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Analyzing User Behavior in UI/UX of Mobile Attendance Aplications for Employees of the Regional Transportation Office of the Province of Sulawesi Utara

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ABSTRACT

Effective user interface and user experience (UI/UX) design is a crucial investment in ensuring the success of mobile application development. By prioritizing user demands and preferences, effective UI/UX design can generate a favorable and fulfilling experience for users, while enhancing the value and functionality of the application. The objective of this study is to examine user behavior in UI/UX of the mobile attendance application for employees of the Regional Transportation Office of the Province of Sulawesi Utara and determine the degree of usability of their mobile application. The study included all employees of the Regional Transportation Agency of Sulawesi Utara Province who used mobile attendance devices. Two data collection methods were employed, interviews, which were analyzed using Nielsen Norman Group heuristic evaluation method, and questionnaires, which were analyzed using System Usability Scale (SUS). The results of the heuristic evaluation indicate that the ePegawai application has multiple usability issues of moderate severity that require immediate attention. Additionally, the SUS results reveal that the ePegawai application has achieved an average score of 73, placing it in the "good" category. The research findings indicate that the ePegawai application demonstrates satisfactory usability, while there are specific aspects of the user experience that require enhancement.

Keywords: ui/ux design, usability, sus, heuristic evaluation, mobile application

INTRODUCTION

Our interactions with our surrounds have changed as a result of the rapid integration of various areas of our life due to the rapid development of the times. The importance of mobile applications is one clear example of this integration in action. in overseeing a variety of tasks. Installed on mobile devices like smartphones, tablets, and smartwatches, software known as mobile applications is written using computer programming. Mobile applications' user interface and user experience (UI/UX) design plays a significant role in drawing users in and delivering a positive experience.

This study will concentrate on conducting a comprehensive examination of the utilization of mobile applications for attendance management within the Regional Transportation Agency of Sulawesi Utara Province. The application's ability to enhance ease and efficiency for employees in reporting their daily attendance will be emphasized. Although there is significant promise for enhancing administrative procedures, however, there is an inequity in the amount of focus dedicated to these mobile applications. This situation highlights a significant obstacle, namely the insufficient comprehension of the app's capabilities and

advantages. Lacking comprehension of the features and advantages offered by mobile attendance applications might lead to a subpar user experience. This has the potential to result in irritation and challenges while engaging with the application, which ultimately contradicts the intention of implementing this technology. Thus, to tackle this difficulty, it is necessary to guarantee the presence of sufficient support resources. Providing prompt and helpful assistance will instill users with assurance that they can efficiently and expeditiously solve any challenges.

Employees' experiences using mobile attendance apps can be better understood by doing in-depth research with them. With the right data collection and analysis, we can create more tailored solutions to solve certain problems. To ensure that employees realize that this step is being taken to improve their experience, however, open and clear communication with them is necessary to support this research endeavor. All things considered, the Regional Transportation Office of Sulawesi Utara Province's integration of technology through mobile attendance applications is a tangible illustration of how improvements in technology may improve daily operations. However, there have been obstacles to user adoption and understanding that have made the road to realizing this potential less than straightforward. Incorporating a thorough methodology comprising lucid documentation, prompt technical assistance, detailed research, and feedback usage might make this mobile application a valuable and productive instrument for accomplishing administrative objectives.

In order to address any queries regarding the behavior of users of mobile applications—more especially, UI/UX design issues—regarding employees of the Regional Transportation Agency of Sulawesi Utara Province, researchers apply SUS and heuristic evaluation techniques based on the difficulties they have acquired. The terms SUS and heuristic evaluation methods refer to different things. SUS is a straightforward yet accurate tool for gauging usability, whereas heuristic evaluation is a computer software usability checking method that researchers use to identify possible issues with user interface design. These two approaches will be combined in this investigation.

LITERATURE REVIEW

UI/UX Design

User Interface (UI) and User Experience (UX) design are critical components in the development of digital products, focusing on creating interfaces that are not only visually appealing but also functional and user-friendly (Jati et al., 2024). UI design refers to the process of designing the visual elements of a product, including layout, buttons, colors, and typography, to facilitate user interaction. UX design, on the other hand, encompasses the overall experience a user has when interacting with a product, which includes aspects such as usability, accessibility, and satisfaction (Darmawan et al., 2022).

In recent literature, UI/UX design is described as a user-centered approach that prioritizes the needs and preferences of users throughout the design process (Darmawan et al., 2022). This approach often involves methodologies such as Design Thinking, which emphasizes empathy with users, iterative prototyping, and testing to refine the design based on user feedback. For instance, a study highlighted the importance of involving users in the design process to ensure that the final product meets their needs and expectations, thereby enhancing user satisfaction and engagement (Prayoga et al., 2023).

Moreover, effective UI/UX design is recognized as essential for the success of applications and websites, as it directly impacts user retention and overall satisfaction. Research indicates that a well-designed interface can significantly improve the usability of a

system, making it easier for users to navigate and accomplish their tasks efficiently (Putra & Saputri, 2024). The integration of UI and UX design principles is crucial in creating cohesive and intuitive experiences that resonate with users and encourage continued interaction with the product (Moura et al., 2023).

System Usability Scale

Usability, as defined by the International Organization for Standardization (ISO), refers to the degree to which a product can be effectively, efficiently, and satisfactorily utilized by specific users to achieve specific goals within a certain context of usage. Usability refers to the technology's capacity to enable users to accomplish their duties securely, proficiently, and satisfactorily within a defined context or setting.

The System Usability Scale (SUS) is a widely recognized questionnaire designed to evaluate the usability of various systems, particularly in the context of software and technology. Developed by John Brooke in 1986, the SUS questionnaire is used to evaluate products, services, hardware, software, websites and applications (Cestari et al., 2021). It consists of ten questions that users respond to on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree" (Bendtsen et al., 2024). The scale is particularly valued for its brevity and ease of use, allowing researchers and practitioners to quickly gather subjective assessments of usability across different systems and applications (Nicolaidou et al., 2022). Studies have demonstrated that the SUS exhibits good reliability and validity, making it a preferred choice for usability evaluations in diverse fields, including healthcare, education, and technology (Da Col et al., 2021). Multiple research studies have employed the System Usability Scale (SUS) for purposes such as evaluating usability (Singh et al., 2024) and improving the user interface (UI) and user experience (UX) of a mobile application (Adnan et al., 2023). Furthermore, its ability to provide a single usability score facilitates comparisons across different systems and studies, enhancing its utility in benchmarking usability performance. The SUS is a critical instrument in the field of usability research, offering a standardized method for assessing user perceptions of system usability. Its widespread adoption across various domains underscores its importance in improving user experience and guiding iterative design processes.

Heuristic Evaluation

Heuristic evaluation is a usability inspection method that allows evaluators to identify usability problems in user interfaces by employing a set of established heuristics or principles. This method is particularly effective in early design stages, as it enables the identification of issues that may not be apparent during user testing but could be costly to rectify later in the development process (Cho et al., 2022). The heuristic evaluation process consists of several key steps. Initially, evaluators review the interface individually, documenting usability issues based on the heuristics provided (Martínez et al., 2021). After this independent assessment, the evaluators convene to discuss their findings and consolidate their observations into a comprehensive report.

One of the significant advantages of heuristic evaluation is its cost-effectiveness and efficiency. It can be conducted relatively quickly compared to user testing, making it an attractive option for organizations looking to improve usability without extensive resource investment. Additionally, heuristic evaluations can uncover a significant number of usability problems, often more than traditional user testing methods, particularly in the early stages of design (Müssener et al., 2020). This makes it a valuable tool for iterative design processes, allowing for timely refinements before a system's deployment.

METHODS

The steps of the research process are depicted in the Figure 1 below, outlining the steps the researcher took to carry out the investigation.

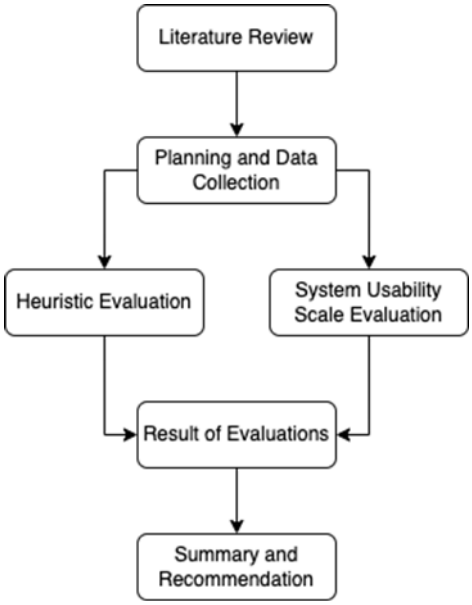

Figure 1. Usability Evaluation Process

The research commenced by conducting a comprehensive examination of pertinent literature in order to get insight into prior studies that were still applicable to the research objectives. Subsequently, the researcher undertook the appropriate arrangements for conducting the tests, encompassing user authentication, procurement of essential tools or instruments, development of test situations, and formulation of interview inquiries. We conducted preliminary testing by performing usability trials on the existing "ePegawai" application. This study encompassed a total of 93 participants, all of whom were employed by the Regional Transportation Office of Sulawesi Utara Province. The process of completing the SUS method questionnaire will encompass all 93 respondents in the population. Every member of the population will take part in assessing the viability of the user's application. Additionally, the ePegawai application will undergo measurement utilizing the heuristic evaluation method. During this phase, researchers will carry out an interview with a preselected specialist. Upon acquiring the interview results, the researcher will disseminate questionnaires utilizing alternative instruments that have comparable study aims. The purpose of this study is to compare the findings with the target of investigation.

By engaging in discussions with experts, researchers aim to acquire comprehensive insights and perspectives. In order to have a whole comprehension of the mobile application attendance system, researchers also necessitate data from additional sources. Both of these data collection methods will produce findings concurrently, which will subsequently be compared to the mean test score of the ePegawai application. This procedure also entails the utilization of statistical techniques for analysis, particularly the System Usability Scale (SUS) method. The subsequent phase is conducting a usability test on the "ePegawai" application, with the participation of the same respondents who took part in the previous trial. Upon completion of this trial, the results will be compared to those of the initial trial to evaluate whether there has

been an enhancement in usability in terms of effectiveness, efficiency, and satisfaction following the implementation of the improvement recommendations.

This study aims to explore the total number of individuals employed at the Regional Transportation Office of Sulawesi Utara Province. The office is divided into two sections: the Main Office, which consists of 64 employees, and UPTD LLAJ, which is located in 10 terminals and has a total of 29 employees. The Regional Transportation Office of Sulawesi Utara Province employs a total of 93 individuals. The study employed primary data collected by researchers. Researchers acquire or produce primary data directly in the course of their research. Within this particular framework, researchers will disseminate questionnaires to those who utilize mobile applications affiliated with the Sulawesi Utara Province Regional Transportation Agency. The data collection strategy in this study entailed distributing questionnaires to respondents through Google Form, based on the identified questions and the established question model in the SUS method.

RESULTS AND DISCUSSION

The researchers initially employed the Heuristic Evaluation and System Usability Scale (SUS) methodologies to gather data from staff working at the Sulawesi Utara Regional Transportation Office. Heuristic Evaluation is employed to assess the usability level based on the principles established by the Nielsen Norman Group, while SUS is utilized to assist the computation of the received data's outcomes.

The attributes of Heuristic Evaluation were elucidated employing a pair of instruments. Initially, interviews were carried out with sources at the Regional Transportation Office of Sulawesi Utara Province. The interviews were conducted using questions that were adapted from the 10 principles of Heuristics Evaluation as defined by the Norman Nielsen group. The severity rating was determined via heuristic judgment. Furthermore, the researchers employed the Heuristic Evaluation Workbook from the Nielsen Norman Group to carry out additional research. The objective was to identify any problems and offer suggestions for improving the ePegawai Application. The report employs two interconnected methodologies: the severity rating calculation, which is utilized to detect information or usability concerns in ePegawai through inquiries from the Nielsen Norman Group, and additional research undertaken by the researchers to reveal more complex hurdles. This allows them to provide customized advice based on the specific difficulties that have been identified. Prior to performing the interview, the researcher employed severity rating to evaluate each question and recorded the interview outcomes in the usability aspect as shown in Table 1.

Table 1
Severity Rating Description

Severity Rating	Description
0	Disagree (system/feature needs to be overhauled)
1	Disagree (there are problems that make it difficult for users)

2	Neutral (there are potential problems that can make it difficult for users)
3	Agree (there are problems that do not really affect users - problems are not important)
4	Strongly Agree (no problem)

Source: Nielsen Norman Group

Table 2

Severity Rating Value for the ePegawai application of the Regional Transportation Agency of Sulawesi Utara Province

Usability Aspect	SR Average Value	Rounding Value
Visibility of System Status (H1)	2,1	2
Match Between the System and the Real World (H2)	2,3	2
User Control and Freedom (H3)	2,1	2
Consistency and Standards (H4)	2,5	3
Error Prevention (H5)	2,4	2
Recognition Rather than Recall (H6)	2,3	2
Flexibility and Efficiency of Use (H7	1,5	2
Aesthetic and Minimalist Design (H8)	2,4	2
Help Users Recognize, Diagnose, and Recover from Errors (H9)	1,7	2
Help and Documentation (H10)	1,7	2

Source: Calculated by Authors

According to the findings of the Heuristic Evaluation assessment presented in Table 2, the ePegawai application of the Sulawesi Utara Regional Transportation Office has an average severity rating of 2.1 on a scale of 2. These findings indicate that the ePegawai application has multiple usability issues of moderate severity that require quick resolution.

According to Figure 2, researchers obtain the outcomes of interviews with the severity rating value 2 (neutral) for principle 1. This demonstrates the user-friendly nature of the program and its positive reception. Nevertheless, throughout the researchers' observations, they noticed a discrepancy between the icon and the actual functionality of a certain feature. The proposed functionality involves the use of a fingerprint icon to initiate the online absence feature, while the actual process of capturing absences is carried out using a facial camera. It is recommended to replace the fingerprint icon with a camera icon for this purpose.

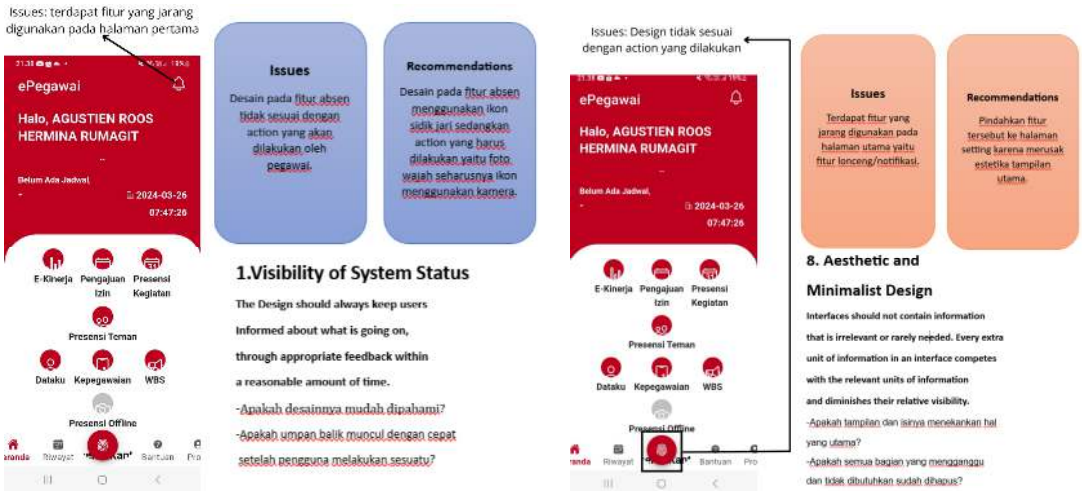

Figure 2. **Usability Evaluation Process**

The usability of the ePegawai application was assessed using the System Usability Scale (SUS) approach. Researchers collect data by distributing a questionnaire through a Google Form to all employees who utilize the ePegawai program. The results of the respondents are then calculated using Excel tools in the following manner:

Table 3
SUS Calculation

Calculated Score										Total	Value (Total x 2,5)
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
270	232	249	195	251	223	238	242	235	144	2279	5697
3	3	3	3	3	3	3	3	3	2	29	73

Source: Calculated by Authors

According to the Acceptability Range, the data collected from 78 participants in the Usability study survey of the ePegawai Mobile Application yielded an average score of 73, indicating a "Good" rating according to the SUS grade rankings scores (Figure 3).

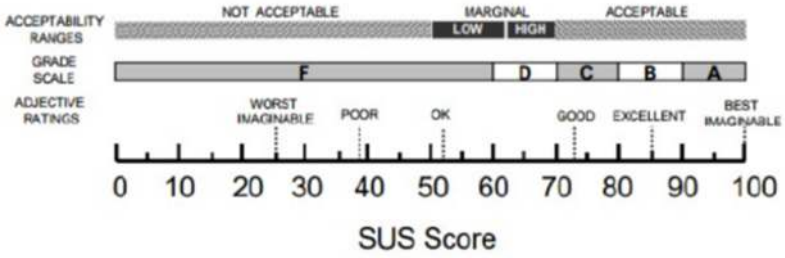

Figure 3. **Grade rankings of SUS scores**
Source: A. Bangor, P.T. Kortum, and J.T. Miller (2009)

CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The research findings indicate that this study intends to ascertain the perspectives of employees regarding the interface design of the mobile attendance application used by the Regional Transportation Office of Sulawesi Utara Province. This study included two methodologies to assess the visual presentation and functionality of each existing feature.

The first method, known as Heuristic Evaluation, involves the use of two tools to assess the outcomes of interviews. Researchers employ Excel to examine limitations and recommendations, while the Nielsen Norman Group workbook template is used to evaluate the results. The findings derived from interviews conducted with many employees in this study were based on 10 Heuristic Evaluation principles, of which seven yielded highly satisfactory outcomes on the ePegawai interface. The research objectives have been achieved by applying the seven principles of the Heuristic Evaluation method, namely Match Between System and the Real World, User Control and Freedom, Consistency and Standards, Error Prevention, Recognition Rather Than Recall, Flexibility and Efficiency of Use, and Help Users Recognize, Diagnose, and Recover. The interview recapitulation yields a rating of 2, indicating a neutral assessment that necessitates modifications. When researchers use the Nielsen workbook to evaluate the ePegawai interface, they believe that three principles need to be modified: Visibility of System Status, Aesthetic and Minimalist Design, and Help and Documentation.

In the second approach, specifically the Sequential Unconstrained Surveys (SUS) method, researchers employed a questionnaire to gather data for the ePegawai application research. Subsequently, the collected data was analyzed using Excel to compute the information provided by the respondents. When conducting computations in Excel, researchers seek to determine the mean of all respondents' values. The average results achieved will serve as a testament to the efficacy and efficiency of the ePegawai application, based on the feedback from its users.

The researchers provided several suggestions to enhance the quality of the ePegawai application regarding the principle of system status visibility where the absence function is designed with a fingerprint symbol, but the action to be executed involves capturing a face shot. The icon should utilize the camera symbol. For the principles of aesthetic and minimalist design aspect, the recommendation is to relocate the notification feature to the settings page, as it is hardly utilized and detracts from the visual appeal of the primary display. And last, the principles for help and documentation aspect need to generate informative instructions for each feature to facilitate the understanding of new users.

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