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Redesigning the User Interface of a University Laboratory Website Using the User-Centered Design Approach

Ahmad Luthfi Ridho, Dawam Dwi Jatmiko Suwawi*, Rosa Reska Riskiana

School of Computing, Telkom University, Bandung, Indonesia
Email: [1]ahmadluthfiridho@telkomuniversity.ac.id, [2,*]dawamdjs@telkomuniversity.ac.id, [3]rosareskaa@telkomuniversity.ac.id
Correspondence Author Email: dawamdjs@telkomuniversity.ac.id

Abstract−This study was carried out on the Human Centric Engineering (HUMIC) website, which had not previously undergone redesign approaches such as User-Centered Design (UCD), Goal-Directed Design (GDD), or similar methods. Following the initial usability assessment utilizing the Single Ease Question (SEQ) encompassing 7 tasks to gauge the simplicity or complexity of the tested activities, along with the System Usability Scale (SUS) containing 10 queries for evaluating usability, the interim average SEQ score achieved was 5.5 out of 7. Meanwhile, the average SUS score was 43, falling below the typical score of 68. Based on the interview results with HUMIC website users, it was found that users felt uncomfortable when accessing the website due to a non-responsive user interface on smartphone screens, indicating the need for a redesign of the website's user interface. This article's aims are to enhance HUMIC website's user interface for better usability using the UCD approach, encompassing user engagement throughout the entire procedure. Following the redesign of the user interface, the ultimate test outcomes exhibited an average SEQ score of 6.4 out of 7 and an average SUS score of 80.5, surpassing the typical score of 68. Consequently, it can be inferred that the application of the UCD method led to a successful user interface redesign with enhanced usability, fostering a comfortable user experience when navigating the HUMIC website.

Keywords: User-Centered Design; User Interface; Single Ease Question; System Usability Scale

1. INTRODUCTION

Information technology (IT) is currently utilized by organizations or universities for business activities and as a means of supporting information delivery [1]. IT has been adopted by many individuals from diverse backgrounds to access various pieces of information, typically presented on websites that can be accessed anytime and anywhere [2].

Human Centric Engineering is a central research institution at Telkom University that focuses on various essential fields such as computing, informatics, electronics, robotics, mechanical engineering, and biomedical [3]. As a research institution playing a role in developing technology and innovation, its website should represent the institution's excellence and professionalism [4]. However, the current condition shows a gap between user expectations and the reality of accessing the Human Centric Engineering website. In order to assess the usability score of the Human Centric Engineering website, measurements of usability were performed by utilizing an SEQ and SUS with a sample of 5 participants [5], respondents who were representatives of the staff of the Human Centric Engineering central research institution and students from Telkom University who had accessed the website. SEQ and SUS were selected due to their demonstrated capability in identifying distinctions in smaller sample sizes, unlike other surveys. The achieved SEQ score stood at 5.5 out of 7, suggesting that the Human Centric Engineering website performed better than average in terms of user-friendliness, surpassing 4.8 [6]. In the meantime, the acquired SUS score registered at 43, implying that the Human Centric Engineering website achieved a usability score lower than the average, exceeding 68 [7]. The range of acceptability landed in the "unacceptable" classification, the grading scale received an "F" rating, and the descriptive evaluations were within the "acceptable" spectrum.

Moreover, the investigators carried out observations and interviews with users of the Human Centric Engineering website to gather more detailed data concerning the interface challenges encountered by participants who utilized the site. The results of observations and interviews showed that respondents still felt uncomfortable when accessing the website due to several interface deficiencies, such as unresponsiveness when accessed via smartphones, cluttered content placement, confusing navigation, inconsistent writing style, unclear font colors reducing text readability, and inaccessible website pages.

Based on the identified issues, a redesign of the Human Centric Engineering website interface is needed. In order to tackle these concerns, a revamping of the user interface for the Human Centric Engineering website was undertaken through the implementation of the UCD methodology [8]. This method entails engaging users at each stage of the design process to guarantee that the resultant design genuinely fulfills their requirements and inclinations [9].

The study entitled "Enhancing User Interface and User Experience on Telkom University Open Library Website Through User-Centered Design Approach" by Rakha Labib Ramadhan, Alvi Syahrina, and Ahmad Musnansyah asserts that the application of the UCD method to redesign the UI and UX of the Telkom University Open Library website led to suggestions for website design enhancement. The usability was gauged using SUS and yielded a usability score of 84.75, signifying that the revamped website's usability surpasses the average usability score of websites [5]. The study titled "User-Centered Design (UCD) Approach for Analyzing User Experience and Enhancing Online News Portal Website (Case Study: Cakrawala.co)" authored by Mochamad Ihza Yudhakesuma, Anita Muliawati, and Helena Nurramdhani underscores the importance of achieving a commendable level of usability on a website to ensure its ease of comprehension and user-friendliness. This research employed the UCD approach to address user needs through methods like questionnaires, surveys, prototyping, and assessing usability using the SUS calculation. The findings demonstrated a

37.5% increase in usability scores and yielded recommendations for refining the website's format in order to enhance its efficiency and effectiveness [2]. The study titled "Enhancing Website Interface through User-Centered Design Method and System Usability Scale Approach (Case Study: Agricultural Census Dissemination Website)" authored by Migunani Puspita Eugenia, Muhammad Abdurrofi, Bagus Almahenzar, and Ardita Khoirunnisa outlines the study's objective of revamping and appraising the interface of the agricultural census dissemination website. According to the initial assessment, the achieved System Usability (SUS) score amounted to 60.05 points. Following the redesign process, the concluding evaluation outcomes indicated that the design solution yielded by the system redesign utilizing the UCD approach surpassed the original system design in terms of effectiveness [10]. The study entitled "Incorporating User-Centered Design Approach in UI/UX Design of Employee Website" authored by Christofer Veronica, Hasniati, and Izmy Alwiah Musdar reveals that the utilization of UCD for evaluating and enhancing the user interface and user experience effectively improved the ease of use of the employee website. This enhancement was substantiated by questionnaire outcomes, scoring 84 and classified as "Excellent" or "acceptable" by users within the parameters of the SUS method guidelines [11]. The study titled "Designing User Interface and User Experience for a Mobile-Based Medical Tourism Indonesia Application using User-Centered Design Method (Case Study: PT Cipta Wisata Medika)" authored by Sulistya Ernawati and Aries Dwi Indriyanti asserts that employing the UCD method yielded a design and prototype for the mobile app. Subsequently, the app underwent evaluation using the SUS method and attained a rating of 80.125, categorizing it as "Good." This score indicates that the interface of the Medical Tourism Indonesia application is of high quality and effectively caters to user requirements [12].

The objective of this articles is to revamp user interface of Human Centric Engineering website by employing the User-Centered Design (UCD) approach, all based on user requirements. The goal is to assess the outcomes of the revamped user interface for the Human Centric Engineering website through the employment of the SEQ and SUS. Furthermore, it involves analyzing the outcomes of the conducted evaluation.

2. RESEARCH METHODOLOGY

2.1 Data Collection

Gathering of data took place involving 5 individuals who interacted with the Human Centric Engineering website. This was done through online observations and interviews, during which researchers engaged in question-and-answer sessions with participants. The aim was to comprehend their distinct concerns, requirements, and anticipations for the forthcoming interface redesign of the Human Centric Engineering website.

The usability evaluation of the Human Centric Engineering website was performed using SEQ and SUS. Single Ease Question (SEQ) is a type of Post Task Questionnaire employed to evaluate the simplicity of a product feature, centered on user experience, utilizing a single question for each task [13]. SEQ is conducted after user’s complete tasks in Usability Testing sessions, serving as a user experience metric used by researchers in usability studies to determine how difficult or easy it is for users to perform a task [14]. This allows researchers to obtain more qualitative information and understand users' feelings about the task [15]. The System Usability Scale offers numerous benefits for assessing system usability, including its user-friendly nature as it presents outcomes through an average score spanning from 0 to 100. It avoids intricate computations, comes with no extra expenses, and its validity and reliability have been established, even when applied to a small sample size of 5 individuals who utilized the Human Centric Engineering website [16].

The obtained SEQ score was 5.5 out of 7, indicating that the Human Centric Engineering website received a score above the average level of ease for a product feature, which is 4.8 [6]. The achieved SUS score registered at 43, signifying that the Human Centric Engineering website garnered a usability score lower than the mean level, which stands above 68 [7]. Considering the classification, the range of acceptability fits into the "unacceptable" grouping, the grading scale is evaluated as "F," also descriptive category fall at "satisfactory" category.

2.2 Research Stages

During that phase, the outlined procedures for conducting the research are delineated. This article utilize the UCD approach, which encompasses four phases: Grasp the Usage Context, Define User Needs, Devise Solutions, and Appraise Alignment with Requirements [11]. As shown in Figure 1.

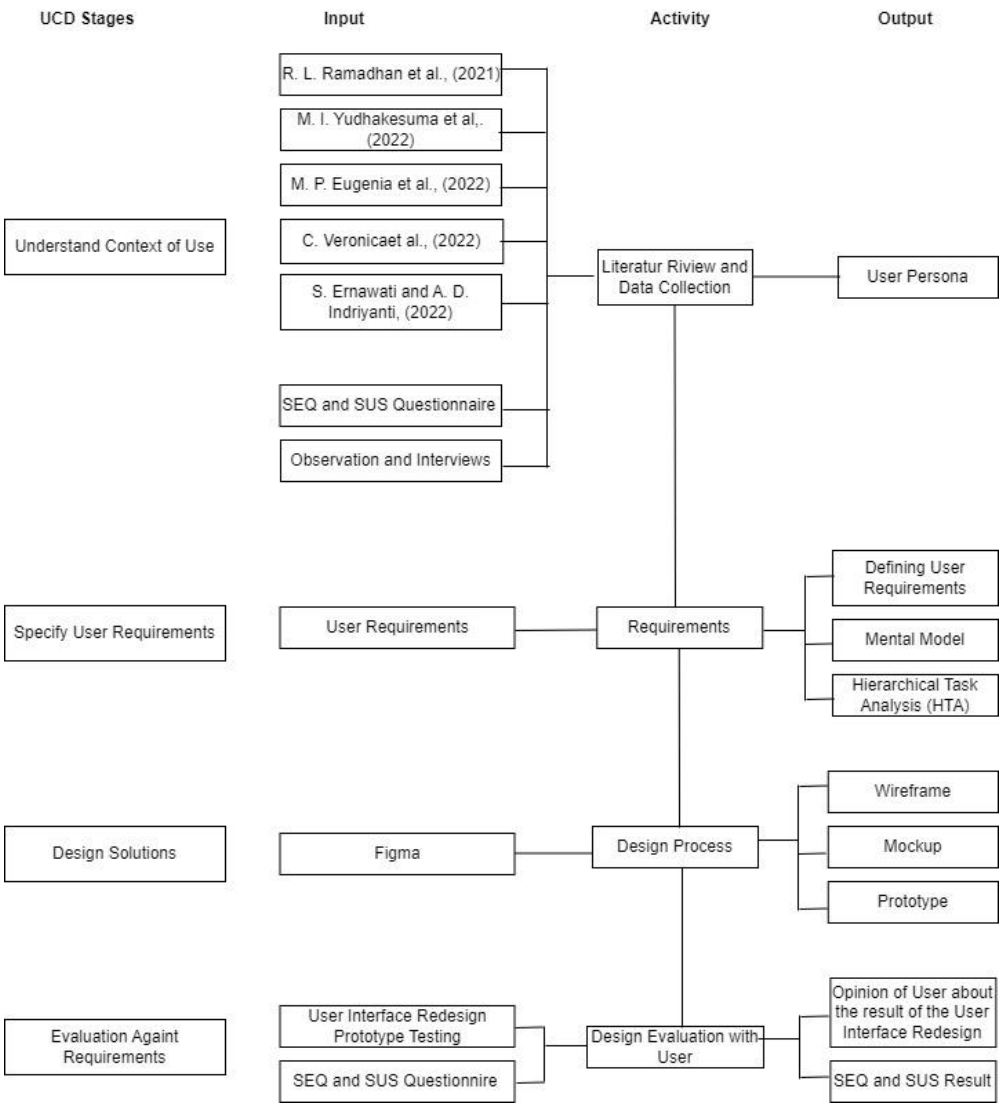

Figure 1. Research Stage

2.3 Understand Context of Use

The procedure executed during the Grasp the Usage Context stage involves extracting data from interviews and observations involving 5 Human Centric Engineering website users. Subsequently, this data is translated into user personas.

2.3.1 User Persona

A user persona is a portrayal of users in the guise of fictional individuals employed by researchers to comprehend demographics, behaviors, motivations, challenges, and requirements [16]. User personas assist researchers in designing from the user's perspective. By using user personas, researchers can gain deeper insights into the user's perspective, enabling them to create website designs that cater to the users' needs [17].

Table 1. Persona

Demographics	Behavior	Motivation	Problems	Requirements
Age: 20-26 years old	Using the internet for 10 to 15 hours a day.	Reading information available on the Human Centric Engineering website.	The website interface display is not responsive when accessed through smartphones.	Responsive interface display when accessed through smartphones.
Occupation: Staff of Human Centric Engineering and	Using the internet to search for information,	Searching for information about events or events being held.	The placement of image content is still messy and the	Neat placement of image content and easily understandable navigation.

Telkom University students		communicate, and perform other tasks.	navigation is confusing.	
			Inconsistent writing style and unclear font color reduce the readability of the text.	Consistency in writing style and clear font color selection.
			There are website pages that cannot be opened.	Removing website pages that cannot be opened.

2.4 Specify User Requirements

During this stage, the researcher will pinpoint the prerequisites that must be met in accordance with the needs of the respondents. After that, a mental model and Hierarchical Task Analysis (HTA) will be developed.

2.4.1 Defining User Requirements

Subsequent to establishing the persona in the preceding stage, the researcher proceeds to identify the prerequisites and demands necessary to fulfill the respondent's requirements, and then assesses the sections of the website that require redesigning, drawing from the information acquired in the previous phase.

Table 2. Needs and Requirements

Needs	Requirements
Responsive interface display when accessed through smartphones.	Creating a responsive interface display for the website when accessed through smartphones.
Neat placement of image content and easily understandable navigation.	Rearranging image content and creating a simple navbar with easily understandable navigation.
Consistency in writing style and clear font color selection.	Using easily readable fonts with appropriate sizes and clear font color selection.
Removing website pages that cannot be opened.	Removing pages that cannot be opened.

2.4.2 Mental Model

A mental model represents what users perceive and understand about the steps involved in utilizing a product. Mental models depend on users' understanding rather than accurate information and represent users' knowledge of a product [15]. It is depicted in Figure 2.

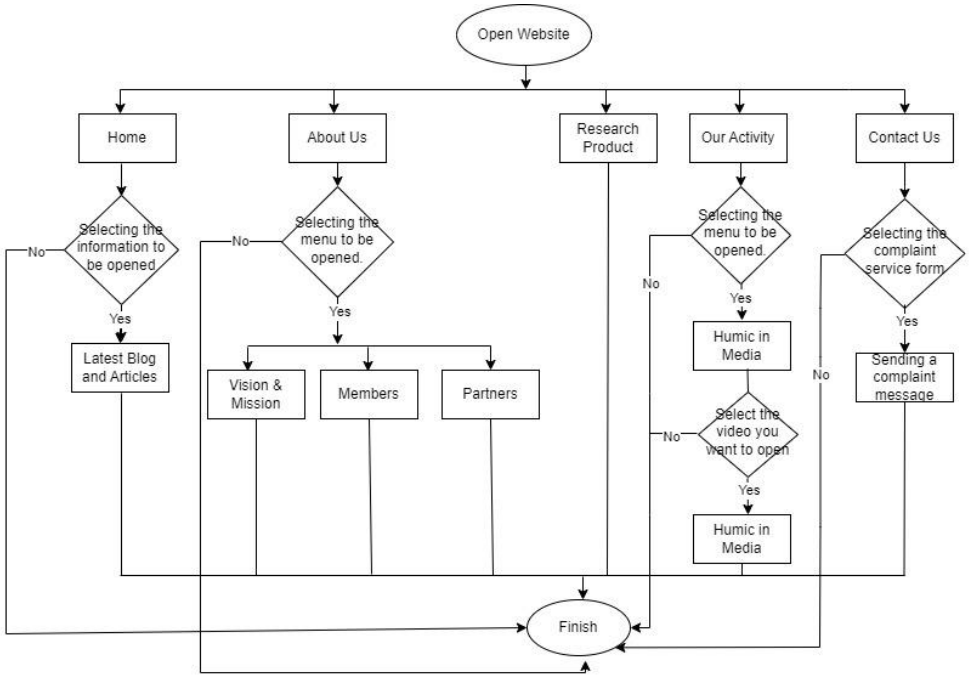

Figure 2. Mental Model

Within this design procedures, the development of a mental model is strongly focused on addressing user requirements. Based on the input provided by users, primary steps have been identified to craft an enhanced experience.

Aspects such as a responsive interface when accessed through smartphones, organized placement of image content, and user-friendly navigation are key focal points in constructing the mental model. Additionally, the significance of consistency in writing style and clear font color choices is also reflected in this process. By eliminating inaccessible pages, serious attention is directed toward ensuring users receive relevant and valuable content. This mental model analysis underscores the importance of aligning interface design with user preferences and specific requirements to deliver a more optimal and satisfying experience.

2.4.3 Hierarchical Task Analysis (HTA).

Hierarchical Task Analysis (HTA) involves the analysis of tasks with the purpose of outlining the sequence and prerequisites that empower users to execute their actions within an application or system [8]. In this case, the tasks are structured hierarchically for easier understanding. Task analysis is used to facilitate the development of interface design as it contains the content and flow that will be built into an interface [9]. It is shown in Figure 3.

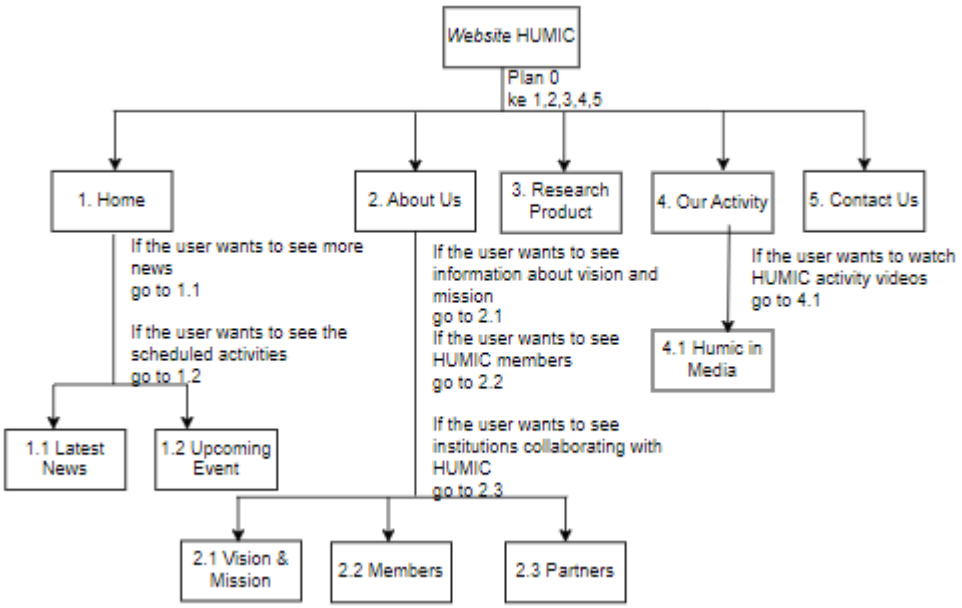

Figure 3. Human Centered Engineering HTA

The implementation of HTA in this design phase becomes crucial to comprehend the steps required by users to achieve their goals. In HTA, user needs serve as the primary foundation to detail the tasks that need to be accomplished. In this context, a responsive interface when accessed through smartphones, as well as organized placement of image content and user-friendly navigation, are key points in the HTA. The application of consistency in writing style and clear font color choices is also noted as aspects influencing how users interact with the interface. The removal of inaccessible pages is also reflected in HTA, indicating a focus on providing relevant content. This HTA analysis provides a detailed overview of how the planned task steps interact with the interface design. Consequently, the outcome will be a design that is more precise, effective, and in harmony with the primary requirements of users.

2.5 Design Solutions

In this stage, design is carried out by creating new design solutions based on the requirements and needs of the tasks that are required by Human Centric Engineering website users obtained from the previous process. The process to form a user interface design can be done by creating wireframes, mockups, and developing design prototypes.

2.6 Evaluate Against Requirements

In this stage, design prototypes are evaluated, ideally through usability testing with users of the product. The purpose is to ensure that the interface design results meet the users' needs. The steps conducted in this stage include usability testing and analysis of usability evaluation results.

3. RESULT AND DISCUSSION

3.1 Wireframe

A wireframe is a simple visual representation of the user interface of a website, application, or other digital product [18]. It provides a basic view of the structure and layout of the main elements on the page without considering the actual visual design or content [19]. Wireframes serve as a guide for designers and developers to efficiently design and arrange interface elements before starting the more detailed design process [17]. They help identify the information structure, navigation,

and user interactions with the interface, ensuring a better and functional user experience in the early stages of development [18]. The wireframe for the Human Centric Engineering website, which has been generated, is visible in Figure 4.

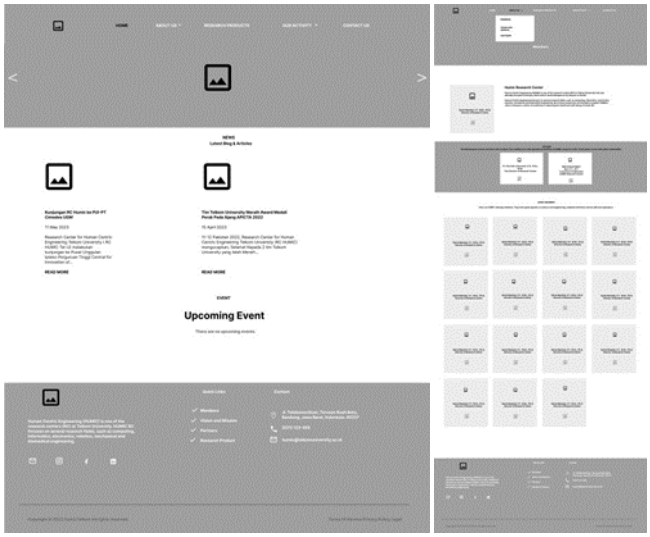

Figure 4. Wireframe After Redesign

The depicted visual is a wireframe illustrating the recently designed user interface for the Human Centric Engineering website. Addressing these aspects demonstrates a meticulous consideration of user preferences and usability. The wireframe designs are strategically aligned with the requirements articulated by users, ensuring a seamless and engaging user experience. The focus on responsive design for mobile accessibility, along with the organized arrangement of visual elements and intuitive navigation, underscores the commitment to optimizing user interactions. Consistency in writing style and font color selections further enhances readability and aesthetics, contributing to a coherent and visually appealing interface. The decision to remove inaccessible pages indicates a commitment to providing users with valuable and accessible content, streamlining their interaction journey. This user-centered approach to wireframe design ensures that the final interface will cater to users' expectations, resulting in an improved overall experience that aligns with their needs and preferences. The comprehensive wireframe is available for reference in the appendix.

3.2 Mockup

Mockup is a visual representation or initial model of a product, typically in the form of a visual design displaying the appearance and layout of the product's interface or elements [20]. Mockups are employed to offer a preliminary visualization of how the product will appear prior to its actual implementation or development. Mockups help to understand and evaluate the design, structure, and layout aspects of the product before moving into further development stages [21]. The designed mockup for the Human Centric Engineering website is depicted in Figure 5.

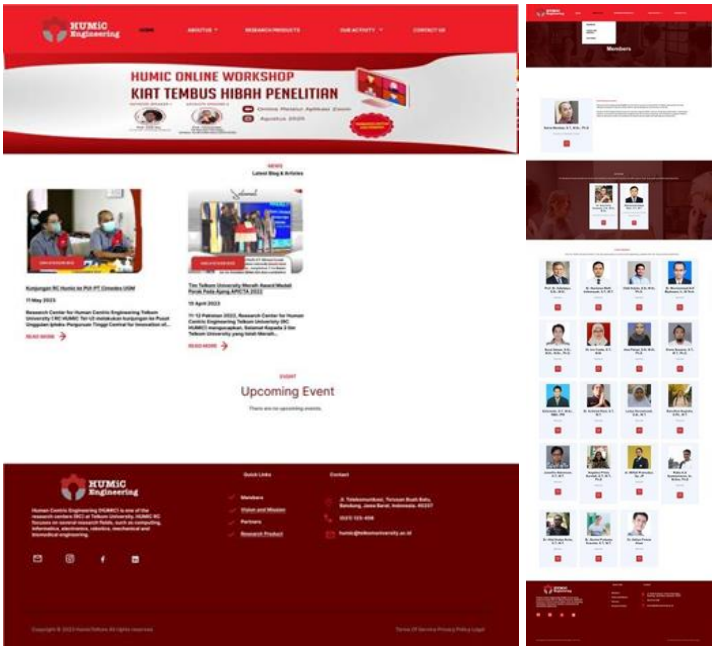

Figure 5. Mockup After Redesign

The depicted visual portrays a mockup of the recently crafted user interface design for the Human Centric Engineering website. These considerations highlight a thorough understanding of user preferences and a commitment to providing an optimal user experience. The mockup designs are strategically aligned with user requirements, ensuring a seamless and engaging interaction process. Prioritizing a responsive design for mobile devices, coupled with well-organized image placements and user-friendly navigation, underscores the dedication to enhancing user interactions. Consistency in writing style and font color selections further contributes to readability and visual coherence, promoting a professional and cohesive appearance. The decision to eliminate inaccessible pages signifies an effort to deliver valuable and accessible content, minimizing user frustration. This meticulous approach to mockup design reflects the aspiration to meet user expectations, resulting in an enhanced user experience that harmoniously accommodates their needs and preferences. The in-depth mockup is viewable in the appendix.

3.3 Prototype

A prototype is a model or initial design of a product or system created to test or experiment with its features, functionality, and design before the product or system is actually built or implemented [22]. Prototypes typically represent a simplified early version of the final product, used to gather feedback from users or stakeholders, validate concepts, and make improvements before developing a more complete and mature product or system [22]. Prototypes can help identify issues and errors early on, thus saving time and costs in further development [23]. The comprehensive prototype is available for reference in the appendix

3.4 Testing

The subsequent stage involves testing the prototype of the recently designed interface for the Human Centric Engineering website, crafted in the preceding phase, with the participation of 5 individuals. This testing employs an SEQ and SUS questionnaires. Single Ease Question (SEQ) is among the post task questionnaires utilized for evaluating the simplicity of a product feature, relying on user experience through a singular question for each task [13]. The System Usability Scale (SUS) survey comprises 10 inquiries utilized for assessing the general usability [24]. The aim of this usability testing is to demonstrate how implementing the UCD approach enhances Human Centric Engineering website's usability and guarantees that the new website interface design aligns with user needs. The evaluation involves 5 participants, encompassing Human Centric Engineering staff and Telkom University students who have prior experience with the website. These participants are engaged in usability testing of the Figma prototype, accessible on their electronic devices, enabling them to compare the previous and new interfaces of the website. After concluding their engagement with the updated interface, participants are encouraged to fill out the SEQ and SUS questionnaires. Single Ease Question (SEQ) questionnaire utilizes 7-point scale for rating, ranging from extremely challenging (1) to exceedingly effortless (7). SUS questionnaires contain of 10 questions, each using a five point rating scale where "one" represents "Strongly Disagree" and "five" portray "Strongly Agree" [23]. SEQ questionnaire's seven questions are presented in Table 3, and 10 questions of the SUS questionnaire are displayed in Table 4.

Table 3. SEQ questionnaires

No.	Question
1	Overall, task opening one of the news information on the Home page was?
2	Overall, task exploring the Members page was?
3	Overall, task accessing the Vision and Mission page was?
4	Overall, task opening the Partners page was?
5	Overall, task exploring the Focused Research page was?
6	Overall, task opening one of the videos on the Humic in Media page was?
7	Overall, task sending a chat through the form on the Contact Us page was?

Table 4. SUS questionnaires [21]

No.	Question
1	I believe I will prefer using this website regularly.
2	I noticed this website appeared needlessly intricate to me.
3	I perceived the system as user-friendly.
4	I believe I would require technical assistance to effectively use this system.
5	I noticed effective integration of various functions within this system.
6	I observed excessive inconsistency within this system.
7	I assume that most individuals would grasp the usage of this system swiftly.
8	I encountered the system to be quite unwieldy.
9	I feel very assured while utilizing the website.
10	I must acquire substantial knowledge before being proficient with this system.

The SEQ score is calculated by taking the average of all participants' answers to that question. For example, if there are 10 participants who answered the SEQ question with scores of 5, 6, 7, 4, 5, 6, 7, 6, 5, and 6, then the SEQ score for that task is (5+6+7+4+5+6+7+6+5+6)/10 = 5.7 [6]. To calculate the SUS score, there are several rules that must be applied. For statements with odd numbers, deduct 1 from the chosen user score (x-1), and for those with even numbers, subtract the user's selected score from 5 (5-x). Then, combine the values from both even and odd-numbered statements [25]. Next, proceed to multiply the total by 2.5. Example, If the user selects a score of 4 for question 1, the score for question 1 is 3 (4-1), If the user selects a score of 1 for question 2, the score for question 2 is 4 (5-1), and then, sum all the scores and multiply by 2.5 in order to obtain the ultimate System Usability Scale (SUS) score [25].

3.5 Testing Result

Before the process of redesigning the user interface took place, the score obtained from the Single Ease Question (SEQ) questionnaire was 5.5. After undergoing the redesign process, there was an increase in the SEQ score to 6.4. This indicates that the changes made to the user interface have had a positive impact on improving the assessment of the user-friendliness of tasks within the interface. It is shown in Figure 6.

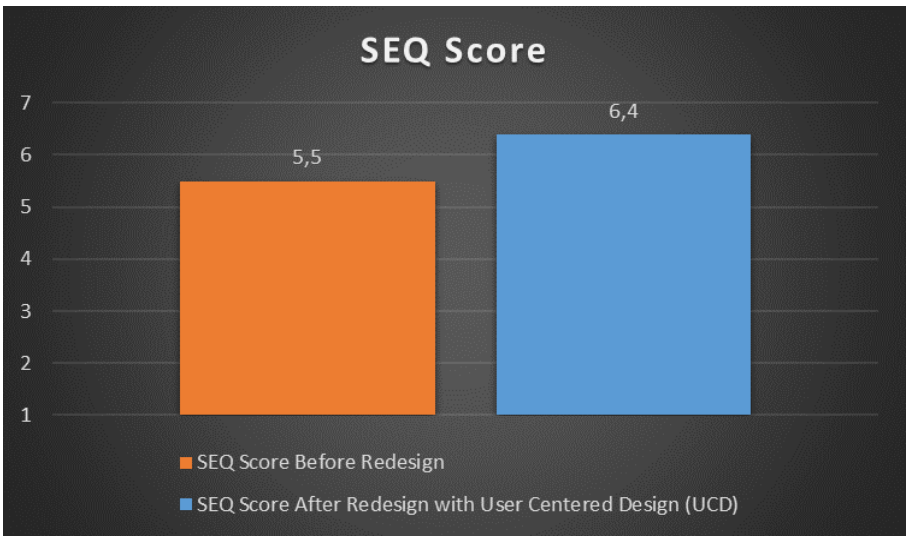

Figure 6. Before and after redesign SEQ Score

Significant changes are evident in the evaluation of the user interface after undergoing the redesign process. Before the redesign, the acquired System Usability Scale (SUS) score stood at 43. However, after the user interface was revised, there was a dramatic increase in the SUS score to 80.5. This substantial improvement indicates that redesigning with a user-focused approach can result in a user interface that is much more user-friendly and satisfying. It is shown in Figure 7.

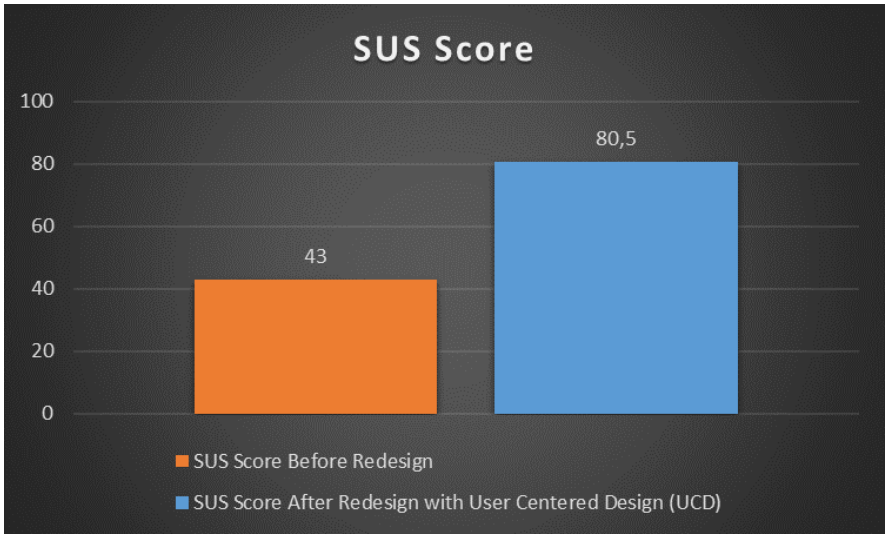

Figure 7. Before and after redesign SUS Score

Redesigning the user interface of a website involves strategic thinking and a mature approach. In this scenario, the process of revamping the user interface for the Human Centric Engineering website adheres to the User-Centered Design

(UCD) methodology, which places user requirements and preferences as the central factors influencing every facet of interface design. Drawing inspiration from user input and feedback, this redesign aims to create a better, responsive, and easily accessible user experience. A key focal point of this redesign is the responsiveness of the interface when accessed through smartphones. The prevalence of mobile devices has transformed how people access online content, making it essential for website interfaces to adapt to various screen sizes. This need is reflected in the responsive interface design, enabling users to experience consistency whether accessing the website through a desktop or smartphone. Beyond responsiveness, the organized placement of image content is also a primary concern in redesigning the interface. Properly arranged and integrated images facilitate users' understanding of presented information. Clear and comprehensible navigation is also crucial in delivering a positive user experience. In this redesign, efforts are made to establish an intuitive and clear navigation flow, allowing users to seamlessly transition between pages without confusion. In addition to visual factors, consistency in writing style and font color selection receives serious attention. A consistent writing style helps create a professional impression and enhances readability. Similarly, selecting clear and easily readable font colors is essential to effectively convey information without straining users' eyes. Another significant step is the removal of inaccessible website pages. This action is essential to eliminate potential user frustration when encountering non-functional pages. This removal also signifies an effort to present users with relevant and useful content, without unnecessary technical obstacles. Prior to initiating the interface redesign, evaluations of the SEQ and SUS scores were undertaken to gauge the quality of user experience. The measurements before the redesign indicated a SEQ score of 5.5 and a SUS score of 43. This indicates potential for improvements in terms of readability and interface usability. Following the application of the UCD approach in the redesign procedure, the SEQ score saw an enhancement to 6.4, while the SUS score displayed a notable rise to 80.5. This change reflects a substantial enhancement in user experience following the adoption of a user-focused approach. The higher SEQ score indicates that tasks within the user interface are perceived as easier and more efficient after the redesign. In the interim, the elevated SUS score signifies that users experience an elevated sense of contentment regarding the overall excellence of the revamped interface. In general, the application of the UCD approach to redesign the user interface in accordance with user requirements has led to discernible enhancements in the interface's responsiveness, readability, and overall usability. These changes indicate that a user-focused approach has a positive impact on enhancing the overall user experience. By understanding user needs and preferences, this redesign has created a more satisfying and effective interface for delivering information to users.

4. CONCLUSION

Utilizing insights gathered from interviews, the researchers have undertaken a revamp of the Human Centric Engineering website employing the UCD approach. Subsequently, a redesigned user interface for an Human Centric Engineering website was implemented into the front-end. The outcomes were assessed by means of usability testing, employing the questionnaires of SEQ and SUS. A mean pre-redesign Single Ease Question (SEQ) score stood at 5.5, while after the redesign, it advanced to an average of 6.4 in the post-redesign assessment, showcasing an enhanced performance in contrast with pre-redesign stage. Moreover, the average SUS score before the redesign was 43, whereas the average SUS score after the redesign (80.5) from the testing showed a significant improvement in usability compared to the pre-redesign phase. The post-redesign results were categorized as 'acceptable' within the acceptability ranges, 'B' in the grade scale, and 'excellent' in the adjective rating. In this study, there are certain limitations that can be further developed in future research. Therefore, there are suggestions in this study, namely conducting more in-depth research with a larger sample of respondents to strengthen the validity and generalizability of the results. Additionally, it is recommended to employ different research methods to gain a broader perspective and to compare the findings with previous studies.

REFERENCES

[1] M. D. Ariawan, A. Triayudi, and I. D. Sholihati, "Perancangan User Interface Design dan User Experience Mobile Responsive Pada Website Perusahaan," *J. Media Inform. Budidarma*, vol. 4, no. 1, p. 161, 2020, doi: 10.30865/mib.v4i1.1896.

[2] M. I. Yudhakesuma, A. Muliawati, and H. N. Irmanda, "Analisis User Experience dan Redesign Antarmuka Website Portal Berita Online dengan Metode User Centered Design (UCD) (Studi Kasus: Cakrawala.co)," *Inform. J. Ilmu Komput.*, vol. 18, no. 1, p. 23, 2022, doi: 10.52958/iftk.v17i4.4154.

[3] "People | Human Centric Engineering (2020)." https://humic.telkomuniversity.ac.id/people/ (accessed Aug. 09, 2023).

[4] M. Agarina, A. S. Karim, and S. Sutedi, "User-Centered Design Method in the Analysis of User Interface Design of the Department of Informatics System's Website," *Int. Conf. Inf. Technol. Bussiness (ICITB 2019)*, no. Icitb 2019, pp. 218–230, 2019, [Online]. Available: https://jurnal.darmajaya.ac.id/index.php/icitb/article/view/2098

[5] R. L. Ramadhan, A. Syahrina, and A. Musnansyah, "Perancangan Ulang User Interface dan User Experience Pada Website Telkom University Open Library Menggunakan Metode User Centered Design," *eProceedings Eng.*, vol. 8, no. 5, pp. 8–45, 2021, [Online]. Available: https://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/15775

[6] A. Pambajeng Furgandini Rencang, "Pengembangan User Interface (UI) Dan User Experience (UX) Aplikasi Cashoop Untuk Pengelolaan Keuangan Pribadi," *J. Sarj. Tek. Inform.*, vol. 7, no. 1, pp. 20–33, 2019.

[7] S. A. Aryono, Harlili, and D. P. Satya, "User Interaction Design for Financial Technology Mobile Application using User-Centered Design," *Proc. - 2019 Int. Conf. Adv. Informatics Concepts, Theory, Appl. ICAICTA 2019*, p. 6, 2019, doi:

10.1109/ICAICTA.2019.8904187.
[8] A. B. Cavanaugh, E. Rahmawati, and I. G. N. A. W. Putra, "Analisis dan Perancangan UI/UX dengan Metode User Centered Design pada Website DLU Ferry," *J. Sist. Inf. Univ. Din.*, vol. 10, no. 3, pp. 1–8, 2021.
[9] A. A. Puji and V. Engraini, "Perancangan User Interface Website E-Commerce Pada Usaha Kuliner Menggunakan User Centered Design," *J. CoSciTech (Computer Sci. Inf. Technol.*, vol. 2, no. 1, pp. 1–8, 2021, doi: 10.37859/coscitech.v2i1.2196.
[10] M. P. Eugenia, M. Abdurrofi, B. Almahenzar, and A. Khoirunnisa, "Pendekatan Metode User-Centered Design dan System Usability Scale dalam Redesain dan Evaluasi Antarmuka Website," *Semin. Nas. Off. Stat.*, vol. 2022, no. 1, pp. 573–584, 2022, doi: 10.34123/semnasoffstat.v2022i1.1454.
[11] C. Veronica, H. Hasniati, and I. A. Musdar, "Implementasi Pendekatan User Centered Design Pada Perancangan UI/UX Website Worker's," *J. KHARISMA Tech*, vol. 17, no. 02, pp. 71–84, 2022, [Online]. Available: https://jurnal.kharisma.ac.id/kharismatech/
[12] S. Ernawati and A. D. Indriyanti, "Perancangan User Interface dan User Experience Aplikasi Medical Tourism Indonesia Berbasis Mobile Menggunakan Metode User Centered Design (UCD)(Studi Kasus: PT Cipta Wisata Medika)," *J. Emerg. Inf. ...*, vol. 03, no. 04, pp. 90–102, 2022, [Online]. Available: https://ejournal.unesa.ac.id/index.php/JEISBI/article/view/49296%0Ahttps://ejournal.unesa.ac.id/index.php/JEISBI/article/download/49296/40999
[13] D. Hasnan Hariri, H. Hannie, I. Purnamasari, and U. Singaperbangsa Karawang Abstract, "Analisis User Experience pada Website Waste4change Menggunakan Metode Single Ease Question," *J. Ilm. Wahana Pendidik.*, vol. 8, no. 13, pp. 95–108, 2022.
[14] N. K. Ningrum, I. U. W. Mulyono, and Z. Umami, "Pengujian UI/UX dengan System Usability Scale dan Single Ease Question pada Aplikasi Pantau untuk Monitoring Perkembangan Penanaman Tanaman di Lahan Hijau," *Proceeding Sci. ...*, vol. 7, no. Sens 7, p. 9, 2022, [Online]. Available: https://conference.upgris.ac.id/index.php/sens/article/view/3466%0Ahttps://conference.upgris.ac.id/index.php/sens/article/download/3466/2146
[15] N. R. Ramadhani, A. Mulyanto, and G. S. Niwanputri, "Designing Interaction and User Interface of Computational Thinking Digital Game for Children using User-Centered Design Approach," *2020 7th Int. Conf. Adv. Informatics Concepts, Theory Appl. ICAICTA 2020*, p. 6, 2020, doi: 10.1109/ICAICTA49861.2020.9429049.
[16] C. Pricilla, D. P. Lestari, and D. Dharma, "Designing Interaction for Chatbot-Based Conversational Commerce with User-Centered Design," *ICAICTA 2018 - 5th Int. Conf. Adv. Informatics Concepts Theory Appl.*, pp. 244–249, 2018, doi: 10.1109/ICAICTA.2018.8541320.
[17] M. Multazam, "Perancangan User Interface dan User Experience pada Placeplus menggunakan pendekatan User Centered Design," *Univ. Islam Indones.*, vol. 1, p. 8, 2020, [Online]. Available: https://journal.uii.ac.id/AUTOMATA/article/view/15528/10233
[18] R. T. Maulana, "Perancangan User Interface User Experience Dengan Metode User Centered Design Pada Aplikasi Mobile Auctentik," *Informatics Eng.*, pp. 22–75, 2020, [Online]. Available: https://dspace.uii.ac.id/123456789/28891
[19] S. D. Buntoro, "Perancangan Desain User Interface dan User Experience Menggunakan Metode User Centered Design (UCD) Pada Proses Pembelian Obat Oleh Customer di Aplikasi K24KLIK (Studi Kasus : K24Klik)," 2020.
[20] J. M. Putri, E. Krisnanik, H. Nurramdhani, T. Tjahjanto, and D. Mahdiana, "Analisis dan Perancangan User Interface dan User Experience BNI Life Mobile dengan Metode User Centered Design," *Inform. J. Ilmu Komput.*, vol. 18, no. 1, p. 34, 2022, doi: 10.52958/iftk.v17i4.4319.
[21] R. B. Solichuddin and E. G. Wahyuni, "Perancangan User Interface dan User Experience dengan Metode User Centered Design pada Situs Web Kalografi," *Automata*, vol. 2, 2021, [Online]. Available: https://dspace.uii.ac.id/handle/123456789/40597%0Ahttps://dspace.uii.ac.id/bitstream/handle/123456789/40597/18523239.pdf?sequence=1&isAllowed=y
[22] F. H. Ahsin, H. B. Santoso, and R. Yugo Kartono Isal, "Usability evaluation and interface redesign on Rumah Belajar application with the user-centered design approach," *2019 Int. Conf. Adv. Comput. Sci. Inf. Syst. ICACSIS 2019*, pp. 49–54, 2019, doi: 10.1109/ICACSIS47736.2019.8979909.
[23] Y. Efindo, L. E. Nugroho, and R. Ferdiana, "The design of two-way relationship tourism planning system with user centered design (UCD)," *2019 Int. Conf. Inf. Commun. Technol. ICOIACT 2019*, pp. 38–43, 2019, doi: 10.1109/ICOIACT46704.2019.8938433.
[24] Y. A. Rahman, E. D. Wahyuni, and D. S. Pradana, "Rancang Bangun Prototype Sistem Informasi Manajemen Program Studi Informatika Menggunakan Pendekatan User Centered Design," *J. Repos.*, vol. 2, no. 4, pp. 503–510, 2020, doi: 10.22219/repositor.v2i4.433.
[25] E. E. Zarwono and A. N. Hidayanto, "Analysis and Design of Internal Information Systems of the APU-PPT Education and Training Center Using the User-Centered Design Method," *Proc. - 2nd Int. Conf. Informatics, Multimedia, Cyber, Inf. Syst. ICIMCIS 2020*, pp. 159–165, 2020, doi: 10.1109/ICIMCIS51567.2020.9354312.