Wireframe Creation on SIOBEL Application User Interface Design using User Centered Design

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ABSTRACT

The development of an interactive SIOBEL (Sistem Informasi Bela Neagara) application requires the application of User Centered Design in the UI/UX design phase. In this context, User Centered Design becomes an important cornerstone in ensuring an optimal user experience and meeting the needs of users when using the SIOBEL application as a platform to integrate state defense values with oubound. By applying UCD, the UI/UX wireframe design of the SIOBEL application can create a better and satisfying user experience. Users will feel engaged and comfortable when using the application.

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1. Introduction

Today, almost all of our needs can be met digitally via websites and applications. It aims to optimize and streamline the work that humans do. By using digital technology, time and space restrictions can be solved. It is because we can access the digital space whenever and wherever we want. This advantage can be utilized by us to solve problems effectively and efficiently[1].

One of the problems that we can solve with the help of digital technology is the integration of state defense outbound activities. State defense outbound activities mean developing character building and leadership to ensure every citizen has a strong understanding of values, ethics, and their responsibility to the country [2],[3]. These activities are also efforts to encourage individual awareness and responsibility for the national interest and provide a foundation for security, sovereignty, and country stability [4].

During this time, state defense outbound activities are conducted online. This is sometimes an obstacle if the condition of a specific area makes it impossible to hold offline outbound activities. For example, during the last COVID-19 pandemic, it was impossible to conduct offline activities. Therefore, we need to integrate activities that are commonly done offline with those that can also be done online. This integration effort can be done by developing an application system, namely SIOBEL (Sistem Informasi Bela Negara) [5], or State Defense Information System in English. This application has the functionality to serve as a platform to conduct all state defense outbound activities. So that the integration of state defense outbound, which is commonly done offline, can also be done online [6].

In the SIOBEL development process, there is a need to design UI/UX. UI/UX design is an important process within the development of the SIOBEL application to provide an overview of the application prototype [7]. So that we can perform evaluations earlier about application functionality before implementing it into the program code. This allows us to save development costs effectively and efficiently during the application development process.

UI (User Interface) refers to the system and user that are interacting with each other, or a technique to operate a system, insert data, and use content, while UX (User Experience) refers to all the experiences related to perception (emossion and thought), reaction, and perceived user behavior through the use of a system, products, contents, or services directly [8].

User-Centered Design (UCD) is an interactive approach to the design process that focuses on usability goals, user characteristics, environment, task, and workflow within its design. Some advantages of the user-centered design approach are that products require less redesign and integrate into the environment faster, and the collaborative process generates more creative design solutions to solve problems [9].

Research that discusses user-centered design (UCD) has been done by researchers. For example, the research that has been done by Mukti (2018) concluded that the implementation of user-centered design in web applications can improve a website's usability, learnability, efficiency, satisfaction, memorability, and errors.This research has been done to compare user-centered design measurements on SMP Negeri 1 Sekayu's website. So that the resulting website is in accordance with user needs. Some expected needs are the availability of a chat feature and a communication forum [10].

Similar research was also conducted by Pratiwi (2017), who talked about user-centered design in the redesign of Brawijaya University Pychology's Web Portal [11]. This research evaluates the web portal 2017 design. It concludes that user-centered design can solve the existing problem with the final evaluation score, which has experienced an increase up to 0.185.

Based on the background above, this research aims to design the UI/UX for the SIOBEL application. The goals of this research are to see four UI/UX approaches that include analysis, design, evaluation, and implementation.

2. Method

The research method is a systematic approach that focuses on the stages or processes in a research activity. The method of this research is to use an approach in the form of designing UI/UX wireframe SIOBEL application UCD (User Centered Design) method, where the stages will be divided into 4 main stages, namely the analysis stage, design stage, evaluation stage and implementation stage [12].

2.1.Analysis

This stage is an analyzing process carried out when first starting to process the overall UI/UX design, where the results of this stage are the initial sketches of making designs that are packaged based on user needs for the application of national defense values through outbound [13].

2.2.Design Phase

This stage is the stage in making a design in the form of a wireframe prototype. This prototype is made in accordance with the application we are aiming for, namely the SIOBEL application. As according to Dwi Purnomo (2017), the purpose of system developers using

the prototyping process as the start of the system is to collect information obtained from users, so there will be interaction between users and prototype models that are in the process of development [14]. Another benefit of creating a prototype is to make it easier for developers to create application designs, because prototypes can be easily edited based on application development needs. A prototyping is also expected to save resources, funds and time in producing applications that are more efficient, appropriate and useful for users.

2.3.Evaluation

The Evaluation stage is an advanced stage from the previous stage, namely the wireframe prototype design stage for the SIOBEL application. At this stage the prototype design that has been made will be carried out an evaluation involving the user as a jury. The evaluation stage is carried out until the developer gets a positive response from the user to the wireframe prototyping design. The evaluation stage will be finished if the UI/UX wireframe design results are in accordance with SIOBEL user needs. This stage entirely uses the User Centered Design (UCD) method approach, because this stage focuses on the end user. The method is to show the results of the prototype UI/UX wireframe design to the end user, then the user will assess the feasibility of the design [15].

2.4.Implementation

This stage is the stage to implement the prototype design of the UI/UX wireframe design of the SIOBEL application that has been evaluated. With the final result, the design will be developed into a mockup with figma application.

3. Results and Discussion

3.1.Requirement Analysis

Based on interview of vice dean of the faculty of computer science UPN "Veteran" Jawa Timur, there are some requirements that needed for the system:

Table 1. Requirements Analysis Table

No	Requirements Analysis	
	User Requirements	***Source***
1.	SIOBEL or the system itself can input state defense values within the education. It includes awareness of prioritizing country's interest, patriotic spirit, and citizen's duty.	User Interview
2.	System is running online	User Interview
3.	System has possibility to be accessed by people from everywhere without attending directly for the outbound activities.	User Interview
4.	System can integrate the state defense value with education activities	User Interview
5.	Lecturer can scoring students outbound assignments	User Interview
6.	Students can submitting their outbound assignments	User Interview

No	Requirements Analysis	
	User Requirements	***Source***
7.	System can display state defense values as rubrics	User Interview
8.	System can display every lecturer's classes and the information of students of that classes	User Interview
9.	We can download the documents related to outbound activities between students and lecturer	User Interview

3.2.Mock Up Design for Student

We have analysed the requirements of the system. We can translate it into mock up design, so we can see the system worldview generally.

A. Dashboard Mock Up Design

Student dashboard will display some information such as greeting to the user, assignment card, scoring card, and rubrik card. Assignment card is the card or menu that will be linked into the list of user's assignments if it was clicked. Scoring card is the card or menu that will be linked into the list of user's score result if it was clicked. Rubrik card is the card or menu that will be linked into the list of state defense values rubrik.

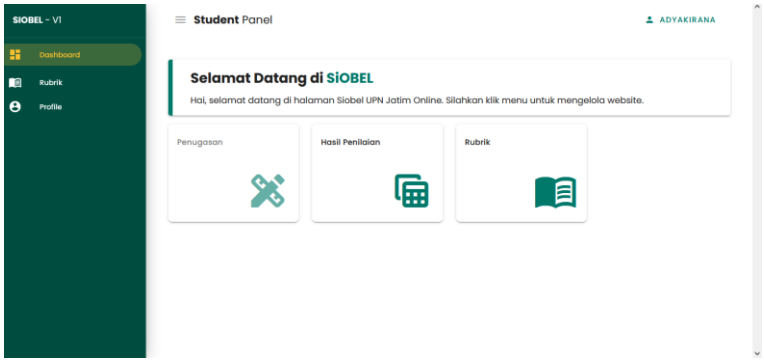

Fig. 1. Student Dashboard Mock Up

B. Student's Score Menu

Student's score menu will display some information about student learning activities. It includes the information of student biography, total student's score, and student's score detail. The biography of student includes student name, student number, faculty, course, class, and lecturer name. Total student's score is obtained from total sum of each student activity point.

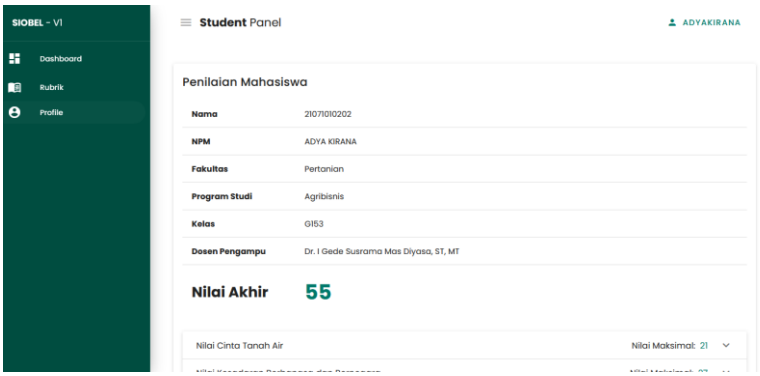

Fig. 2. Student's Score Menu Mock Up

C. Assignment Menu

All about managing assignment activities will be done in this menu. Student can submit the documents that required to finish all assignments for every indicator of state defense values. Student can select the green upload icon button to submit their document, red trash icon button to delete document, pen blue button to edit document, and yellow eye button to view document. When submitting document, after student selected the green icon button, pop up window will appear to the application as shown in the Fig. 3.. In this pop up windows, student can select the file from their local computer or storage to be uploaded. The selected file must be match to the provided document format, for example .pdf document format.

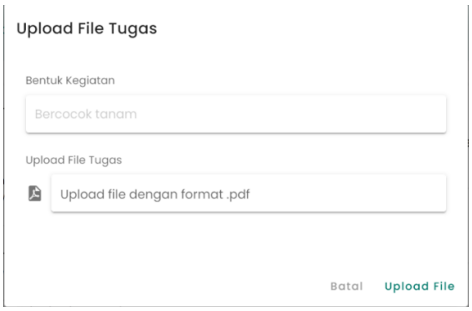

Fig. 3. Document Submitting Pop Up Windows Mock Up

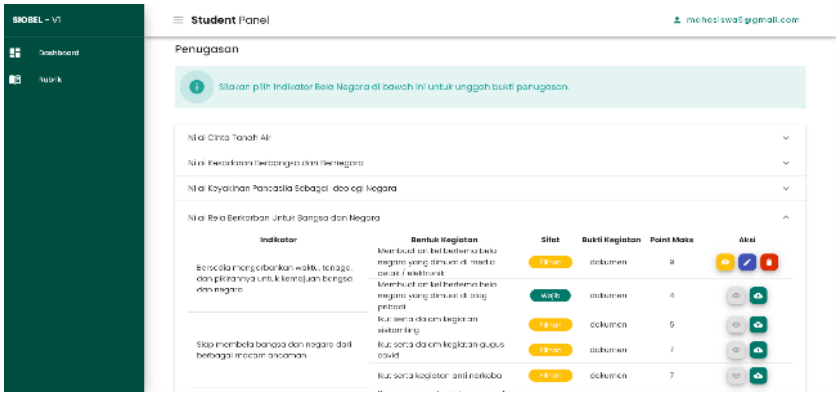

Fig. 4. Student's Assignment Menu Mock Up

D. Rubrik Menu

Rubrik menu will display all the information of student learning activities that must be completed by student. It contains every point of state defense values which every point of state defense values has indicators, activity forms, properties, evidence, and maximum score.

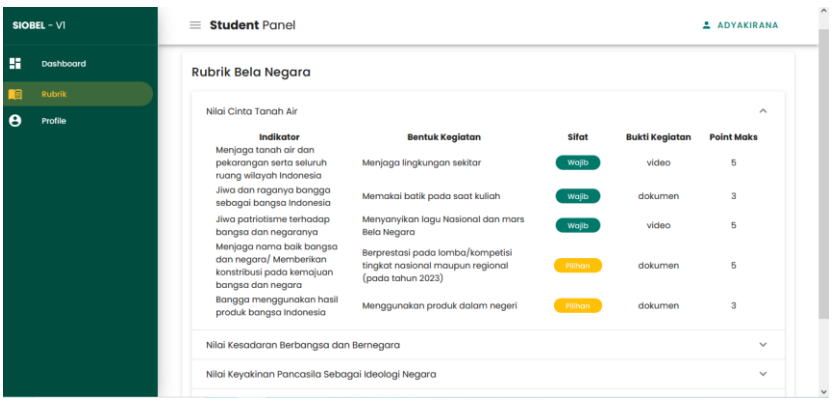

Fig. 5. Student's Rubrik Menu Mock Up

E. Profile Menu

Profile menu let student know about their personal information detail. It also allow student to edit or update their personal information. Informations that can be managed in this menu such as student number, student name, email, phone number, class, and study program.

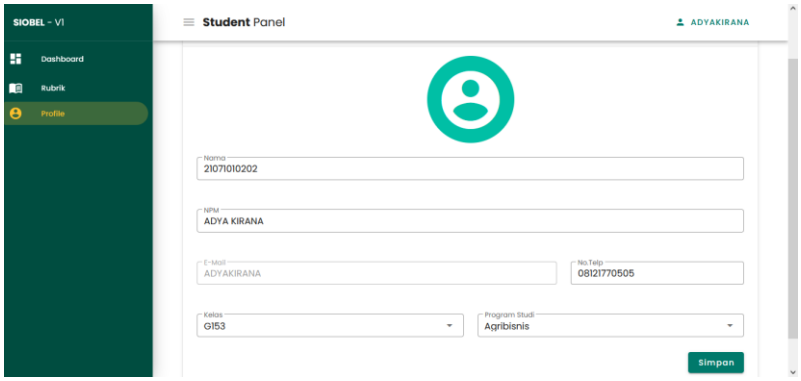

Fig. 6. Student's Profile Menu Mock Up

3.3.Mock Up Design for Lecturer

A. Lecturer's Dashboard Menu

Lecturer dashboard will display some information such as greeting to the user, My Class card, and rubrik card. My Class Card is the card or menu that will be linked into the list of user's class that being taught. Rubrik card is the card or menu that will be linked into the list of state defense values rubrik.

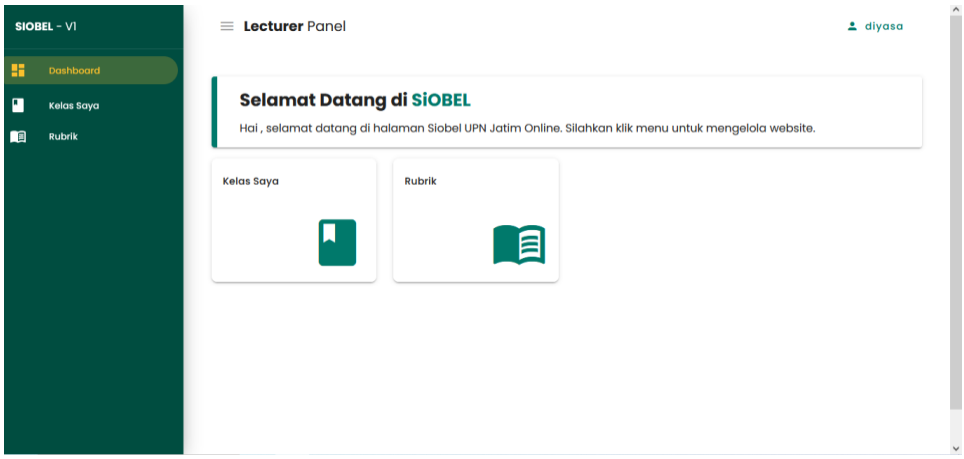

Fig. 7. Lecturer Dashboard Menu Mock Up

B. Lecturer's My Class Menu

On this menu will be displayed a list of classes that are being taught by the user as lecturer. Every list of classes can be selected to see about details of the selected class. As shown on the Fig.8 below, list of classes will be displayed as green card. Inside green card, we can see book icon and the name of the class. So that the user can be more comfortable and easier to see list of class that they have into this menu.

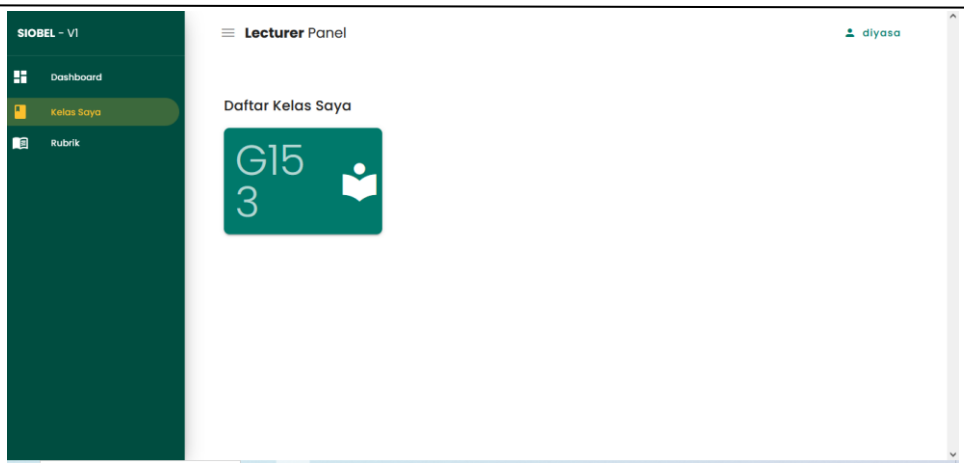

Fig. 8. Lecturer's My Class Menu Mock Up

C. Lecturer's My Class Details Menu

On this menu will be displayed all the details or informations about selected class that have selected before in the beginning of My Class menu. As we can see on Fig.9, this menu has three sections. First section is the navigation bar at the top of menu. Second is class information section, where we can see some informations such as class name, lecturer's name, and search bar to find the data. And the last one is student name section, where we can find all the student who are taking the class. In this section we can see which student who have not been assessed yet. The red box indicates the student who have not been assessed yet. So lecturer can start to give assessment with selecting the name of student. After the name of student is selected, lecturer will be linked into another assessment page or menu.

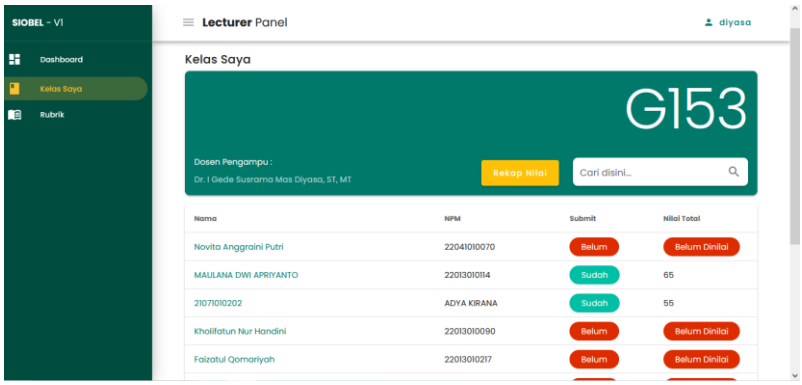

Fig. 9. Lecturer's My Class Details Mock Up

D. Lecturer's Student Assesment Menu

This menu has three sections. First section is the navigation bar at the top. Second section is the section for student information details. It contains student name, student number, student faculty, study program, class, lecturer name, temporarily total student score, and the score locking button. Temporarily total student score is the information about the total score that student have. It is obtained from the total sum of score that student have acquired for submitting every student assigment. The score locking button is the button to lock the student score when all the assignments have finished to being assessed. Lecturer has to click this button to set the final student score. If this button does not clicked by lecturer, the final student score will be automatically setted when it has reached the predefined time limit.

The last section of this menu will show every assignments that has given to student. Lecturer can see the documents that have submitted by student in this section. As shown in **Fig. 10** below, last section has indicators which every indicators contain state defense values as same as in rubrik menu. For every indicator there are action buttons such as view, edit, download. Edit button let the lecturer can edit the submitted assessment document, for example editing the score, view button let the lecturer can see the submitted assessment document, and download button let lecturer to download the submitted assessment document.

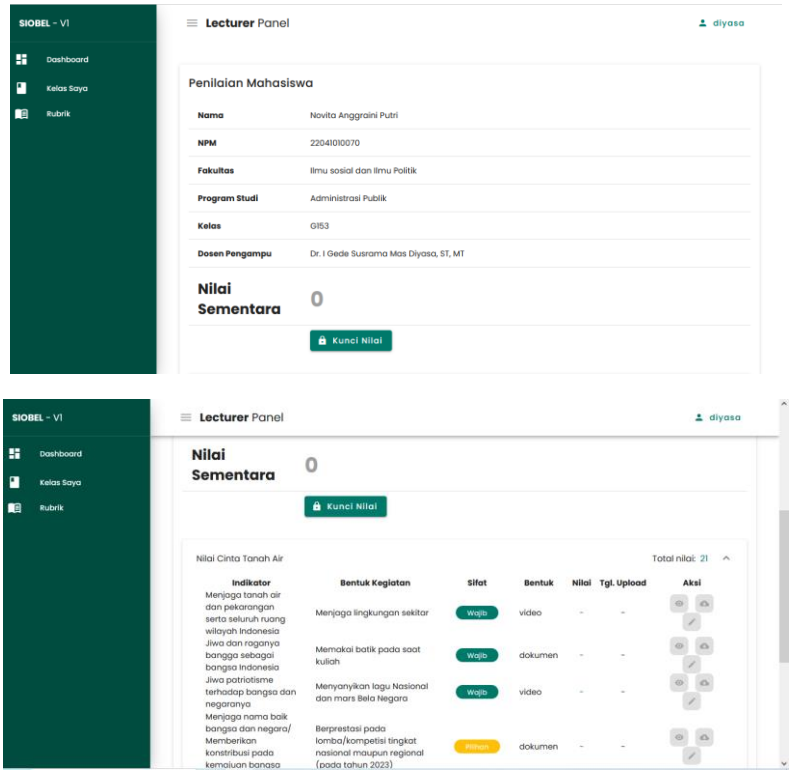

Fig. 10. Lecturer's Student Assesment Menu Mock Up

3.4.Evaluation

The evaluation stage is carried out to measure the accuracy of the prototype design results that have been built. This is done so that we can find out whether the prototype results that have been produced are in accordance with user satisfaction, considering the method used is user-centered design. The evaluation is using a questionnaire method for 20 respondents. Each respondent will answer four questions. These four questions will be used to measure the level of user satisfaction, learnability, memorability, and efficiency of the SIOBEL prototype. Respondents consisted of five lecturers and 15 students. The details are explained in the **Table. 2**

Table 2. Respondent Details

No	Respondent Details	
	Subjects	***Total***
1.	Lecturer	5
2.	Students	15

Measurements are made using five test parameters, namely very good, good, good enough, less good, and not good. Based on the questionnaires that have been distributed, the results are shown in the figure. We can see that the level of user satisfaction with the SIOBEL prototype 30% feel very satisfied, 50% feel satisfied, and 20% feel quite satisfied. At the learnability level, respondents stated that 65% were very satisfied with the level of ease of learning the prototype. At the memorability level, respondents stated 50% were very satisfied and 50% were satisfied. While at the efficiency level, respondents stated that 50% were very satisfied, 35% were satisfied, and 15% were quite satisfied.

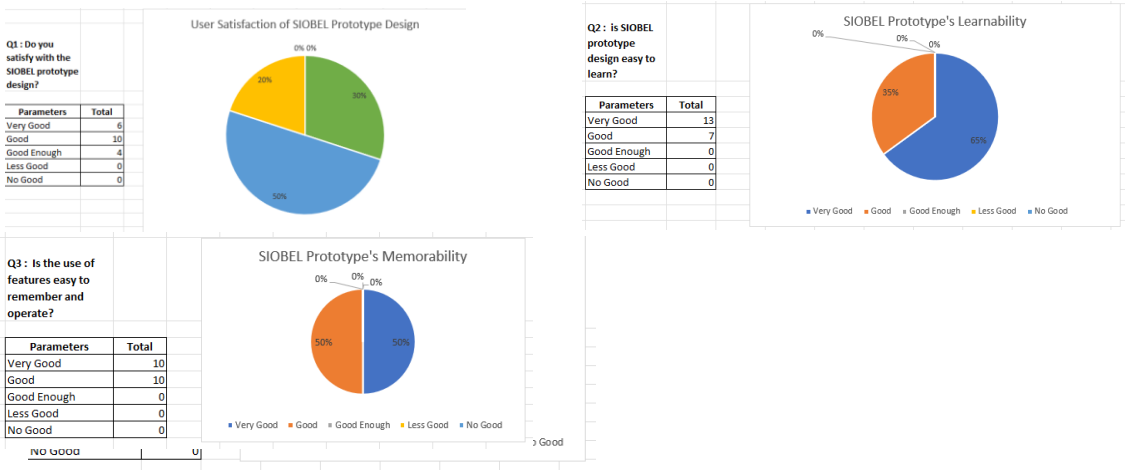

Fig. 11. SIOBEL prototype evaluation results.

2. Conclusion

By using the User Centered Design method, the results of this research in the form of SIOBEL prototypes have met the principles of usability in the context of human and computer interaction. Through user perception testing on the SIOBEL prototype application, this application can be a solution to help integrate outbound state defense activities so that they can be carried out both online and offline. The development of the SIOBEL application design prototype cannot be said to be perfect considering that over time the concept of UI/UX will also develop so that it is necessary to develop and design a better design in the future.

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