Jurnal Teknologi Sistem Informasi dan Aplikasi **ISSN: 2654-3788**
Penerbit: Program Studi Teknik Informatika Universitas Pamulang **e-ISSN: 2654-4229**
Vol. 7, No. 2, April 2024 (806-813) **DOI: 10.32493/jtsi.v7i2.39247**

Development of UI/UX Application of Javanese Script Using User Centered Design in Elementary School

Adlan Wibowo[1], Desty Rakhmawati[2], Ali Nur Ikhsan[3]

[1,2,3] Informatic Department, Universitas Amikom, Banyumas, Indonesia, 53127
e-mail: [1]mymailadlan@gmail.com, [2]desty@amikompurwokerto.ac.id,
[3]alinurikhsan@amikompurwokerto.ac.id

Submitted Date: April 15th, 2024 Reviewed Date: April 21st, 2024
Revised Date: April 26th, 2024 Accepted Date: April 30th, 2024

Abstract

Indonesia is a country with an area of 1.9 million km², rich in diversity, including various languages in each region. This linguistic diversity gives each region its unique characteristics. However, in the 21st century, there is a noticeable decline in the use of regional languages, particularly in polite speech. This decline is attributed to the influence of Western culture, which has permeated Indonesia through technological advancements and television broadcasts showcasing urban and foreign cultures. The Javanese language, known for its unique *unggah-ungguh* (levels of politeness) and distinctive script, is one of the cultures at risk. The rapid development of technology, especially in education, necessitates its optimal utilization while preserving ancestral heritage such as the Javanese language. This study focuses on designing an optimal User Interface (UI) and User Experience (UX) for a Javanese language learning application on Android devices. The application includes features such as wulangan (lessons), pitakonan (questions), and tembang (traditional songs), with a focus on the User-Centered Design (UCD) approach. The research object is MI Nurul Islam, an elementary school in Brebes Regency. After the UI/UX design was successfully created, the System Usability Scale (SUS) was used to evaluate its effectiveness. The design received an average SUS score of 77.5, indicating that it is well-suited for further application development. The findings suggest that the designed application can significantly aid in preserving and promoting the use of the Javanese language among early childhood learners, addressing the decline caused by external cultural influences.

Keywords: User Centered Design; System Usability Scale; Desain interface; Javanese language; Early Childhood

1 Introduction

Indonesia is a country with an area of 1.9 million km2 which is rich in diversity, including language differences in each region. This diversity of languages gives its own characteristics to each region. But in the 21st century we are witnessing the phenomenon of loss of the values of manners in speaking using regional languages (Sunaryo, 2019). This is due to the influence of western culture that penetrated Indonesia, especially through technological advances and television broadcasts that often show city and foreign culture. As a result, many young people tend to forget the values of politeness in communicating, influenced by the style of slang they see and hear. One of the threatened cultures is the use of Javanese language which is increasingly rarely used.

Javanese language is unique with upload-ungguh as a differentiator from other regional languages. Language uploads include rules in speaking and behaving, paying attention to speakers, interlocutors, and situations as a form of maintaining the value of courtesy, courtesy, and mutual respect (Bhakti & Pekalongan, 2020). Javanese language also has layers of language use known as grammatical arrangement, namely Krama and Ngoko which are divided into Krama Alus, Krama Lugu, Ngoko Alus, and Ngoko Lugu. The rapid development of technology, especially in the world of education, requires us to make the best use of it, but still maintain and preserve the heritage

of our ancestors, such as Javanese culture (Shari, 2021).

This is a big challenge, especially for parents and teachers in preserving the Javanese language, especially in early childhood which is the main target of conservation efforts (Yehdeya et al., 2023). The rapid growth of information technology and mobility has changed the learning landscape, such as introducing E-Learning platforms as modern solutions to expand access and effectiveness of learning (Wulandari & Voutama, 2023).

In this digital era, E-Learning platforms can be an effective means to teach and introduce Javanese to the younger generation, while maintaining traditional values. This research aims to design an optimal UI/UX design for Javanese E-Learning platforms on Android devices, focusing on the UCD approach.

UCD (User Centered Design) is a widely used method and is considered an innovative approach in system development. UCD can be used to describe a model, so the core of the UCD concept is to prioritize user experience in the system development process, with the aim that the entire system environment is based on user experience (Rohman et al., 2023).

This is expected to produce a UI/UX design design that is responsive, intuitive, and in accordance with the wishes and level of understanding of users, thereby increasing the attractiveness of Javanese E-Learning applications on the Android platform (Ernawati, 2020).

After finishing designing the application, the next stage is to conduct testing to evaluate the usability of the application. Tests were conducted using the System Usability Scale (SUS), a questionnaire used to measure user perceptions of the usability of software after it has been installed, built, and developed (Purnama, 2023).

This measurement method involves 10 questions graded on a scale of 1-5 (Subhiyakto et al., n.d.), where a value of 1 indicates very high disapproval, and a value of 5 indicates very high disagreement (Azi et al., 2022).

After the data is collected from respondents, calculations are carried out to analyze the results. In previous studies, there was also a discussion about UCD which researchers used as literature review material and increased knowledge before conducting this research. The first research was conducted by Kurniawan et al entitled User Interface Design of STMIK Student Credit System "AMIKBANDUNG" Based on Website with User-Centered Design (UCD) Method. The results of this study showed that evaluation using the usability test resulted in an average score on the usability variable greater than 126, so there were no significant problems. In addition, a total score exceeding 102 indicates that substantial improvement is not needed. Therefore, it can be concluded that the application of a User-Centered Design (UCD) approach before application development is very important to ensure that the application created is aligned with user expectations and needs (Kurniawan, 2023).

The second research was conducted by Ramadhan et al entitled Designing User Experience for Submitting E-KTP Applications Using the UCD Method in Tanah Baru District. The study yielded results with the application of the user-centered design method in the Electronic Identity Card (E-KTP) application system. The advantage of the UCD method is to build an efficient and user-friendly E-KTP application system because the UCD method involves users throughout the design process (Ramadhan, 2021).

The third study was conducted by Mahfud et al entitled User Interface Design User Experience Android-Based E-Ngaji Application Using User-Centered Design (UCD) Method at TPQ. The research produced UI / UX results on the E-Ngaji application designed with the User-Centered Design (UCD) method. App prototypes are created to understand user preferences, placing them at the core of app design. To achieve usability, usability testing was carried out on the prototype using the cognitive walkthrough method. The test time for each session does not exceed 30 seconds, and the problems faced by participants when using the design are relatively small, with an error percentage of no more than 50%. This is done to ensure that the application has an attractive and consistent interface that aligns with user satisfaction (Saputra, 2022).

The fourth research was conducted by Khairil et al entitled Analysis of the Usability of Online News Websites Using User-Centered Methods. In this study, an analysis of the usability of the bertuahpos.com website was carried out, and a prototype was developed. The method used is User-Centered Design, which includes six

principles: perspective, compliance, feedback, relatedness, limitation, help, and usability. Based on the results of the analysis, three things were identified as problematic: Perspective, Compliance, and Feedback. For the principle of Perspective, it is recommended to beautify the website by adding comment features from various social media accounts such as Facebook, Twitter, and Gmail. Regarding Compliance, the suggestion is to add content for each district in Riau province. As for the principle of Feedback, the website must provide clear error messages to users in the search feature. These improvements are implemented into the prototype of the proposed design without changing any other aspects of the design. The prototype serves as a reference for companies to perfect usability-related website design (Khairil Ahsyar et al., 2020).

The fifth research was conducted by agus et al to design an attractive, minimalist, and modern UI/UX design prototype for the My CIC application. This design process is done using Figma software and includes student academic information. It is hoped that this design will help Catur Insan Cendekia University to continue to develop technology in education to improve the quality of service and the competitiveness of human resources, so as to produce quality graduates who can compete globally (Muhyidin et al., 2020).

After conducting a literature study, this study is different from previous research, this study focuses on designing Javanese language applications for elementary school children besides that in this study design testing was carried out to measure whether the design is feasible to use in a system or not. Then in this research focuses on the introduction of Javanese script, simple vocabulary and reading procedures in krama and equipped with music features to avoid boredom in learning.

2 Method

In this study, researchers used the UCD (User Centered Design) method. UCD (User-Centered Design) is an approach in product or system development that puts the user at the center of the design. This approach focuses on understanding user needs, capabilities, and preferences during the entire design process. Then in figure 1 there is a research flow that will be used.

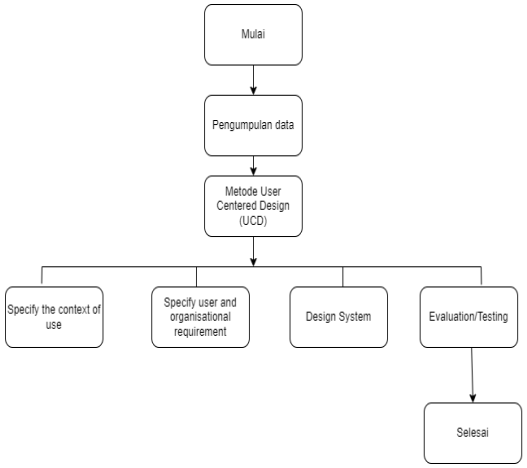


Figure 1. Research Flow

2.1 Data Collection

In this study, data collection was conducted through two interview methods and questionnaires. An interview is a process of oral interaction to obtain direct information. The results of this interview are useful for identifying the obstacles that exist on the website. In addition, questionnaires are used before and after the design of the new system. The data obtained from this questionnaire will be the basis for designing a new website. This process ensures that any system design is created based on relevant input from users. In the process of data collection was carried out at MI Nurul Islam Kalijurang in Brebes Regency. This school has obstacles related to Javanese language subjects, due to the lack of learning media so this research needs to be done. The hope is to increase the enthusiasm of students in learning Javanese.

2.2 Metode UCD (User Centered Design)

User Centered Design (UCD) or known as human centered design is an approach that puts the user as the main focus in system development (Indriyanti, 2023). The difference between human centered design and user centered design lies in the scope of language, where human centered design focuses on all stakeholders while user centered design only focuses on program users (Aminah et al., 2024). This method provides guidance in system development based on user needs, taking into account aspects such as system development targets targeting users, structured and integrated design, user engagement throughout the UCD process, and interactive design (Wibisono, 2023).

In the UCD process, there are four steps that must be done.

1. Specify the context of use
   This stage refers to the in-depth identification of who will use the system, how it will be used (characteristics of use), and the conditions or situations under which the system will operate. This identification helps to understand the context in which users will interact with the system, which is an important foundation for designing appropriate solutions.

2. Specify the user and organizational requirement
   This step aims to identify the needs and requirements of users and related organizations. These needs form the initial basis for system design, helping the development team understand what is expected of the system and how it can support organizational goals.

3. Design system
   The stages of system design include the use of information from identifying user needs to develop an appropriate system design. Data from previous stages is used as a guide for designing features, functions, and interfaces of the system as a whole.

4. Evaluation (Evaluasi)
   At the evaluation stage, the system that has been designed is evaluated to ensure conformity to user needs. This evaluation often involves the end user by sending out questionnaires or conducting live testing to gather feedback. The main objective is to ensure that the developed system meets the expectations and needs of users well.

2.3 Testing

Testing is a process carried out to measure whether or not a design or system is feasible to be applied in practice. In the context of UI/UX or system design, testing aims to validate the performance, usability, and reliability of the design before it is introduced to the end user (Cahyani, 2022). The purpose of testing is to find problems, errors, or flaws in the design so that they can be corrected before the product or system is widely used. For this research, testing was carried out using the SUS method (System Usability Scale) (Pratama et al., 2023).

SUS stands for System Usability Scale. This is a method used to measure user satisfaction with information technology-based systems or products. SUS provides a structured approach to collecting data from users regarding their experience using specific systems (Yunita et al., 2023).

The SUS method involves filling out a questionnaire by the user based on a series of statements regarding user experience, navigation, and system usability. The SUS questionnaire consists of 10 statements that are scored by users using the Likert scale (Wirawan et al., 2023). For SUS questions can be seen in table 1.

Table 1. SUS Questions

No.	Question
1.	I think I will use this system again.
2.	I find the system complicated to use.
3.	I find the system easy to use.
4.	I need help from others or the latest in using this system.
5.	I feel that the features of this system work properly.
6.	I feel there are many inconsistencies in the system.
7.	I feel others will understand how to use this system quickly.
8.	I feel the system is confusing
9.	I feel that there is no obstacle in using this system
10.	I need to get used to it before using this stem.

ISSN: 2654-3788
e-ISSN: 2654-4229
DOI: 10.32493/jtsi.v7i2.39247

3 Result and Dicussion

3.1 Specify the context of use

In the early stages, the author identifies who will use this system. This study is focused on early childhood education, specifically targeting MI Nurul Islam in Brebes district. The objective of this research is to design and develop an educational application aimed at introducing local culture to elementary school children. MI Nurul Islam was chosen as the research subject due to its location, facilitating direct testing of the application with the target audience. Therefore, the development of this application is expected to have a positive impact in introducing and preserving local cultural richness among the younger generation.

3.2 Specify the user and organizational requirement

At this stage determine the needs of the user. For its needs, namely the lack of learning media, especially in Javanese subjects which results in boredom in learning. This has an impact on the understanding of students. Therefore, a simple but all-encompassing system is needed so that it is easy to understand and does not cause boredom. In figure 2 there is an empathy map that is used as material for the design design to be made.

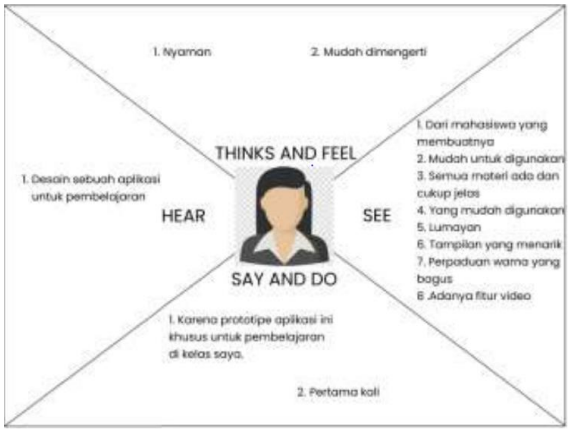
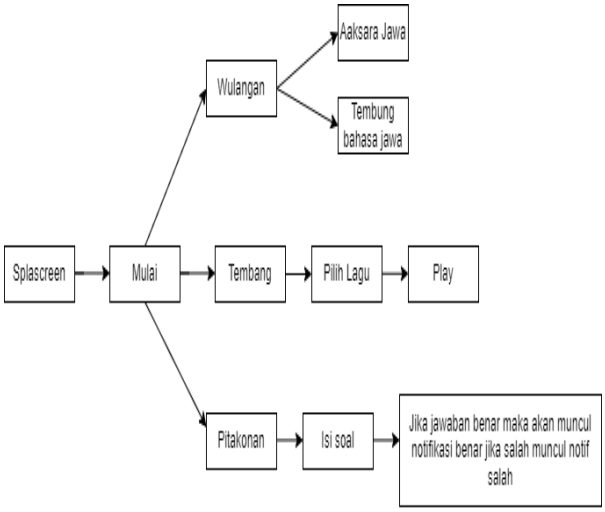


Figure 2. Empathy Map

Then after creating empathy, creating an application flow is carried out which can be seen in figure 3.



Gambar 3. Alur Apilkasi

It can be seen in figure 3 that in the application there are three features such as wulangan, tembang and pitakonan. In the wulangan there are only two materials, namely Javanese script and simple vocabulary equipped with how to read. Researchers took these two materials because schools want their students to be able to learn Javanese script and memorize vocabulary easily. For the ribbon feature, it is used to measure the extent of students' understanding after learning and the last in the song feature as a distraction when students feel bored in learning.

3.3 Design System

In making design tools used is figma. Figma is a web-based design platform used to create graphic designs, prototypes, and team collaboration in digital product development. Then to retrieve assets such as icons using the freepik platform. Freepik is a graphic resource platform that provides a variety of design content such as images, vectors, icons, and graphic templates for design purposes. The site provides a diverse collection of graphics that designers, web developers, marketers, and individuals can download and use for their creative projects.

Before making a design that is equipped with colors or mock ups, the initial step of making a design begins with making a wireframe. Wireframes and mockups are two different concepts in user interface design (UI/UX). A wireframe is a simple visual representation that shows the basic structure and hierarchy of elements within an interface without aesthetic detail. Wireframes help in layout planning and navigation.

On the other hand, a mockup is a more complete visual representation that displays the final design of the interface, including colors, typography, and other graphic elements. Mockups provide a more detailed picture of how the interface will look and behave, as well as assist in the communication of the design to the development team or client. For wireframes in this study can be seen in figure 4 while mock up applications can be seen in figure 5.

Figure 4. Application Wireframe

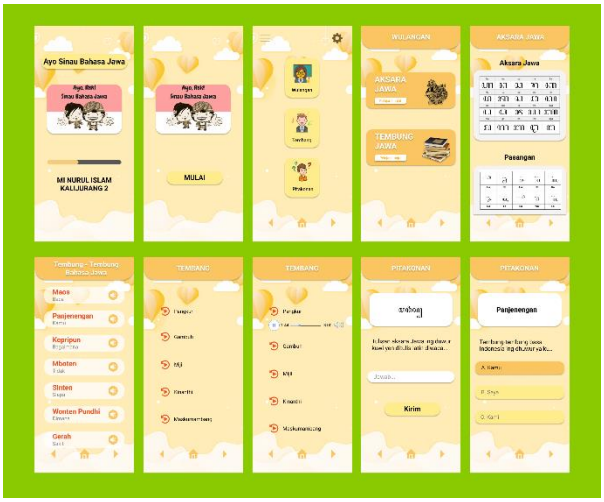


Figure 5. Application Mockup

3.4 Testing

After making the design, the testing stage is used for feasibility testing. The questionnaire was given to MI teachers based on teacher evaluations during the teaching and learning process, for only five respondents because this study only focused on design and design feasibility tests before deploying into an application. Table 2 is the pure result of the SUS score then in table 3 the SUS score has been calculated according to the SUS formula.

Table 2. Original Score of respondet's answer

Respondent	Question									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
R1	5	4	5	2	5	4	4	5	5	2
R2	5	3	5	3	5	5	5	5	5	4
R3	5	4	5	4	5	4	5	5	5	5
R4	5	3	5	3	5	4	5	4	5	3
R5	5	4	5	4	5	5	5	3	5	5

Table 3. Calculation SUS

Responden	Question										Raw	SUS	Grade
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	SUS	Score	
R1	4	3	4	1`	4	3	3	4	4	1	31	77.5	B
R2	4	2	4	2	4	1	4	4	4	3	32	80	A
R3	4	2	4	3	4	3	3	1	4	1	29	72.5	B
R4	4	2	4	2	4	2	4	3	4	2	31	77.5	B
R5	4	3	4	3	4	2	4	2	4	2	32	80	A
Nilai Rata – Rata SUS												77.5	B

In Table 3 above, there are answers to SUS questions and the final assessment results using the SUS formula with an average result of 77.5. If the average SUS score is more than 70, then the application prototype is acceptable, and for a value of 77.5 it belongs to category B. This information can be seen in Figure 6 for the SUS scale or the SUS category from Range 0 to 100.

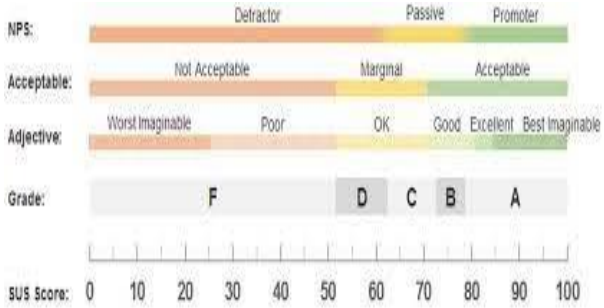


Figure 6. SUS Scale

4 Conclusion

After carrying out various stages of data collection and design making, it can be concluded that this research obtained an application design based on user needs, namely one of the MIs located in Brebes Regency, Tonjong District. When designing the design of the Javanese E-learning application, the use of the UCD (User Centered Design) method produces a prototype design that provides convenience for students, the tool used is figma to find icons using freepik. In this study, a prototype design of a learning application was produced that provides convenience for students by combining multiple functions in one application. There are several features such as wulangan, tembang and pitakonan. The design is made as simple as possible but still attractive in order to avoid boredom in learning. After making the design, then the design test to measure feasibility with the System Usability Scale (SUS), obtained an average score of 77.5. It can be concluded that the structure of the Android-based Javanese E-learning application is acceptable because it is included in the B / Good category. For future research, you can create an application according to the existing design and then conduct SUS testing again to evaluate the success of the application created.

References

Agus Muhyidin, M., Sulhan, M. A., & Sevtiana, A. (2020). *Perancangan Ui/Ux Aplikasi My Cic Layanan Informasi Akademik Mahasiswa Menggunakan Aplikasi Figma* (Vol. 10, Issue 2). Https://My.Cic.Ac.Id/.

Azi, M. F., Wiguna, C., & Meiah, K. N. (2022). Analisis User Interfaces Pada Website Kampiun Ittp Dengan Metode Heuristik Dan System Usability Scale (Sus). *Jurnal Media Informatika Budidarma*, *6*(2), 1080. Https://Doi.Org/10.30865/Mib.V6i2.3802

Bhakti, W. P., & Pekalongan, I. (2020). Pergeseran Penggunaan Bahasa Jawa Ke Bahasa Indonesia Dalam Komunikasi Keluarga Di Sleman. In *Jurnal Skripta* (Vol. 6). Pbsi Upy.

Cahyani1, R. D., & Dwi, A. (2022). Penerapan Metode User Centered Design Dalam Perancangan Ulang Desain Website Man 1 Pasuruan. *Jeisbi*, *03*, 2022. Https://Mansatupasuruan.Sch.Id.

Candra Kirana, H., & Setiawan Wibisono, I. (2023). *Aplikasi Edukasi Islam Berbasis Android: Pengenalan Huruf Hijaiyah Dan Hukum Tajwid Dengan Metode Waterfall Di Tpq Sidiq Al-Musirun*. Https://Jurnaldidaktika.Org

Ernawati, S., & Dwi Indriyanti, A. (2020). Perancangan User Interface Dan User Experience Aplikasi Medical Tourism Indonesia Berbasis Mobile Menggunakan Metode User Centered Design (Ucd) (Studi Kasus: Pt Cipta Wisata Medika). *Jeisbi*, *03*, 2022.

Khairil Ahsyar, T., Jakawendra, A (2021). Studi Sistem Informasi, P., Sains Dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau Jl Soebrantas Km, F. H., & Pekanbaru-Riau, P. (2020). Analisa Usability Website Berita Online Menggunakan Metode User Centered Design. *Jurnal Ilmiah Rekayasa Dan Manajemen Sistem Informasi*, *6*(2), 165–172.

Kurniawan, R., & Putra, D. P. (2023). *Perancangan User Interface Sistem Kredit Aktivitas Mahasiswa Stmik "Amikbandung" Berbasis Website Menggunakan Metode User Centered Design (Ucd)*.

Mahfudh, A. A., & Saputra, W. R. (2022). Perancangan User Interface User Experience Aplikasi E-Ngaji Berbasis Android Menggunakan Metode User Centered Design (Ucd) Pada Tpq Designing an Android-Based User Interface User Experience Application Using the User Centered Design (Ucd) Method at Tpq. *Jurnal Ilmiah Intech: Information Technology Journal of Umus*, *4*(2), 255–262.

Nirsal, N., & Aminah, S. (2024). Desain User Interface Berbasis Website Absensi Fingerprint Mahasiswa Berbasis Iot Menggunakan User Centered Design (Ucd). *Jiko (Jurnal Informatika Dan Komputer)*, *8*(1), 73. Https://Doi.Org/10.26798/Jiko.V8i1.1044

Pratama, R. E., Prasetyanto, F., & Zani, T. (2023). *Pembangunan Ui/Ux Dan Aset 3d Pada Aplikasi Multimedia Interaktif Untuk Museum Geologi Bandung Ui/Ux Development And 3d Assets in Interactive Multimedia Application for Bandung Geological Musem*.

Purnama, C. A., & Mariana, N. (2023). *Penerapan Metode User Centered Design Dalam Perancangan Sistem Informasi Kasir*.

Ramadhan, S. L., Fitri, I., & Rubhasy, A. (2021). *Perancangan User Experience Aplikasi Pengajuan E-Ktp Menggunakan Metode Ucd*

Pada Kelurahan Tanah Baru. Http://Jurnal.Mdp.Ac.Id

Saepul Rohman, R., Wahyudin, Y., Oktapiani, R., & Arief Firmansah, D. (2023). Rancang Bangun Website Desain Sertifikat Elektronik Menggunakan Metode User Centered Design. *Jurnal Responsif*, *5*(1), 70–79. Https://Ejurnal.Ars.Ac.Id/Index.Php/Jti

Sarah Victoria, M., & Dwi Indriyanti, A. (2023). *Penerapan Metode User Centered Design (Ucd) Dalam Merancang User Interface Learning Management System Website Torche Education*.

Shari, D., Azizah, E. N., & Kunci, K. (2021). Penerapan Bahasa Jawa Pada Anak Usia Dini. *Jce*, *5*(2), 2598–2184. Https://Doi.Org/10.Xxxxx

Subhiyakto, E. R., Astuti, Y. P., & Umaroh, L. (N.D.). *Konstelasi: Konvergensi Teknologi Dan Sistem Informasi Perancangan User Interface Aplikasi Pemodelan Perangkat Lunak Menggunakan Metode User Centered Design*.

Sunaryo, T. (2019). Indonesia Sebagai Negara Kepulauan. *Jurnal Kajian Stratejik Ketahanan Nasional*, *2*(2).

Wirawan, R., Pramiyati, T., Sandya Prasvita, (2023). *Pengujian Usability Menggunakan Model Human-Computer Interaction Studi Kasus Pada Aplikasi Hoax Buster Tools (Rio Wirawan, Titin Pramiyati, Desta Sandya Prasvita Dan Melati Rahayu) Pengujian Usability Menggunakan Model Human-Computer Interaction Studi Kasus Pada Aplikasi Hoax Buster Tools Usability Testing Using the Human-Computer Interaction Model on Case Study Hoax Buster Tools Applications*.

Wulandari, K., & Voutama, A. (2023). Volume 6; Nomor 2. *Juli*. Https://Ojs.Trigunadharma.Ac.Id/Index.Php/Jsk/Index

Yehdeya, E. F., Primasari, C. H., Purnomo Sidhi, T. A., Wibisono, Y. P., Setyohadi, D. B., & Cininta, M. (2023). Analisis User Interface (Ui) Dan User Experience (Ux) Sudut Elevasi Pemukul Gamelan Metaverse Virtual Reality Menggunakan User Centered Design (Ucd). *Jiko (Jurnal Informatika Dan Komputer)*, *7*(1), 137. Https://Doi.Org/10.26798/Jiko.V7i1.757

Yunita, Z., Susanto, E. R., Ulum, F., Penulis, N., & Submited, K. (2023). *Sistem Informasi Manajemen Monitoring Kemajuan Pekerjaan Konstruksi Pada Pt Pln Up3 Kota Metro*. *4*(2), 170–178. Https://Doi.Org/10.33365/Jtsi.V4i2.2569