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Application of Heuristic Evaluation Method to Evaluate User Experience and User Interface of Personnel Management Information Systems to Improve Employee Performance

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Abstract

This research aims to determine the level of user satisfaction with using SIMPEG application and evaluate the user interface design to improve the user experience. The research was conducted using qualitative methods. Researchers decided to involve as many as 100 participants in this research. To collect data and information based on system requirements, researchers collect data using observation, interviews, questionnaires, and literature studies. In designing the evaluation at application, researchers used a user-centered design approach and the heuristic evaluation method. Based on the research results, it was found that in the UCD approach, it often experiences bugs and errors, whereas in application there is no mobile application available, which aims to make it easier for employees to access the application anywhere and anytime. It is currently only available on a web basis. The UCD approach shows that the application has uses and functions that meet employee expectations with an average percentage of 70%, falling into the attractive category. The end result of the UCD approach emphasizes the importance of clearly understanding users and providing better user experiences. Meanwhile, the HE approaches helps identify problems with the application and focuses attention on usability issues in the HE aspects. In an effort to improve the quality of the user interface (UI) and user experience (UX) in application, the evaluation that has been carried out shows that improvements need to be focused on the appearance and use of the application.

Keywords: User Interface, User Experience, User Satisfaction, User Centered Design, Heuristic Evaluation.

1. Introduction

Facing the development of information technology, which is growing rapidly and innovating every day, the need for information system technology has become a portal for every human being who needs it. Information technology is really needed. It is hoped that using information systems can improve agency performance in obtaining information. In this way, the information technology used functions to facilitate the work of agencies or companies [1]. The Ministry of Education, Culture, Research, and Technology utilizes the presence of information technology to facilitate work and missions or tasks in companies [2]. The purpose of an information system is to provide information in the areas of planning, organization, and operations of a company's business that serves organizational synergy in the process of controlling decision-making stages [3]. The Ministry of Education and Culture has many departments or organizational structures, one of which is the Secretariat General, which operates in the Human Resources Bureau [4] [5]. Human Resources Management (HR) is an organization that greatly influences many aspects that determine the success of an organization's work [6]. One very important element in an organization is human resources [7]. The HR Bureau has duties and functions, namely to carry out guidance, planning needs, formation, distribution, procurement, discipline, transfer, promotion, dismissal, retirement, awards, development, and performance assessment of human resources within the Ministry as well as the Bureau's administrative affairs [8].

Service user satisfaction is a challenge for application managers. One way to improve user management is to make them comfortable when using the application [9] [10]. This comfort can be achieved in various ways, including by providing a good user interface (UI) and user experience (UX) according to the user's wishes and needs [11]. The user interface (UI) discusses the appearance of the system, or what is beautiful and attractive. And user experience (UX) discusses more about the process or stages so that a user experience can be achieved [12] [13]. There are several applications to make all tasks easier and save time in carrying them out [14]. The aim of the Employee Management Information System (SIMPEG) is to create a personnel database starting from

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the government, city, district, and Ministry of Home Affairs levels that processes, accommodates, stores, searches, and allocates employee data [15]. Understanding beauty means understanding the design structure, which consists of design principles, design elements, and design principles [16] [17]. Consistent application of color creates beauty if it has design guidelines that are asymmetrical and less neat; coloring and contrast that do not match the color composition are important factors for the success of user interface design, which is determined when interaction occurs with the user based on design principles [18].

Heuristic evaluation (HE) is an approach method for evaluating a system using 10 HE principles. The HE method is a method that can be used to find out and uncover existing problems related to usability in the system being studied [19]. One usability research method that we can use to evaluate the results of errors or deficiencies in usability in applications is heuristic evaluation [20]. The UCD approach is a design process that focuses on specific user needs and characteristics [21]. Among the design methods or approaches that are optimized for the end user or end-user and emphasize how the end user or end-user needs or wants to use the product so that the product provides comfort and satisfaction is user-centered design [22] [23]. Then, this research uses a qualitative approach because it focuses more on understanding users in terms of activities and user behavior when interacting with the application [24] [25]. Data processed in qualitative research, for example, are user comments, opinions, feelings, user behavior, or user motivation [26]. The qualitative approach is an approach that is related to a subject's understanding or interpretation of the meaning of data as information material, referring to quality, which means nature, quality, level, and meaning [27]. Therefore, the results of this data collection are better able to explain the reasons why something happens [28]. Previous research has proven that the UCD approach helps their research in analyzing initial user needs in general so that, at the final stage of this research, they get feedback from users and the research can adjust the final design of the user interface [29]. However, feedback from users is only general and not detailed therefore, the research was also carried out using the heuristic evaluation method in two stages and produced 15 problem findings with five classifications, so that the research obtained a final design according to user feedback.

2. Research Methods

The research was conducted using qualitative methods. The qualitative approach is an approach that is related to a subject's understanding or interpretation of the meaning of data as information material, referring to quality, which means nature, quality, level, and meaning [30]. By using this qualitative methodology, the author seeks to understand complex phenomena by approaching the research subject from a more holistic and contextual perspective [31]. In the next stage, the researcher makes a list of requirements in SIMPEG regarding what elements, components, services, or features must be maintained, what must be added, or what needs to be improved based on all the results of the approach taken to collect qualitative data. Researchers decided to involve as many as 100 participants in this research [32]. To collect data and information based on system requirements, researchers collect data using observation, interviews, questionnaires, and literature studies [33]. In designing the evaluation at application, researchers used a user-centered design approach and the heuristic evaluation method. Analysis is carried out by identifying and explaining obstacles or problems that occur to the application users while using the system, so as to provide a deeper understanding of the phenomenon being studied [34].

3. Results and Discussion

SIMPEG is useful for producing complete, fast, and accurate information to support personnel administration. It has helped employees facilitate daily work, such as administrative activities related to employee needs. Using the application to carry out daily work sometimes experiences difficulties, both in terms of the application system, which often experiences bugs or errors, and in terms of users or human error. In this evaluation, the author applies an approach related to user-focused research with guiding principles in carrying out the user-centered design approach. The author also applies a method related to heuristic evaluation, or, in other words, heuristic evaluation. The heuristic evaluation method has ten criteria, which the author uses as a reference at this interview stage in order to carry out an evaluation. The evaluation carried out using the heuristic evaluation method involves interviewing resource persons who act as the application managers. The resource person asked the same questions to the application management, one of which was regarding the background to which the application was created. To this question, each manager has their own answer, or, in other words, has a different point of view but still has the same goal. Basically, the application is an important application and must be owned by every agency because the large number of employees and the data it contains make it impossible for an agency to do it manually. The application was created as a whole to make it easier for managers and employees to do their work. From a manager's point of view, the application makes it easier for managers to need reports to be submitted to leadership; these reports are like staff transfers. Then, from an employee perspective, the application makes it easier for employees to change or save their personal database in accordance with applicable regulations.

Then, in the interview section, based on the UCD approach, the author carries out activities in UCD, one of which is research, namely research methods such as interviews or surveys. In this research phase, the author conducted survey and interview techniques with the application managers regarding the applications he had designed and maintained. The application has updated or added new features to the Dikbud-WFH menu, which was released recently. Due to the COVID-19 situation, some employees do their work from home, or WFH, so the management designed a Dikbud-WFH attendance feature to make it easier for employees to carry out online attendance from home. Apart from the Dikbud-WFH feature, the manager also provides other new features, such as a job map, which is similar to a structured hierarchy chart. The application aims to help employees carry out personnel management. Of course, it will be troublesome and disrupt the progress of work if the application does not run as it should. Based on the results of the interview, this application has experienced errors and bugs that interfere with users doing their work. The error or bug that was detected and known was that the storage was limited, so it was full, and an annoying notification warning appeared when the user had opened a tab on the browser for a long time, which instructed the user to log in again. The manager also said that there might be other errors, but they had not been detected. Managers who rarely use this application are one of the reasons why this bug still exists today.

The success of an application in meeting user needs can be seen by how effective, efficient, and satisfying the application is. Therefore, it is necessary to carry out usability testing. Usability has a function to measure efficiency. As well as convenience in the useful ability to remember and learn how to interact without experiencing difficulties with the application to determine the level of use of the interface and make it possible to make improvements based on the results of the test. The application itself apparently has not yet carried out usability testing but has been used for daily employee needs. This can happen due to limited funds, time, and human resources, so there are no trial sessions. The application, in general, must carry out computer-based work well that is integrated with employee data and information as well as organizational procedures. It still has many shortcomings that require managers to immediately repair and improve the application. So that personnel management activities can be made easier and all activities related to personnel can be carried out in one application. At the time this interview took place, it was still only used for storing employee data and employee data reports. A website or application must respond to its access device, from the wide screen to the small screen. Responsive web design is a method or technique for creating website layouts for web designers and adjusting them according to the user's screen size. This is something that a website application must have so that it makes it easier for users to use it and makes maintenance easier for managers. However, it does not have this. It is possible that if the application was an application for commercial purposes, this application could be immediately abandoned. It takes a long time to enter the website, and the display is unresponsive for an application that is used daily by employees.

The interoperable mobile platform offers access to a variety of application-relevant information, and mobile application UIs frequently have unique interaction mechanisms with website-based resources. The application currently does not have a mobile application version. In fact, the needs of employees who work from home require employees to upload their work results to the application, which is currently only available on the website version and is considered less effective in practice due to the long access to the application and the bugs and errors described above. Therefore, careful planning is needed when creating a mobile application version of the application. Starting from what features are useful to facilitate the running of personnel activities, which will be included so that the creation of this mobile application version can be effectively used for all employee administration needs. Not only does it need to store employee data and personnel reports in the application, but it can also be directed towards daily attendance activities; the presence of absences can be tracked, and absence history can be added. Then you can add profile features that are integrated with the user's position profile for civil servants. However, this is still a plan. The last feature update in the application during the COVID-19 pandemic was the addition of the Dikbud-WFH feature, which aims to help employees take attendance without having to come to the office. The application manager said that the next feature that will be added is a feature for applying for leave and arriving late. Sometimes the application does not work according to the wishes of the user, so it becomes an obstacle that hinders work. Therefore, there is a need for a help button or feature in the application. However, in fact, it currently does not have this feature. When there are problems or users need help regarding the application, they can currently only contact the application manager via the WhatsApp application via personal chat or WhatsApp group.

The main task of the UCD approach is to understand the user's or employee's background well, prioritize user experience, analyze user experience (comfort, beauty, convenience), and evaluate user input. The condition is that the user must be considered right from the start, which includes the entire product creation cycle. In this way, the author carries out an analysis according to the UCD approach. The benefits of UCD are saving time, reducing costs, and increasing user satisfaction. Among the design methods or approaches that are optimized for end users or end-users and emphasize how end-users need or want to use the product so that the product provides comfort and satisfaction is user-centered design (UCD). Understanding users well or employee backgrounds is a

technical approach in the author's research. To carry out the UCD approach, the author carried out iterations and user experiences when running the application. Therefore, understanding the user well is used as a guide in carrying out the UCD approach process, understanding and comprehending the user clearly, and ensuring that the work carried out is in accordance with the user's environment. In the evaluation approach, the author interviewed resource persons who, incidentally, were employees who also accessed the application. Judging from the background of the use of the application version that the author has seen, it still uses the web version, and there is no mobile application, which means it can only be accessed using a browser.

Mobile applications are really needed for employees who access them, especially for employees who use applications for their work. An application's user interface must make users comfortable when using it. In accordance with the UCD requirement specification approach, namely understanding what user needs are, this mobile application influences user needs because mobile applications are more effective and efficient. Apart from that, this process requires knowing the users well. The most important thing is in terms of user interface design. For a government service application, the design that the application displays is fairly typical. This shows that the application needs improvement in terms of appearance and design because it is considered less attractive. So it is necessary to improve its appearance and design to make it more user-friendly and attractive to users. Color composition is an important factor in the success of user interface design, which is determined when interaction with the user occurs. Understanding beauty means understanding the design structure, which consists of design principles, design elements, and design principles. If design principles serve as a guide, consistent color application produces beauty. There is still much room for improvement in this area because users find the application display's color composition and menu placement to be confusing when first using it. The placement and size of the icons in this application is also one of the complaints from users who think that the icons in this application are too small and appear to be piled up so that it interferes with the user pressing the desired icon. This is also detrimental for users who are older and have visual impairments.

Based on the assessment results, it can be concluded that the features used in the menu and information are not yet fully efficient and flexible, so they are not enough to make it easier for employees to access. Then the response to actions in the application is fast, and the language used is easy to understand, but there are still no language options in the application. These results can be seen from the overall participant assessment, which the author made into a graphic diagram to make it easier to understand. The minimalist design and appearance of the application are not completely attractive, which means that users are not comfortable when interacting with the application. The application that employees use is insufficient and does not match its portion for each use because the appearance and layout of the icons and menus are also difficult for users to understand. Apart from that, there are several elements in the application that employees cannot do, namely, there are no information slides in the initial display menu. This can cause human errors to occur among employees because each piece of information must be presented more consistently and elegantly in each application so that errors do not occur or confusion occurs when using the application. You cannot choose to change the theme and color of the display, which may make some users uncomfortable, and you cannot change the font size if it is considered too big or small. This makes it difficult or ineffective for users if they have to zoom in or zoom out on the display page.

When an error occurs, the application has completely provided an error message, but some of these error messages cannot provide a solution. For example, the application storage database sometimes experiences errors. At that time, there is an error message, but there is no information for a solution yet. This causes the user to not be able to save their last access when the database has an error, as in point 5, namely that sometimes there is no automatic action storage system when the application experiences an error and they have to connect to admin. Another thing is that if the user forgets the personal password, an error message appears and also provides a solution for errors with the password. Then the structure of each page display is consistent and neat, and the title on each page in the application is completely clear and informative, making it easier for users to access the application and making it possible to minimize errors that occur. At this stage, the point is based on the principles of user-centered design, namely using an approach where the main focus is listening to the user and involving the user with the application, such as understanding the user in order to get input and material for evaluation consideration. Then the second principle is error mitigation, where errors occur due to two things, namely, technical errors or errors because the user cannot use a function according to its use application evaluation stage. Each question received positive and negative responses from respondents. It can be accessed mobile; this makes it easier for users to access the application anywhere and anytime, but this is not a mobile application but only an interactive web in general that is accessed with a browser. Then the icons, colors, fonts, and background look modern and attractive, making users comfortable when using the application. Each menu has the functions required by the user, and the application has also met employee needs. However, the overall appearance needs to be updated, and the menu or icon also needs to be added or updated, considering that it suits the user's needs when choosing answers to the questionnaire. Then users sometimes face errors when changing the error page.

The user interface aspect of the interface design and usability evaluation that will be carried out is measured using three design factors and five stages based on the UCD approach for the usability category, with a focus on measuring the quality of the the application UI and UX, making recommendations for UI prototypes, and evaluating prototype designs to meet user needs. Then what will be the main focus of evaluating and developing the interface design is the appearance of pages, namely the login page, home page, and also menus. Finding issues with the design, specifically the login page, homepage, and menu options page, led to results. One of them is the homepage (main menu), whose layout is still not neat; some of the icons are still the same, considering that each icon has a different function. This causes the design of the icon menu to be inaccurate and not modern. The layout of the menus and icons and the color composition are less modern than the standard; this happens because the font size is too small, the colors are a bit dark in the main navigation section, and the font layout is less symmetrical, making it less effective for users with short eyes or those who have reached the maximum age limit and providing less satisfaction to users. A minimalist design will be a requirement for users of many employee websites to balance employees, especially employees who often come into contact with the application, because it is an application that employees need, so the choice of color, layout of icons and menus, and font size are the main basis for employee comfort using it.

There are three evaluation aspects based on the HE method in the application. An explanation of the design suggestions for all three parts of heuristic evaluation, as well as suggestions for one menu: the absence/presence status menu at the bottom of the main navigation. This is a brand-new menu. At the recommendation stage for interface development in the application, the author created a design by considering the efficiency, effectiveness, and minimalist design of using the application, which is more interactive with error correction if the application experiences problems. Then the author makes design recommendations based on the heuristic evaluation method in accordance with user-centered design standards. Based on the flexibility and efficiency of the HE method. This aspect has a big influence on employees. The quality of a the application must first be improved by improving the criteria that influence the usability aspect of the application by prioritizing designs that are flexible and efficient, easy to use, and simple. Therefore, the application developers need to understand that employees care about the ease of running the application. With the current condition of the application, it needs to make improvements in terms of flexibility and efficiency in use, and it needs to improve the quality of design that is friendly to use, so the author created a main menu page that focuses employees on the menu options in main navigation. All menus in the main navigation can be accessed more quickly and easily because, after the login page, you will be directed to this main menu page. Then, if employees experience problems or difficulties in using the application, the author adds a list of help center features consisting of about, which functions as a medium for information about the application and application version; then help, which functions as a help feature for problems that occur in the application and contact support, which functions to get assistance and services via the customer service application. Then, on the left side of the page, there is employee profile information that the author created without changing the design function side of the current main menu.

4. Conclusion

Based on the research results, the results obtained from the UCD approach are that the application often experiences bugs and errors. At the application, there is no mobile application available, which aims to make it easier for employees to access anywhere and anytime. It is currently only available on a web basis. While the concentration of UI and UX is on conceptual display design that is clear and interactive, the weakness of the current display is that the mapping of functions and menus is still somewhat inaccurate and makes employees uncomfortable. Then the color composition is said to be less appropriate, and the size of the letters and icons is not large enough, so it is less comfortable and the application has found a new innovation, namely, it has released new features on its menu, namely dikbud-wfh and job maps. Flexibility and efficiency criteria, flexibility and efficiency, aesthetic and minimalist design, has a poor rating with a weight of three, as well as the criteria that help users recognize, diagnose, and recover from errors; and the evaluation based on a user-centered design approach. Has a sufficient assessment, with a weight of 4. Overall, the results of data collection based on the UCD approach show that it has uses and functions that meet employee expectations with an average percentage of 70%, falling into the attractive category. The end result of the UCD approach emphasizes the importance of clearly understanding users and providing better user experiences. Meanwhile, the HE approaches helps identify problems with the application and focuses attention on usability issues in the HE aspects. In an effort to improve the quality of the user interface (UI) and user experience (UX) in the application, the evaluation that has been carried out shows that improvements need to be focused on the appearance and use of the application. Employees report that the layout of SIMPEG menus, icons, and information is not yet understandable, so developers need to focus on improvements to the appearance and use of it.

SIMPEG's recommendations almost meet the criteria for flexibility and efficiency, then aesthetic and minimalist design and modernity with appropriate menu and function mapping, firm color saturation, simple modes and drop shadow effects, and appropriate font sizes. Menu groupings created in a simple display mode make their

work easier for employees. Based on the results of the research that researchers have conducted, there are several suggestions that could be taken into consideration for further research, namely as follows: Because the COVID-19 pandemic is over, it is hoped that future researchers will focus more on research observation sites and can expand the target participants to be interviewed. Then, when distributing questionnaires, consideration can be given to expanding the reach of distributing questionnaires and direct face-to-face contact with respondents so that they know more about the goals and objectives of the research, as well as helping respondents if they feel confused or have questions they want to ask. Combine with approaches or methods other than UCD and HE, and consider approaches or methods according to research needs. It is best to pay more attention to the user experience when interacting with the application to increase user satisfaction in the UI and UX aspects by focusing on the problem factors and obstacles experienced by users. So that the information or data results obtained will be more accurate, clear, and understood by users and agencies and can be used as evaluation material for agencies.

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