



UI/UX Analysis and Design Development of Less-ON Digital Startup Prototype by Using Lean UX

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Abstract

The growth of startups in Indonesia continues to experience upward growth. Behind the growth that continues to move up, there is a success rate statistic which is a contradiction behind its development. The startup statistics show that about 90% of startups fail. As many as 75% of unicorn startups believe that a good UI/UX design can increase startup valuations and additional investors' funds. User Interface (UI) and User Experience (UX) are closely related because UX results from UI interactions. Less-On is a provider of private tutoring service providers who serve as an intermediary bridge between teachers and students. This research will be carried out by integrating the processes in the Lean UX method into every process that exists at the stages of software engineering development. The results obtained from this study are a final prototype validated in terms of criticism and suggestions through a questionnaire as a form of Less-On branding. Positive UX and better usability are significant for further development of the prototype private tutor booking application, which plays a vital role in acceptance, satisfaction and efficiency in using this Less-On application. The UI has good usability for users, with a SUS scoring earn 85.53, which is above average and acceptable.

Keywords: UI/UX, Lean UX, SUS, Prototype, Less-ON;

1. Introduction

The growth of startups in Indonesia continues to experience upward growth. Data released by the Financial Services Authority (OJK) as of December 11, 2021, notes that the current number of Indonesian startups is 2,319. It makes the potential for digital transactions in the country extraordinary, estimated at 124 billion US dollars in 2025. However, behind the growth that continues to move up, there is a success rate statistic which is a contradiction behind its development.

Statistics show that 90% of startups fail. The number one reason startups fail is misreading the market demand/not according to the market demand, which is found in 42% of cases. With the growth of startups that are growing, there is a critical aspect of startups so that they can pay attention to the important part, namely analysis and good UI/UX design. As many as 75% of unicorn startups believe that a good UI / UX design can increase startup valuations and additional investors' funds [1], [2], so this research needs to be done.

Less-On is a new startup in the field of education which provides private tutoring service providers who become the bridge between teachers and students. The imposition of restrictions on community activities and the appeal not to assemble due to the COVID-19 pandemic has caused many private tutoring and tutoring industries in the form of courses to become suspended. All components supporting this activity were affected, especially the teaching staff and students. The demands for education are also increasing, requiring many students to need additional offline guidance to improve their skills and knowledge. Therefore, Startup Less-On is here to provide a win-win solution to this problem.

Aspects must be considered to support the design of a Less-On startup prototype, one of which is to create a User Interface and User Experience that is User Friendly. The current problem faced by Less-On is the unavailability of a platform that can accommodate every private tutoring activity in one platform (batch).

Due to limited capital, Less-On startups must be run efficiently and effectively to prioritize the principle of

just-in-time production and immediate launch. The next problem is that the features provided by the Less-On application extend the cycle time for launching (Cycle Time).

Based on the startup phenomenon, the initial stages needed in designing the platform in this study were carried out and compiled into the analysis and design of a general UI/UX startup prototype based on the Lean UX method [3]. Because this method has a combined intersection of lean startup principles, design thinking, and agile, this method is very efficient to use in the analysis and design of a startup UI/UX prototype [3],[4]. In terms of user experience, to be closer to users' needs and satisfaction, testing the usability scale of the system using the System Usability Scale (SUS) [2],[5],[6]. Each prototype test will be evaluated using a success rate to minimize or eliminate waste of time, energy, and materials [7].

User Interface (UI) and User Experience (UX) are closely related because UX results from UI interactions. In principle, UI is more focused on while UX is more focused on the reaction of the user's display experience [7], [8], [9], [10]. UI is a visual display of a product that bridges the system with the user. UI appearance can be in the form of shapes, colours, and writing designed as attractive as possible [7]. In simple terms, UI is how the user sees the appearance of a product.

UI has several components, and each element has a function that is important in good UI design. These components are layout, colour, and typography. A lousy UI design will affect the use of a system because users will find it difficult to operate. A good design is a design that can make you immediately understand just by taking a glance at a display. Most apps have good usability, but now an app needs a good UX, too [7],[11].

The UX of a good product usually won't make it difficult for users to achieve their goals[12],[13]. Whether it's from a user-friendly UI design, simple menus, or lightweight products when accessed. On the other hand, poor UX frustrates users because it is difficult to get what they need.

Simply put, user-centred design is about designing with the needs and expectations of user behaviour [14],[15]. UX-focused UI analysis allows startup application prototype designs to focus on the user. This analysis increases a startup's chances of success when it is finally introduced to the market. The result obtained from this research is a final prototype validated in terms of criticism and suggestions through a questionnaire as a form of Less-On startup branding.

2. Research Methods

This research is implementation research which has the first stage is a literature review. The second is a needs analysis, the third is the design of a Less-On application

prototype, the fourth is implementation, the fifth is testing, and the last is drawing conclusions and suggestions [16]. The research method used is the Lean UX will be evaluated by Usability Scale testing.

Lean UX is a popular method in software development. This method allows developers to measure and validate the UI/UX developed according to user feedback and experience to increase user satisfaction. This method can complete a software product/application faster by reducing documentation activities but focusing more on a shared understanding of the developed software/application [3], [6], [17],[18].

LeanUX is becoming increasingly used by researchers because it can increase the effectiveness of the design process of a software product/application [3], [16]–[18]. LeanUX is a highly data-oriented process with minimal use of assumptions. So that the decisions made can be more precise and the final quality is better.

Lean UX methods through Agile refocus software development on shorter cycles and continuous learning to get direct improvement suggestions from customers quickly and to feel how the solutions offered are acceptable [19].

This research will be carried out by integrating the processes in the Lean UX method into every process that exists at the stages of software engineering development. In the needs analysis, there is a Declaring Assumptions process which consists of assumptions, hypotheses, personas, and features. At the design stage, there is a process of Create an MVP, Run an Experiment, and Feedback & Research. In every cycle, if there is a change or iteration, it will start the process back to the needs analysis section. If the iteration does not occur again, the process will continue to the implementation stage [3], [16]. The literature study was carried out to find out related studies that had been carried out in the past and to know the basics of theory as a reference in this study. The sources of information used as references are books, scientific journals, and websites.

Requirements analysis is carried out to obtain information about the needs required by the application to be built on the Less-On application prototype using the Lean UX approach. The design stage is carried out after the needs analysis process is completed. By using the Lean UX approach, these stages will adjust the process to the method used [20], [21]. Three steps must be carried out. The first stage is to Create an MVP, which is to create a product with the minimum possible features to get an overview of the user experience for the product you want to create. The second is Run an Experiment, which is conducting experiments by going directly into the field and conducting experiments based on the MVP that has been designed for use by users. The last one in the Lean UX cycle is Feedback & Research, which is getting opinions from users and

processing them to be used as consideration for iterating on the design and repeating the cycle, starting from the needs analysis or continuing to the implementation stage [16].

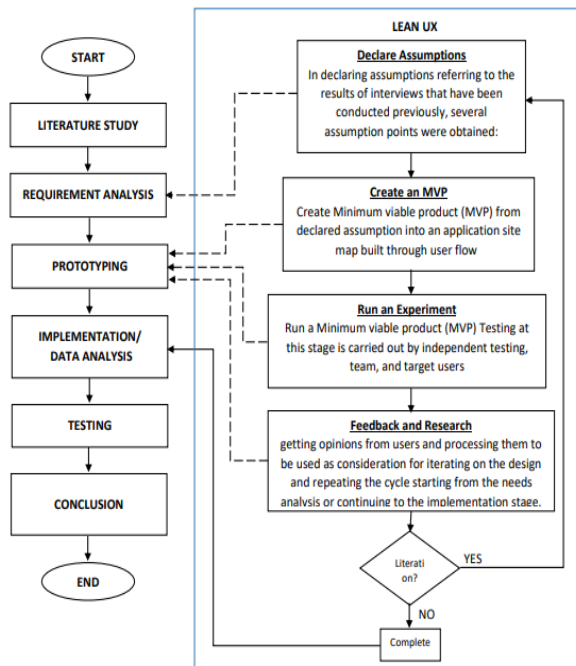


Figure 1. Research Method

After the iteration in the Lean UX cycle has been completed, the next step is to carry out implementation activities based on the design that has been implemented [22]. UI/UX design testing on the application prototype is carried out to provide certainty that the UI/UX design on the application prototype that has been implemented has resulted in those defined at the design stage. The Less-On application prototype testing is carried out using system usability scale testing.

System Usability Scale

John Brooke developed SUS in 1986, which is a usability scale that is reliable, popular, effective, and inexpensive. SUS has 10 questions and 5 answer options [2], [5], [23]. The answers consist of strongly disagree to strongly agree, where the accumulation has a minimum score of 0 and a maximum score of 100. After collecting data from respondents, the data is calculated by several rules in calculating the SUS score [24], [25].

SUS has become an industry standard, with references in over 1300 articles and publications. The benefits of using SUS include SUS Being a very easy scale to administer to participants. It can be used on small sample sizes with reliable results and effectively differentiate between usable and unusable systems[5].

For each odd-numbered question (1,3,5,7, and 9), the score of each question obtained from the respondent's

score will be deducted by 1. Each question has an even number (2,4,6,8,10), and the final score is obtained from a score of 5 minus the question score obtained from the respondents. The SUS score is obtained from the sum of the scores for each question which is then multiplied by 2.5.

For the calculation formula and the SUS average conversion scale, it can be seen in equations 1 [2], [26], [27].

$$SUS = 2.5 \times \left[\sum_{n=1}^5 (U_{2n-1} - 1) + (5 - U_{2n}) \right] \quad (1)$$

The rules for calculating scores apply to 1 respondent. For further calculations, the SUS score of each respondent is sought for the average score (\bar{x}) by adding up all scores ($\sum x$) and dividing by the number of respondents (n) by using equation 2 [2].

$$\bar{x} = \frac{\sum x}{n} \quad (2)$$

The conclusion on how to use the System Usability Scale (SUS) is that after calculating the average SUS score of all respondents. The score is then adjusted for the SUS assessment. In which category are the test results with the average score already obtained. The average SUS score from the number of studies is 68, so if the SUS score is above 68, it will be considered above the average, and the score below 68 is below the average. If the score you get is below 68, it means there is a usability problem that needs improvement [20].

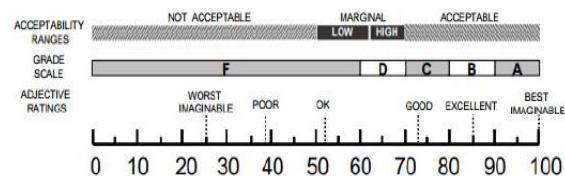


Figure 2. SUS Score

Table 1 represents Figure 2 of the SUS rating scale for measuring UI/UX with low, medium, and high perceived usability [2].

Table 1. Curve Grading Scale SUS

SUS Score Range	Grade
84.1 – 100	A+
80.8 – 84.0	A
78.9 – 80.7	A-
77.2 – 78.8	B+
74.1 – 77.2	B
72.6 – 74.0	B-
71.1 – 72.5	C+
65.0 – 71.0	C
62.7 – 64.9	C-
51.7 – 62.6	D
0.0 – 51.6	F

3. Results and Discussions

Tests carried out include functional testing and non-functional testing. Functional testing aims to test whether the application's functionality follows what has

been defined in the requirements analysis and Lean UX implementation in the analysis and design of the UI/UX of Less-ON applications. Non-functional testing through the SUS test on the prototype is one method of validating application acceptance by the user.

3.1 Observation and Literature Study

At this stage, the researcher researches the target user to find out the difficulties and desires of the user using direct observation through interviews. In this phase, where software requirements (needs) from users (users) and customers (customers) are collected, understood, and defined.

3.2 Declare Assumption

The declaration of assumptions is an early stage of the development stage. Assumptions are needed to find out the problems faced by users. In declaring assumptions referring to the results of interviews that have been conducted previously, several assumption points were obtained: Users need an application to order private lessons anywhere and anytime; The application consists of 2 main parts: the teacher and those who require teaching; Applications that do not have too many menus and are easy to use; With an exemplary user interface and user experience, the Less-ON application can make it easier for users; With a comfortable and user-friendly user interface and user experience, easy access to smartphone applications will make it easy for users to maximize Less-ON applications;

The next step in this stage is to determine user requirements specifications by conducting a user persona analysis to determine the requirements needed by users for Less-ON applications. After analyzing the user persona, the next step is to build a scenario context in the form of a wireframe to determine user behaviour when interacting with the system, as follows: Target Users of Teaching Users are tutors, creative industry players, practitioners, and academics; Target users who need teaching are students, tutoring participants, and parents of students; Target users (teachers/students) are active smartphone users;

3.3 Create MVP

Site Map by using activity Diagram. The first step in making an MVP is to interpret the declared assumption into an application site map built through an activity diagram, as shown in Figure 3.

The order of process actions in a Less-ON application is shown in Figure 3. Activity diagrams explain business processes, the order of steps interacting with the application, and the overall process. The declaration assumption stage is transformed into the login, order, receive an order, status update, search, payment, review, and rating processes. The activity of the business flow for processing private tutor orders is shown in the above diagram. The requested order is the

activity's input parameter in the activity diagram up top. Payment will be accepted if the order has been received, all necessary information has been provided, and the job status has been approved by review and rating.

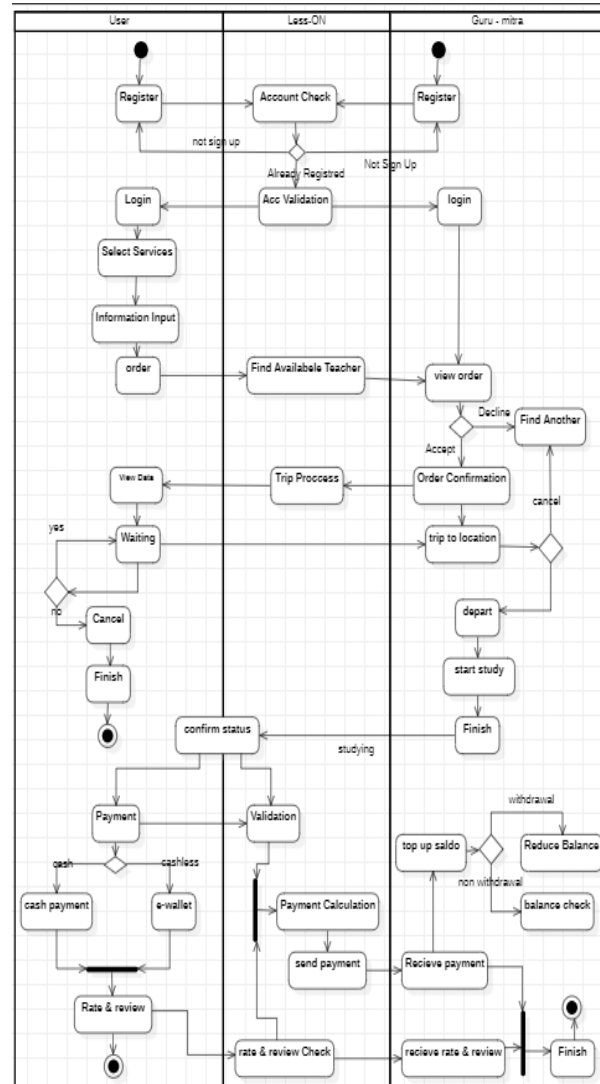


Figure 3. Activity Diagram

3.3.1 Low Fidelity (wireframe)

This stage is the initial stage of creating a Less-ON application user interface. The wireframe is designed using standard sizes for mobile application design, with the frame used being iPhone 11 Pro/X (375px) with a margin of 20 px. Even though it's just a rough drawing, it can be used to determine the layout before moving on to high-fidelity designs.

Before moving on to the visual mockup stage, the wireframe stage is a plan or framework that can offer a low-fidelity overview of each page featured in an application. The first step in designing a wireframe is figuring out the content and flow depending on how the user interacts with the product. The wireframe is created under the flow shown in Figure 3, where each flow

represents the flow of actions taken or natural user interactions with digital goods, and the content represents the data that will be shown to consumers at each step or page. Information design, navigation, and interface design are all included in Figure 4. A wireframe's information design presents the information or material you want to convey to users well, such as inputs, thumbnails, images, icons, links, and others. Straightforward navigation is one way to ensure users know where they can find information and how to find it. The incorporation of information design into navigation produces a user interface. Interface design is the process of selecting and placing elements such as buttons, links, titles, text aligns, font sizes, and others.

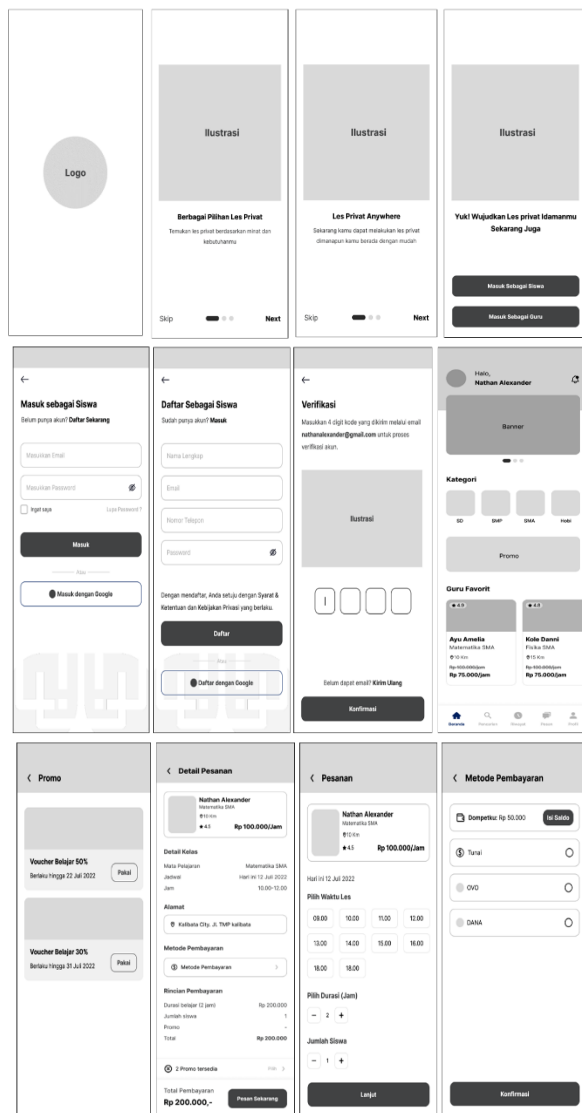


Figure 4. Wireframe Less-ON

3.3.2 High Fidelity (prototyping)

At this prototype stage, it is the embodiment, colouring, and arrangement of user interface elements from the previously made wireframe. Although the wireframe is

the initial design of the prototype, the prototype is not always precisely the same as the wireframe because it is caused by several factors, including getting input from experts in the field. That is the assumption of a different team and can also be caused by the perspective or view of the designer because he gets a new thought on an old design that is considered too difficult to understand, in the case of prototyping (high fidelity) by using Figma tools or applications.

The logo is used as the primary identity in improving the branding and layout of the application. The logo is located in the middle of the page so that users can easily recognize it using the Less-ON application. The logo has two models: the main logo colour set and the background logo in the footer. Logo used on splash pages, login pages, and every app footer background.



Figure 5. Less-ON Logo

Colour Style uses the main colour code #19007F and several colour combinations, as shown in figure 6. In determining the typeface, the typography selection was based on field observations through interviews and previous questionnaires, using the Inter font.

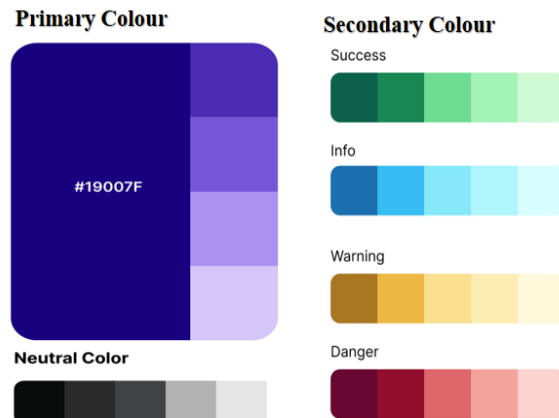


Figure 6. Colour Style selection Less-ON

The next stage of making paper prototypes or mockups has been made in the previous step in the form of a user interface that comes with clearer visuals. The result is a prototype or mockup of user interface design for Less-ON applications.

Splash screen and login

The UI splash screen and login page design are the initial interaction by the user when running the Less-ON application. The splash screen begins with the appearance of the Less-ON logo for 3 seconds and then the welcome page before entering the login page. Login

Page consists of 2 models login as a teacher and login as a student. The resulting UX is the interaction of a new user list, logging in to the application via Google, forgetting passwords, resetting passwords, and OTP verification, as shown in Figure 7.

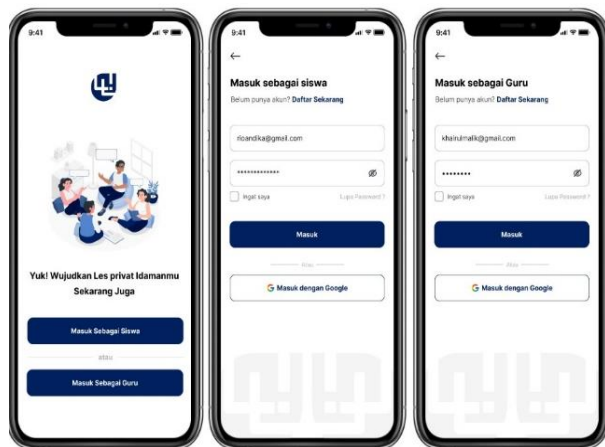


Figure 7. Splash Screen and Login Page Prototype

Student Pages

The UI design for the student user is when the user successfully logs in/registers as a student. The resulting UX is interaction on the main menu, namely the Student Homepage, Search, order history, messages, and Profile. Other interactions by the user on the student page are selecting a teacher, teacher messages, notifications, vouchers, address sets, tutoring details set, address sets, reviews, payments, monitoring order status, cancelling orders, etc., as shown in Figure 8.

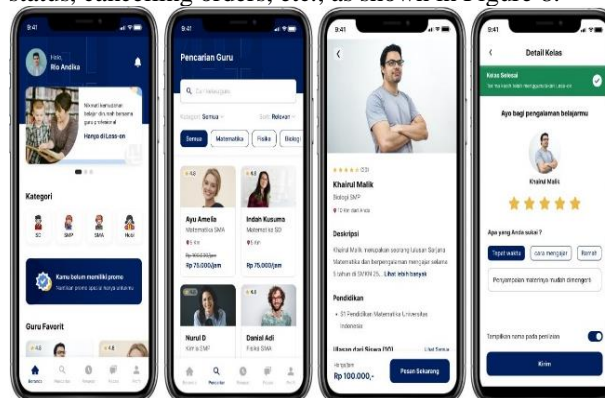


Figure 8. Prototype on Student user

Teacher's Page

The UI design for the teacher user is when the user successfully logs in/registers as a teacher. The resulting UX is interaction on the main menu, namely the Teacher's Homepage, teaching history, income, messages, and Profile. Other user interactions on the Teacher page are Status Available, Check Orders, notifications, reject/accept orders, set addresses, Ratings, payments, starting and finishing classes, updating trip statuses, editing profiles, etc., such as Figure 9.

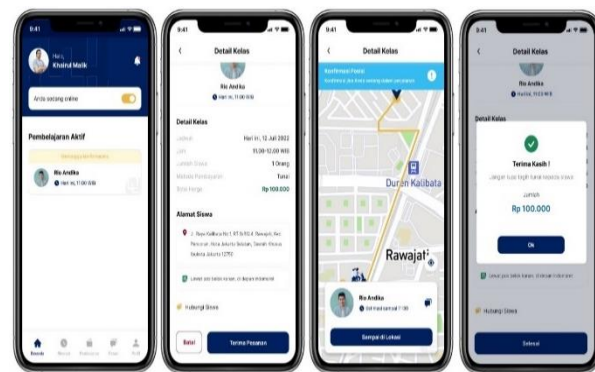


Figure 9. Prototype on teacher user

3.4 Run an Experience

The experiment stage was carried out to determine the flow of a prototype made previously at the MVP stage. Testing at this stage is carried out by independent testing, team, and target users. In separate and group testing, it is helpful to find errors in the user interface design, prototype flow, typography, and visual design before testing the target user. Independent or team testing is carried out in conjunction with the MVP (Minimum Viable Product) design so that the prototyping runs optimally. Tests are carried out on target users using questionnaires conducting these experiments, and testing researchers will get feedback on the prototype design, which will be processed at the feedback and research stage, which will later help improve the user interface.

3.5 Feedback and Research

The System Usability Scale, When SUS was used, 52 respondents were asked to rate the following 10 items with one of five responses adopted from the standard SUS template ranging from Strongly Agree to Disagree Strongly:

Table. 2 System Usability Scale Statements

No	SUS Statements
1.	I think that I want to use the Less-ON app frequently.
2.	I found the Less-ON app unnecessarily complex.
3.	I thought the Less-ON app was easy to use.
4.	I believe that I would need the support of a technical person to be able to use this Less-ON app.
5.	I found the various functions in this Less-ON app were well integrated.
6.	I thought there was too much inconsistency in this Less-ON app.
7.	I imagine most people would learn to use this Less-ON app very quickly.
8.	I found the Less-ON app very cumbersome to use.
9.	I felt very confident using the Less-ON app.
10.	I needed to learn many things before I could get going with this Less-ON app.

The SUS equation's calculation results with the formula (questionnaire one - 1) + (5 - questionnaire two) can be seen in the calculated score in table 2. The average score of the final result can be found by the formula (sum of the computed score x 2.5) divided by 52, namely the

number of respondents. It can be seen that the final result SUS score is 85.53.

Table 3. SUS Score

Respondent	SUS										Total	Sus Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
R1	4	4	4	4	4	3	4	4	3	3	37	92,5
R2	4	3	4	3	4	4	4	3	4	3	36	90
R3	3	3	4	4	3	3	4	3	3	3	33	82,5
R4	4	2	4	4	4	3	4	3	4	3	35	87,5
R5	3	4	3	4	3	3	3	3	3	3	32	80
R6	3	3	3	3	4	4	4	3	4	3	34	85
R7	3	3	3	4	3	3	3	3	4	3	32	80
R8	4	3	4	4	4	4	4	3	3	3	36	90
R9	3	3	3	3	4	4	4	3	3	3	33	82,5
R10	4	4	3	4	3	3	3	3	2	3	32	80
R11	3	3	4	3	3	4	4	4	3	3	34	85
R12	3	3	3	3	3	3	4	4	4	3	33	82,5
R13	4	4	4	4	4	4	4	4	3	4	39	97,5
R14	3	3	3	3	4	4	4	3	3	3	33	82,5
R15	3	4	3	4	4	4	3	3	3	3	34	85
R16	4	4	4	4	3	4	4	4	3	4	38	95
R17	3	3	3	3	4	3	4	4	4	4	35	87,5
R18	4	3	4	3	4	4	4	3	4	3	36	90
R19	4	3	4	3	3	3	3	3	3	4	33	82,5
R20	4	3	4	3	3	3	3	3	3	3	32	80
R21	4	4	4	4	3	3	4	4	3	4	37	92,5
R22	4	3	4	3	4	4	4	3	4	3	36	90
R23	3	3	4	4	3	3	4	3	3	3	33	82,5
R24	4	2	4	4	4	3	4	3	4	3	35	87,5
R25	3	4	4	4	3	3	3	3	3	3	33	82,5
R26	3	3	3	3	4	2	4	3	4	3	32	80
R27	3	4	3	4	3	3	3	3	4	3	33	82,5
R28	4	3	4	3	4	4	4	3	3	3	35	87,5
R29	3	4	3	3	4	4	4	3	3	3	34	85
R30	4	4	3	4	4	3	3	3	2	3	33	82,5
R31	3	3	4	3	3	4	4	4	3	3	34	85
R32	3	3	3	3	3	3	4	4	3	3	33	82,5
R33	4	4	3	3	4	4	4	4	3	4	37	92,5
R34	3	3	3	3	4	4	4	3	3	3	33	82,5
R35	3	4	3	4	4	4	3	3	3	3	34	85
R36	4	4	4	4	3	3	4	4	3	3	36	90
R37	3	3	3	3	4	3	4	4	4	4	35	87,5
R38	4	3	4	3	4	4	4	3	4	3	36	90
R39	4	3	4	3	3	3	3	3	3	4	33	82,5
R40	4	3	4	3	3	2	3	3	3	3	31	77,5
R41	4	4	3	4	3	3	3	3	4	2	33	82,5
R42	3	3	4	3	3	4	4	4	3	3	34	85
R43	3	3	3	3	3	3	4	4	4	3	33	82,5
R44	3	4	4	4	4	3	4	4	3	4	37	92,5
R45	3	3	3	3	4	4	4	3	3	3	33	82,5
R46	4	4	3	4	4	4	3	3	2	3	34	85
R47	3	3	4	3	3	4	4	4	3	3	34	85
R48	3	3	3	3	3	4	4	4	3	3	33	82,5
R49	4	3	4	4	4	4	4	4	3	4	38	95
R50	3	3	3	3	4	4	4	3	3	3	33	82,5
R51	3	3	3	3	3	3	4	4	4	3	33	82,5
R52	2	4	3	3	4	3	4	4	3	4	34	85
SUS Result											85,5	
											2885	

Figure 13 summarizes the evaluation of SUS for UI/UX Less-ON. It explains in detail that SUS is in the acceptable/ best imaginable category and can be promoted to respondents based on the calculation results. SUS result has good usability for users, with a SUS scoring earn 85.53, which is above average and acceptable

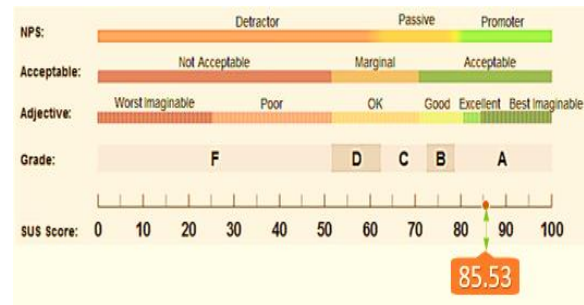


Figure 13. Less-ON SUS Score

4. Conclusion

Based on the identification's discoveries, Less-ON developed a prototype for a mobile application. It begins by declaring assumptions, including personas, features, assumptions, and hypotheses. A procedure of Creating an MVP, Run an Experiment, and Feedback & Research is used during the design stage. Every cycle will restart at the needs analysis section and the results of the SUS questionnaire that was previously issued if there are any changes or iterations. It is possible to draw the following iteration conclusion from the results of the created design.

Fifty-two (52) respondents participated in tests and evaluations using the Lean UX methodology, and SUS testing was assessed throughout the design and development of prototypes. It can be concluded that the Less-ON application prototype has a good User Experience and can be accepted by users. Positive user experience and better usability are significant for further development of the prototype private tutor booking application, which plays a vital role in acceptance, satisfaction and efficiency in using this Less-ON application. The user interface has good usability for users, with a SUS scoring earn 85.53, which is above average and acceptable.

For the following research, the number of respondents and the number of iterations need to be increased for improvement in the next study and tested by a more varied method to measure the level of UX.

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