

Usability Analysis of Online Loan Application System using the System Usability Scale (SUS)

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Abstract- The rapid development of information technology has transformed various aspects of life, including the financial sector. A significant innovation is the online loan application system which provides convenience and speed for users in accessing financial services. Therefore, this final project aims to design and develop an Online Loan Application System for Koperasi Simpan Pinjam XYZ, based on the Laravel framework. This research not only focuses on developing a modern and reliable system, but also critically evaluates its usability level. The system is designed using the waterfall method, and functional testing is performed with black box testing. To measure and analyze the system's usability, this research specifically uses the System Usability Scale (SUS) method. The usability testing results using SUS obtained a score of 73, which according to the SUS value scale, is classified as 'Good'. This result indicates that the developed system has a good level of ease of use, thus being able to facilitate prospective members in submitting loan applications online without being constrained by distance. This research contributes to the financial industry by presenting a functional and user-friendly online lending system, and serves as a guide for developers in utilizing the Laravel Framework and the SUS method for usability evaluation in similar projects in the future.

Keywords: System Usability Scale; web Application; Laravel; Online Loan Application; Waterfall Method

Article info: *submitted March 18, 2025, revised June 2, 2025, accepted June 25, 2025*



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1. Introduction

In the current era, technology has become a highly significant factor in the professional world. Despite potentially requiring considerable costs, technology can accelerate work processes and improve data accuracy. Consequently, the internet has become a pivotal element across various fields, including business. A crucial aspect to note is that interacting with the internet automatically connects users globally, thereby expanding business reach [1][2].

One impactful endeavor facilitated by this development is the Cooperative, an organizational form vital in enhancing the economic needs of prospective and current members, ranging from food, clothing, to shelter. A cooperative is an economic entity dedicated to improving member welfare and participating in national economic development in accordance with Pancasila principles and Law No. 25 of 1992. Furthermore, cooperatives represent an economic force founded on familial values. Koperasi Simpan Pinjam XYZ operates in the savings and loan sector, providing loan services for various groups, including entrepreneurs and freelancers, provided they meet the loan requirements set by Koperasi Simpan Pinjam XYZ [3][4].

Given the large number of prospective members who wish to visit the cooperative for loan applications, there are often obstacles related to travel distance to the office. This presents a frequent challenge because the loan application data entry still uses a manual system, requiring written submissions on application forms. Therefore, this project aims to develop an Online Loan Application System for Koperasi Simpan Pinjam XYZ to facilitate prospective members in submitting loan applications. This project is expected to be a solution for prospective members, allowing them to access the system via their mobile phones without needing to visit the office solely for application submission. The system will also serve as an information medium, providing details about Koperasi Simpan Pinjam XYZ [5][6].

While developing a functional system is essential, its effective adoption and user satisfaction are critically dependent on its ease of use and user-friendliness, commonly referred to as usability. A system, no matter how feature-rich, will fail to achieve its full potential if users find it difficult to navigate or understand. Therefore, this research not only focuses on the design and development of the web-based loan application system using Laravel, but also emphasizes the thorough analysis of its usability to ensure it effectively addresses user needs and provides a seamless experience [7].

The problems formulated in this project are how to design and analyze an online loan application system and how to build a web-based system using Laravel. The scope of this research is limited to the loan application process only; prospective members still need to visit the office for the disbursement process once their application is approved. The system will display information regarding time deposits and the cooperative's profile. This system is exclusively for Koperasi Simpan Pinjam XYZ [8].

For the functional testing of this system, black box testing will be employed. Furthermore, to evaluate the system's usability and ensure its effectiveness from the user's perspective, the System Usability Scale (SUS) method will be utilized. This comprehensive approach aims to deliver a robust and highly usable online loan application system.

2. Methods

A. System Design Method

This research employs a systematic approach to design, develop, and evaluate an online loan application system for Koperasi Simpan Pinjam XYZ. The methodology encompasses both the system design process and the method for analyzing its usability.

The system will be designed using the Waterfall method. This method is chosen due to its clear stages and ease in the assessment process. The Waterfall model, first introduced by Winston Royce around 1970, is a widely used software development model known for its systematic and sequential approach. Each stage must be completed before proceeding to the next, following a linear progression from initial planning to final maintenance [9][10].

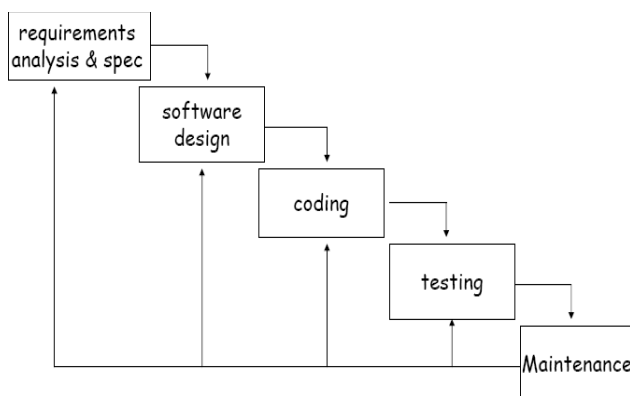


Figure 1. Waterfall methods [11][12]

The phases involved are as follows:

1) *Requirements Analysis & Specification*: This initial stage of the Waterfall method involves analyzing the needs of Koperasi Simpan Pinjam XYZ. Based on frequent complaints regarding the inconvenience of distance for loan applications that are not yet approved, the idea for an online loan application system at Koperasi Simpan Pinjam XYZ was proposed and approved by the cooperative. In this phase, specific user requirements were gathered, emphasizing the need for an intuitive and accessible platform to overcome geographical limitations and simplify the application process.

2) *Software Design*: The second stage involves creating the software design in accordance with user requirements. This phase aims to provide users with a visual representation of the system's appearance. For this system, the design was developed using Adobe Illustrator and implemented using CSS and Bootstrap. The design prioritized user-friendliness, clear navigation, and an intuitive layout to enhance the overall usability of the system from the outset.

3) *Coding*: The subsequent stage is coding, which involves implementing the application's code using appropriate programming languages. In this phase, the software code was implemented using HTML, PHP, JavaScript, CSS, and the PHP Laravel 11 framework.

4) *Testing*: This stage involves testing the designed system to ensure its overall functionality. The purpose of this testing is to evaluate software performance and ensure that every function operates correctly. For functional testing, black box testing was used to verify that each system sequence operates as intended. Crucially, this phase also includes comprehensive usability testing to assess the user experience, ensuring the system is not only functional but also easy and pleasant to use.

5) *Maintenance*: The final step in the Waterfall method is the deployment and maintenance of the prototype program. This includes fixing errors not identified in previous stages.

B. System Analysis methods

For the analysis of this system, the System Usability Scale (SUS) method was utilized. SUS is a simple 10-item scale used to test system functionality. It is an effective and popular research method. SUS provides a usability evaluation using a simple five-point scale where respondents indicate their level of agreement or disagreement. SUS is an inexpensive usability metric that can be used to test systems globally. The objective of usability testing is to use a method that is not only quick and simple but also reliable in assessing the usefulness of an application [13].

The SUS method considers the end-user, resulting in outcomes that align more closely with real-world conditions, and its advantage lies in respondents' ease of understanding, determining whether the application is useful or not. The instrument used for this research is a questionnaire distributed to 20 respondents for the Online Loan Application System website. These 20 respondents are members of Koperasi Simpan Pinjam XYZ who have previously taken out loans from the cooperative. The list of questions for the SUS method used and distributed to respondents refers to Brooke's instrument, which has been adapted into Indonesian. In this SUS research method, the aspect tested is the use of the web system designed by the researcher [14][15].

The SUS scoring calculation follows specific steps:

- 1) For odd-numbered questions, the user's score is reduced by 1.
- 2) For even-numbered questions, the user's score is subtracted from 5.
- 3) The final SUS score is the sum of all scores, multiplied by 2.5.

These calculation steps are applied per person. To calculate the average SUS value for all respondents, all individual respondent scores are summed and divided by the total number of respondents [16]. The formula for calculating the SUS average score is given by

$$\bar{x} = \frac{\sum x}{n} \dots \quad (1)$$

Where:

\bar{x} = average score

$\sum x$ = sum of SUS scores

n = number of respondents

An example of the System Usability Scale (SUS) questionnaire questions, as utilized in this research, is such a follow. This questionnaire consists of ten statements, each designed to elicit a respondent's perception of the system's usability. Users are asked to rate their agreement with each statement on a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questions cover various aspects of usability, such as ease of use, complexity, consistency, the need for support, and learnability. For instance, users are asked to rate statements like "I think that I would like to use this system frequently" (Question 1) or "I found the system unnecessarily complex" (Question 2). The alternating positive and negative phrasing of the questions (e.g., "I found the system easy to use" for Question 3 and "I think that I would need the support of a technical person to be able to use this system" for Question 4) is a characteristic feature of the SUS method, intended to avoid response bias and ensure a comprehensive assessment of the system's perceived usability [17][18].

An example of SUS score results is shown in Figure 4. The final score is obtained by summing the respondent scores from Q1 to Q10 and multiplying the result by 2.5. Once the final score is obtained, the average SUS score is found.

No	Responden	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	Responden 1	5	1	4	1	5	2	4	3	5	2
2	Responden 2	5	1	4	1	5	2	4	3	5	2
3	Responden 3	5	1	4	1	5	2	4	3	5	2

Figure 2. SUS score result example

3. Results and Discussion

A. System Design

In the design phase, a thorough analysis of the system to be developed was conducted. Figure 3 illustrates the overview of the web-based loan application system. The system will feature distinct login access for administrators and members. Members will be able to view information about the products available at Koperasi Simpan Pinjam XYZ and general information about the cooperative. Should members have inquiries, they can contact the marketing number provided on the web application system via WhatsApp or visit the Cooperative directly, as the website also provides the Cooperative's address.

Members can submit loan applications, but to do so, they must first have a username and password to fill out the application form available in the system. They can also check the status of their loan application and view information about the Cooperative from the designed system. The administrator login allows the admin to

download submitted application files from members and to provide status updates on applications.



Figure 3. System Design

The design of these interactions and the overall system flow prioritized clarity and intuitiveness to ensure a smooth and user-friendly experience for both members and administrators, thereby directly supporting the system's usability.

B. Functional Requirement

Functional requirements define the necessary menus and functionalities a product must possess to meet user objectives or needs. They specify what the system *does*. In other words, functional requirements define the functions or activities that the system must perform. Table 2 outlines the functional requirements for the system:

Table 1. Functional Requirement

Code	Functional Requirement
R001	Members can register
R002	Members and administrators can log in
R003	Members and administrators can view information about the Cooperative
R004	Members can submit loan applications
R005	Members can upload documents for application
R006	Administrators can check incoming applications
R007	Members can check application status
R008	Administrators can assign status to loan applications

Each of these functional requirements was designed with the user in mind, ensuring that the necessary actions are straightforward and easily discoverable within the system, contributing to a positive user experience.

C. Non-Functional Requirement

Non-functional requirements are aspects not directly related to specific functions or activities performed by the system, but rather influence its performance, security, reliability, and other attributes. They encompass critical aspects that determine how well a system performs and meets user expectations in a broader context. Table 3 presents the non-functional requirements:

Table 2. Non-Functional Requirement

Code	Functional Requirement
NF001	The system can be accessed anywhere as long as it uses the internet
NF002	This system can be used on any device
NF003	This system can only be used internally by company

The non-functional requirements, particularly NF001 and NF002, directly support the system's accessibility and versatility, which are key aspects of its overall usability, ensuring that users can interact with the system conveniently regardless of their location or device.

D. Usecase Diagram

The Use Case Diagram, shown in Figure 4, illustrates the interactions between users and the system. It demonstrates that prospective members/members can access information without logging in. However, to submit a loan application, prospective members/members must first register if they do not yet have an account on the website. After registration, they can proceed to the application form menu to submit a loan application and upload supporting documents. For administrators, upon logging in, they can check incoming applications and assign application statuses.



Figure 4. Usecase Diagram

E. Application Result

The following represents the design of the web, implemented using HTML, PHP, JavaScript, CSS, and the PHP Laravel 11 framework.

- 1) *Information Menu*: In this menu, prospective members do not need to register to access features such as Home, About, Product, and Contact. This design choice aims to provide knowledge and promotion to prospective members who may not yet be familiar with Koperasi Simpan Pinjam XYZ.

- 2) *Registration Menu*: This menu displays the registration feature. Registration is necessary because members/prospective members must have a username and password, obtained through registration, to submit a loan application. Figure 5 shows the registration form, designed to guide users clearly through the required fields.

The screenshot shows a registration form titled "Register User Koperasi" with the following fields: NIK (text input), Nama (text input), Jenis Kelamin (dropdown menu with "Laki Laki" selected), Tempat Lahir (text input), Tanggal Lahir (date picker showing "mm/dd/yyyy"), No. Telepon (text input), Pekerjaan (text input), Penghasilan (text input), Alamat (text input), and Email (text input). The form is part of a web interface with a logo for "Koperasi Simpan Pinjam Dana Mandiri" at the top.

Figure 5. Registration Menu

- 3) *Login Menu*: This menu provides a login feature for users who already have an account. Members/prospective members must log in to initiate the loan application process, using the email and password registered during the registration. Figure 6 illustrates the straightforward login interface.

The screenshot shows a login form with the following fields: Email (text input) and Password (text input). Below the fields is a "LOG IN" button. At the bottom, there is a link that says "Bila belum punya akun register." The form is part of a web interface with a logo for "Koperasi Simpan Pinjam Dana Mandiri" at the top.

Figure 5. Login Menu

- 4) *Application Menu*: Figure 205 shows the loan application form where prospective members can fill in details and upload necessary documents. Prospective members are required to upload their KTP, Family Card, and Guarantee Data, even if other data is incomplete. The layout, as seen in Figure 207, is structured to simplify the submission process.

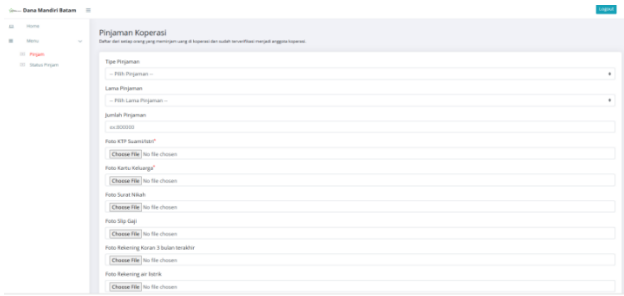


Figure 6. Application Menu

- 5) *Loan Status Menu*: In this menu, prospective members can view the status of their submitted loan application. This menu will show whether the application has been approved or rejected by the Cooperative. If approved, the Cooperative will directly contact the prospective member via the phone number provided during the loan application. Figure 7 shows an example of the loan status display.

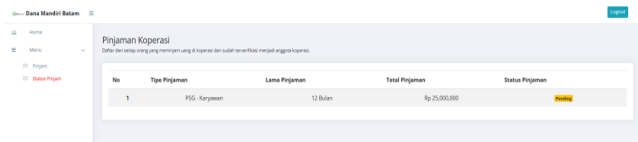


Figure 7. Loan Menu

- 6) *Check Application Menu (Admin)*: This menu is only accessible using a special admin email. The admin login is used to view incoming applications from prospective members, and the admin can approve or reject the loan applications.

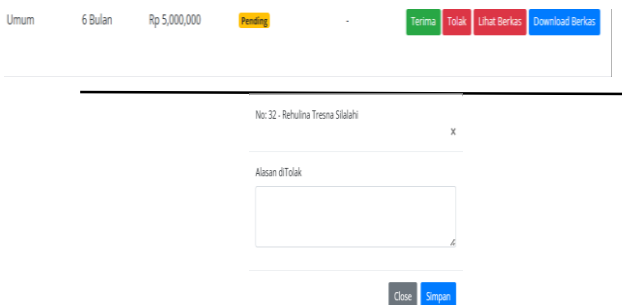


Figure 8. Check Application Menu

No	Skor Asli										Skor Hasil Hitung										Jumlah	Nilai (Jumlah x 2.5)
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	3	4	3	4	4	4	3	3	2	4	2	1	2	1	3	1	2	2	1	1	16	40
2	5	1	5	2	5	1	5	1	5	2	4	4	4	4	4	4	4	4	3	3	38	95
3	4	2	4	2	4	2	4	2	4	4	3	3	3	3	3	3	3	3	1	28	70	
4	5	1	5	2	5	1	5	1	5	4	4	4	4	4	4	4	4	4	1	36	90	
5	4	2	4	3	3	2	4	2	4	4	3	3	2	3	3	3	3	3	1	26	65	
6	5	1	5	1	5	1	5	2	5	3	4	4	4	4	4	4	3	4	2	37	93	
7	4	2	4	4	4	2	4	3	4	4	3	3	1	3	3	3	2	3	1	25	63	
8	4	3	4	4	4	3	3	2	4	5	3	2	3	1	3	2	2	3	3	0	22	55
9	4	2	5	2	4	1	4	2	4	5	3	3	4	3	3	4	3	3	0	29	73	
10	4	2	4	2	4	2	4	2	4	2	3	3	3	3	3	3	3	3	3	3	30	75
11	4	2	5	1	4	1	4	1	5	3	3	3	4	4	3	4	4	2	3	4	33	85
12	5	2	5	4	4	1	5	2	4	1	4	3	4	1	3	4	4	3	3	4	33	83
13	5	3	4	3	4	2	4	3	4	4	2	3	2	3	3	3	2	3	1	26	65	
14	5	2	5	2	5	1	5	2	5	4	4	3	4	4	4	4	3	4	1	34	85	
15	4	2	5	4	3	2	4	4	4	5	3	3	4	1	2	3	3	1	3	0	23	58
16	4	2	4	4	4	2	4	4	5	3	3	3	1	3	3	3	1	4	2	26	65	
17	4	2	4	4	4	4	2	4	1	1	3	3	1	3	1	3	3	3	4	27	68	
18	5	3	5	2	5	3	5	3	4	2	4	2	4	2	4	2	3	3	3	3	31	78
19	5	2	5	1	5	1	5	1	5	4	4	3	4	4	4	4	4	4	1	36	90	
20	4	2	4	4	5	1	4	2	4	4	3	3	1	4	4	3	3	3	1	28	70	
Skor Rata-rata (Hasil Akhir)																						73

Figure 9. Raw SUS Score

Figure 9 presents the detailed scores from the SUS calculations, showing both the raw scores and the calculated scores for each respondent across the 10 questions, ultimately yielding individual total scores and final SUS scores for each respondent. The average SUS score for all respondents was calculated using the formula (1) above:

$$\bar{x} = \frac{\sum x}{n}$$

Based on the calculations from the collected data (Figure 8), the sum of all SUS scores ($\sum x$) was 1463, and the number of respondents (n) was 20. Therefore, the average SUS score (\bar{x}) is:

$$\bar{x} = \frac{201463}{28} = 73.15$$

According to the SUS score standards shown in Figure 23, a score of 73 falls within the 68 – 80.3 range, which corresponds to a Grade B and an "Good" adjective rating. Based on this, the usability test result for this research is 73.15, which is considered a "Good" value on the SUS score scale.

This indicates that the system is generally well-received by its users in terms of ease of use and satisfaction. The high SUS score suggests that users found the system easy to learn, efficient to use, and felt confident in its operation, validating the design choices made to prioritize user experience.

4. Conclusion

Based on the comprehensive analysis, it is concluded that the developed web-based loan application system for Koperasi Simpan Pinjam XYZ is both functional and effective, as robustly validated by the successful outcomes of the black box testing. Beyond its functionality, the system also demonstrates strong usability, a critical factor for its successful adoption, effectively addressing the prior constraints of distance and time for prospective members in submitting loan applications. The usability assessment, performed using the System Usability Scale (SUS), yielded a score of 73.15, classifying it as "Good" with a Grade B according to established SUS standards. This positive evaluation confirms that the system provides a user-friendly and intuitive experience. For future enhancements, it is recommended to expand the system's capabilities to include fully online fund disbursement processes, thereby eliminating the need for in-person visits entirely. Additionally, continuous refinement based on user feedback and further analysis of specific SUS question responses can target any

F. Usability System Testing Results

For usability testing, the System Usability Scale (SUS) was used, with 10 questions given to 20 respondents as the sample. These 20 respondents were Cooperative members who had previously taken out loans at Koperasi Simpan Pinjam XYZ. The designed system was tested beforehand to identify any errors.

remaining areas for improvement, ensuring an even more seamless and efficient user experience in subsequent iterations.

Reference

- [1] Maharani, Dewi; Helmiyah, Fauriatun; Rahmadani, Nurul;, "Manfaat Menggunakan Internet dan Website selama Pandemi COVID-19," *Jurnal Pengabdian Calon anggota/anggota Informatika*, vol. 1, p. 5, 2021.
- [2] Rumatna, Mathus Supriyatno; Lina, Tirsia Ninia; Santoso, Agustinus Budi;, "Konstruksi Aplikasi Koperasi Simpan Pinjam dengan Metode Penelitian dan Pengembangan," *Jurnal Simetris*, vol. 11, p. 120, 2020
- [3] N. Ardi and D. A. Azhari, "Analisis Aplikasi Lembur Berbasis Web menggunakan System Usability Scale (SUS) Pada PT. XYZ", *J. Ilm. Inform. Glob.*, vol. 16, no. 1, pp. 10–19, Apr. 2025.
- [4] Fuad, Mohamad;, "Perancangan Sistem Informasi untuk Koperasi Simpan Pinjam "Kopitama" Depok," *UG Jurnal*, vol. 9, pp. 01-05, 2019.
- [5] Edi; Ismawati, Nur;, " Sistem Informasi Fintech untuk Pinjaman Online" *Jurnal Sistem Informasi, Teknologi Informasi dan Komputer*, vol. 9, pp. 100-107, 2019
- [6] N. Ardi, S. S, and A. Irmansyah Lubis, "Predicting Missing Value Data on IEC TC10 Datasets for Dissolved Gas Analysis using Tertius Algorithm", *JAIIC*, vol. 7, no. 1, pp. 50–56, Jul. 2023.
- [7] Samsudin, Muhammad; Abdurahman, Muhdar; Abdullah, Muksin Hi;, " Sistem Informasi Online yang Mendukung Pengkreditan Nasabah Koperasi Simpan Pinjam Sejahtera Baru Kota Ternate," *Jurnal Ilmiah ILKOMINFO*, vol. 2, pp. 11-12, 2019.
- [8] N. Ardi, A. I. Lubis, and Ikhwan Ash Shafa Arrafi, "Analysis of docker container Implementation in SIEM infrastructure", *JAIIC*, vol. 9, no. 3, pp. 973–978, Jun. 2025.
- [9] Ramadhani, Rendi; Purnomo, Agus;, "Analisis Perspektif Calon anggota/anggota Terhadap Pinjaman Online Ditengah Berkembangnya Bank - Bank Syariah," *Jurnal Ilmiah Mahasiswa Ekonomi Syariah*, vol. 3, pp. 146-147, 2023.
- [10] N. Ardi, A. I. . Lubis, and Isnayanti, "Decision Tree for Predicting the Mortality in Hemodialysis Patient with Diabetes", *jmp*, vol. 12, no. 1, pp. 346-356, Mar. 2023.
- [11] Ambriani, Dinni; Nurhidayat, Andi Iwan;, "Rancang Bangun Repository Publikasi Ilmiah Dosen Berbasis Web Menggunakan Framework Laravel," *Jurnal Manajemen Informatika*, vol. 10, pp. 59-60, 2020.
- [12] Ardi, Noper, Noor Akhmad Setiawan, and Teguh Bharata Adji. "Analytical incremental learning for power transformer incipient fault diagnosis based on dissolved gas analysis." In *2019 5th International Conference on Science and Technology (ICST)*, vol. 1, pp. 1-4. IEEE, 2019.
- [13] Febriyanti, Ni Made Dwi; Sudana, A.A Kompiang Oka; Piarsa, I Nyoman;, "Implementasi Black Box Testing pada Sistem Informasi Manajemen Dosen," *Jurnal Ilmiah Teknologi dan Komputer*, vol. 2, p. 3, 2021.
- [14] Ardi, N., Adri, M. and Azhar, N., 2022. Implementasi Arsitektur Hierarchical Model View Controller (HMVC) Dalam Portal Akademik. *Jurnal Teknik Komputer dan Informatika*, 1(1| Agustus), pp.21-30.
- [15] Salamah, Irma, "Dengan menggunakan Sistem Usability Scale, Evaluasi Usability Website Polsri," *Jurnal Nasional Pendidikan Teknik Informatika*, vol. 8, p. 177, 2019
- [16] Ardi, N. and Isnayanti, I., 2022. Implementasi Artificial Neural Network dalam Memprediksi Jumlah Peserta Les Bahasa Inggris Menggunakan Metode Back Propagation (Studi Kasus di Lembaga Kursus Global English). *Jurnal Teknik Komputer dan Informatika*, 1(1| Agustus), pp.45-51.
- [17] Nugroho, Kurnianto Tri, Julianto, Bagus; Ms, Danny Febryan Nur, "Usability Test System Information Management System Using System Usability Scale Method," *Jurnal Nasional Pendidikan Teknik Informatika*, vol. 11, p. 75, 2022.
- [18] Ardi, Noper, Andas Puranda. " Design and Development of a Training Management Application at PT. XYZ." In *2024 7th International Conference on Applied Engineering (ICAE)*, pp. 163-178.