Evaluating the Usability of a Book Stock and Sales Recording Android App: System Usability Scale (SUS), Heuristic Evaluation, and Maze Tool Insights

Abdul Rezha Efrat Najaf[1], Reisa Permatasari[2], Ciptagusti Sila Sakti[3]

[1,2,4]Informatics System Departement, University of Pembangunan Nasional "Veteran" Jawa Timur, Surabaya, Indonesia
Email: [1]rezha.efrat.sifo@upnjatim.ac.id, [2]reisa.permatasari.sifo@upnjatim.ac.id, [3]css.mil17@gmail.com

Abstract

The implementation of digitalization in organizations is needed to apply technology and provide more value to customers. However, digitization still needs to be fully maximized in manually recording book stocks to record book stocks. Printed books are recorded as incoming books, sold books are sold as outgoing books and incoming and outgoing data are matched. Publishers still use Google Sheets as the primary tool for recording available book stock. However, human error, such as writing or data entry, often leads to inaccurate book stock information. Therefore, Peneleh Publishing needed an application prototype design using usability testing to identify usability issues in UI/UX development. During usability testing, the Maze tool collects user interaction data. This study used heuristic evaluation to find and solve usability problems in book sales and stock recording applications. According to the research results, the SUS score 85.2 falls into the Very Good and Acceptable category. In addition, as shown by the Tool Maze analysis, users can manage scenarios well. Experts used heuristic evaluation to suggest display improvements, pop-up notifications when books are added or subtracted, and information about successful or unsuccessful actions.

Keywords: Usability Testing, Heuristic Evaluation, Book Stock, SUS, Maze Tool

1. INTRODUCTION

The development of information and communication technology and internet technology creates various changes in the social, political, trade, and educational fields. The era of globalization is increasingly becoming digital application-based [1]. The development of technology and communication and its easier access also impact the transformation that supports the digitalization process. Digitalization in business processes is changing the way businesses operate and serve customers [2]. In the era of digitalization, every organization, regardless of size or industry, relies on data and technology to operate more efficiently and deliver value to customers. A key tool in this transformation is digital applications, which offer more efficient and integrated solutions for diverse business needs.

In addition, over the past few years, the printing and publishing business has become an essential part of people's lives. The existence of COVID-19 has hurt the book industry. A survey on the impact of COVID-19 on the book industry was conducted by the Indonesian Publishers Association (IKAPI) and found that most IKAPI members experienced a decline in sales. However, the survey results in Indonesia showed that 58.2% of book publishers complained of an almost 50% drop in sales; publishers also said that working from home reduced employee productivity [3]. However, in responding to the problems that occurred overnight with COVID-19, the business processes of printing and book publishers must quickly take advantage of the digitization of business processes so that the problem of declining sales does not become a problem again in the years to come.

Peneleh Publishing Company is a non-profit organization whose business process is to publish books from writers, from reviewing manuscripts, editing manuscripts, and layouting to marketing in the marketplace. In addition to publishing books, Peneleh Publishing also records book stocks in stock-taking by the way books printed will be recorded in the incoming book and books that have been sold will be recorded in the outgoing book and recorded to verify those in the record with the actual book stock. Peneleh Publisher faces problems when doing stock and book sales, and they still need to take advantage of digitalization properly, so designing an Android-based application that can record book sales and stock is required.

The results of interviews and observations made with the manager of Peneleh Publishing Company show that the company needs an application for recording stock. Peneleh Publishers still relies on Google Sheets web services as the primary tool for recording available book stock. Google Sheets is often prone to human error, such as writing or inputting data errors that can make book stock information inaccurate [4]. Therefore, testing related to usability on the User Interface (UI) of the book sales and stock recording application is needed so that Android-based users can accept Android-based applications, and it is also essential to ensure that the application design developed can provide an acceptable User Experience (UX) and provide a good experience for users.

According to the International Organization for Standardization (ISO), usability is the ability of a system to be used by specific users to achieve predetermined goals with effectiveness, efficiency, and satisfaction in a specific context of use. [5]. Usability testing is a characteristic that refers to how a user can learn and use a system or product to obtain goals and satisfaction for its users [6]. The benefits of system testing for organizations include documenting test results so that the organization can ensure that the product is better in the future or at least can maintain system usability standards [5]. A well usable product can make customers

happy and likely to use it again. It can also be profitable and require less help from the help desk [6].

Evaluation of user experience with the application of Usability testing in the field of education [7], [8], evaluation of usability testing of environmental hygiene applications [9], and usability testing on online shopping applications [10]. Usability testing can use various approaches such as the system usability scale [4, 10, 11]. Usability testing with the System Usability Scale and Heuristic Evaluation approach is a usability testing approach that is commonly applied when evaluating User Experience and User Interface applications. Therefore, this research tests User experience using usability testing to see the usability problems most often found by utilizing Heuristic Testing and the MAZE Tool to test and analyze user experience by testing prototypes and interface designs before the product or application is launched.

Based on some of the research submitted, usability testing is essential because testing is carried out on the prototype design before it is released. Therefore, in this research, researchers tested the design of the book sales and stock recording application by applying SUS testing, utilizing Heuristic Testing, and using the MAZE Tool to test and analyze usability before the application was released to users.

2. METHODS

There are four stages in usability testing research on the prototype of the book sales and stock recording information system, including problem identification, data collection, data analysis, and the results of recommendations for improving its usability, which can be seen in Figure 1.

Figure 1. Research stages

2.1. Identification of Problems

A very important first step in the usability testing process is the problem identification stage. The researcher aims to find and record usability problems in the Android-based book sales and stock information system at this stage. This problem identification is carried out through several activities, including a thorough analysis of UI/UX, user interaction with the system, and routine observations. Peneleh Publisher's business currently uses Google Sheets to keep records manually. In addition, Google Sheets can store the selling and printing

prices of published books for use in marketing. Peneleh Publishers needed help with adequate digitization, as the recording of incoming and outgoing books and information on print and selling prices were collected into various files. Digitization makes essential data that supports Peneleh Publisher's stock records fragmented and difficult to access.

Stock management is an additional issue that arises in addition to record-keeping information. Complex decisions that impact the company's finances, such as financing, promotion, supply, and acquisition, will be easier to make with a sound stock management system. Stock management not only ensures the availability of goods and low investment but also ensures efficient operations and reduces costs. With customer demand and increased profitability, the publishing industry must maintain an adequate stock of books. Knowing which products sell the most and which tend to be unsold is a frequent problem in sales. Transaction data is beneficial for decision-making and knowledge. By implementing information systems, Peneleh Publishers can ensure popular books are always available, improve customer satisfaction, and maximize sales data. Utilizing this data to support business strategy and operational decisions is critical to gaining a competitive advantage.

Based on these problems, this research focuses on usability testing using Tool Maze and Heuristic testing to create an efficient system prototype in UI/UX before users use the system directly. Understanding user desires is very important because UI/UX design must be based on user experience and Human-Computer Interaction rules. Usability testing aims to assess whether the product can be used by users (users) to fulfil specific goals effectively and efficiently and whether users (users) feel comfortable using the product or system [12]. Problem identification is obtained from users, observations, and literature reviews. The literature is done by analyzing research journals on the research topic. Research [13] evaluated the usability of a Moodle-based online learning system at a university (Sustainability). Usability testing is a must to maximize the efficiency of technology in education. Research [14] resulted in evaluating the usability of mobile applications, which was carried out with a systematic literature review of 22 papers. The results show that 73% of the methods used are usability testing, 23% are heuristic evaluations, and 4% are user satisfaction usability evaluations.

2.2. Data Collection

Initial data collection is through the System Usability Scale (SUS) questionnaire. This questionnaire is used to identify the UI/UX usability design of the book sales and stock recording information system. Ten users and questionnaires have filled in the questionnaire. The SUS questionnaire consists of 10 statements on a 5-point Likert scale, with 5 points ready to be, "strongly disagree," "disagree," "neutral,"

"agree," and "strongly agree" [15]. The questions used for the SUS questionnaire are shown in Table 1.

Tabel 1. SUS Questionnaire

No	Questions
1	I think that I would like to use this system frequently
2	I found the system unnecessarily complex
3	I thought the system was easy to use.
4	I think that I would need the support of a technical person to be able to use this system.
5	I found the various functions in this system were well integrated.
6	I thought there was too much inconsistency in this system.
7	I would imagine that most people would learn to use this system very quickly.
8	I found the system very cumbersome to use.
9	I felt very confident using the system.
10	I needed to learn a lot of things before I could get going with this system

The benefits of the SUS tool include that it is technologically agnostic (i.e., it can be used for different types of information technology systems), quick and easy to use by both participants and researchers, provides a single score on a scale that is easy to understand, and is cost-efficient as it does not require additional costs [16].

2.3. Data Analysis

The data analysis stage is carried out into three stages in evaluating usability testing. The following are the stages:

2.3.1 System Usability Scale (SUS)

SUS was conducted on the respondents, and the questionnaire was based on Table 1. Research [17] used odd and even questions on SUS to increase respondents' focus when reading the questionnaire. To get a score from the SUS analysis calculation, the value of the statement must be reduced with the provisions of the positive statement value minus 1 to X-1 and the negative statement minus five so that the statement value becomes 5-X. The average calculation is as shown in Equation 1.

$$\bar{x} = \frac{\sum x}{n} \tag{1}$$

Descripsion:
$\bar{x}$ = Average Score
$\sum x$ = Total SUS Score
n = Number of Respondents

The general rating scale interpretation of SUS scores is described in Figure 2.
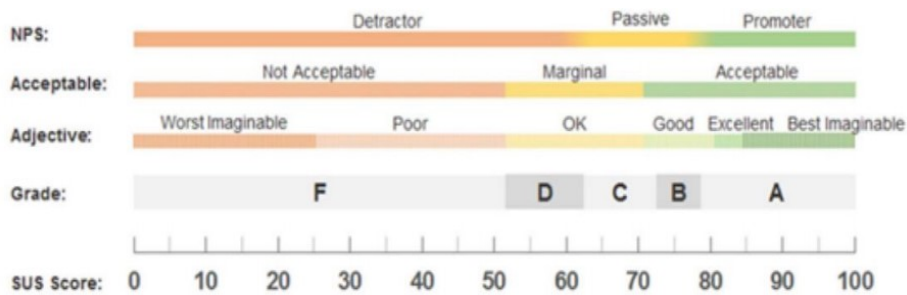
Figure 2. Grading Scale Score Result Interpretation SUS [15]

2.3.2 Usability Testing with the Maze Tool

After usability testing using SUS, the next step is to evaluate usability using the Maze—co tool. Maze is a platform designers can use to improve user experience by testing usability. The resulting output is a usability score. This usability score is obtained through a specific calculation of the task given to the user. The score is influenced by the task completion time, click error rate and success status of each respondent. Testing is carried out on the system prototype to identify usability problems; in addition, the results of this test will display the results of the system heat map to see what attracts users' attention and what users "click" during the system prototype testing process. Usability testing scenarios using the Maze tool are divided into several test scenarios presented in Table 2. Usability Testing with the Maze Tool focuses on usability testing with system users who will conduct tests using six test scenarios.

Tabel 2. Test Scenario using Maze Tool

ID	Scenario	Task Scenario
1	Search for Information about Books	The buyer is asked to search for a specific book. Use the search feature to search for a particular book. Verify that the searched book appears in the search results.
2	Record Book Sales	Enter book sales record data
3	Delete Book List	Search for books that match the title Click the "Delete book" button. Verify that the book has been added or deleted.
4	Book Stock Check and Update	Search for the book in the stock list and add stock by 2-5 units.
5	Delete Sales Record Data	Delete sales data that has been entered for a specific book.
6	Making Invoices for Book Sales	Create a sales report for the last month

2.3.3 Heuristic Evaluation Analysis

The testing process using the Maze tool, the next stage is the analysis stage using the Heuristic Evaluation method. Heuristic Evaluation involves usability experts in assessing whether a website's elements have followed the principles of Usability [18]. The problem identification assessment compares the product with the ten heuristic principles proposed by Nielsen. The evaluation heuristic analysis stage will involve three experts. In Nielsen's opinion, using only three evaluators is satisfactory [19]. In addition, this stage will involve three users, the samplers in this study. Table 3 contains ten heuristic guidelines formulated by Jakob Nielsen, including, and using the severity rating in Table 4.

Tabel 3. Heuristic Evaluation Guidelines

No	Heuristic
1	Visibility of System Status
2	Match Between System and the Real World
3	User Control and Freedom
4	Consistency and Standards
5	Error Prevention
6	Recognition Rather Than Recall
7	Flexibility and Efficiency of Use
8	Aesthetic and Minimalist Design
9	Help Users Recognize, Diagnose, and Recover from Errors
10	Help and Documentation

Tabel 4. Heuristic Evaluation Guidelines

Scale	Description
1	Cosmetic Problems Only: This issue is cosmetic and does not require a fix unless additional time is added to the project.
2	Minor Usability Problem: This issue has little usability impact, so its fix can be given a low priority.
3	Major Usability Problem: This issue affects central usability and should be given high priority for fixing.
4	Usability Catastrophe: This issue is severe and potentially disastrous in terms of usability. They must be fixed before the product can be released.

3. RESULTS AND DISCUSSION

This study collected data by involving ten respondents, consisting of users and management of Peneleh publishers involved in the information system business process.

3.1. SUS Score

SUS is obtained from the results of questionnaire calculations using Equation 1. SUS questions use the questions in Table 1. In contrast, the results of the analysis questionnaire using the SUS method are presented in Table 5. In table 5, the values in the SUS score column are calculated using Equation 1, which assigns a score to each recorded response. Finally, the SUS score is determined, and the mean value of each response from all SUS scores is calculated.

Tabel 5. SUS Calculated Score

R	Question										Total	Value (Total * 2.5)
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	4	4	4	3	4	1	2	4	3	3	32	80
2	4	4	4	3	4	4	4	4	3	4	38	95
3	4	4	4	3	4	3	3	3	3	3	34	85
4	3	3	3	3	4	4	4	3	1	1	29	72,5
5	4	4	4	3	4	4	4	4	3	3	37	92,5
6	4	4	4	3	4	3	3	3	3	2	33	82,5
7	4	3	3	3	3	4	3	3	3	2	31	77,5
8	4	4	4	4	4	4	3	4	4	3	38	95
9	4	4	3	4	4	4	4	3	3	2	35	87,5
10	3	3	3	3	3	4	3	3	3	4	32	80
Average												**85.2**

Table 5 shows the results obtained from 10 respondents who answered ten questions from the SUS analysis. The SUS average value will be generated after all the respondents' answers are received. The average value of SUS testing shows a final value of 85.2. Regarding Figure 1, the final value of 85.2 is included in the Excellent category and is acceptable.

3.2. Usability Testing with the Maze Tool

The Maze tool measures and analyzes user interactions with applications, including efficiency, effectiveness, and user satisfaction. Measurements will be made for five critical features of the information system business process. Measurement involves five respondents representing management and system users. The results of the test can be seen in Figure 3. Then, in Table 6, the testing result using the Maze tool is shown.

Tabel 6. Usability Testing Results using Maze Tool

Parameters	Respondents				
	1	2	3	4	5
Scenario 1: Search for Information about Books					
Completion Time	30.13s	32.62s	33.4s	3.86s	8.26s
Status	Direct Success	Direct Success	Direct Success	Indirect Success	Direct Success
Scenario 2: Record Book Sales					
Completion Time	22.87s	73.97s	63.88s	21.57s	12.36s
Status	Direct Success	Direct Success	Direct Success	Direct Success	Indirect Success
Scenario 3: Delete Book List					
Completion Time	9.02s	16.56s	12.85s	39.34s	30.3s
Status	Direct Success	Direct Success	Direct Success	Direct Success	Indirect Success
Scenario 4: Book Stock Check and Update					
Completion Time	38.13s	82.02s	81.6s	41.41s	53.89s
Status	Direct Success	Direct Success	Indirect Success	Direct Success	Direct Success
Scenario 5: Delete Sales Record Data					
Completion Time	8.15s	25.67s	36.27s	16.98s	24.48s
Status	Direct Success	Direct Success	Direct Success	Direct Success	Direct Success
Scenario 6: Making Invoices for Book Sales					
Completion Time	5.74s	20.15s	24.52s	11.8s	19.37s
Status	Direct Success	Direct Success	Direct Success	Direct Success	Direct Success

Meanwhile, Figure 2 is an example of one of the usability testing results using the Maze tool. Figure 3 displays the results of heat maps scenario 2, "Record Book Sales". One of the tasks is adding books before proceeding to the book sales recording task. From the test results, "Participants who successfully moved to the next screen" was 80% successful, but "Participants who went off the expected path" was 10%; this means that one respondent did not comply with the given task.
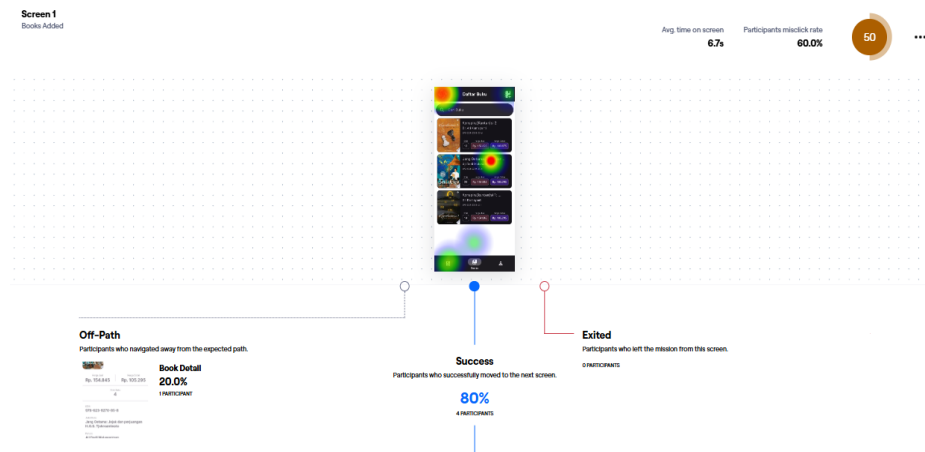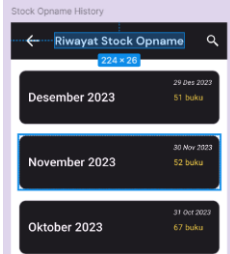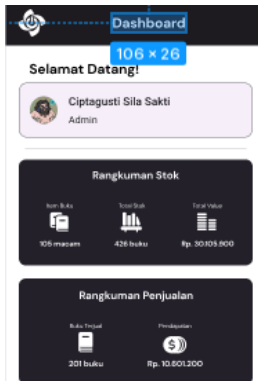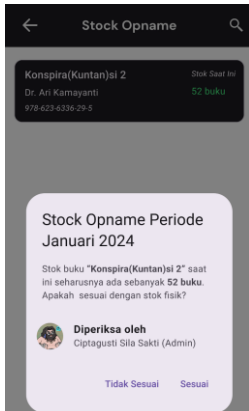
Figure 3. Usability Testing Results Report

3.3. Heuristic Evaluation

Three professional experts in the UI/UX field underwent heuristic testing, which is shown in Table 7. The results will be a recommendation for design improvements to the prototype of the book sales and stock recording application before it is released for users' use.

Tabel 7. Usability Testing Results using Maze Tool

No	Problem Findings	Severity Rating (1-4)	Advice	Heuristic Guidelines Violated
		Evaluator 1		
1	Use of foreign language	2	Re-adjusted to Indonesian language that has the same meaning and meaning so that the system is more consistent	*Consistency and standards*
2	There is no clear information on the status of the system when interacting with the interface, such as a pop-up notification when a book is successfully added or subtracted	3	Notified when the system has successfully performed the task	*Visibility of system status*

No	Problem Findings	Severity Rating (1-4)	Advice	Heuristic Guidelines Violated
3	There is no FAQ page or customer service feature to provide help information and documentation that is easily accessible when needed by users	2	Added pages or features regarding help for users when users need more information about using the system	*Help and documentation*
Evaluator 2				
1.	The text "Dashboard" is not centered.	3	The text should be positioned in the same center position as on other pages	*Aesthetic and Minimalist Design*
2.	Text button "suitable" and "not suitable" is not visible enough.	2	It is better to give a different background color to one of the text buttons so that the user can see the difference	*Recognition Rather than Recall*
3.	There is no confirmation to confirm whether you really want to delete a user when clicking the "Delete User" button	3	Added a confirmation pop up after clicking the "Delete User" button to ensure	*Error Prevention*

No	Problem Findings	Severity Rating (1-4)	Advice	Heuristic Guidelines Violated
			whether you really want to delete the user and avoid the problem of wrong clicks	
Evaluator 3				
1	There are several different languages such as English or Indonesian. Sometimes, for example, the navbar says "profile" but when entering the page, the language used changes to "profile", in addition there are language differences in the words "action" and "action"	2	For the language, I suggest adjusting whether you want to use English or Indonesian.	Match between the system and the real world
2	There are still many buttons that users don't realize are at the bottom and need to scroll to see them	3	Use a fixed section to place the button like the shopee application. Give a color that indicates the status that the user's task on the page has been completed (active button) or has not been completed (inactive button)	Visibility of system status
3	There is no cancellation information regarding a certain action. This might be a bit of a problem if the user makes an error or omission that cannot be undone	3	My suggestion might be to provide an access override such as a question pop-up notification that ensures the user of their choice In addition, perhaps add a face-id or pin set feature that provides a layered level of security	Error prevention
4	There is no information about the success/failure of an action such as when	2	My suggestion might be to add a pop-up to provide	Help users recognize, diagnose,

No	Problem Findings	Severity Rating (1-4)	Advice	Heuristic Guidelines Violated
	performing in/out book transactions		information that the process failed/succeeded. If the process fails, additional information should be provided as to why the process failed so that the user can correct the failure	and recover from errors

3.4. Discussion

This study combines three approaches to assess the usability of book sales and stock recording application design: System Usability Scale (SUS), Heuristic Evaluation, and Maze Tools. Combining these three approaches allows researchers to look at usability from a broader range of perspectives compared to previous studies that tend to use one approach and or two approaches. In this study, researchers will discuss the results of each approach.

In this study, the SUS score was 85.2, which indicates that users generally found the system easy to use. However, this research differs from previous research because it uses SUS as a starting point to study more specialized problems using heuristic evaluation and Maze tools. The SUS score obtained provides an initial indicator, which is then validated and clarified by other qualitative and quantitative methods.

The Maze tool offers a new perspective in usability testing based on user tasks. It allows researchers to directly measure how users complete specific tasks in the system, find bottlenecks, and measure completion times and user behavior patterns. One of the most significant contributions of this research is the data generated from the Maze using six scenarios in which the user completed the task.

This research uses heuristic evaluation to find usability problems based on heuristic principles that have proven successful in various system contexts. In this study, the heuristic evaluation results revealed essential issues, such as interface inconsistency and navigation complexity, that needed to be fully visible in the SUS results. These results emphasize that while SUS provides an overview, heuristic evaluation provides a more specific and in-depth understanding of usability issues.

4. CONCLUSION

This study aims to evaluate the usability of the book sales and stock recording application design using the heuristic evaluation method and the Maze tool. The results of the SUS analysis showed that the application design demonstrated important elements of usability, such as effectiveness and efficiency, with a score of 85.2 and was selected for excellent and Acceptable ratings. In addition, the results of testing with the Maze tool showed that the scenarios and bags given to users were completed; however, four indirect tasks and twenty-six tasks were completed. There are many expert opinions on heuristic evaluation. Furthermore, in the heuristic evaluation analysis, there are several findings from experts. Several improvement recommendations were suggested, such as improving navigation, providing more consistent feedback, and simplifying the interface layout. Implementation of these improvements is expected to increase the usability of the app significantly. This research emphasizes the importance of continuous usability evaluation to ensure that the app meets user needs and changes according to changes in technology and user preferences.

REFERENCES

[1]   A. Y. Karoma, T. J. Ichsan, M. A. Dewi, and S. G. Rabiha, "User Experience Analysis on JIBAS Computer Based Exam Application Using Usability Testing Method," *2023 IEEE 9th Int. Conf. Comput. Eng. Des. ICCED 2023*, pp. 1–6, 2023, doi: 10.1109/ICCED60214.2023.10425732.

[2]   M. Muhammad, A. Triayudi, and A. Iskandar, "Usability Testing Menggunakan Metode Heuristik dan End User Computing Satisfaction Pada Website Ikan Hias Menteng," *KLIK Kaji. Ilm. Inform. dan Komput.*, vol. 4, no. 1, pp. 445–452, 2023, doi: 10.30865/klik.v4i1.991.

[3]   G. Indra Kusuma Nugraha, M. Rizki Firdaus, and A. Mahatma Ratri, "Jurnal Bisnis dan Manajemen Eksistensi Industri Percetakan dan Penerbitan di Masa Pandemi Covid-19: Sebuah Prespektif," *J. Bisnis dan Manaj.*, vol. 10, no. 1, pp. 79–86, 2023.

[4]   C. Sila Sakti, A. R. Efrat Najaf, and R. Permatasari, "Sistem Informasi Stok dan Penjualan Buku Berbasis Android di Penerbit Peneleh," *JITSI J. Ilm. Teknol. Sist. Inf.*, vol. 5, no. 2, pp. 50–57, Jun. 2024, doi: 10.62527/jitsi.5.2.239.

[5]   D. C. Jeffrey Rubin, *Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests*, Second Edi. Wiley, 2011.

[6]   S. S. Tyas and Y. Khairunisa, "Usability Testing for Student Academic Information System in State Polytechnic of Creative Media," in *Journal of Physics: Conference Series*, 2021, vol. 1898, no. 1. doi: 10.1088/1742-6596/1898/1/012012.

[7]   J. S. Informasi, "Evaluasi Website Dengan Menggunakan System Usability

Scale (SUS) Pada Perguruan Tinggi Swasta di Palembang," vol. 4, pp. 89–98, 2018.

[8]   A. G. Imana and Y. S. Nugroho, "Ux (User Experience) Evaluation of the Openlearning System At Universitas Muhammadiyah Surakarta Using Heuristic Evaluation and Usability Testing," *J. Tek. Inform.*, vol. 4, no. 4, pp. 681–691, 2023, doi: 10.52436/1.jutif.2023.4.4.824.

[9]   N. Luh Putri Ari Wedayanti, N. Kadek Ayu Wirdiani, and I. Ketut Adi Purnawan, "Evaluasi Aspek Usability pada Aplikasi Simalu Menggunakan Metode Usability Testing," *J. Ilm. Merpati (Menara Penelit. Akad. Teknol. Informasi)*, vol. 7, no. 2, p. 113, 2019, doi: 10.24843/jim.2019.v07.i02.p03.

[10]   T. Wahyuningrum, C. Kartiko, and A. C. Wardhana, "Exploring e-Commerce Usability by Heuristic Evaluation as a Compelement of System Usability Scale," *2020 Int. Conf. Adv. Data Sci. E-Learning Inf. Syst. ICADEIS 2020*, pp. 1–5, 2020, doi: 10.1109/ICADEIS49811.2020.9277343.

[11]   M. A. Sari and K. D. Tania, "Usability Evaluation in Knowledge Management System (KMS) Using System Usability Scale (SUS) Method," *IJICS (International J. Informatics Comput. Sci.*, vol. 6, no. 3, p. 119, 2021, doi: 10.30865/ijics.v6i3.4244.

[12]   H. Hosizah, F. Tamzil, and M. Wiharto, "Evaluasi Usability Electronic Integrated Antenatal Care (e-iANC)," *Heal. Inf. Manag. J. ISSN*, vol. 8, no. 2, pp. 2655–9129, 2020.

[13]   O. Suria, "A Statistical Analysis of System Usability Scale (SUS) Evaluations in Online Learning Platform," *J. Inf. Syst. Informatics*, vol. 6, no. 2, pp. 992–1007, 2024, doi: 10.51519/journalisi.v6i2.750.

[14]   A. Nugroho, P. I. Santosa, and R. Hartanto, "Usability Evaluation Methods of Mobile Applications: A Systematic Literature Review," *Proceeding - 2022 Int. Symp. Inf. Technol. Digit. Innov. Technol. Innov. Dur. Pandemic, ISITDI 2022*, pp. 92–95, 2022, doi: 10.1109/ISITDI55734.2022.9944401.

[15]   K. Dwi, N. Pradnyani, A. S. Fitri, A. Rezha, and E. Najaf, "Application of Design Thinking on BPD Bali Mobile Banking," no. May 2022, pp. 1–11, 2024.

[16]   J. R. Lewis, "The System Usability Scale: Past, Present, and Future," *Int. J. Hum. Comput. Interact.*, vol. 34, no. 7, pp. 577–590, 2018, doi: 10.1080/10447318.2018.1455307.

[17]   J. Brooke, "SUS: A 'Quick and Dirty' Usability Scale," in *Usability Evaluation In Industry*, CRC Press, 1996, pp. 207–212. doi: 10.1201/9781498710411-35.

[18]   I. D. N. M. Suputera, I. M. A. Pradnyana, and I. K. R. Arthana, "Usability Testing pada Sistem Informasi Akademik New Generation (SIAK-NG) Undiksha Menggunakan Metode Heuristic Evaluation Ditinjau dari Pengguna Mahasiswa," *Inser. Inf. Syst. Emerg. Technol. J.*, vol. 3, no. 1, pp. 14–27, 2022, doi: 10.23887/insert.v3i1.43173.

[19]   B. F. Alamandha and R. Yulius, "Usability Analysis of the IBOSS PTSP BP Batam User Interface Using Heuristic Evaluation," *J. Inf. Syst. Informatics*, vol. 6, no. 2, pp. 1070–1085, Jun. 2024, doi: 10.51519/journalisi.v6i2.756.