



Research, Development and Design for Product Development SAC: Interaction Design Mobile Web Application Using User Centered Design Methodology

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ABSTRACT: In the era of Covid-19, people are more sensitive to their health and hygiene. SAC is present in the community as a service to clean each customer's favourite shoes. Even though SAC has been around since 2013, until now they have not touched the digital realm. For this reason, innovation for SAC needs to be implemented so they are not left behind by competitors who are starting to become aware of digitalization. So that the implementation of digitalization can save costs and time, the approach to making digital products is through product development. To innovate through the use of product development in digital, a User-Centered Design (UCD) method approach with a Design Thinking (DT) mindset is used. The UCD process includes understanding context, specify user requirements, design solution, and evaluate. With the DT mindset, the process of empathizing, defining, and ideation is applied to the understand context and specify user requirements so that this research will understand the usability side for users. With the addition of 5 UCD elements from Jesse James Garret, the digitalization process will be more in-depth and detailed in terms of creating interface design solutions. Primary data will be collected through In-depth Interview resulting abundant data that create persona and Minimum Viable Product(MVP). This research aims to analyze and identify the user experience flow for the prototype mobile web app product design SAC with the identifying the MVP and design prototype mobile website application and later do some usability testing to getting result that can meet the needs and uses for SAC customers. The result of this design approach method is a high-fidelity mobile web app prototype which was evaluated using Usability Testing (UT). The persona of each customer and the desire are the first key in development. Strong framework is formed with information architecture, low-fidelity, and high-fidelity prototypes. The final stage of the UCD iteration is to evaluate Usability Testing with a binary task success rate of 90%. Another UT results of quantitative data analysis with the Single Ease Question (SEQ) showed the number 6.42 and the System Usability Scale (SUS) showed the number 87.5 with quality A.

KEYWORDS: Digitalization, Product Development, Ui/Ux, High-Fidelity Prototype, Usability Testing.

1.1 INTRODUCTION

Nowadays, the use of internet technology has become an important necessity for everyone. The internet plays a role in meeting the daily needs of users, such as accessing information and news, educational needs, and business. The advantages of using the internet in business continuity, can provide opportunities for every business person to expand to the international market, income for businesses by creating applications, and looking for the latest innovations to be able to improve the quality of existing products (Sathyanarayanan. A, 2023). Where the world has been hit by the COVID 19 pandemic, the digital era of transformation is growing very rapidly. The importance of hygiene in the world makes people aware of external hygiene, such as in clothes, bags and shoes. Since the COVID 19 pandemic struck, laundry services have been growing and successful. Laundry services have increased their focus on hygiene and cleanliness, and with that they implementing new cleaning processes and technologies with online services(Novozymes, 2020). Online washing service will probably stay because the demand for internet services is anticipated to rise as more individuals become aware of their advantages.

In Indonesia, the shoe washing business is growing after the COVID 19 pandemic occurred. This is happened because people began to care about cleanliness also for their shoes. The revenue results rose considerably in 2023 when compared to 2018 and before the COVID 19 pandemic according to SAC internal data. SAC does not have the product to cauterize customer who wants to track their status. With that itself, SAC has a long wanted to digitalize the business.

To overcome the innovation through digitalization, the solution that can be done was proposed to research, development and design for product development by creating an interaction design prototype shaping with mobile website application. This research focusing on creation of product development using User Centered Design (UCD) design approach methodology. With these problem, SAC need to innovate and adapt the current condition to enable and sustain in the market along with competitor in the same line of business through digitalization by product development of mobile website application, the early development for this research focusing by implementation of the prototype mobile website application.

1.2 BUSINESS ISSUE EXPLORATION

The impact of COVID 19-pandemic made a big contribution to the business. When other businesses experienced a decline in productivity, SAC saw this phenomenon as the turning point to make Shoes and Care grow even more. The results of an informal interview with the CTO is the digital technology idea has been thought of since the early COVID 19 pandemic, but there are too many obstacle and other things to do. The Minimum Viable Product (MVP) to be achieved is prototyping the interaction design of this mobile website application were able to answer the unrest of customers who do not get certainty when they want to pick up their shoes and check the status of the order. Starting point with the interface user design for the mobile web application. Because Shoes and Care did not have an existing system, the author will try to create from the initial stage with the User-centered design approach method which pays attention to the 5 most important stages, Determining User Context, Determining User Needs, Alternative Design Solutions, Designing Prototypes, and Design Evaluation. The author hopes to be able to catheterization the problems that occur in Shoes and Care by bringing digital transformation which can later help SAC customers to facilitate all processes for service. To be able to produce accurate data, conducting in-depth interview and the use of user experience is also important in the research process for developing prototype mobile website for product design development.

2.1 CONCEPTUAL FRAMEWORK

The conceptual framework organizes the study's main concepts in order to define the study's focus and direction. The essential concepts are derived from a literature review of related topics and phrases, as well as the literature theories' findings (Shikalepo E, 2020). The conceptual framework for this research illustrated above in the Figure 1 below.

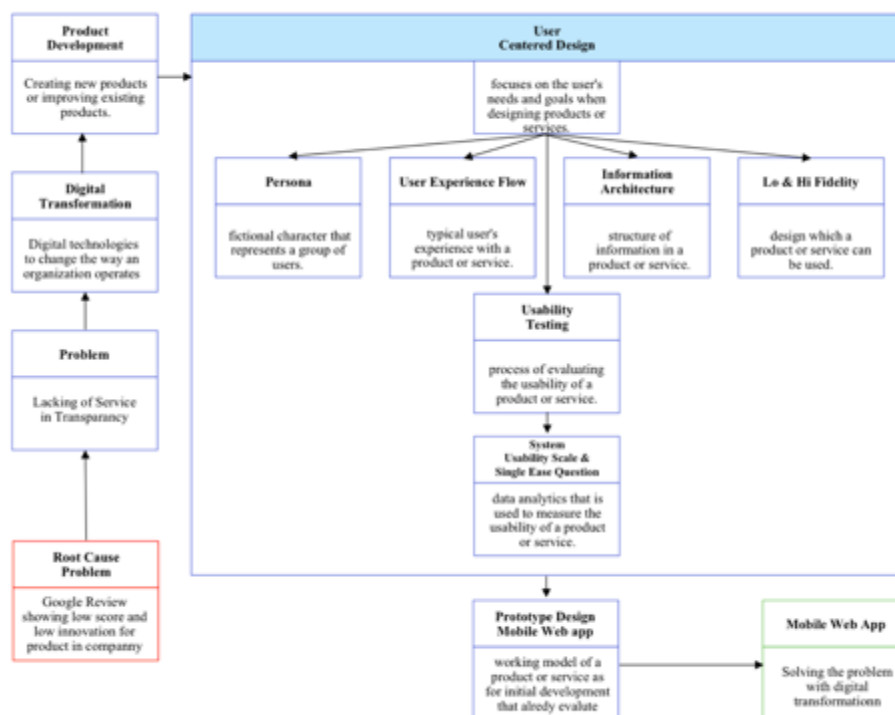


Figure 1. Conceptual Framework (Author Analysis, 2023)

The conceptual framework is a combination of central ideas and central concepts from theories, essential research findings, policy statements, and other expert knowledge that guides the research project. The user-centered design was the basic framework used in this research to making the digital transformation of Shoes and Care by making a Prototype Mobile Web Application Interaction Design. The user-centered design was the basic framework used in this research to making the digital transformation of Shoes and Care by making a Prototype Mobile Web Application Interaction Design. The conceptual framework above illustrates how these parts operate in harmony to enhance digital product development. Usability testing, scenario assessment, and user interviews are all examples of methods for gaining insight into users' perspectives and needs, etc. Using these components, companies can make items that are easier to use and that satisfy customers' wants and needs. The UCD method is similar to Design Thinking, the author thinks that UCD is a more organized and focused way to solve problems with developing the end product, while design thinking is a more creative and open-ended way. So in this section the author uses the design thinking method as a mindset to find empathizing with users and stakeholders to understand their needs and challenges when conducting In-depth Interviews for primary data.

3.1 RESEARCH DESIGN

Research design is the purpose of an adequate research framework for a study of research methodology so that the study is conducted in a systematic and rigorous fashion, and that the results are valid and reliable. It describes the general strategy to the study, including the research questions, the methods to be used, and the data analysis method (Sileyew, K. J. 2019). Figure 2 illustrated research design that reflected to the conceptual framework.

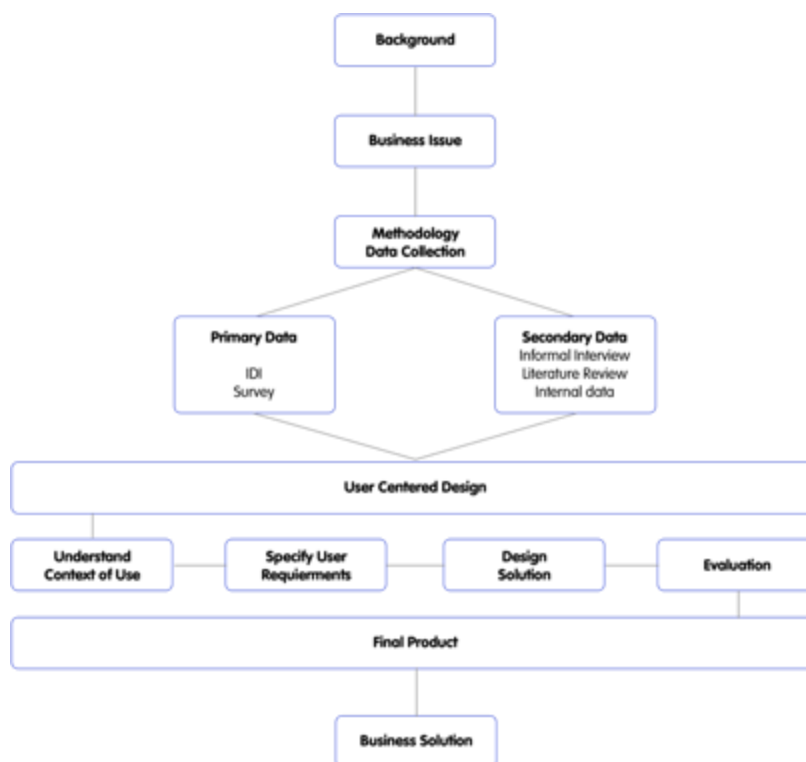


Figure 2. Research Design (Author Analysis, 2023)

Figure 2 determine the purpose of the research, then it is followed by a research methodology that comes up with data collection for the objective. Search data collection will be divided into two sources, Primary data & secondary data. Primary data comes from conducting in-depth interviews with users, and the author has conducted informal interviews with CEO and CTO shoes and care for initial data and insights from this research. Literature review and internal data are used as assistants and supporters for primary data so that it is more directed and the data used is more certain. The research objective is to digitalize shoes and care process through the mobile web application user interface prototype. To be able to create the product (user interface prototype) that is user friendly



and according to user requirements, data collection is obtained from primary and secondary data that move in parallel. In-depth interviews were conducted to find out the pain points and opinions of each user who might use this product. With internal data and literature reviews, it becomes the foundation for building products that suit all user needs. In order to make product creation directed, the author uses the UCD method as the main framework and DT for the mindset in building a prototype user interface mobile application that will become a business solution shoes and care.

3.2 DATA COLLECTION METHOD

At this stage the collection data by looking for information related to the user interface, requirements and system flow. The data collection that the author did was to use the literature review method for secondary data. Besides that, the author will also conduct in-depth interviews. The explanation of each collection method is as follows:

A. Informal Interview

In looking for initial insights, interviews can be conducted to find real problems that occur within the company. Informal Interview is one way to get initial data and insights from existing problems to support background and business issue exploration. This interview can be done anywhere and has the same goal as a formal interview. The author conducted an informal interview with unstructured question with the CEO and CTO of Shoes and Care

B. Literature Review

In this research the author conducted a literature search to find and discover theories, concepts, definitions, and related studies obtained through. Various reference sources such as scientific journals that are widely spread on official websites such as Google Scholar, IEEE Explore, ResearchGate, Schimagojr, SBM ITB Library and e-Books. The results of the literature study that has been analyzed will form the basis of the problem formulation that the author will examine to explore how to create digital product designs using a user-centered design approach. The results of the literature study that have been analyzed are in the form of problem formulations that will be investigated further.

C. Qualitative Data

User research is a way that may be used to obtain data that is reliable, quick, and under control by using a method that dissects from the perspective of the user's experience and point of view (E.Goodman, et al., 2013). Qualitative method is an approach to inquiry the user research to seek and focus on gaining some insights and understanding more about one or more problems that exist in one incident. After gaining some insights, the insights needed are the user experience and behaviour of each user (Creswell, J. W., Creswell, J. D. 2018). Qualitative data research using contextual in-depth interviews(IDI). The author will conduct in-depth interviews with sources related to this research, namely shoes and care service. At this stage the author will extract up information from sources related to the system that the author created, so that the author can find out things that the author may not know but are known by the respondent. Such as anxiety that occurs, existing difficulties, service information, expectations for shoes and care, and expectations for existing features. Then from the results of the In-depth Interview, the Author will create personas for existing respondents. Each Persona, which has its uniqueness and characteristics, will become a reference in the prototype design to create segmentation for each user. The number of respondents for IDI will be from the range of 10 respondents.

a. Persona

Based on the results of the in-depth interviews, the author can arrange Persona in Shoes and Care. Personas are there to create a behaviour simulation based on their perspective. Persona will be a research reference in determining user segmentation and seeing unique patterns from each segmentation.

b. Design Insights

Based on the results of in-depth interviews with semi-structured questions, the author can get informational data from users by asking their opinions about digitization and what information needs to be available. From this, it can be translated into design insights that will become features for MVP needs. The results of this analysis are carried out as a scope plane in designing the needs according to the user, this refers to the five elements of UCD (Garrett J.J 2022). With the scope plane created, the interaction design that will be compiled can be based on what the user needs.



c. Flowchart

Based on the results of in-depth interviews, an analysis was also carried out on the evaluation as well as collecting suggestions for features on the prototype mobile application interaction design shoes and care. Their opinions about their journey while using the service were also solicited which can become a flow of information for a user experience flow.

D. Method Design Plan and Development Prototype Interaction Design

The results of convergence can be determined by the final evaluation results from the User Researcher which is a continuation of the steps with the design and development of interaction design prototypes. At the design stage it can be categorized as a step from the plane structure of the 5 UCD elements (Garrett J.J 2022). Then the prototype development stage includes the framework plane and the surface plane of the final UCD element (Garrett J.J 2022).

a. Design Plan

After getting insights that can be used for persona and user requirements, the author can do a design plan for the information architecture of the prototype system which is a structural plane to help create an information space that facilitates the running of the system. This is also a reference for user needs.

b. Development

The presence of information architecture helps the author in making a low fidelity prototype (framework plane). The goal is to form simply and quickly according to the target of the prototype. After low-fidelity, an alternative high-fidelity design will be implemented (surface plane) which has a visual of the product being developed. Interactive elements and interaction simulation on prototypes are the end result.

E. Evaluation Prototype

To make sure the information shown in the prototype is easily understood by the user, an evaluation of the interface design will be created for them after the prototype is finished. Prototype of High-fidelity design undergo this sort of assessment. Usability testing was used to evaluate the high-fidelity prototypes with the same interviewees used in the User Research phase. Distributing questionnaires for the single ease question (SEQ) and system usability scale(SUS) is also an additional evaluation of the prototype. The result of this stage is an appropriate design revision according to the insights received from the respondents

3.3 DATA ANALYSIS METHOD

In-depth interviews were conducted to find data qualitatively. The in-depth interview questions are semi structured and compiled which will later be analyzed and codified for each question segment. Each segment that has been codified will make it easier to dissect questions for each segment that has a different purpose. Later there will be additional questions to expand the context of the answers when the respondents articulate the answers to these questions so that there is flexibility. Triangulation methods will be carried out such as observation to make it easy for the author to collect the data of expression and such. For the UT, the analysis will be done with simple calculations such as average and total from the help of excel tools as a medium of calculation. Binary task avg success rate, SEQ and SUS are data analyzed in the form of numbers as UT results.

4.1 ANALYSIS

The process analysis was carried out using a process from the contextual framework that was written previously by applying the UCD design approach. In each process, UCD is applied in more depth with the five elements of UCD to be able to understand more in depth the creation of SAC mobile web applications. The first stage of this analysis is to discuss the analysis of the In-depth Interview in depth. Because this is a new innovation created by the author for the company, insight is really needed in the analysis process. Then proceed with the formation of a persona and design insights as a form of requirement for the SAC application features. When we know that this can be combined with the SAC business process, the author can create a Flow from User Experience as the foundation for the application journey. It is hoped that this Proposed Flow will help customers get a seamless experience when fully navigating digital applications.



4.1.1 In-depth Interview

Respondents were divided into two groups, the internal and external segments. Because there are two segments so there are different questions. The purpose of differentiating several questions is so that comparisons can be made which will later be useful as research and insights in digitizing the SAC process as context, content and requirements. Below is a description of the respondents profile personal data in Table 1.

Table 1. Respondent Profile In-depth Interview(Author Analysis, 2023)

Code Name	Domicile	Division / Role
I-01	Jakarta, Bekasi	Technology Officer
I-02	Jogja	Chief Executive Officer
I-03	Jakarta, Cipete	Head of Marketing
I-04	Jogja	General Manager (Pusat)
E-01	Jakarta, Tebet	Law Private Sector
E-02	Jakarta, Cakung	Managing Director Private Sector
E-03	Jakarta, Kuningan	BS Private Sector
E-04	Bogor	Data Analyst Private Sector
E-05	Jakarta, Rawamangun	Entrepreneur
E-06	Jakarta, Gading	Auditor Private Sector

In-depth Interview Questions

With the aim of finding out about concerns, difficulties, experiences, information and insights from each service user from the beginning to the end. The author divides two question segments which are slightly different in terms of wording, for SAC internals [I] who understand more about all aspects of business and service flow and SAC customers or external [E] who use SAC services. To be clearer about the differences in questions, they will be explained in the following Table 2 below.

Table 2. Combined Questions of In-Depth Interviews (Author Analysis, 2023)

Code	Question
Respondents' daily habits (KRS)	
KRS[E I]-01	What are your daily activities when and when you are not working?
KRS[I]-02	Based on your experience, what are the obstacles to this business in its activities? What motivation makes you persist?
Customer motivation when they want to wash their shoes (MCS)	
MCS [E]-01	Tell us about your motivation when you wanted to find out about shoe laundry <ul style="list-style-type: none"> ○ Who are the shoe laundries that you know of ○ Your perception about shoe laundry ○ Why do you need to find out in advance?
MCS [E]-02	What specifications are needed in choosing a shoe laundry?
SAC laundry service journey experience (JSS)	
JSS[E]-01	What is your experience in washing shoes at SAC <ul style="list-style-type: none"> ○ Who are involved in the process? ○ How do you feel? Are you satisfied? ○ What obstacles are you experiencing? ○ How long did that process take in your experience?
JSS[I]-01	What is the end-to-end journey process for a customer when they want to use SAC laundry services?



	<ul style="list-style-type: none"> ○ How long does it take for each process? ○ What obstacles, troubles & complaints often occur in each process? ○ End-to-end process is technology-assisted?
JSS[E]-02	How do you feel after using SAC services? <ul style="list-style-type: none"> ○ Do you get a satisfaction guarantee? ○ Is there a way for you to know the status and finish time of your shoes?
JSS[E]-03	Have you been helped by technology during this journey?
JSS[E I]-04	What advice can you give on this journey?
Information on Google Review SAC (GRS)	
GRS[E I]-01	What are the benefits of using Google Reviews?
GRS[E I]-02	Stars on Google Review <ul style="list-style-type: none"> ○ Indicators of success in store selection in the SAC ○ [E] How many stars does it take for a customer to check the store and does it affect the use of laundry services? ○ [I] How the SAC responds to star grades <, 3, > ○ [I] Can Google reviews improve customer experience? ○ [I] What about this feature? Are there any complaints overall
GRS[E I]-03	What suggestions can you give?
Introduction of application digitalization plans at SAC (DSA)	
DSA[E I]-01	Thoughts on concept idea and expectation on SAC digitization
DSA[E I]-02	Information on digitalization <ul style="list-style-type: none"> ○ What are the most important features needed ○ Google Review in app (embedded)
Risks with digitalization applications on SAC (RDA)	
RDA[E I]-01	Bottlenecks and troubles when digitalization is implemented
Preferences regarding digitalization of SAC applications (UIS)	
UIS[E I]-01	Suggestions (in search of novelty features)

The questions provided in the Table 1 above are a condensed version of more comprehensive questions. For the analysis of the in-depth interview, we will explain some of the following that are related to the answer as a business solution.

JSS[E]-01 Question Results Analysis

The JSS[E]-01 segment question discusses habits when respondents want to wash their shoes at the SAC branch of their choice. The aim of this is to find out their experiences of their habits when carrying out and using shoe laundry services at SAC. A description of the results of the JSS[E]-01 analysis can be seen in Table 3.

Table 3. Summary of Questions Results JSS[E]-01 (Author Analysis, 2023)

Habits	Freq	Analysis
Choose to take delivery	4/6	Several respondents choose to use SAC's delivery service because they don't have time.
Come to the branch store	2/6	In-person visits due to the heightened sense of reassurance they have when personally delivering their shoes.
Use WA to ask about shoes	6/6	All respondents wanted to know where their shoes and the status



A summary of respondents' answers to their habits when they want to use SAC laundry services. In fact, there are two types in two segments of respondents, especially in terms of their habits when they want to wash their shoes. This will be explained more in the user persona section. Then it is clear that these respondents do not have a place to see the status of their shoes which have been placed in the store or pick up delivery to their respective homes

JSS[I]-01 Question Results Analysis

Questions in the JSS[I]-01 segment discuss the internal perspective regarding customer habits. Slightly different from JSS[E]-01, this question aims to group the types of customers who want to use SAC laundry services. A description of the analysis of JSS[I]-01 can be seen in Table 4 below.

Table 4. Summary of Questions Results JSS[I]-01 (Author Analysis, 2023)

Type of Customer	Analysis
New Customer	4 out of 4 internals agree that this type of customer will always ask for recommendations for washing their shoes because they lack experience and knowledge about shoe materials.
Customer Loyal	These customers has prior knowledge about the specific shoe treatment they desire upon arriving at the store.
Customer Delivery	Same as Loyal, but doesn't have time to come to the store branch, not all branches implement delivery, such as outside JABODETABEK

A summary of internal respondents' answers to the habits of customers who want to use SAC services. There are three customer classifications such as new customers, loyal customers / members, and delivery customers. Internal respondents feel that the technology currently provided to customers is only WhatsApp as a bridge between customers and admin. However, POS and QRIS have also been implemented even though they only function as transactional functions for SAC customers.

JSS[E]-02&03 Question Results Analysis

The purpose of this question JSS[E]-02 is to find out their satisfaction with SAC services and find out how they can find out about their shoe process. From this objective we can understand the importance of information during the service process. Question JSS[E]-03 discusses processes assisted by technology by knowing during the service process at SAC whether respondent [E] has ever been helped by technology for the status of their shoes. The explanation of the results of the JSS[E]-02 & 03 questions can be seen in Table 5 below

Table 5. Summary of Questions Results JSS[E]-02 & 03 (Author Analysis, 2023)

Respond	Freq	Analysis
Knowing status Shoe	6/6	All respondent ask to WA ADMIN
Satisfaction	4/6	Four of the respondent feeling satisfied using sac and the rest just ok
Technology	6/6	If it consider as technology, then only is assisted in terms of technology

It can be seen that all respondents have quite good feelings about SAC service. However, there were respondents who felt that they could not give satisfaction but only Ok. This was supported by respondents 04 and 05 who felt that the WA SAC admin took a very long time to inform them of the status of their shoes, which made them feel mixed feelings. As for Technology, if WhatsApp is a technology then only that platform helps them to find out the status of their shoes by asking the admin. No other platform is technologically assisted in knowing the status of their shoes.



JSS[E I]-04 Question Results Analysis

It is a combination of external and internal respondents. The purpose of this question is to ask whether there are suggestions that can be given for developing the customer journey process. You can see the results of the preference for suggestions given from both parties in Table 6 below.

Table 6. Summary of Questions Results JSS[E I]-04 (Author Analysis, 2023)

Suggestion	Freq	Analysis
System Platform for Customers	6 (out of 6) External 4 (out of 4) Internal	Practicality if SAC had a special system platform for customers to see the status of their shoes could really overcome that. It does not rule out the possibility of implementing customer delivery into a system platform that previously only came from WA (supported by the results of JSS Analysis [E] [I] – 01) Even though this suggestion appears in all answers, it is also necessary to pay attention to the flow for orders, flow for shoe status, flow for complaints and so on

The answers that have been analysed and concluded can help find out what can be done to make SAC services better and upgraded to a higher level with digital transformation.

GRS[E I]-01 Question Results Analysis

This question will discuss the benefits of Google reviews in general and for SAC. The aim of this is to find out the similarities in the patterns of each respondent, whether Google reviews are still relevant in choosing a place or service that is transactional in nature, and also to find out whether it influences them in making decisions.

The use of Google reviews for external and internal can be seen from various factors. Firstly, place references, this is a determining factor for respondents to see which places have lots of reviews as their assessment. Second, other's experience, this is a support for the first factor because people's experiences with the place or service have been written in the Google review column along with the stars given to form two parts of the rating for the place, namely AVG stars and sentiment. The third is also related to the second and first, namely Brand. All respondents said that if a place and service had a high score on Google reviews, it would influence their perspective on the brand. Because the perspective on the brand has been formed, it can be a reference for decision making for customers to go to that place or use that service. All of these factors are interconnected and form all the thoughts in respondents' decision making in determining the benefits for SAC itself. An explanation of the results of these thoughts can be seen in Table 7 below.

Table 7. Summary of Questions Results GRS[E I]-01 (Author Analysis, 2023)

Factors	Analysis
Place	Determining factor for respondents to see which places have lots of reviews as their assessment
Other Experience	A support for the first factor because people's experiences with the place or service have been written in the Google review along with the stars given of the rating for the place
Brand	If a place and service had a high score on Google reviews, it would influence their perspective on the brand. Because the perspective on the brand has been formed, it can be a reference for decision making for customers to go to that place or use that service



The results of the thoughts analysis in the Table 7 above are a combination of three factors from all external and internal respondents. There are no additions from other sources, but only focus on analysis of In-depth Interview answers.

GRS[E I]-02 Question Results Analysis

This question discusses the star value in Google reviews as a whole, which has the essence of knowing the indicators of success in selecting a SAC store based on the star value listed in Table 8 below.

Table 8. Summary of Questions Results GRS[E I]-02 (Author Analysis, 2023)

Stars Indicator Success	Frequency	Analysis
4,5	4 (out of 6) E 2 (out of 4) I	Out of the total of 6 responders, the majority (4.5) said that this was the optimal amount for the success of a SAC store.
4	1 (out of 6) E 2 (out of 4) I	Three respondents collectively indicated that a rating of 4 was satisfactory, while acknowledging the potential bias or impartiality of the reviewers' feeling.
< 4	1 (out of 6) E 0 (out of 4) I	One participant believed that a score below 4 might be deemed as successful due to their confidence in the reputation of the SAC brand.

Please note that the analysis results in this table are only indicators of success for respondents, this is not part of their decision to use the service or not. For the next question outside the context of the table above, this question discusses external respondents regarding the influence of star value in their decision making in using services if at the SAC branch store the star rating is only 3.5. Three (3 out of 6) external respondents said they would not use the SAC service which has a 3.5 star rating, while the rest continued to use it because they thought it was not their basic reference. External respondents were also asked whether stars on Google reviews had an influence on their decision making regarding SAC services as a whole. 3 (out of 6) respondents said they were not a 100% reference in decision making because they already believed in the brand and they were members. The remaining 3 (out of 6) respondents said that the stars on Google reviews were their main influence in making the decision to use SAC services. If the stars are not fit on their criteria, then they will look for another branch of SAC service.

DSA[E I]-02 Question Results Analysis

This question discusses what information needs to be displayed in a high fidelity digital mobile web application. The aim of this question is none other than to look for general features that the respondent can provide. This can also be used as a reference in creating information architecture in the next. The Table 9 below shows information.

Table 9. Explanation of Potential Feature from Information Question DSA[E I]-02 (Author Analysis, 2023)

Code	Information
MWI-[1]	Can do Tracking of shoes that are being washed
MWI-[2]	There is delivery inside
MWI-[3]	SAC Member information that has been connected to previous data
MWI-[4]	There is Point reward information that can be redeem into an action
MWI-[5]	A complaint box is provided
MWI-[6]	Information for education about shoe care
MWI-[7]	There is activity information on each SAC store that is having an event
MWI-[8]	Information about ongoing promos
MWI-[9]	SAC stores / branches

MWE-[10]	Can registration with Gmail before logging in
MWE-[11]	Feature that will ask to put photos of shoes before sending them
MWE-[12]	Display for schedule selection for shoe delivery or pickup.
MWE-[13]	Payments that have integrated security
MWE-[14]	Can provide a review inside
MWE-[15]	Built-in chat box feature so you don't have to go back and forth to other applications
MWE-[16]	FAQ for new customers
MWE-[17]	Customer Service 24/7 if possible
MWE-[18]	Location for the nearest branch store
MWE-[19]	Live tracking when shipping shoes like other platform (Gojek)
MWE-[20]	Navigate to order with the application if not going to the store

Questions related to the desired content or visual elements on the user interface of the high-fidelity mobile web application provide a total of 20 potential features. Will be further refined to ensure that the resulting feature information is more solid and aligned with fixed features from every information.

4.1.2 Persona

Based on the results of in-depth interview research, the analysis found is that there are two personas in SAC customers with two different characteristics. The first persona is the “Lazy lover” Delivery Customer and the second persona is the Branch Explorer Customer. The two personas will be explained further in the following Figure 3 & 4 below.



Figure 3. Persona 1 Alexander Alpha (Author Analysis, 2023)

This is User Persona 1 for SAC Customer, Alexander Alpha who is a Data Analyst and Scientist in a private office who prefers to use delivery services for SAC shoe laundry

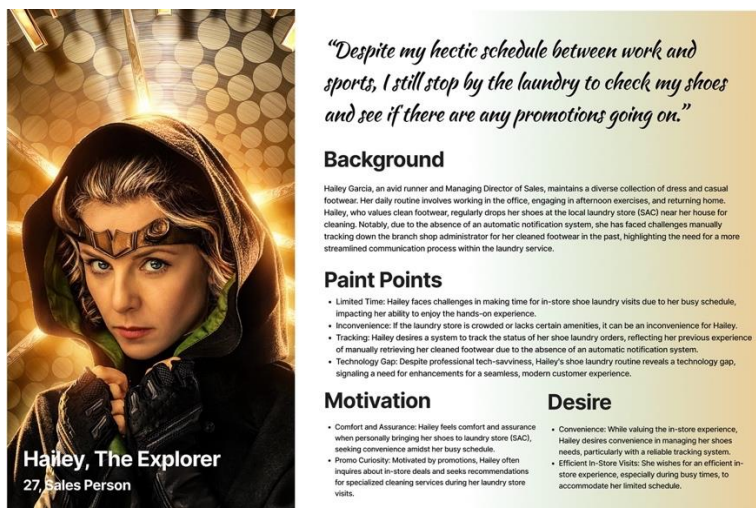


Figure 4. Persona 2 Hailey Beta (Author Analysis, 2023)

This is User Persona 2 for SAC Customer, Hailey Beta who is the Managing Director of Sales in a private office who prefers direct come to SAC branch stores amidst her tight and busy schedule.

4.1.2 Analysis Design Insights

According to the findings from in-depth interviews, there are over 20 pieces of information regarding features from explanation before from sub chapter of (DSA[E I]-02 Question Results Analysis). However, due to similarities in type or content, the author has loosely grouped them into 20 distinct features. The explanation for this Design Insights will be provided in the Table 10 presented below.

Table 10. Potential Feature for Design Insights (Author Analysis, 2023)

No	Information	Design Insight (Feature)
01	Can do Tracking of shoes that are being washed	Feature Tracking Order
02	There is delivery inside	Feature delivery pick up and send
03	SAC Member information that has been connected to previous data	Feature member information
04	There is Point reward information that can be redeem into an action	Feature point progress and redeem point
05	A complaint box is provided	Feature complain box for SAC
06	Information for education about shoe care	Feature information page for shoes tip
07	There is activity information on each SAC store that is having an event	Feature event information on sac store
08	Information about ongoing promos	Feature page promotion
09	SAC stores / branches	Feature location store branch
10	Can registration with Gmail before logging in	Feature Register with Gmail
11	Feature that will ask to put photos of shoes before sending them	Feature shoes photo before order
12	Display for schedule selection for shoe delivery or pickup.	Feature selection of delivery schedule
13	Payments that have integrated security	Feature payment
14	Can provide a review inside	Feature review
15	Built-in chat box feature so you don't have to go back and forth to other applications	Feature in app chat for consultation
16	FAQ for new customers	Feature information about FAQ
17	Customer Service 24/7 if possible	Feature Customer service
18	Location for the nearest branch store	Feature location user and store

19	Live tracking when shipping shoes like other platform (Gojek)	Feature live tracking delivery
20	Navigate to order with the application if not going to the store	Feature online order

Later in Business Solution, author will connect the feature to the design principles of 8 golden rules theory in implementing Alternative Design Solution. The prospective outcomes of the feature will also be reevaluated and discussed together by the internal department to verify the requirements. While external customers may want certain features, it is crucial to obtain validation later from internal parties to ensure that the endeavour inefficient.

4.1.2 Analysis Flowchart

A flow chart analysis is a visual depiction of a procedure, demonstrating the sequential progression of actions or steps in a concise and structured fashion. The picture utilizes standard flowchart symbols, including ovals to represent the beginning and end of the problem-solving process, rectangles to indicate the steps of the process, diamonds to signify the decisions that need to be taken in order to progress, and arrows to indicate the direction of the process (Richmond et al., 2023). To better understand this process, the author will create a user experience flow as a rough description of the product user interface of SAC Mobile Web. This creation will outline the user navigation for using SAC services and illustrate the flow of the SAC business process when digitalized.

User Experience Flow

To establish coherence in SAC's digital product development, it is imperative to generate a user flow derived from meticulously analysed responses gathered through in-depth interviews. In this section, the author will exclusively outline the user experience flow for a crucial feature, specifically the transaction feature, encompassing the customer's journey from logging in to the completion of their shoes being washed on the Mobile Web App. Figure 5 depicts the flow of the user experience.

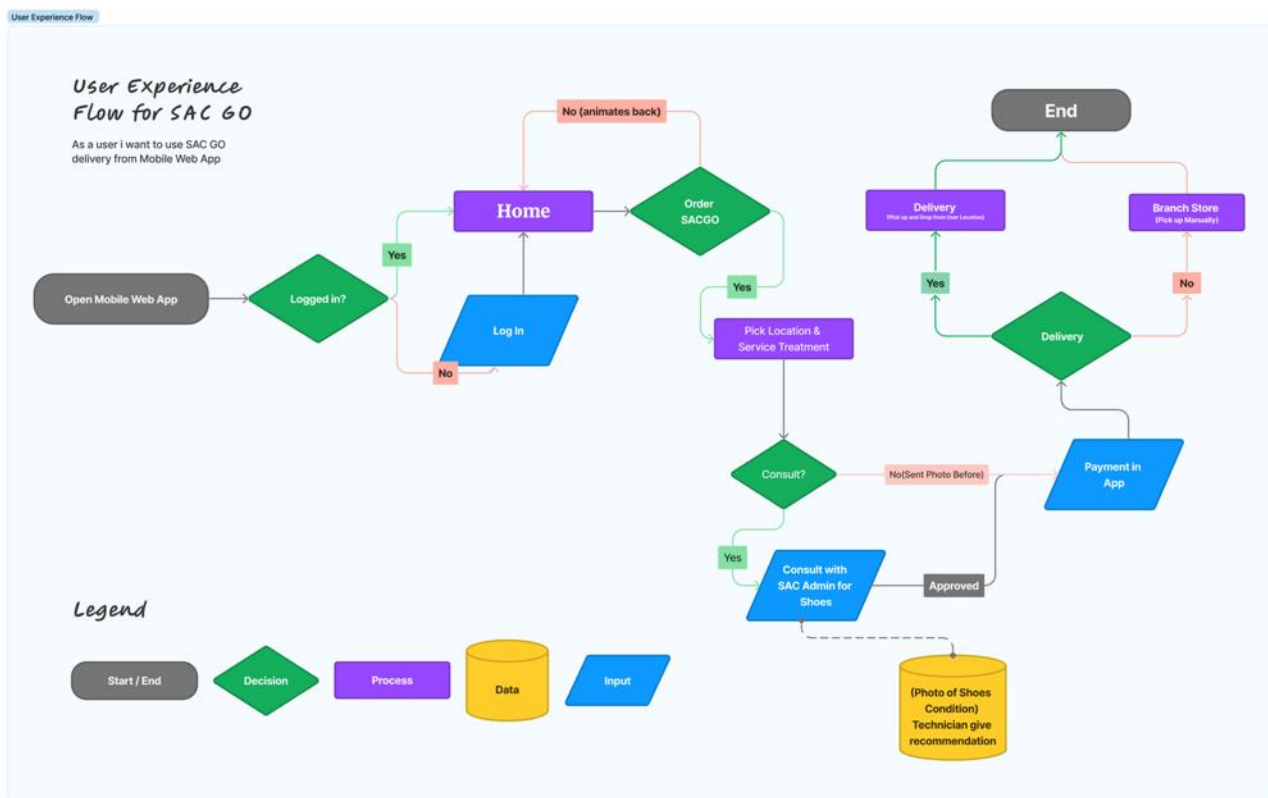


Figure 5. Customer Order SACGO - User Experience Flow (Author Analysis, 2023)



The User Experience Flow for the ordering feature commences at the user's initiation of the mobile web application. Prior to proceeding, the user will be required to log in, if they have not already done so. Upon successful login, they will be directed to the Home page. To proceed, simply click on the SACGO order button in order to select store location and select the many treatment menu footwear options offered by SAC. There are two choices available. Typically, new members opt not to seek consultation as they already comprehend their intended actions. However, they still want photographs for pre- and post-treatment purposes. If they have already uploaded a photo and received confirmation, they can make a direct payment through the application and select a delivery date. If the user selects the "consult" option, they will have a consultation with the SAC administrator regarding their treatment and may also receive recommendations if necessary. The SAC administrator will further request photos of the shoes and forward them to the technician for assessment of their repair and cleaning feasibility. Once accepted, users will retain the ability to make payments within the application and select their preferred method of receiving their order, either through delivery or by picking it up at the store (only if they have completed their treatment). This allows them to choose between full delivery or partial delivery. To ensure a seamless user experience specifically for the order delivery functionality, this feature will play a crucial role in the Minimum Viable Products (MVPs) during designing, developing, and researching for the digital SAC mobile web app.

4.2 BUSINESS SOLUTION

The solution that will be offered for the SAC shoe laundry business is in the form of a high fidelity design clickable prototype mobile web app. The process for proposing a business solution is obtained from the previous sub-chapter. The first stage is to provide a requirements solution from design insights. The first stage is additional requirements that do not yet exist from the results of in-depth interview analysis information. Then the second stage is alternative design solutions. The third stage is the web application interface design. The final stage is the form of a SAC mobile web design prototype that can be navigated in its entirety.

4.2.1 Alternative Design Solution

The final design stage involves generating alternative designs by utilizing the findings from in-depth interviews, as well as incorporating characteristics that can be translated into designs ranging from low-fidelity to high-fidelity

Implementation of Design Principles

The application of Design Principles by Ben Schneiderman's became the foundation for the author in the development of the SAC mobile web app design for the Customer section. The application of interface design is made according to user needs obtained from in-depth interview analysis and then adjusted based on Ben Schneiderman's Eight Golden Rules of Interface Design. Each information is mapped with rules which can be seen in Table 11 below.

Table 11. Design Principles 8 Golden Rules Synchronized Information Feature (Author Analysis, 2023)

No	Design Principles	Implementation Feature Solution
1	Strive for Consistency	Create a layout structure on all pages with predetermined design elements. Registering with Google makes it easier for customers because everything is integrated.
2	Cater to Universal Usability	Create a display with the Mobile Web App so that it is more interactive and can be accessed anywhere. Implementing Payment with QRIS which has gone very well. Availability of information on Tips for Caring for Shoes from SAC.
3	Offer Informative Feedback	Providing full information regarding how to order on each page and tracking the status of the shoes during each processing process from delivery, cleaning, to completion.
4	Design Dialog to Yield Closure	Dialog design information for users after ordering delivery to check the user's location address and branch store. Every user who has made a payment will receive a pickup confirmation notification Tracking status notifications on the user's shoes when the shoes are complete and can be sent
5	Prevent Errors	Checking the full schedule for pick-up or delivery will show that information is not available, which means you have to change the delivery schedule.

6	Permit Easy Reversal of Actions	Each user can change the delivery schedule as long as time is available and is limited by a certain time and users can return to change their payment type.
7	Support Internal Locus of Control	Order history is there so customers can see the history of their shoes. Customers are given the freedom to manage their profile. There are review and complaint features provided in the Mobile Web App. Added chat feature with SAC admin.
8	Reduce Short-Term Memory Load	Create a login display using the Google method to make it easier to register new customers. Information for customers who have become members and can check their points without having to come to the store Filter for the nearest shop location from the customer/user location.

The SAC mobile web app design will adhere to the Eight Golden Rules of Interface Design Principles, as outlined by Ben Schneiderman (Schneiderman et al., 2016). The author will greatly benefit from aligning their beliefs with this feature, as it will serve as a solid theoretical foundation for designing a prototype of a Mobile Web App SAC that meets the general user needs and enables them to achieve their own objectives using this digital platform.

Information Architecture

Information Architecture has the idea from the arrangement of information for alternative design designs is in accordance with the results of in-depth interview analysis data. According to Dillon, the Core Competency of an Information Architecture wants to show that the alternative design system that you want to build has a navigation system so that it is easy to navigate between interfaces of page and feature (Dillon et al., 2005). Figure 6 is the early stage information architecture of the SACGO prototype.



Figure 6. SACGO Information Architecture Alpha Version for Design Solution (Author Solution, 2023)

4.2.2 Interface Design Website Application

After getting all the data obtained from the previous sub-chapter, you will enter the mobile web application interface design section which will be the solution for the SAC business. This stage is the third stage in the User-Centered Design method, namely design solutions, then in the UCD method, the UCD development method is also used in more depth by Jesse James Garret. Currently, we have entered element level 4 (see sub-chapter 2.1.2.1 UCD) in the skeleton section to design the interface, navigation, and information design. The information in the Design guideline elements will also guide the author in the first stage of designing a SAC design solution, namely creating a low-fidelity design. The author will carry out the low fidelity stage by using paper as a medium for making simple prototyping. If low fidelity has been roughly formed, it can be implemented in high fidelity form with the help of design tools from Sketch and Figma. At this stage it can still be called level 4 for UCD elements. When high fidelity is ready in this alpha version, any interface can be connected, which we can then call a clickable mobile web app interface (prototype). At the prototype stage, only level 5 for UCD elements is a surface stage that pays attention to visual design aspects to become a concrete cover for Jesse James Garret's UCD design development method.

Low Fidelity

A wire frame in the paper as the medium as a rough but concrete illustration of the design solution. With wireframe in paper prototyping, you can save time and costs in finding general ideas in rough sketches. The wireframe in Figure 7 is a general design that has been matched with the results of in-depth analysis resulting in features and information architecture.

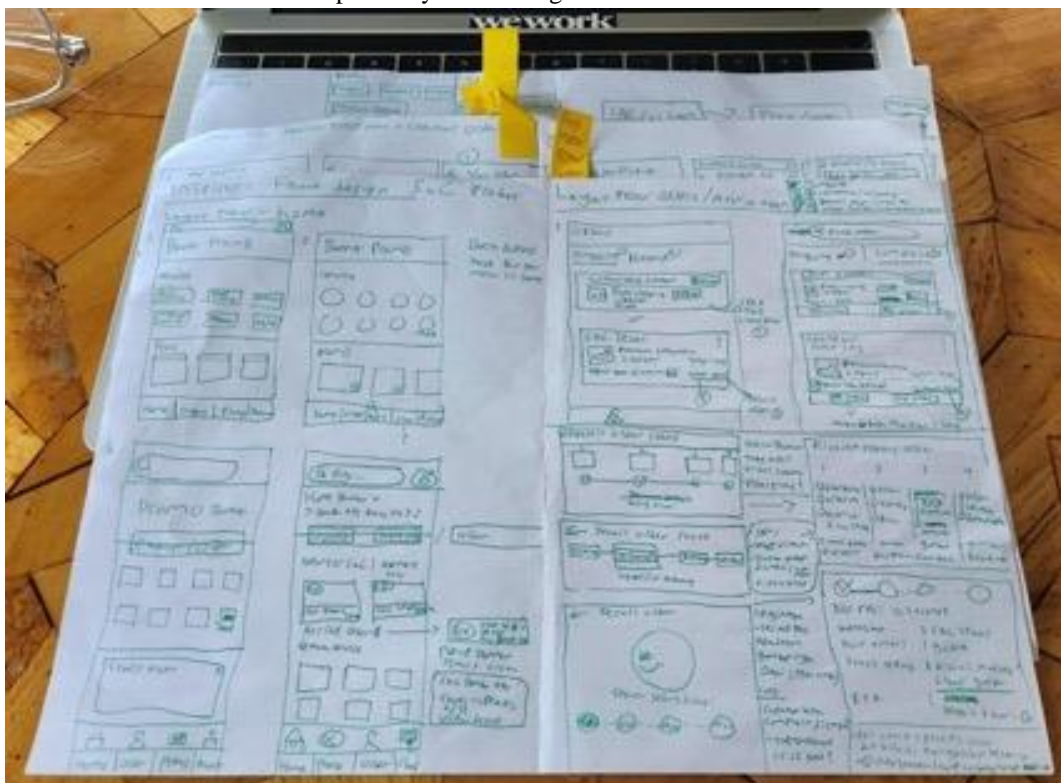


Figure 7. Wireframe in Paper Prototyping SACGO (Author Solution, 2023)

From this wireframe, it can be developed into a digital design with the help of Sketch and Figma tools which will be transformed into a Low Fidelity Design. In Low Fidelity it will only use the basic color as an indication that this structure will not change from the wireframe form. The following is an example of Low Fidelity Design for SACGO which can be seen in Figure 8 below.

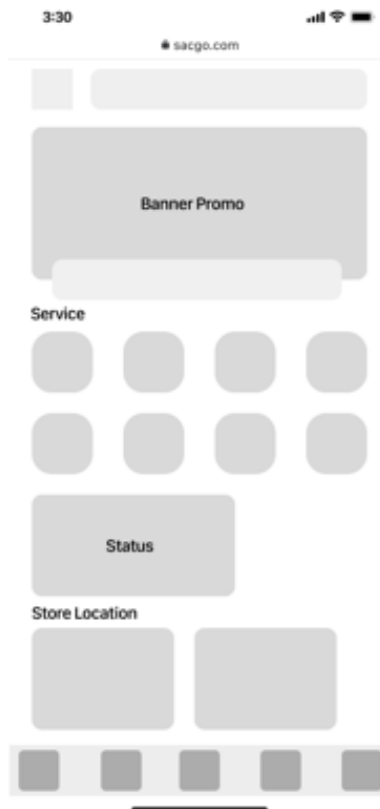


Figure 8. Low Fidelity SACGO (Author Solution, 2023)

High Fidelity

This stage is where everything will be put together from IA, the low-fidelity aspect plus the design guideline elements that have been formed will become a high-fidelity solution for the SAC mobile web app. Please note that this stage is still stages 4 to 5 of the UCD method from Jesse James Garret. Aspects of font, color, design, flow, and layout are all considered when Hi-fi is created. The author will not include all of Hi-fi results in this section. Figure 9 were some example of the Hi-fidelity design.

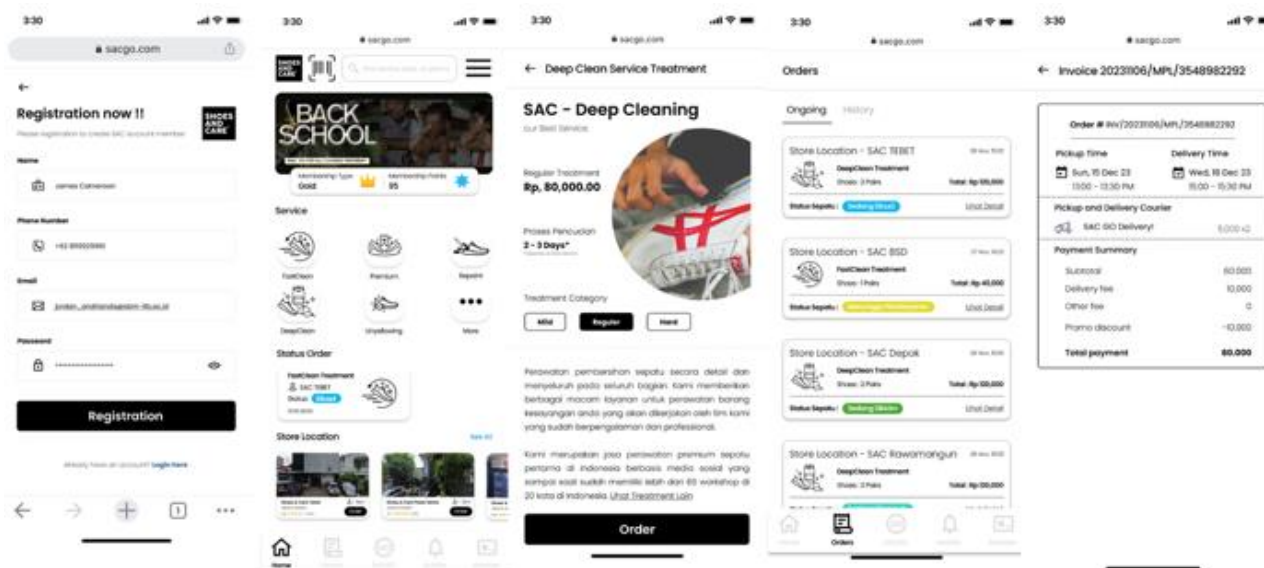


Figure 9. Low Fidelity SACGO (Author Solution, 2023)



Prototype Design

To create a prototype design for the SACGO Mobile Web app, the author will use assisted tools such as Figma. Figma is very powerful as a prototyping tool nowadays because it can determine the animation of each page. When using a smartphone device on a website and app, you must not be aware that there are animations that occur such as slide in, slide out, push in and push out transitions, etc. The prototyping process carried out here is to equate the experience to a system that is already running. Creating the behaviour of each page to navigate to the first to the last page requires deep precision so that the customer's user experience when using the SACGO prototype will feel as real as the real application system. Paying attention to this behavioural aspect will also really help the author when carrying out the prototype design evaluation. When undergoing usability testing, user behaviour will be visible and emerge, such as confusion, anxiety, their way of thinking when navigating to the next page.

4.3 EVALUATION RESULTS

To evaluate the results of solution testing (prototype design) by conducting usability testing using tasks and scenarios to be more focused. Next, the author will try to use tools such as Maze to help UT produce according to expectations. At the end of the UT, the author will ask UT respondents to fill out a short SUS questionnaire containing 10 questions.

4.3.1 Prototype Design Evaluation Task Scenario

Evaluating the SACGO mobile web app design prototype can be done with a collection of tasks and scenarios that have been adapted to customer needs. The author created 5 tasks and scenarios with expected flow which will later be evaluated in Table 12.

Table 12. Task and Scenario With Expected Flow for Usability Testing (Author, 2023)

No	Task	Scenario	Expected Flow
1	Simple Registration	As a non-sacgo user, you want to log in to sacgo.com then you want access to Home from the system.	Open > Registration > Login > Home
2	Check Shoe Status	You are already a SACGO member and have washed your shoes several times with this system. Now you are on the home page and you really want to quickly see the status of your shoes and then want to see the history of your previous shoe washing..	Check Order Status of Shoes > Home(Page) > Orders(Page) > Click Ongoing Tab > Order Status Detail Status > Invoice
3	Order SACGO	You want to order a shoe service at SACGO, when you have chosen a store you want a short consultation regarding the treatment of your shoes, when you have the consultation you will check out and make this payment.	SAC GO(Page)> Pick Store > Pick Treatment > Consultation > Checkout > Payment > Order Detail
4	Review Service	Your shoe treatment order has been completed and your shoes are back in great condition and you want to review.	Orders > Tab History > Review > Post Review (Stars, comment, photo)
5	Member Point	When your order is complete, you will get points for SAC members which can later be redeemed for other services	Check Member Point Progress > Home(Page) > Member (Page) > Point Progress > Rewards to redeem

The tasks and scenarios in Table 11 above will be tested on Usability Testing respondents, with the full hope that the 5 tasks and scenarios above can help as a simple flow of information for users in the future. Therefore, this task and scenario can be a reference for a simple mobile web simulation that will be launched later when the user uses SACGO.

4.3.2 Usability Testing Data Analysis Results

The Usability Testing session was carried out hybrid offline and online because there were respondents who were outside Jabodetabek. Because some UTs use Google Meet, some of the authors did not get insight, such as seeing the testers' anxiety when



navigating and testing task scenarios, but because the majority of all user respondents were tech savvy, it helped a little from their style when navigating the prototype. The results of the UT analysis this time will be in quantitative form (number). UT for the SACGO mobile web app design prototype is measured by the task success rate. Task success rate can be used to measure the success and failure of a task with the number 1 representing success and 0 representing failure in carrying out the task. Table 13 is the main data analysis result from the Usability Testing Prototype Design Mobile Web App SACGO.

Table 13. Binary Task Success Rate for UT Task and Scenario (Author, 2023)

User UT	Task 1	Task 2	Task 3	Task 4	Task 5	AVG Task Rate
1	1	1	1	1	1	100%
2	1	1	1	1	1	100%
3	1	1	1	1	1	100%
4	1	1	1	1	1	100%
5	0	0	0	1	1	40%
6	1	1	0	1	1	80%
7	1	1	0	1	1	80%
8	1	1	1	1	1	100%
9	1	1	1	1	1	100%
10	1	1	1	1	1	100%
Average Task Success Rate						90%

The average task success rate for all users has a high task average, 90%. Based on the results of observations made, the task with the lowest value is task number 3, namely the task of placing orders with SACGO delivery. From the results of the table above, 3 users failed or did not complete task number 3. From observations the author saw that the factors that made them fail in task 3. The first factor internet was different so the prototype had not loaded perfectly but the user had immediately clicked, causing the link from the maze to the prototype to error, the second factor was that there were users who were not yet used to the new layout so halfway through thus user failed to finish. After the results of the quantitative UT data presentation, there were also positive and negative evaluations given to task 1 to 5. Also, some suggestion for every negative evaluation. The total of 12 positive, 12 negative and 12 suggestions.

Data Analysis Results using Maze

The results of data analysis with Maze have several data types such as Direct Success, Indirect Success, Time, average miss click rate, and total Miss clicks for per user test and task. With the maze, the author can fully observe the user's experience during UT. Information will also be displayed regarding which pages have the highest miss clicks, with high miss clicks you can see the heatmap. Heatmaps are hot spots where users click on an object on a certain part of the page repeatedly. The analysis results from the maze data can be seen in Figure 10 below which has been compiled and adjusted to the thesis data because the maze website requires a higher version for complete and in-depth analysis automatically.



Respondent	TASK 1					Respondent	TASK 2				
	Time	AVG Missclick Rate	Missclick	Direct Success Finish	Indirect Success Finish		Time	AVG Missclick Rate	Missclick	Direct Success Finish	Indirect Success Finish
1	31.63s	78.40%	1	1		1	99.50s	61.70%	5		1
2	23.93s		0	1		2	10.80s		0	1	
3	18.20s		2	1		3	12.23s		2	1	
4	24.30s		0	1		4	14.19s		0	1	
5	16.65s		10	0		5	4.9s		3	0	
6	38.86s		5	1		6	25.30s		0	1	
7	129.18s		134	1		7	20.69s		2	1	
8	50.90s		10	1		8	107.38s		8	1	
9	24.02s		6	1		9	6.33s		2	1	
10	87.69s		53		1	10	17.1s		7	1	

Respondent	TASK 3					Respondent	TASK 4				
	Time	AVG Missclick Rate	Missclick	Direct Success Finish	Indirect Success Finish		Time	AVG Missclick Rate	Missclick	Direct Success Finish	Indirect Success Finish
1	114.9s	75.50%	3	1		1	32.7s	63%	3	1	
2	71.94s		3		1	2	22.91s		2	1	
3	49.30s		10		1	3	18.52s		5	1	
4	102.68s		10		1	4	12.69s		0	1	
5	11.12s		4	0		5	12.08s		4	1	
6	59.63s		16	0		6	30.20s		6	1	
7	211.26		175	0		7	53.47s		35		1
8	52.09s		5		1	8	23.07s		2		1
9	53.20s		2		1	9	9.02s		1	1	
10	88.05s		30		1	10	19.85s		2	1	

Respondent	TASK 5				
	Time	AVG Missclick Rate	Missclick	Direct Success Finish	Indirect Success Finish
1	21.9s	58.20%	2	1	
2	27.2s		2	1	
3	13.95s		0	1	
4	35.78s		1	1	
5	27.40s		28		1
6	22.48s		1	1	
7	32.84s		1	1	
8	27.30s		5	1	
9	14.67s		0	1	
10	36.25s		6	1	

Figure 10. UT Data analysis using Maze Compiled Ver (Author Solution, 2023)

Author observation resulted that, It takes time to become familiar with prototype for each user. the time to think, diverse understanding, and different experiences make each user unique when carrying out usability testing. The total time for all task are 2072.23 seconds with 614 miss click, which is fine for the first usability testing and the first iteration of UCD method.

Data Analysis Quantitative Results using SEQ

At the end of each working session for tasks 1-5, the author asks each user respondent to provide an assessment by filling in the Single Ease Question (SEQ). The Single Ease Question (SEQ) is a measurement used to assess the level of difficulty a user experiences when completing specific situations or actions. SEQ testing is conducted subsequent to the user's completion of an activity, wherein they are prompted to answer a series of questions. Each question includes a 7-point ranking system to evaluate the level of difficulty in completing a task (Sauro, 2012). Table 14 are the results of quantitative data analysis results using SEQ which were asked of each respondent at the end of the session for each task.

Table 14. Data Analysis Quantitative Results AVG SEQ (Author Analysis, 2023)

User Respondent	Single Ease Question					
	Task 1	Task 2	Task 3	Task 4	Task 5	AVG
1	7	7	6	6	7	6.60
2	7	7	6	7	7	6.80
3	7	6	6	7	7	6.60



4	6	6	6	6	6	6.00
5	7	7	5	7	5	6.20
6	7	6	4	7	7	6.20
7	6	6	3	7	7	5.80
8	6	6	7	7	7	6.60
9	7	7	5	7	7	6.60
10	7	7	6	7	7	6.80
Average SEQ						6,42

According to usersense.io, the average SEQ is 5.50 among 10,000 testers who have completed 400 tasks. This is just good to know that the analysis results show that the average SEQ for Usability Testing is 6.42. This is a good number and means that users find it easy to carry out each task given overall. SEQ only adds to the usability metric value and is not a reference for success or failure because only 1 question is asked, namely Overall, how easy or difficult was it to perform this task? To answer this user can rate from 1 = very difficult to 7 = very easy. Because the average SEQ value is 6.42, it can conclude that the mobile web app design prototype is overall very easy to navigate for each flow path.

Data Analysis Quantitative Results using SUS

To be able to assess more deeply, SUS is needed as a complement at the end of all UT sessions as a complement to usability metrics. The System Usability Scale (SUS) which was designed by John Brooke is the final quantitative assessment. Based on the results of the System Usability Scale Analysis calculations for Usability Testing of the SACGO mobile web app prototype, the assessment is given in Table 15 for detailed assessments from each respondent who took part in the UT.

Table 15. Data Analysis Quantitative Results AVG SUS (Author Analysis, 2023)

User	System Usability Scale										AVG
	SUS1	SUS2	SUS3	SUS4	SUS5	SUS6	SUS7	SUS8	SUS9	SUS10	
1	5	1	5	1	5	1	5	1	5	1	100
2	5	2	5	2	4	2	5	1	4	1	87.5
3	4	1	4	1	5	1	5	1	5	2	92.5
4	4	1	5	1	5	3	4	2	5	1	87.5
5	3	2	4	1	4	1	4	1	5	1	85
6	4	2	4	1	4	2	5	2	4	2	80
7	5	1	5	1	5	2	4	1	5	1	95
8	4	3	5	1	4	1	1	1	5	4	72.5
9	5	2	5	2	5	1	5	1	5	2	92.5
10	5	4	4	1	5	1	5	1	5	4	82.5
Average SUS											87.5

From data analysis, and quantitative results using SUS, the average system usability scale gets an average value of 87.5 in Table 15 above. The SUS score of 87.5 falls into the excellent category with a quality score of A = Very good which is in accordance with the SUS Scorecard (Sauro 2018). From the results of this assessment, it can be concluded that the usability and design of the SACGO mobile web app meet current user needs, even though it is only at the early development stage (alpha version). Even though this assessment has reached A quality, every respondent who has carried out the exploration will be asked for their final opinion, if any.

5.1 CONCLUSION

With the presence of sophisticated internet technology, everyone will follow the times to do more than just use and utilize the technology around them for their daily lives. The presence of the Prototype SACGO mobile web app will make it easier for every user who wants to do shoes laundry online or offline. Both have the function of tracking the status of their shoes which are being



entrusted to be cleaned with the SAC treatment service. This research aims to develop a prototype mobile web app for SAC specifically for customers who want to service shoes from anywhere without having to come to an offline store, they can still come to the offline store to make normal transactions which will then be entered into this mobile website to process everything. Therefore, this research will answer the research objectives that have been determined previously. Before proceeding to this discussion, the author uses two design methods to apply the design process for creating the mobile web app Shoes and Care. The design method used is User Centered Design as the main method with a Design Thinking mindset as an additional method. According to Griffin, the form of Design Thinking usually starts with any ambiguity in a problem until it reaches the point of clarity and gets the desired and feasible solution (Griffin, 2015). Then DT is an approach to identifying and searching for creative problems as a user interface designer. Then enter the User Centered Design stage because it uses various design techniques to create solutions that meet those needs, such as wireframing, prototyping, and user testing. With the addition of the definition of the 5 elements from Jesse James Garrett, the UCD process can be dissected more deeply and in detail. The primary data method used comes from In-depth-interview which produces an interface design and thereby produces Usability Testing results. The results show very good usability and have no issues, but the main method suggests a second iteration to produce more robust data.

The results of primary data with In-depth Interviews produced a lot of data information as the driving force for this research. The following is the conclusion and answer to the research objective of this study.

1. From the results of the in-depth interview, it produces a flow user experience for the main feature of SACGO, namely order delivery, and with this, you can also obtain business processes from SACGO which have been changed so that they can be digitized from the previous business processes which were still in a special form for offline.

2. In addition to generating a flow and business process, the outcomes derived from primary data can also contribute to the creation of a Minimum Viable Product (MVP) based on features identified and aligned with the 8 golden rules theory for developing interface designs for mobile web app prototypes. To reach this stage, understanding the specific challenges or pain points experienced by each user is crucial, enabling the development of customer personas for the SAC. By identifying these customer personas, the process of creating MVP features becomes more targeted and purposeful.

3. Entering the first iteration in developing a mobile web app prototype design will be very straightforward because it has robust foundation of information architecture as a strong framework for making mobile web app prototypes. Designing a high-fidelity prototype design using the UCD method resulted in 45+ pages of High Fidelity Design. After the high-fidelity form is visible from a visual perspective, the design is converted into a prototype so that Usability Testing can be carried out in-depth as an evaluation of the first iteration of the SACGO mobile web app design prototype. The results of this iteration gave very good results and there were no serious problems in terms of flow, layout, and overall design..

The results of the first iteration of the UT evaluation were the application of a Binary Task Success Rate of 90% for all respondents with 5 different tasks. Each task produces several evaluations that can be used as a reference for the next iteration. With total of 12 Positive evaluation, 19 negative evaluation and 12 advice suggestion. These are all evaluation results in the form of sentimental value. The following results of the third UT are the results of assistance with maze tools with a division of 5 tasks and 10 user respondents who took part in the UT. The results of task 1 produced a total processing time of 445.36 seconds, and 221 miss clicks with an average rate of 78% miss clicks. Task 2 resulted in a total processing time of 318.42 seconds, and 29 miss clicks with an average rate of 61.70%. Task 3 resulted in a total processing time of 814.17 seconds, and 258 miss clicks with an average rate of 75.50% miss clicks. Task 4 resulted in a total processing time of 234.51 seconds, 60 miss clicks, and an average miss click rate of 63%. Task 5 for 259.77 seconds, 46 miss clicks, and an average rate of 58.20%.

A high average miss click is very natural because users think that all designs can be navigated in depth, so a lot of time and a lot of miss clicks occur definitely in the first UT session. The total work on all tasks for all users was 2072.23 seconds with a total of 614 miss clicks. Then the results of the 4th UT with Single Ease Question quantitative research for each mobile web app design prototype task were 6.42. These results are very good for the SEQ assessment, which means that overall users find it easy to carry out tasks and the usability of this prototype is easy to navigate. The fifth and final result from the usability testing (UT) phase, utilizing quantitative research through the System Usability Scale (SUS), revealed an impressive SUS Score of 87.5, indicating a quality rating of A. This result indicates that the Prototype of SACGO mobile web app design effectively addresses user needs in terms of usability, design and layout, flow and navigation, and overall experience.



This accomplishment is notably commendable, especially when taking into account that the evaluation pertains to the early phases of development in the initial iteration of the design process.

5.2 RECOMMENNDATION

In order to advance the development of the SACGO mobile web in alignment with the previously discussed implementation plan, several recommendations can be offered for consideration. This research proposes the execution of design improvements, marking the second iteration in the early stages of development using the User-Centered Design (UCD) method. The author has delineated over 25 significant suggestions for some pages and the overall design. Hence, the task at hand involves refining these recommendations to address the issues identified during the initial Usability Testing (UT) iteration. Once the high-fidelity enhancements have been implemented, the prototype will undergo usability testing using the same methodology employed in the initial iteration. The author recommends executing until third iteration, highlighting that this final stage is anticipated to involve fewer adjustments.

The author also recommends incorporating additional participants in the upcoming Usability Testing (UT) to gather more insights for the advancement of the SAC GO mobile web app prototype. It is advised to conduct a Scrum meeting only after the completion of the final product in terms of interface design. During this meeting, developers can be briefed on how to generate the functional code for the SACGO mobile web app. It's crucial to bear in mind that the implementation of the plan adheres to an agile methodology, allowing for swift responses and adaptations to unforeseen circumstances. Future research efforts will pay more attention to thinking about the financial side of product development. Considering finances becomes crucial in the realm of software development, as analyzed by the author. For instance, the creation of a real-time in-app chat feature demands a significant financial investment due to the necessity of renting or acquiring servers to maintain a 24/7 operational database. The author emphasizes the significance of careful financial planning, asserting that effective budgeting will be pivotal for SACGO's future success, allowing for well-organized and strategic to generate more revenue through digitalization.

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