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UI/UX Optimization of GOBIS Suroboyo Application with User Centered Design Approach and Short User Experience Questionnaire

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ABSTRACT

GOBIS Suroboyo is a mobile application designed to assist Suroboyo Bus passengers in accessing route information, schedules, and general bus details. Despite its potential, the application has lacked systematic user experience evaluation, resulting in usability issues that require improvement. This study aims to optimize the user interface (UI) and user experience (UX) of the GOBIS Suroboyo application using the User-Centered Design (UCD) approach. The research was conducted through four main stages: analysis of the existing application, identification of user needs, redesign of the interface, and evaluation of the resulting prototype. The usability evaluation was performed using the Short User Experience Questionnaire (UEQ-S), which assessed both hedonic and pragmatic qualities. The results showed mean scores of 1.69 for hedonic quality and 1.425 for pragmatic quality, which fall into the "Excellent" and "Above Average" categories, respectively, based on the benchmark scale. These results indicate that the redesigned prototype is engaging, motivating, efficient, and user-friendly. This study concludes that the UCD approach, with active user involvement, is effective in enhancing the user experience of mobile applications.

I. INTRODUCTION

The use of adequate transportation resources facilitates efficient mobilization. Dinas Perhubungan (Dishub) Kota Surabaya has made significant efforts in public transportation, with notable initiatives including the introduction of the Suroboyo Bus. The Suroboyo bus has been well-received by the public because it makes it easier for people from all walks of life, especially those from the lower middle class. At the beginning of its launch, the Suroboyo bus was free of charge, allowing people to participate in preserving the environment through a payment method that uses a plastic bottle exchange [1]. In addition, Dishub has developed the GOBIS (Golek Bis) Suroboyo application. This application aims to facilitate access to Suroboyo Bus and provide general information about Surabaya City. It is designed to help citizens view routes, schedules, and bus locations in real time. The implementation in 2018 is to enhance the public transportation infrastructure in Surabaya, the capital of East Java. Once the application is installed, users register using their national identity number and can access its important features. Fleets that can be accessed are Suroboyo Bus, Wirawiri, Teman Bus, and Trans Jatim. Users can find the location of bus stops and the real-time status of the bus through maps based on the chosen route and fleet type [2]. Users can also use travel tickets using balances previously topped up using the QRIS method. These features are helpful for passengers who need the latest information on the bus they need to ride.

According to the Google Play Store page, the GOBIS Suroboyo application has been installed by more than 500,000 Android users and has received more than a thousand user reviews since its launch. However, its overall rating hovers around three out of five points. Confusing interface and user experience, lots of bugs and troubles, mismatched bus schedules, and inaccurate bus tracking are issues that

many users complain about. Based on issues reported by users, the GOBIS Suroboyo application still needs UI/UX improvements.

The user interface and user experience of an application are essential and cannot be ignored. UI is one part of the user experience, which is what users see and what serves as their medium for interacting with the system [3]. UX certainly involves the end-user as the center [4]. Both are the primary keys to creating a comfortable and easy-to-use application. Well-designed interfaces are necessary for users. If they are confusing and inefficient, people will have tremendous problems doing their tasks and make more mistakes. Poor design can even cause users to abandon the system permanently. It can also cause annoyance, frustration, and raised stress [5].

Previous researchers have studied and conducted experiments related to improving the user interface and user experience of the GOBIS Suroboyo application. This application has several UI/UX aspects that need improvement to prevent user confusion. Research [6] evaluated and improved the user interface of the GOBIS Suroboyo application based on usability testing using the design thinking method. From the results of improving the application's user interface, an increase in usability aspects was obtained compared to the previous application. The effectiveness aspect increased by 100%; the efficiency aspect improved to 7.35 times faster; and the satisfaction aspect improved to 3.1 times better than the previous application. Research [7] also used the design thinking method and conducted testing with the SUS method. The SUS score for the improvement design is 69.725, categorized as "marginal".

Research [8] uses the User-Centered Design method to redesign the GOBIS Suroboyo application. Interface design testing was carried out based on usability testing using the SUS questionnaire. The score obtained was 97 to 100, with no unresolved tasks, and click accuracy ranged from 0% to 4.5%. Task duration varied from 1.5 seconds to 24.4 seconds, indicating a relatively high level of efficiency. Meanwhile, research [9] using the same method revealed a significant difference between the SUS scores of the old and new interface designs. The previous version achieved an average score of 57.25, earning a rating of "poor"; in contrast, the average SUS score of users after the redesign process reached 82.25, rated as "good".

The User Centered Design can be used as a guide in improving user interfaces with the user as the primary focus. UCD aims to resolve user issues with the application. UCD designs applications based on user preferences, focusing on user needs, desires, and limitations at each stage of application design [10]. Applications developed with a focus on the user can make it easier to find the necessary information and use the application [11]. According to the current standards and updates, the ISO standard definition now also emphasizes understanding the user, user tasks, and environment, as well as validation testing with users and design development, while encompassing the entire user experience. According to [12], the stages of UCD are specify context of use; specify user and organizational requirements; produce design solutions; and evaluate design. Implementing UCD requires adhering to the principles of a user-oriented focus, integrated design, and sustainability, which involves user testing and interactive design. Therefore, UCD is an iterative and interactive process.

The User Experience Questionnaire (UEQ) enables a quick assessment or evaluation of a system or application's user experience [13]. The results of research [14] using the UEQ user experience evaluation of student academic information systems show that all aspects of user experience give a positive impression. The results of the evaluation for each aspect of UEQ are as follows: attractiveness (1.375), clarity (1.552), efficiency (1.354), accuracy (1.377), stimulation (1.346), and novelty (0.855). Research [15] implemented UEQ to analyze user experience on university websites. The results showed positive user perceptions in the aspects of attractiveness (1.142), clarity (1.427), efficiency (1.028), accuracy (0.900), and stimulation (0.974); while the novelty aspect (0.591) was rated neutral. However, according to the benchmark analysis, the website still scored below average compared to other systems.

UEQ-S is a simpler form of UEQ. UEQ-S is used as an evaluation framework for the user experience of applications or systems on a less complex scale. The UEQ-S is used to measure and evaluate applications against pragmatic and hedonic quality variables, typically comprising eight questions. Pragmatic quality refers to quality aspects related to application tasks, whereas hedonic quality encompasses quality aspects unrelated to these tasks [16]. The UEQ was shortened by omitting the measurement of the single dimensions. The short version of the UEQ (UEQ-S) will contain eight items grouped into two meta-dimensions: hedonic and pragmatic quality. Each dimension contains four items. The overall UX value will be accumulated from the mean value of the eight items [17].

The GOBIS application is expected to be developed to be more user-friendly and helpful for the general public. This application improvement is expected to enhance usability and user satisfaction levels, enabling the application to compete effectively with other transportation service applications. Based on the results of literacy studies from previous research, the combination of User Centered Design methods and evaluation using the User Experience Questionnaire in user interface and user experience development is an interesting approach that warrants further study. This research aims to optimize and improve the interface and user experience based on the results of user-centered evaluation. This research integrates the User Centered Design approach with the Short User Experience Questionnaire (UEQ-S). UCD is a user-centered application development method that enables gaining insight from users regarding the application. In the final stage, the evaluation will assess the design and

experience of the application using the UEQ-S approach, which involves users as key stakeholders in the application development process. The UEQ-S results are used to analyze aspects that need improvement within a system.

II. METHODS

The research method employed consists of several stages, as described in Figure 1. These stages are existing application analysis, user needs analysis, redesign, and design evaluation.

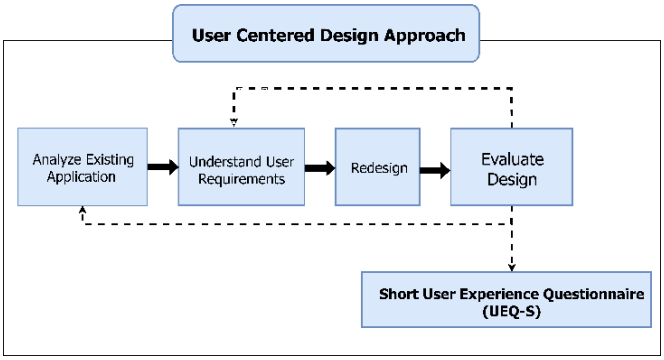

Figure 1. Research Method

A. Analyze Existing Application

This stage involves specifying the application context of use. An initial study was conducted on the existing version of the GOBIS Suroboyo application available on the Google Play Store, focusing on analyzing its features, navigation structure, and user interface. In addition to the technical problems, we analyzed user reviews from the Play Store to identify frequent complaints, usability concerns, and user expectations. This analysis aimed to identify common issues and critical pain points that negatively impact the quality of the user experience.

B. Understand User Requirements

As presented in Table I, a public transportation survey was conducted on active users of the GOBIS application to investigate their needs, perceived challenges, and expectations through a series of structured questions. Data were collected using a combination of open- and closed-ended questionnaires supplemented by brief interviews. The resulting data were analyzed and categorized into core areas of user needs, including usability, information clarity, and accessibility.

TABLE I
PUBLIC TRANSPORTATION USER SURVEY QUESTIONS

No.	Question
1	What Kind of Public Transportation Do You Use?
2	How Frequently Do You Use Public Transportation in A Week?
3	What Public Transportation Apps Have You Used or Are You Currently Using?
4	What Is Your Primary Purpose for Using Public Transportation?
5	What Are the Advantages of The Public Transportation App You Are Currently Using?
6	What Are the Disadvantages of The Public Transportation App You Use?
7	What Features Are Needed in A Public Transportation App?
8	How Do You Usually Find Information About Public Transportation Schedules and Routes?
9	What Platforms Do You Use to Access the App Daily?
10	How Comfortable Are You with Using Map-Based Apps for Navigation?
11	How Vital Are Notification Features (E.G., Reminders That the Bus Is About to Arrive) to You?
12	What Is Your Most Convenient Payment Method If an In-App Payment Feature Is Available?
13	Would You Like to Use an App Specifically for Tracking Public Transportation?

C. Redesign

During this stage, interface design and user experience are developed based on observations and analysis of user needs surveys. The output of this stage is a wireframe and high-fidelity prototype with improvements to GOBIS Suroboyo's features that previous users have complained about. The design developed also adjusts respondents' suggestions regarding the specifications of public transportation applications that suit user needs. The GOBIS Suroboyo app redesign was made using Figma. This prototype design was created to be easy and natural for users. It considers user preferences and uses design rules, including Gestalt laws [18], which help arrange visual elements so they are naturally understood and feel clear and intuitive.

To ensure the prototype design meets user needs, we followed an iterative process. After each iteration, we gathered feedback directly from users, which was then incorporated into the next version of the prototype. This feedback loop allowed us to continuously refine the design based on real-world user interaction, ensuring the final prototype was both user-friendly and effective.

D. Evaluate Design

In the initial, early prototyping usability testing stage, respondents will test the application prototype through several test scenarios. This phase will consist of a single iteration of testing. Researchers will not provide assistance or time limits to users. This approach helps determine user understanding of the application, identify potential problems, and assess the task length. Table II outlines the user test scenario against the GOBIS redesigned prototype.

TABLE II
REDESIGN GOBIS APPLICATION TEST SCENARIO

No.	Question
1	Find A Bus Route from "A" To "B" Location
2	Check Bus Position in Real-Time
3	Buy And Check the Ticket History
4	View The Bus Operation Schedule
5	Report A Problem and Contact the Customer Service
6	View Bottle Points Detail
7	Balance Top-Up and View Transaction History
8	View Recent Information and Notification

After conducting usability testing with the available test scenarios, the designed prototype was tested on thirty potential users. Each participant was asked to interact with the prototype and complete the UEQ-S questionnaire, which consists of eight bipolar word pairs. The UEQ-S uses a 7-point Likert scale for its eight items [19]. This instrument assesses two key dimensions of user experience: pragmatic quality (measuring functionality, usability, and clarity of the interface) and hedonic quality (measuring emotional appeal, engagement, and user delight) [20]. The scores for each aspect were processed to calculate the average values, which were then presented in the form of a bar graph. The instruments, categorized as pragmatic and hedonic variables, are summarized in Table III.

TABLE III
UEQ-S INSTRUMENT FOR GOBIS SUROBOYO REDESIGN PROTOTYPE

No.	Pragmatic Quality	Hedonic Quality
1	How Practical Is This App When You Use It?	How Attractive Is the Interface of This App?
2	Is The Information and Navigation in the App Easy to Understand?	Does It Feel Innovative or Just Plain Ordinary?
3	How Efficient Is This App in Helping You Complete Your Tasks?	Was The Experience of Using This App Enjoyable?
4	Did You Find the Interface Clear or Confusing?	How Aesthetically Pleasing Is the App's Design?

III. RESULTS AND DISCUSSION

This study adopted a user-centered design approach to analyze user-related problems and gain deeper insights for the redesign process. It was selected for its emphasis on active user involvement in every development phase. By using the UCD approach, user expectations and satisfaction will increase. User-centered design is a framework for interface and experience design in application development.

A. Existing Application Analysis

An analysis of user reviews from the GOBIS Suroboyo application version 5, as of April 2025 (installed on Android phones) reveals several critical pain points in the existing user interface and experience. According to Figure 2, the most frequently reported issues were technical problems within the application, such as bugs, errors, and crashes (25 reports). These were followed by user problems during the registration and login process, which were reported 18 times. These functional issues hinder user engagement and may result in discontinuing the app usage. There were 15 reports highlighting issues, including poor interaction design, an unresponsive interface, and a lack of responsiveness to user input.

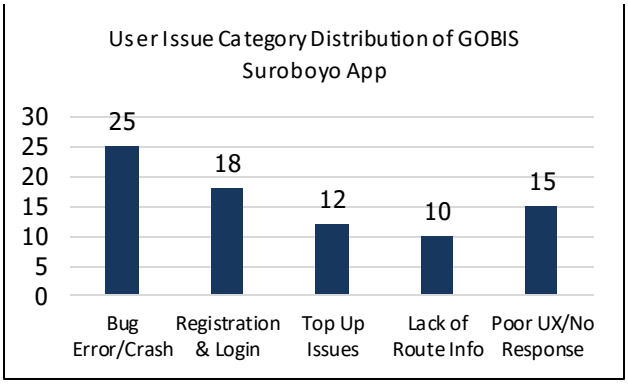

Figure 2. User Issue Category Distribution of GOBIS Suroboyo App

Additionally, 10 reports revealed unclear route information, indicating that the app does not fulfill its main requirements. These insights highlight a critical need to upgrade the interface, simplify the flow, and enhance system responsiveness for a more effective and user-friendly experience.

B. User Requirements

The user survey on the GOBIS Suroboyo app, with feedback gathered from an online survey, highlights several UI/UX insights. The survey primarily reflects insights from Surabaya's highly digitally active and economically productive population, with the majority of respondents (81.3%) aged 18-35. The notable representation of users over 45 (12.5%) further indicates the app's potential for broader appeal across diverse age groups. This demographic composition offers valuable insights into user perceptions of ride-hailing applications like GOBIS Suroboyo.

As shown in Figure 3, users valued clear, convenient features like digital payment integration, real-time vehicle tracking, and transparent fare displays, which enhanced usability by reducing conflict and improving trust. However, major UI/UX challenges were identified, as illustrated in Figure 4, including delayed tracking data, inconsistent schedule information, confusing interface layouts, and frequent bugs or crashes. These issues affect user trust and satisfaction, especially commutes in critical time.

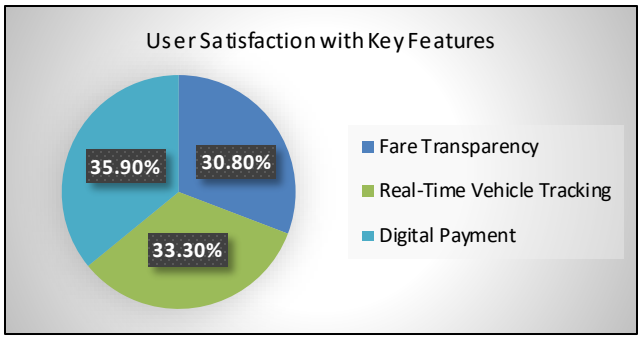

Figure 1. User Satisfaction of Key Features

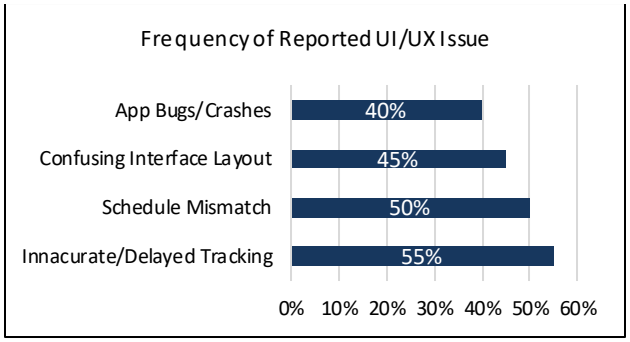

Figure 2. Frequency of Reported UI/UX Issues

According to Figure 5, many users express need for real-time updates, clearly display estimated time arrival (ETA), clear bus route information, and multilingual support to enhance accessibility and usability. Overall, the findings highlight the necessity of user-friendly interface design, consistent system feedback, and stable performance, particularly on the most commonly used platform such as Android.

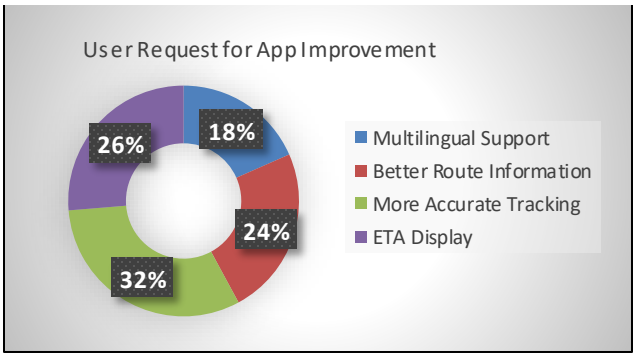

Figure 3. User Requests for Improvements

However, implementing UCD principles often faces significant obstacles. These can include: difficulty in gathering comprehensive user feedback (especially from diverse user groups or in environments with limited connectivity) and resource constraints (limited budget, time, or skilled personnel for extensive user research and iterative design).

C. Application Redesign

In this process, a new design was refined and prototyped, aligning with the identified areas for improvement and the proposed solutions derived from the user requirement analysis. The prototype design was developed in response to user feedback that indicated difficulty and challenges when accessing the application. This early prototyping phase involved a single iteration to quickly validate the core design changes. The features redesigned in this study are summarized in Table IV, showing the comparison between the previous and the redesign.

TABLE IV
FEATURE COMPARISON OF PREVIOUS AND REDESIGN

Feature	Previous Design	Redesign
Homepage	√	√
Bus Route Search	X	√
Bus Tracking	√	√
Bus Ticketing	√	√
Bottle Point	√	√
Reward Redemption	√	√
Information	√	√
Notification	X	√
Language Switching	X	√
History	√	√
FAQ	√	√
Profile Update	X	√

1) Homepage

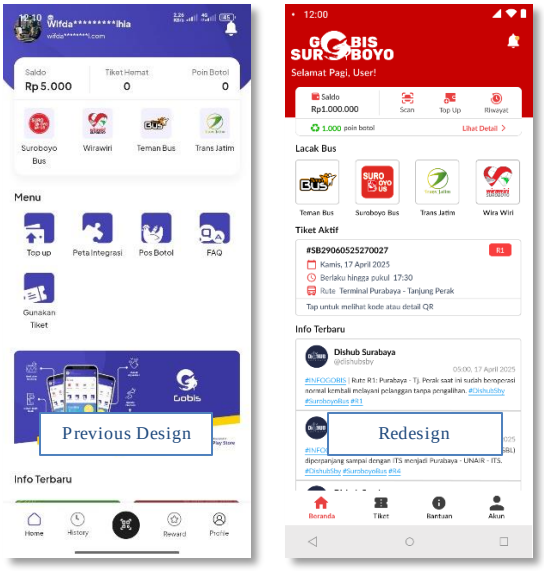

Figure 4. Previous and Redesigned of Homepage

The home page of the GOBIS Suroboyo application, in both its previous and redesigned versions, is shown in Figure 6. On the old design home page, the menu or features provided are located in the center of the page. There are "Top up", "Peta Integrasi", "Poin Botol", “FAQ”, and "Gunakan

Tiket" menus. The menus are not well categorized and scattered, despite the navigation bar already having a feature icon that represents the menu category. Likewise, the icons of Suroboyo Bus, Wara Wiri, Teman Bus, and TransJatimare placed in a single grid with Balance, Save Tickets, and Bottle Points, causing confusion among users about the purpose of these icons and designs, whether they are intended for purchasing transportation tickets or other functions. After the redesign, the menu position is better and grouped.

2) Bus Route Search

In the GOBIS Suroboyo application, users can access bus routes based on existing options. However, most users have expressed concerns in finding specific bus routes within the application, mainly due to inefficient search features. They struggled to find routes based on bus codes or route names, which were less user-friendly and more time-consuming. To address this issue, as shown in Figure 7, the redesigned interface introduces several usability improvements, including a search bar that helps users to identify bus routes using code or route name. Each route is now clearly labeled with both its bus code and name to improve clarity and route identification easily.

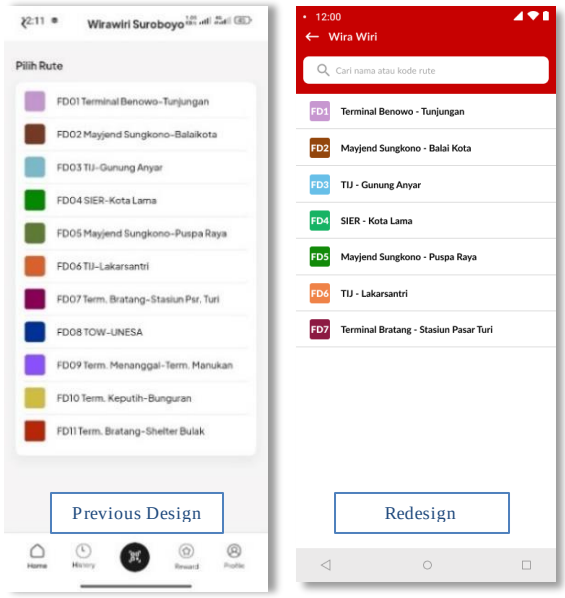

Figure 7. Previous and Redesigned Bus Route Page

3) Bus Tracking

In addition to difficulties in finding bus routes, another usability issue is the limited effectiveness of the real-time tracking system. Most users reported missing key information such as bus location, route stops, operating hours, and estimated time of arrival (ETA). To address this issue, a new design was developed (Figure 8), featuring a more intuitive layout with route visualization, clearly labelled stops, and an enhanced information panel displaying detailed route and schedule data.

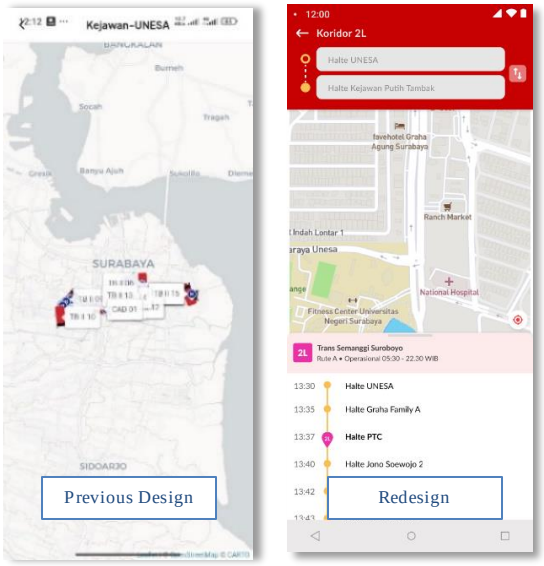

Figure 8. Previous and Redesigned Real-Time Bus Tracking Page

4) Bus Ticketing

Another observation reveals that most users prefer purchasing bus tickets through digital payment methods, considering them more convenient and efficient. Moreover, most application users are within the 20–35 age group. Figure 9 shows the bus ticket purchasing page before redesign.

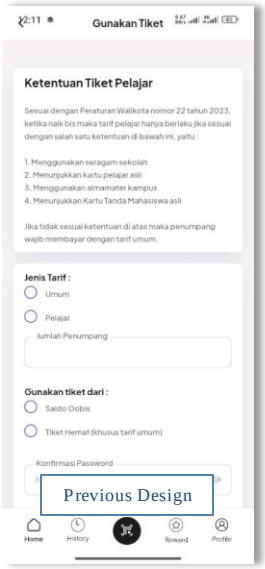

Figure 9. Previous Design of Bus Ticketing Page

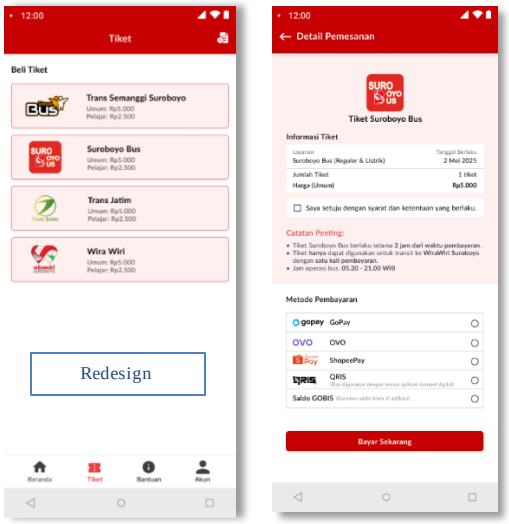

Figure 10. Redesigned Bus Ticketing Page

In the previous design, the ticketing process required users to confirm transactions using a password. While this feature enhanced security, it also created difficulty for users who forgot passwords. To overcome this issue, the updated ticket purchasing flow offers a more accessible, efficient, and user-friendly experience by removing the password confirmation step and integrating multiple digital payment options, as illustrated in Figure 10. After successfully purchasing a ticket, users can also access and view their ticket history, as shown in Figure 11, which now clearly displays the status of each ticket.

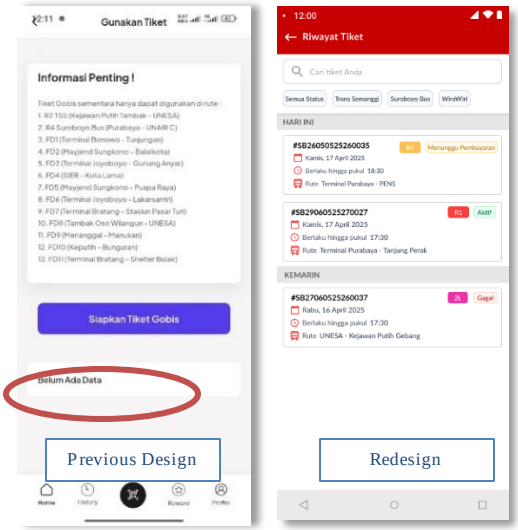

Figure 11. Previous and Redesigned Ticket History Page

5) Bottle Point and Reward Redemption

The GOBIS Suroboyo application includes a unique feature that allows users to earn points by recycling bottles. This feature is designed to raise awareness of plastic waste among Surabaya citizens and bus passengers. To improve usability, the feature's flow has been redesigned for greater flexibility and a better user experience.

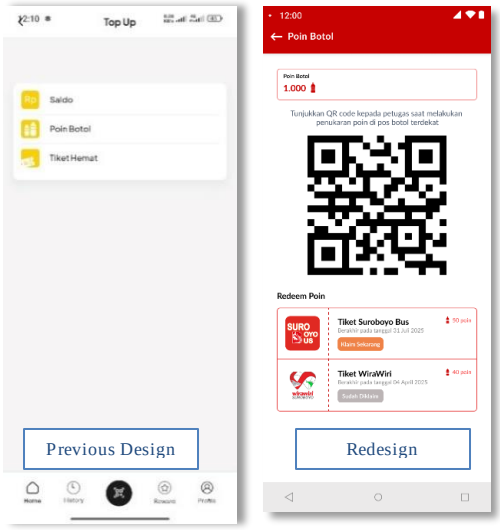

Figure 12. Previous and Redesigned Bottle Point Page

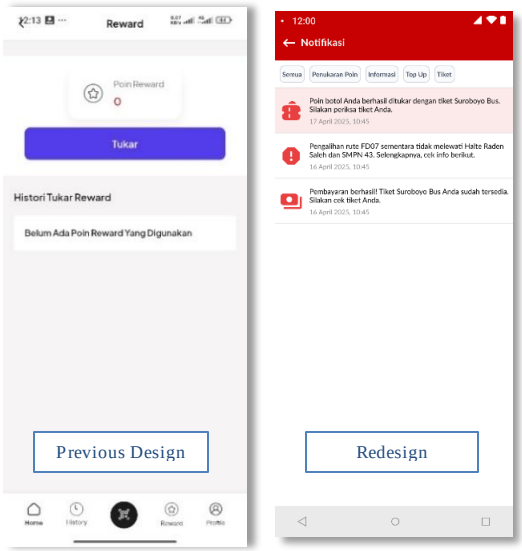

Figure 13. Previous and Redesigned Reward Redemption Page

As shown in Figure 12 and Figure 13, the previous design made it difficult for users to check their points and redeem rewards due to a scattered menu structure and limited information. In the updated version, a new feature for bottle redemption points has been seamlessly integrated. All key functions related to this, particularly point balance, a dedicated QR code for bottle redemption, and available rewards, are now presented on a single, clear screen. Reward details, such as required points and expiration dates, are clearly displayed, and users receive notifications after successful redemptions.

6) Information and Notification

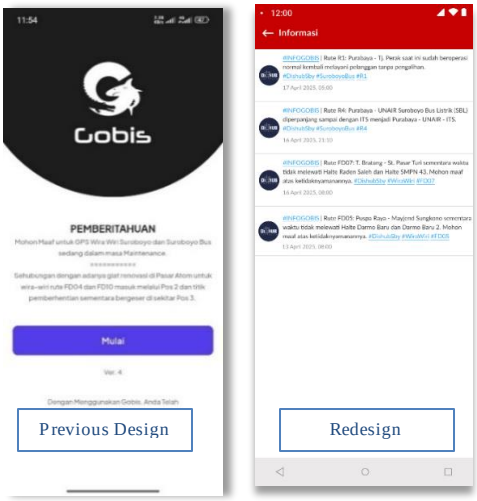

Figure 54. Previous and Redesigned Information Feature

Figure 14 illustrates a comparison between the previous and updated designs of the GOBIS Suroboyo application's information feature. In the previous version, the announcement of route changes or important information appeared on the start screen, offering immediate visibility but reducing visual clarity. The new design introduces a separate section in the "Informasi" menu, displaying all information as a structured list with timestamps and route tags. This adjustment enhances the user interface by reducing the main screen and improving the overall usability and maintainability of the application.

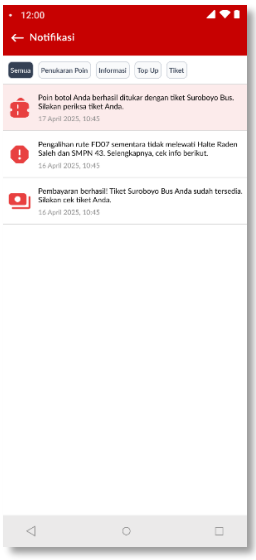

Figure 65. Notification Feature

Figure 15 shows the notification page on the redesigned application. In the previous design of the GOBIS Suroboyo application, there was no notification feature to alert users to updates in information, ticket status, and important information that needed to be known immediately, such as bus rerouting or delays in bus arrival. Users can choose from four notification filters: point redemption, information, top up, and tickets. This feature can increase user engagement with the application, raise awareness, and enhance the application's efficiency.

7) Language Switching

In the previous app design, there was no language switching feature. Users suggested this feature after we conducted a user survey on the GOBIS Suroboyo app. Figure 16 shows the design of the language option feature. This feature can assist users who struggle with the app due to language barriers. The original app, which is in Bahasa Indonesia, can also be expanded to support foreign languages, catering to tourists and foreign travelers who use the app.

Figure 76. Language Switching Feature

Based on the observation and redesign process of the Android version of the GOBIS Suroboyo application, the most difficult feature to optimize is the real-time bus tracking feature. One of the challenges in optimizing the design of the real-time bus tracking feature is its dependence on the accuracy of the GPS and the stability of the network connection. Discrepancies between the actual position of the bus and the displayed data can decrease user confidence in the application. In addition, the visualization of location and route data in a limited interface, such as a mobile phone screen, requires an appropriate design approach so that the information remains easy to understand without confusing the user.

However, the redesign process carried out on several features and pages of GOBIS Suroboyo in this study took one

month using Figma as a free design and prototyping tool. The short and limited design process resulted in a lack of in-depth exploration and suboptimal results. The influence of low costs in the redesign process in this study is the use of a less optimal prototyping tool, which is unable to access premium features, resulting in testing that is limited to only the most important features.

D. Design Evaluation

Referred to the research method of this study, the following stage after designing the prototype of the redesigned GOBIS application was evaluating the design. Design evaluation is an essential step of User Centered Design that involves users to help build the application. The evaluation of the redesigned interface was conducted using the User Experience Questionnaire Short (UEQ-S), which measures users' perceptions of both hedonic and pragmatic aspects of the new design. The questionnaire's format allows users who test the application to express their judgment and feelings [21]. This quantitative assessment is an iterative input for the next design. Generally, larger sample sizes are necessary for complex or critical projects, whereas smaller samples are sufficient for evaluating early-stage designs [22].

Evaluation with UEQ was carried out by 30 participants who had tested the redesigned application prototype. UEQ results were obtained through filling out the UEQ questionnaire in the form of a Google Form by participants. Participants are students, lecturers, and private workers. Participants are on average 23 years old and familiar with using applications on smartphones. A total of 36.7% of participants claimed to have used the GOBIS Suroboyo application, while the remaining 63.3% had never used this application. Based on user experience in using public transportation, 13.3% of participants often, 50% of participants rarely, 33.3% sometimes, and the remaining 3.3% never use public transportation.

1) UEQ-S Analysis

Following the usability testing conducted through a series of test scenario tasks, the next step in this research involved measuring user experience using the User Experience Questionnaire (UEQ). The official UEQ website on ueq-online.org/ provides tools that facilitate the analysis of user experience data derived from the tested design. This study employed the short version of the questionnaire, UEQ-S. The questionnaire has 8 items. Each rated on a 7-point Likert scale ranging from 1 to 7. The respondents' answers were subsequently entered into the UEQ-S Data Analysis Tool, which converts the 1–7 scale to a standardized range of -3 to +3 [20]. The results of the UEQ-S of 30 participants who evaluated the redesigned GOBIS Suroboyo high-fidelity prototype are presented in Table V.

TABLE V
UEQ-S RESULT

Dimension	Mean	Comparison to Benchmark
Pragmatic Quality	1.425	Above average
Hedonic Quality	1.69	Excellent
Overall	1.56	Good

Based on the table of UEQ analysis results, which were obtained using the UEQ-S Data Analysis Tool, the hedonic quality dimension received a high score of 1.69, categorized as "Excellent" according to the benchmark. Hedonic quality relates to user engagement, enjoyment, and emotional appeal. These results indicate that the high-fidelity prototype of the redesigned GOBIS Suroboyo has the potential to positively engage users and motivate them to use the application with a sense of enjoyment. Meanwhile, the pragmatic quality dimension scored 1.425, which corresponds to the "Above Average" category in the benchmark. This suggests that the redesigned interface is perceived as user-friendly and efficient. Overall, the UEQ-S results reflect a positive evaluation, with the average score of 1.56 categorized as good.

TABLE VI
MEASUREMENT RESULTS OF PRAGMATIC AND HEDONIC QUALITY

Item	Mean	Variance	Std. Dev.	Negative	Positive	Scale
1	1,5	1,5	1,2	obstructive	supportive	Pragmatic Quality
2	1,2	2,1	1,5	complicated	easy	Pragmatic Quality
3	1,8	1,4	1,2	inefficient	efficient	Pragmatic Quality
4	1,2	2,0	1,4	confusing	clear	Pragmatic Quality
5	1,8	1,4	1,2	boring	exciting	Hedonic Quality
6	1,5	1,3	1,1	not interesting	interesting	Hedonic Quality
7	1,9	0,9	1,0	conventional	inventive	Hedonic Quality
8	1,6	1,7	1,3	usual	leading edge	Hedonic Quality

Table VI presents the complete measurement results for both pragmatic and hedonic quality dimensions. Overall, all eight aspects were tested among a few respondents and received positive scores. The highest score within the

pragmatic dimension was for the efficiency aspect, with a mean value of 1.8. In the hedonic dimension, the innovative aspect achieved a high score, with a mean value of 1.9. The comparison of UEQ-S results with the benchmark scale presented by Figure 17.

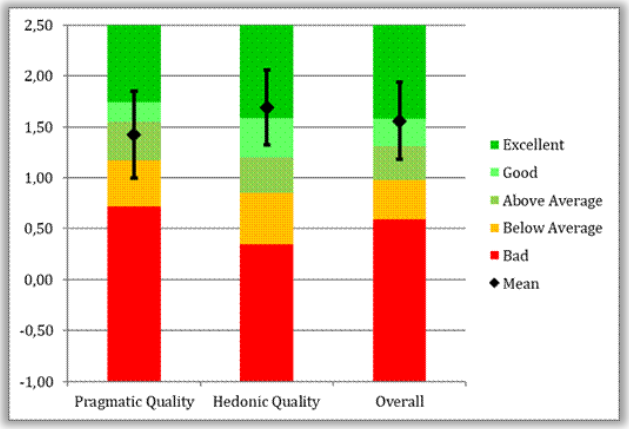

Figure 87. Comparison of UEQ-S Results with Benchmark Scale

The results of the UEQ-S scale measurement, based on eight questionnaire items distributed to 30 respondents, indicate that the pragmatic quality dimension is rated as above average, while the hedonic quality dimension is rated as excellent. Overall, the high-fidelity prototype in this study received positive feedback and scores from respondents, although improvements are still needed in the area of pragmatic quality.

In addition to the UEQ-S scale measurement, think-aloud sessions were conducted with the prototype design. Participants' verbal feedback confirmed that users appreciated the prototype's strong core functionalities (like real-time bus tracking and top-ups) combined with an intuitive, attractive, and easy-to-understand interface. However, the sessions also identified critical areas for improvement, including the need to enhance visual clarity and interactive functionality specifically, addressing confusing iconography (such as the real-time bus icon), optimizing feature layout, improving application responsiveness, and providing clear initial guidance. Addressing these aspects is vital for an overall smoother and more intuitive user experience.

2) Time-Based Efficiency

Figure 18 shows the average task completion duration for eight usability tasks, indicating system efficiency. A positive learning curve is noticeable as users adapt to the application interface. Task 2 had the longest completion time (~31s), while tasks 5-8 were completed efficiently (~5-7s), suggesting improved interaction. There was slight deviation in Task 7 (~13s) possibly due to complexity. These patterns align with UEQ dimensions of efficiency and dependability, with early delays suggesting a need to improve perspicuity. The integration of task performance and UEQ data offers a comprehensive UX assessment and informs iterative design improvement.

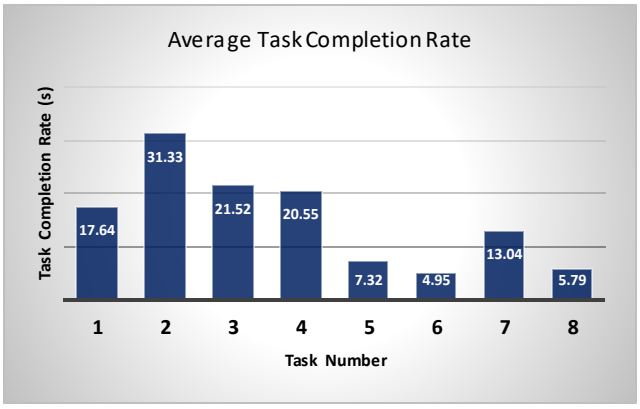

Figure 98. The Average Task Completion Rate (in seconds)

Elaborating on these outcomes, the time efficiency reflected in both task metrics and subjective UEQ evaluations highlights the importance of a revamped and streamlined interaction design. In this study, time-based efficiency (TBE) was applied as a key metric to evaluate the performance of the new prototype design. It was calculated as the average time required for users to successfully complete each task, as shown in Equation (1).

$$TBE = \sum_{j=1}^{R} \sum_{i=1}^{N} \frac{n_{ij}}{t_{ij}} \quad (1)$$

Based on the calculation, the results of TBE were calculated to be 0.66 goals per second. This value indicates a moderate level of interaction efficiency, indicating that users were generally able to complete tasks successfully within a reasonable time frame [23]. This TBE result indicates that the system enables users to complete approximately two tasks every three seconds, reflecting a relatively efficient interaction rate [24]. It also supports the system's usability and provides evidence of a positive learning curve. Nonetheless, there is still some potential to further optimize specific interaction components to reduce task completion times and improve overall system responsiveness.

IV. CONCLUSION

This study successfully leveraged User-Centered Design (UCD) and the UEQ-S method to optimize the redesign of the GOBIS Suroboyo app. The high-fidelity prototype yielded encouraging results, demonstrating positive user experiences (pragmatic score of 1.425, hedonic score of 1.69) and moderate interaction efficiency (0.66 goals per second).

However, a critical perspective is essential. While the "positive" UEQ-S scores are encouraging, it is crucial to assess if they genuinely reflect an outstanding user experience or merely meet basic expectations for a daily public transport app in Surabaya. The "moderate" interaction efficiency also presents a potential bottleneck for a real-time, decision-

critical application, demanding focused design enhancements. Furthermore, prototype success does not guarantee live performance. Real-world factors like backend stability and the diverse range of devices used in a dynamic city like Surabaya can significantly impact the actual user experience, therefore requiring continuous validation.

It is essential to note that, although this study employed the UEQ-S, it did not thoroughly measure the specific UX qualities of pragmatic and hedonic quality. For future iterations, we suggest employing the full version of the UEQ as a more comprehensive experience evaluation questionnaire, ideally with a larger number of respondents to capture a broader range of user perspectives. We also recommend evaluating the two applications by comparing their test scenarios to establish a significant threshold based on the application redesign results. Additionally, future work should consider a combined methodology, incorporating A/B testing to effectively increase conversion rates for both new and existing users, complemented by the UEQ-S to assess how version changes influence user UX perception in a live environment. This extended approach, including a second development iteration beyond initial prototyping, would further enhance the user experience of the GOBIS Suroboyo app.

REFERENCES

[1] Z. A. Haqie, R. E. Nadiah, and O. P. Ariyani, "Inovasi Pelayanan Publik Suroboyo Bis Di Kota Surabaya," *JPSI (Journal of Public Sector Innovations)*, vol. 5, no. 1, p. 23, 2020, doi: 10.26740/jpsi.v5n1.p23-30.

[2] W. Yuliawati, Suroso, and I. D. Pramudiana, "Efektivitas Pelayanan Suroboyo Bus melalui Aplikasi Golek Bis (GOBIS) dalam Rangka E-Government (Studi pada UPTD Pengelolaan Transportasi Umum Dinas Perhubungan Surabaya)," vol. 1, no. 2, 2023.

[3] Deacon and Pamala, *UX and UI Strategy: A Step by Step Guide on UX and UI Design*. 2020.

[4] N. R. Wisesa, "User Interface dan User Experience untuk Mengelola Kepuasan Pelanggan," *Jurnal Sosial Humaniora Terapan*, vol. 3, no. 2, 2021, Accessed: May 31, 2025. [Online]. Available: https://scholarhub.ui.ac.id/jsht/vol3/iss2/2

[5] M. Zeiler *et al.*, "A User-Centered Design Approach for a Screening App for People With Cognitive Impairment (digiDEM-SCREEN): Development and Usability Study," *JMIR Hum Factors*, vol. 12, 2025, doi: https://doi.org/10.2196/65022.

[6] R. Ardhya Bisma, L. Fanani, and A. Hendra Brata, "Evaluasi dan Perbaikan User Interface Aplikasi Mobile GOBIS Suroboyo Bus berdasarkan Usability Testing menggunakan Metode Design Thinking," *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, vol. 5, no. 10, pp. 4591–4601, 2021, [Online]. Available: http://j-ptiik.ub.ac.id

[7] H. Fitriaruli and D. F. Suyatno, "Analisis Perbaikan User Interface dan User Experience pada Aplikasi Gobis (Suroboyo Bus) menggunakan Metode Design Thinking," *Journal of Emerging Information Systems and Business Intelligence*, vol. 5, no. 1, 2024.

[8] A. Barki and A. Pramono, "Perancangan Ulang User Interface Aplikasi Mobile GOBIS Surabaya berdasarkan Evaluasi User Experience untuk Peningkatan Pemahaman dan Fitur Pengguna dengan Metode User Centered Design," *Jurnal Teknik Informatika Kaputama (JTIK)*, vol. 9, no. 1, p. 12, 2025.

[9] D. A. P. Prasetya, Y. Purwati, and S. Suliswaningsih, "Redesign Golek Bis Application Using UCD (User Centered Design) Approach," *JURTEKSI (Jurnal Teknologi dan Sistem Informasi)*, vol. 11, no. 1, pp. 23–30, Dec. 2024, doi: 10.33330/jurteksi.v11i1.3231.

[10] M. Indra Gunawan, R. Indah Rokhmawati, and N. Hendrakusma Wardani, "Evaluasi dan Perbaikan Antarmuka Pengguna Menggunakan Pendekatan User Centered Design (UCD) dan Card Sorting (Studi Kasus: Website Awake Project Malang)," vol. 3, no. 5, pp. 4835–4845, 2019, [Online]. Available: http://j-ptiik.ub.ac.id

[11] "Ergonomics of human-system interaction – Part 10: Human-centred design for interactive systems," 2010.

[12] M. Mujinga, "Online Banking User Experience: A User Experience Questionnaire (UEQ) Assessment in South Africa," 2024.

[13] M. Schrepp, *User Experience Questionnaire Handbook*. 2023. doi: 10.13140/RG.2.1.2815.0245.

[14] S. Rasio Henim and R. Perdana Sari, "Evaluasi User Experience Sistem Informasi Akademik Mahasiswa pada Perguruan Tinggi menggunakan User Experience Questionnaire," *Jurnal Politeknik Caltex Riau*, vol. 6, no. 1, pp. 69–78, May 2020, [Online]. Available: https://jurnal.pcr.ac.id/index.php/jkt/

[15] A. Dyah Savitri and C. Indah Ratnasari, "Implementasi User Experience Questionnaire (UEQ) untuk Mengevaluasi Pengalaman Pengguna pada UII RAS," *KLIK: Kajian Ilmiah Informatika dan Komputer*, vol. 4, no. 3, pp. 1352–1361, Dec. 2023, doi: 10.30865/klik.v4i3.1444.

[16] D. Khuntari, "Analisis Pengalaman Pengguna Aplikasi Gojek dan Grab dengan Pendekatan User Experience Questionnaire," *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 8, no. 1, Apr. 2022, doi: 10.28932/jutisi.v8i1.4499.

[17] M. Schrepp, A. Hinderks, and J. Thomaschewski, "Applying the User Experience Questionnaire (UEQ) in Different Evaluation Scenarios," *Springer International Publishing*, vol. 8517, pp. 383–392, 2014.

[18] A. Aliyev, "The Application of Gestalt Theory in UX/UI Design: Principles and Their Importance for Users," Jun. 2024. doi: 10.51582/interconf.19-20.12.2024.

[19] S. Nouriska, M. C. Untoro, A. Afriansyah, M. Praseptiawan, W. Yulita, and I. F. Ashari, "User Experience Answer System Automatically with User Centered Design and User Experience Questionnaire-Short," *JITK (Jurnal Ilmu Pengetahuan dan Teknologi Komputer)*, vol. 9, no. 1, pp. 81–88, Aug. 2023, doi: 10.33480/jitk.v9i1.4152.

[20] M. Schrepp, A. Hinderks, and J. Thomaschewski, "Design and Evaluation of a Short Version of the User Experience Questionnaire (UEQ-S)," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 4, p. 103, May 2017, doi: 10.9781/ijimai.2017.09.001.

[21] N. D. Priandani, Y. A. Sandy, and N. R. Sari, "Jurnal Teknologi dan Manajemen Informatika User Experience Evaluation of Botani Mobile Application using User Experience Questionnaire," *Jurnal Teknologi dan Manajemen Informatika*, vol. 9, no. 1, pp. 12–19, 2023, [Online]. Available: http://http://jurnal.unmer.ac.id/index.php/jtmi

[22] R. Macefield, "How to Specify the Participant Group Size for Usability Studies: a Practitioner's Guide," *J. Usability Studies*, vol. 5, no. 1, pp. 34–45, Nov. 2009.

[23] K. Hornbæk, "Current practice in measuring usability: Challenges to usability studies and research," *Int J Hum Comput Stud*, vol. 64, no. 2, pp. 79–102, 2006, doi: https://doi.org/10.1016/j.ijhcs.2005.06.002.

[24] "Ergonomics of human-system interaction-Part 11: Usability: Definitions and Concepts," 2018. [Online]. Available: https://standards.iteh.ai/catalog/standards/sist/d38dc274-d8d4-4fb9-8206