Analysis of Hospital Websites Using Human-Computer Interaction Paradigms (Case Study: Rumah Sakit Unggul Karsa Medika)

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Abstract:
The RS UKM Hospital website serves as an important source of information for the community in need of health services and assistance. In this context, an analysis was conducted to understand how the functions of the website system relate to the principles and paradigms of Human-Computer Interaction (HCI). Through the evaluation of the website's interface design, the author applied heuristic evaluation methods, considering various important aspects, including human, technology, usability, and ergonomic factors.

The results of this analysis indicate that the RS UKM Hospital website does not fully meet the various aspects established in Human-Computer Interaction. Since the primary goal of HCI is to facilitate user interaction with the system and provide necessary feedback, it was found that there are several areas that require attention. Therefore, improvements and developments are needed to ensure that the website functions more effectively in supporting the user experience, allowing them to easily access the health information and services they need.

Keywords: HCI, Information, Website

Introduction

The internet is a boundless global network rich in information. This information is expected to help simplify tasks in order to achieve optimal results. In the context of information systems, analysis plays a very important role. The purpose of this analysis is to produce a system that is effective, efficient, and easy and quick to use by its users (Tuzzahrah et all, 2023). In the healthcare sector, information technology has become a crucial component in supporting the management and electronic storage of patient data. It also facilitates remote consultations and telemedicine, allowing patients in remote areas to access healthcare services. Additionally, this technology plays a role in the collection and analysis of epidemiological data to monitor and control diseases. Information technology also provides a platform for the education of medical personnel and health information for patients, as well as optimizing administrative processes, scheduling, and financial management in hospitals. Overall, information technology is essential for enhancing the efficiency, accuracy, and accessibility of healthcare services.

In 2018, Alan Cooper expressed his concern that many modern software applications still experience the same interaction errors as 25 years ago (Rogers et all, 2023). He questioned why this continues to happen, despite the fact that interaction design has existed for more than 30 years and the number of designers in the industry today is far greater than ever before. He noted that many new product interfaces do not adhere to interaction design principles that were tested and accepted in the 1990s. For example, he pointed out that many applications do not even comply with basic user experience principles, such as providing an 'undo' option. He argued that it is inexplicable and unforgivable that such violations still occur in new products today.

One of the criteria that software must meet to be considered user-friendly is that it has a good interface, is easy to operate, easy to learn, and makes users feel pleased when using it. An application or system is regarded as good by users starting from the 'first impression' when they first use it. This impression does not necessarily mean a flashy or attractive design, but rather relates to the ease of using the system and its speed. As an information medium, the internet is very important. The internet is a network that connects various networks to enable communication, including data exchange in the form of files, audio, and video. This is accompanied by the proliferation of websites that serve as tools for obtaining information. Websites are used to disseminate information and conduct promotions, providing significant benefits for both owners and users, as they can be accessed anytime online, making it easier for users to obtain information. Typically, websites also regularly update articles relevant to their content. In addition to the internet, access to information from websites requires devices such as laptops, computers, and other mobile devices. Therefore, these devices are essential for obtaining information and supporting performance. To determine how easily a website can be used, usability measurements need to be conducted. Usability comes from the word 'usable,' meaning it can be used well, serving as a paradigm for an application that reflects the level of user comfort.

Hospitals are one example of institutions that require information systems technology (Taroreh & Kalalo, 2018) in their management. For instance, information systems are used as tools to assess the performance of hospital staff or as a communication medium between staff and visitors, which heavily relies on information and communication technology (Palasara et al., 2020). As a healthcare institution, hospitals play a crucial role in disseminating useful information about the medical and health fields to the general public. Hospitals need a platform to convey information related to medical and health news to visitors.

This study aims to analyze the website of Rumah Sakit Unggul Karsa Medika based on Human-Computer Interaction (HCI) paradigms. The method used in this research is heuristic evaluation, which involves assessing specifications, prototypes, or products by referring to basic heuristic principles. This method was developed by Jacob Nielsen and Rolf Molich (Wahyuningrum, 2021) includes ten basic principles that will be explained in more detail in the literature review.

Literature Review

A. Website

One of the services that can be accessed by computer users connected to the internet is the WEB, also known as the World Wide Web or WWW (Riyandoro et all., 2023) . The web provides a variety of information, ranging from trivial to highly important, as well as from free information to commercial content. The web uses the HTTP protocol to transmit multimedia documents, including text, images, sound, animations, and video. To access it, software known as a browser is used.

B. Human-Computer Interaction (HCI)

HCI is a discipline that studies the interaction between humans and computers, as well as how computers can be developed to support effective interaction. HCI consists of three elements: the user, the computer, and the ways they interact. This field plays a crucial role in creating systems that are easy to use, functional, and secure. According to HCI principles, users must be the primary focus in every design process so that the resulting solutions can meet their needs, abilities, and preferences in performing various tasks. Therefore, systems need to be designed according to user requirements.

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C. Heuristic Evaluation

Heuristic evaluation is a user interface research method in which individuals or groups assess specifications, prototypes, or products based on basic heuristic principles. It is used to identify usability issues related to user interface design elements and enables quick and efficient decision-making. Heuristic evaluation was introduced by Nielsen and Molich in 1990 (Wahyuningrum, 2021). The main goal of this evaluation is to find usability problems on the web. This method is considered a way to conduct qualitative analytical evaluations and refers to ten principles, among others:

- Visibility of System Status refers to the condition in which the system provides clear information to users about what is being done, where they are, and what is happening.
- Match between System and the Real World refers to the system's need to communicate information in an easily understandable manner, using everyday language. This aims to create a sense of familiarity and enhance user trust.
- User Control and Freedom refers to the system's ability to provide users with ease and flexibility in interacting with the interface.
- Consistency and Standards means that a well-designed and consistent interface helps users recognize features, ensuring they do not feel uncertain when using specific functions. It is important to avoid using different information or images that convey the same meaning.
- Error Prevention refers to the fact that the presence of errors or bugs in the system can create an unprofessional impression for users. To address this, error messages can be communicated through informative design. By applying the first principle (*visibility of system status*), users can understand what is happening within the system.
- Recognition rather than Recall emphasizes the importance of designing applications in a way that allows users to recognize existing design patterns. This enables them to continue using the application without needing to remember the next steps, thereby reducing confusion.
- Flexibility and Efficiency of Use indicates that new users will first learn the system or application, especially if it has many features. Therefore, it is crucial for the application to be designed with flexibility and efficiency, allowing users to easily adapt and understand its functionalities.
- Aesthetic and Minimalist Design emphasizes that a well-organized layout should be visually appealing, utilizing contrasting color combinations and harmonious placement of elements. By adopting a minimalist design approach and effectively using whitespace, the application will appear more elegant.
- Help Users Recognize, Diagnose, and Recover from Errors means that a good and user-friendly design should include effective error handling. When an error occurs, the application should not only display an error message but also provide solutions to help users resolve the issue.
- Help and Documentation indicates that users expect to resolve their problems and tasks using the system or application. To support them, it is important to provide help features and documentation that explain potential errors and how to address them.

Methodology

The research begins by exploring the system to collect the necessary data. After that, the data will be evaluated using heuristic evaluation methods to draw meaningful conclusions.

A. Research Object

The object of this research is the Website of Rumah Sakit Unggul Karsa Medika, which will serve as the subject for evaluation in the development of the user interface design. This

evaluation is expected to enhance the quality and appeal of the RS UKM website. The UKM website provides up-to-date information about the hospital that can be accessed by users through https://www.rsukm.com/. Users can access it using a smartphone or personal computer, as long as they are connected to the internet.

Figure 1 The Website of RS Unggul Karsa Medika

Figure 2 UKM Website can be accessed using smartphone

Figure 1 shows the RS UKM website page displaying a navigation menu that users can access. Additionally, there are icons for WhatsApp, YouTube, and Instagram that direct users to obtain the latest information about RS UKM through these web platforms.

The homepage features slider that automatically transitions and is designed to adjust to screen sizes, ensuring responsiveness on both desktop and smartphone. The moving elements create a dynamic impression on the website, capturing visitors' attention. Additionally, the information presented is quite efficient, allowing for the delivery of multiple content pieces without overcrowding the homepage. This enables visitors to quickly access various offers related to the

latest health checkups.

In Figure 2, the RS UKM website is designed for easy access via smartphones. Its responsive interface ensures that the appearance and functionality of the site adjust to the screen size of mobile devices. Users can quickly navigate through the menu, find important information about hospital services, and access features such as online registration or links to social media. With optimization for mobile devices, this website provides users with the convenience of obtaining up-to-date information and interacting seamlessly, anytime and anywhere.
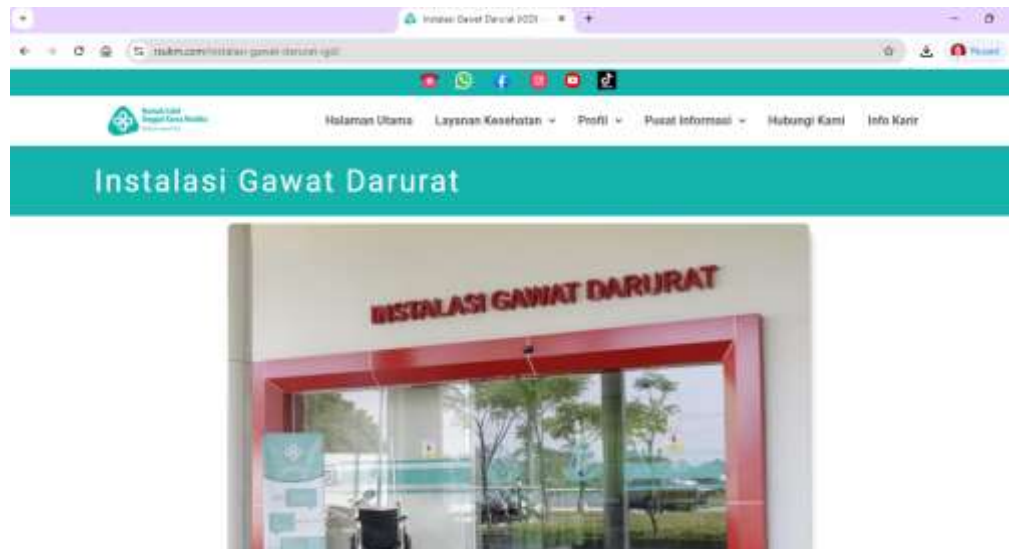

Figure 3 Heatlh Service Menu

In Figure 3, the Health Services Menu at RS Unggul Karsa Medika presents various important information about the available services :
   a) Emergency Department (IGD): The IGD is a crucial part of healthcare services at RS Unggul Karsa Medika, operating 24 hours a day, including Sundays and national holidays. Equipped with professional and experienced medical personnel, the IGD is ready to handle patients with life-threatening conditions. It is located on the first floor and supported by life-support equipment that is always on standby.
   b) Outpatient Services: This installation includes several clinics offering services, such as :
      ● General Clinic
      ● Medical Rehabilitation Clinic
      ● Internal Medicine Specialist Clinic
      ● OBGYN/Obstetrics Clinic
      ● Urology Specialist Clinic
      ● ENT Specialist Clinic, and etc
   c) Surgical Installation: This installation serves as support for surgical procedures required as per the doctor's medical indications. Before undergoing surgery, patients receive sedation services to calm and reduce pain. The Surgical Installation is equipped with state-of-the-art operating facilities that meet health standards in Indonesia and provides specialized care for patients requiring an Intensive Care Unit (ICU).
   d) Pharmacy Installation: The Pharmacy Installation is the main gateway for patients needing consultations and access to various medications and medical supplies. Here, patients can receive information and assistance regarding medications recommended by doctors at the hospital.
With these various services, RS Unggul Karsa Medika is committed to providing comprehensive and quality healthcare to its patients.

Figure 4 The Profile Menu

In Figure 4, the profile menu of the website contains several important pieces of information, including:

a) About Us: This section provides a comprehensive overview of the vision, mission, and values upheld by RS Unggul Karsa Medika. It includes information about the hospital's history, the services offered, and the commitment to delivering quality healthcare to the community.

b) Maranatha Christian College Foundation: In this submenu, visitors can find information about the foundation that supports the operations of RS Unggul Karsa Medika. This includes the foundation's background, establishment goals, and its role in the development of education and healthcare services.

c) Awards: This submenu is intended to display a list of awards received by RS Unggul Karsa Medika in recognition of its achievements and contributions to the healthcare field. However, when this submenu is clicked, no content is displayed, preventing visitors from accessing further information about these awards.

This situation may indicate that the content for the awards submenu is still being populated or updated.
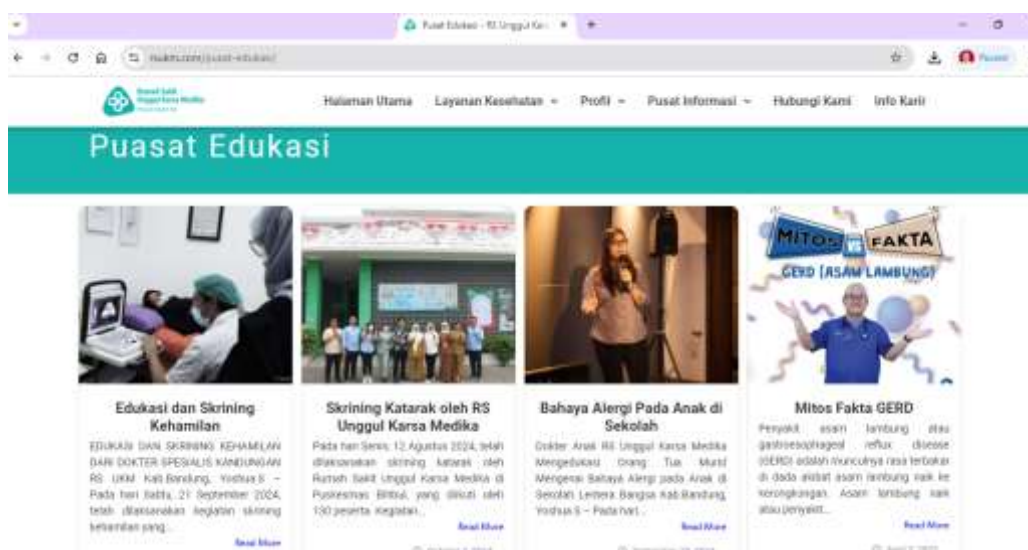

Figure 5 The Information Center

In Figure 5, the Information Center on the website includes several submenus that provide information to visitors:

a) Gallery: This submenu is intended to showcase various photos or documentation related to activities, services, or facilities at RS Unggul Karsa Medika. However, currently, the gallery lacks relevant content. It only contains a link to Google Maps and the hospital's address, which does not provide visual or in-depth information about the hospital.

b) Information Center: In this section, visitors are expected to find important and up-to-date information regarding services and activities at RS Unggul Karsa Medika. However, there are typographical errors in several words, which may hinder the understanding of the information. Additionally, the news submenu is empty, preventing visitors from accessing current information or important announcements from the hospital.

This situation indicates that content management in the information center still requires improvement and updates to provide a better experience for visitors.
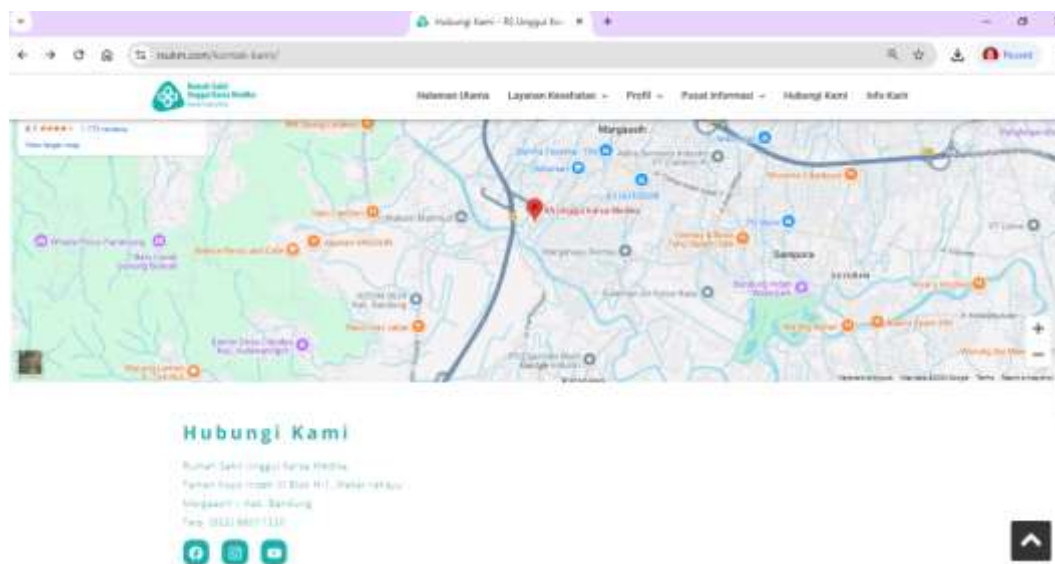

Figure 6 The Contact Us

Figure 6 displays the **Contact Us** menu, which contains important information about RS Unggul Karsa Medika. This section includes the hospital's location shown through Google Maps, allowing visitors to easily find the address. Additionally, there is a phone number that can be contacted. However, it would be beneficial to enhance this menu with a few additions. First, adding more contact numbers would provide visitors with additional options for obtaining information or assistance. Second, including a WhatsApp number for customer service would offer convenience for users who prefer to communicate through messaging apps. Third, having a dedicated phone number for the Emergency Department (IGD) is also crucial, enabling patients or family members to quickly reach emergency services if needed.

With these additional pieces of information, the **Contact Us** menu would be more comprehensive and facilitate easier access for visitors to hospital services.
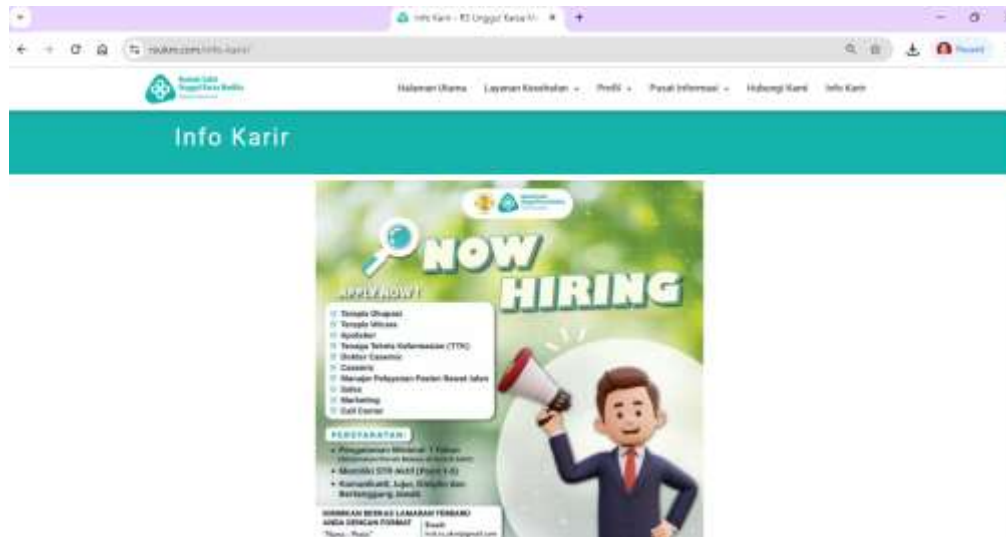
Figure 7 The Career Information

In Figure 7, the career information section on the RS Unggul Karsa Medika website provides details about available job opportunities at the hospital. Here, visitors can find various information related to:

1) Job Vacancies: A list of open positions, including job descriptions, required qualifications, and application methods. This information helps potential applicants understand the requirements and responsibilities of each role.

2) Application Process: An explanation of the steps to follow when applying, such as filling out an online form or submitting documents via email.

3) Advantages of Working at RS UKM: Information about the work environment, company culture, and benefits offered to employees, such as training programs, professional development, and available facilities.

4) Contact for Inquiries: Contact details for reaching out to the human resources department or other relevant parties if there are further questions about the recruitment process or available positions.

With this information, the career section of the RS UKM website aims to attract qualified candidates and provide a clear overview of career opportunities within the hospital.

B. Aspects and Factors of Human-Computer Interaction (HCI)

The field of study known as Human-Computer Interaction (HCI) focuses on how computer technology is designed to facilitate effective interaction between users and computers. In HCI, the main emphasis is on creating interfaces and systems that are intuitive, easy to use, and responsive to user needs. When a system is designed with the principles and paradigms of HCI in mind, it is considered successful. These principles include aspects such as understandability, efficiency, and user comfort. Therefore, the success of a system is not only measured by its technical functionality but also by the positive user experience it provides. This is crucial to ensure that users can interact with technology effectively and productively, achieving their goals more easily.

1. **Human Factors**

Humans function as systems that can process, input, receive, store, and control the data obtained. This situation allows individuals to access resources at the right locations thanks to a clear data structure. However, changes in circumstances can lead to errors. While ideal conditions are important for human insight and well-being, limitations still exist.

Human factors encompass an understanding of how people interact with machines and technological systems to complete tasks. Many social factors, such as motivation, comfort, satisfaction, and levels of experience, can influence human interaction with computers. Every system developer needs to be aware of human potentials and limitations, as well as learn how to design software that is safe and meets user needs. PC workstations help individuals solve problems more quickly and effectively. To increase the available workforce and benefit society, it is essential to conduct studies in the field of Human-Computer Interaction (HCI).

2. **Ergonomics in Human-Computer Interaction**

Ergonomics is the science and technology focused on aspects of safety, comfort, and ease of use for machines operated by humans, including computers. The goal of ergonomics is to create user-friendly systems that are safe, comfortable, and easy to use. Human-Computer Interaction (HCI) is defined as the discipline related to the design, evaluation, and implementation of interactive computer systems for use by humans, as well as the study of the surrounding phenomena. The principle of HCI is to ensure that systems can interact with users in a friendly manner (Pujadi, 2008).

This field requires programmers to design application interfaces that are comfortable to use, including the selection of good color combinations for the eyes. In today's era, where almost all activities are aided by computers, it is essential to have program interfaces designed in such a way that they do not cause eye fatigue for users (Permadi et al., 2018).

3. **Usability in Applications**

Usability comes from the word "usable," which means something that can be used well. In the context of applications, usability refers to the extent to which a system or interface provides comfort and ease for its users. Usability is often regarded as a paradigm that describes the user experience when interacting with an application.

According to Golien in 2004, usability can be defined in terms of user comfort and ease (Rizky 2007):

- Learnability: Applications should be designed so that new users can quickly understand how to use them without requiring intensive training. An intuitive interface and clear instructions can help users learn easily.
- Memorability: After learning to use the application, users should be able to remember how to operate it later. Consistent and familiar design will aid users in recalling the steps needed to complete tasks.
- Operability: Applications should be responsive and easy to navigate. Users should not face difficulties when performing basic tasks, such as searching for information, filling out forms, or executing specific functions.
- Explorability: Users should feel comfortable exploring the features available within the application. Design that facilitates exploration and the introduction of new functions will enhance the user experience.
- User Satisfaction: The final aspect is the level of satisfaction experienced by users after using the application. If the application meets users' needs and expectations, they will feel satisfied and be more likely to continue using it.

By considering these aspects, developers can create applications that are not only effective but also enjoyable to use, thereby increasing user adoption and loyalty.

4. Heuristic Evaluation

In this study, the author employs heuristic evaluation to analyze the website of RS Unggul Karsa Medika based on the principles and aspects of Human-Computer Interaction (HCI). This approach was chosen because it is considered capable of encompassing all existing principles and aspects within HCI. Heuristic evaluation is a comprehensive assessment of a product's interface aimed at identifying potential issues that may arise during user interaction with the system or product, as well as finding solutions.

One well-known method in heuristic evaluation is the Nielsen and Molich method, which includes the following aspects:

- Visibility of System Status: The system should always provide useful information to users.
- Match between System and the Real World: The system should reflect the experiences of the users.
- User Control and Freedom: Users should have the ability to provide feedback when an error occurs.
- Consistency and Standards: The system should remain consistent and adhere to recognized standards.
- Error Prevention: Efforts should be made to minimize errors that may occur while using the system.
- Recognition Rather than Recall: Users and the system should be able to interact without needing to remember prior information.
- Flexibility and Efficiency of Use: The system should allow for efficient use by users.
- Aesthetic and Minimalist Design: The design should be clean and appealing, without unnecessary elements.
- Help Users Recognize, Diagnose, and Recover from Errors: Users should be able to understand error messages and take necessary corrective actions.
- Help and Documentation: The system should provide quick and easily accessible help when users encounter difficulties.

Results & Discussion

In this section, the author discusses the factors involved in Human-Computer Interaction. The aspects covered in this research include human factors, technology, ergonomics, and usability. Meanwhile, heuristic evaluation will be discussed further in the subsequent research.

A. Human Factor

The human factor in the design of the RS UKM website is crucial for creating a positive user experience. The interface is designed with a focus on aesthetics and intuitiveness, ensuring that users can easily interact with various features.

The interface design facilitates information search by using clear icons accompanied by easily understandable descriptions. This allows all users, whether experienced or beginners, to comprehend the functions of each element. By prioritizing the human factor, the RS UKM website aims to reduce confusion and enhance comfort. Users can quickly find important information, such as service schedules, contact details, or other medical information, making their experience more efficient and satisfying.

B. Technology on the RS UKM website

Explanation of Technological Aspects on the RS UKM Website include :

a) Input: The website currently has limitations regarding its search features. Users are unable to perform direct searches for information through inputs, such as online registration forms, doctor availability information, or inpatient admissions. The absence of this feature reduces user convenience in quickly finding the information they need.

b) Output: The outputs generated by the website consist of text and videos that are accessible to users. Additionally, users have the option to download necessary files, which will automatically save to their devices as long as they are connected to the internet. Ease of access to and storage of information is important for enhancing the user experience.

Overall, while there are some existing features, improvements in the input aspect would significantly enhance user interaction with the RS UKM Hospital website.

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C. Usability Factors on the RS UKM Hospital Website

Criteria for Usability Factors on the RS UKM Hospital Website include:

a) Learnability: The RS UKM Hospital website is designed to make it easier for new users to learn how to access the available information. An intuitive interface, along with clear menus and icons, allows users to quickly understand how to use the various features. This ease of use is essential for visitors to promptly find the information they need without feeling confused.

b) Memorability: After visiting the website, users are expected to easily remember how to use the available features when they return later. Consistent design and logical arrangement of elements help reinforce users' memory of navigation, enabling them to return to the website smoothly and efficiently.

c) Operability: Operability encompasses how well the website functions technically. The RS UKM Hospital website must be accessible across various devices and browsers, with fast loading times and responsiveness. Good operability ensures that users do not encounter difficulties when clicking links or buttons, allowing them to perform desired actions easily. However, it should be noted that some sub-menus, such as news, are still in development and do not function optimally as they should.

d) Explorability: The website provides opportunities for users to explore the various information and features available. With clear navigation and an organized layout, users can easily find additional information or services they are looking for. This enhances their curiosity and satisfaction while using the website.

e) User Satisfaction: User satisfaction is an important indicator of usability. The website must meet users' needs and expectations, providing a pleasant and satisfying experience. Through user feedback and usage analysis, the RS UKM Hospital can continuously improve various aspects of the website to ensure users feel satisfied with the services provided. Therefore, future research should implement user satisfaction measurements using statistical methods, allowing for a quantifiable assessment of user satisfaction with the website. Additionally, involving experienced experts in website development can also aid in further enhancement.

By meeting these criteria, the RS UKM Hospital website is expected to provide a positive experience for users, facilitating their access to the information and services they need.

D. Ergonomic Factors of the RS UKM Hospital Website

Ergonomic Aspects of the RS UKM Hospital Website include:

a) Consistency: The features, icons, fonts, and colors used on the website are uniform and consistent.

b) Simplicity: The website implements simple features and layout, allowing users to operate it easily.

c) Human Memory Limitations: The website does not provide additional information if the searched data is unavailable.

d) Cognitive Clarity: Information is displayed according to user selections.

e) Feedback: The website does not automatically download information unless users request to save data to their devices.

f) System Messages: The website presents sentences that are easy for users to understand.

g) Display Issues: The layout of features and menus is designed to be easily comprehensible, with clear information.

From the discussion above, it can be concluded that the RS UKM Hospital website has not fully met the factors of human, technology, ergonomic, and usability considerations within the context of Human-Computer Interaction.

E. Conclusion

Based on the analysis of the RS UKM Hospital website with reference to the Paradigms and Principles of Human-Computer Interaction, the following conclusions can be drawn:

a) Development Needs: The RS UKM Hospital website has met several factors and aspects in line with the Principles of Human-Computer Interaction. However, there is still a need for further development, particularly in some sub-menus that are not functioning optimally. Additionally, the lack of telemedicine and online registration features should be addressed to enhance the website's functionality.
b) Source of Information: This website has the potential to serve as an accurate source of information. Nevertheless, it has not yet maximized its capability to provide solutions to users, especially prospective patients or individuals seeking assistance.
c) Layout Suitability: The positioning of features, icons, and menus on the website is well organized, allowing users to navigate and operate it easily.
d) Attractive Design: The website's appearance is designed to be as simple and appealing as possible, contributing positively to the user experience.

Overall, while the RS UKM Hospital website has several positive aspects, there is room for improvement to enhance its effectiveness and user satisfaction.

References

Ahzka Nabbilah Tuzzahrah , Apriade Voutama , Azhari Ali Ridha (2023). Analisa Website Prodi Sistem Informasi Unsika Berdasarkan Prinsip Dan Paradigma Interaksi Manusia Dan Komputer. Universitas Singaperbangsa Karawang .Scientific Journal MATRIK, Vol. 25 No. 2, August 2023 *(Journal Article)*

Affani Putri Riyandoro, Ahzka Nabbilah Tuzzahrah , Azhari Ali Ridha (2023). Analisa Website Fkip Unsika Berdasarkan Prinsip Interaksi Manusia Dan Komputer. Universitas Singaperbangsa Karawang . ANTIVIRUS: Jurnal Ilmiah Teknik Informatika (p – ISSN: 1978 – 5232; e – ISSN: 2527 – 337X) Vol. 17 No. 1 Mei 2023, pp. 155 – 167 *(Journal Article)*

Dr. Tenia Wahyuningrum, S.Kom., M.T.(2021). Buku Referensi Mengukur Usability Perangkat Lunak. Penerbit Deepublish. *(**Book**)*

Ginanjar Setyo Permadi, S.Kom., M.Kom, et all (2021) . Interaksi Manusia Dan Komputer. Cv. Ae Media Grafika. *(**Book**)*

Melida Ratna Utami, Ito Setiawan. Analisis Usability Pada Aplikasi Allo Bank Menggunakan Heuristics Evaluation. JUSIFO (Jurnal Sistem Informasi), p-ISSN: 2460-092X, e-ISSN: 2623-1662. *(**Journal Article**)*

Magdalena Mirkowicz , Grzegorz Grodner.(2018). Jakob Nielsen's Heuristics In Selected Elements Of Interface Design Of Selected Blogs. Social Communication Volume 2 (2018), pp. 30-51 DOI: 10.2478/sc-2018-0013. *(**Journal Article**)*

Nevita Cahaya Ramadani , Retno Waluyo (2022). Analisis Kepuasan Pengguna Aplikasi Pospay Dari Aspek Usability Menggunakan Metode Heuristic Evaluation. Jutisi: Vol. 11, No. 3, Desember 2022: 679-686. *(**Journal Article**)*

Yvonne Rogers, et all (2023). Interaction Design Beyond Human-Computer Interaction. Published by John Wiley & Sons, Inc., Hoboken, New Jersey. *(**Book**)*

Soetam Rizky (2007). . Interaksi Manusia Dan Komputer. Graha Ilmu *(**Book**)*

Tri Pujadi (2008). Faktor Manusia Dan Ergonomis Penggunaan Komputer Untuk Meningkatkan Kesehatan Dan Keselamatan Kerja (K3) . CommIT, Vol. 2 No. 2 Oktober 2008, hlm. 102 – 105. *(**Journal Article**)*

Taroreh, L., & Kalalo, M. Y. B. (2018). Ipteks Faktor – Faktor Penghambat Proses Pelaporan Data Sistem Informasi Rumah Sakit (Sirs) Berbasis Online Pada Rsup Prof. Dr. R. D. Kandou Manado. Jurnal Ipteks Akuntansi Bagi Masyarakat, 2(02), 632–635. *(**Journal Article**)*

Palasara, N., Anggraeni, D. A., & Qomaruddin, M. (2020). Implementasi Website Penilaian Kinerja Paramedis pada Rumah Sakit. JURIKOM (Jurnal Riset Komputer), 7(3), 469. *(**Journal Article**)*