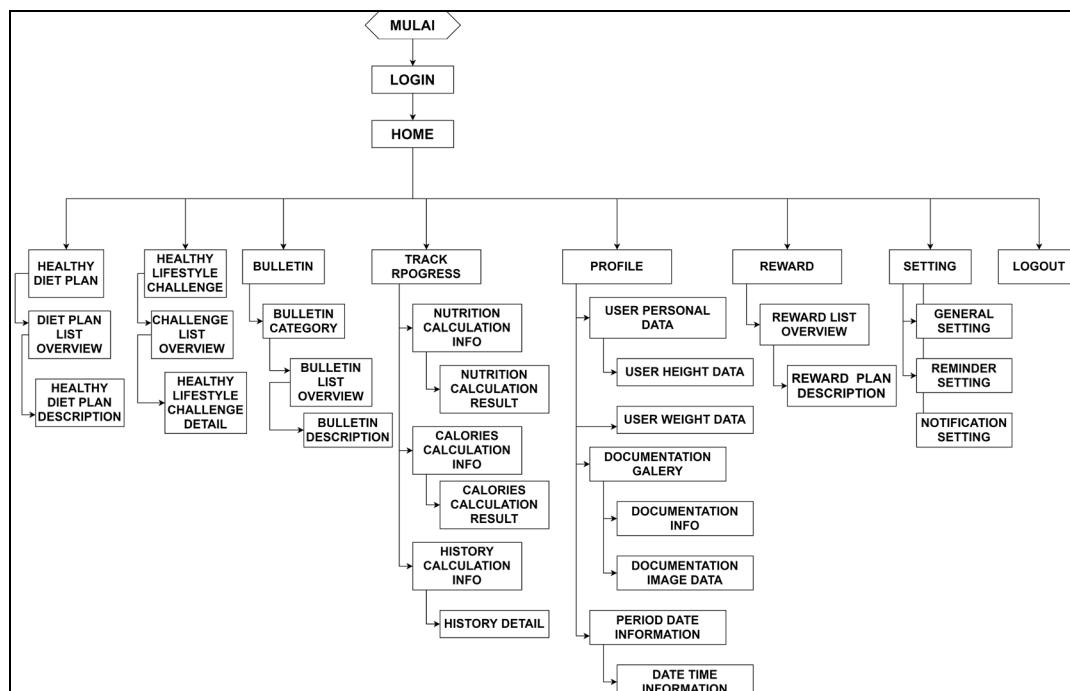


Figure 8. Information Architecture: Structural Model

The conducted evaluation used these three indicators to assess the attractiveness. These picked indicators represented the user satisfaction and product performance that user needed as well as desired business perspective to achieve. Attractiveness is a dimension of emotional reaction that represents pure rejection or acceptance. The quality of attraction was shown in two perspectives, namely: pragmatic and hedonic quality. The pragmatic quality focused on the user's activity and interaction to accomplish tasks and functionality (perspicuity, efficiency, & dependability). While hedonic quality concerned customer pleasure and satisfaction when they are using the application (Stimulation & Novelty) [21]. Aspects of perspicuity & dependability were presented in the practicality indicators. Meanwhile, the novelty & stimulation were presented in the interface indicators.

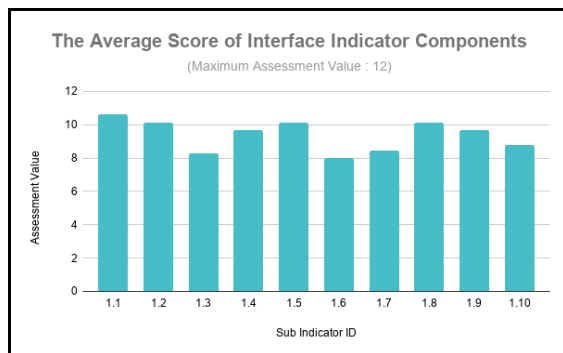


Figure 9. Interface Indicator Assessment

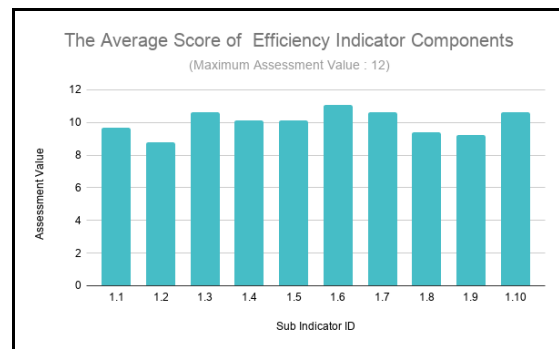


Figure 10. Practically Indicator Assessment

The conducted UAT results indicated that the Health-Key application designed with the Five Planes method have good attraction. This is proved in the average satisfaction score for interface indicators in 78.33%, as shown in Figure 9. This indicator represents the overall user-interface aspect especially the design aesthetics, layout, and composition style based on the eight golden rules of the user interface. Meanwhile, the aspects of the task functionality, feature, and task that can be accomplished by the user were described in practically indicator with the average score of 82,68 %, as shown in Figure 10. Finally, 83.59% for efficiency indicators is shown in Figure 11. This indicator represents design reliability to support user to complete all the tasks effectively and efficiently. Despite 76.9% of respondents stated that the application was feasible, precise, useful, it still needed improvement considering that the new design was carried out in the first iteration stage. This numbers show the potential attractiveness of the application that has been designed, displayed in Figure 12.

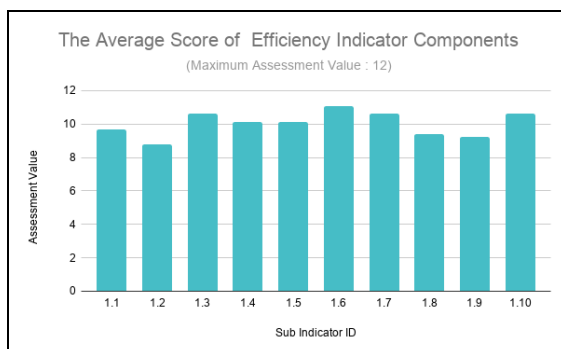


Figure 11. Efficiency Indicator Assessment

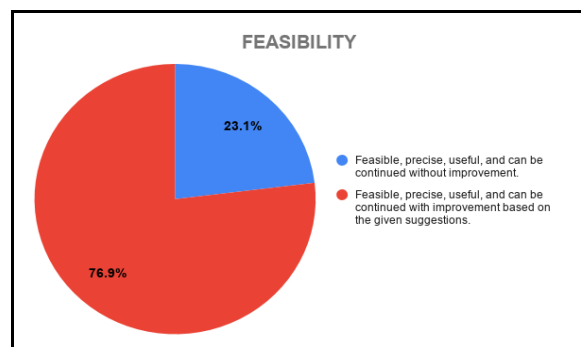


Figure 12. Feasibility Assessment

5. Conclusion & Suggestion

This research proposed a user experience design of the health-mobile application named Health-Key that implemented the Five Planes framework for only one iteration design process. In order to meet the product objectives and fulfill the user needs, the five-plane framework has proven to be working effectively [7]. The evaluation indicated that the prototypes designed had a good attractiveness potential, namely 78.33% for interface indicators, 82.68% on practicality indicators, and 83.59% for efficiency indicators. However, consideration for further iteration to improve the usability of Health-Key was needed. Along with the UAT result, 76.9% of respondents agreed that Health-Key was feasible, precise, and useful. However, an improvement according to the respondent's suggestion need to be implemented. Regarding to further research, the given solutions are to conduct next iteration and to test or evaluate by using different parameters or evaluation methods. The designed M-Health app that reckons the user experience perspective can increase the user engagement in using the Health-Key app and support them to adopt a healthy lifestyle through the fun daily routine. Ultimately, it contributes to the improvement of society's healthy lifestyle awareness.

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