JURNAL TEKNOLOGI DAN OPEN SOURCE
Vol. 7, No. 2, December 2024, pp. 55~66
e-ISSN: 2622-1659, accredited Four Grade by Kemenristekdikti, Decree No: 152/E/KPT/2023
DOI: 10.36378/jtos.v7i2.3808

Modeling User Interface Design E-Business Applications for Marketing MSMEs Products in Payakumbuh City Using Pieces Framework

Rabby Nazli [1)], **Amrizal** [2)], **Hendra** [3)], **Syukriadi** [4)]
[1),2),3),4)] Teknologi Rekayasa Komputer, Politeknik Pertanian Negeri Payakumbuh

Article Info

Article history:

Received 10 04, 2024
Revised 10 15, 2024
Accepted 11 30, 2024

Keywords:

Design,
Analisis,
Model,
Interface,
Pieces Framework

ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) are productive economic enterprises that make a very significant contribution to the process of spurring the development of Indonesia's economic growth. On the one hand, the development of information technology is also growing very quickly. Therefore, managing micro, small and medium enterprises (MSMEs) businesses by utilizing digital technology is now an important part of increasing the competitiveness of micro ,small and medium enterprises (MSMEs) so that they are able to compete with other industry players. The aim of this research is to design an e-business design that can be used to improve business development performance in order to achieve its competitive targets so that it is able to compete with competitors in Payakumbuh city MSMEs. The framework used to analyze design feasibility tests is the PIECES Framework, which includes performance, information, economics, control, efficiency, and services. This method is used to measure the level of satisfaction with using the e-business system in managing MSME businesses in the city of Payakumbuh. The results of this research are in the range 3.4 – 4.91 = satisfied, so the design of the Payakumbuh City MSME e-business application is suitable for implementation in an application form that can be used by Payakumbuh City MSMEs and later used for testing the developed e-business system.

.

Corresponding Author:

Rabby Nazli
Teknologi Rekayasa Komputer, Politeknik Pertanian Negeri Payakumbuh
Sumatra Barat, Indonesia
Email: rabbynazli@gmail.com

1. Introduction

MSMEs, or small, micro, and medium-sized firms, are productive economic entities run by productive community organizations. They represent a significant turning point in the Indonesian economy. In order for micro, small and medium-sized businesses (MSMEs) to become more competitive and be able to compete with fast growing industrial players, managing this business is therefore also a crucial component. The creation of online business models is currently expanding at a very rapid pace. Technological advancements

have an impact on this, particularly the utilization of online resources, which are now much more accessible.[1]

The productive economic enterprises known as micro, Small and medium-sized companies (MSMEs) play a crucial role in promoting Indonesia's economic expansion. This is due to MSMEs' (small, micro, and medium-sized enterprises) substantial and intimate labor absorption potential. According to labor statistics, 99.5% of Indonesians are employed by micro, Small and medium-sized businesses (MSMEs). The government is well aware of this, which is why the Indonesian government's policy includes these MSMEs as a focal point. Laws and government regulations outline the government's policy toward MSMEs. [2]

The development of Micro, Small and Medium Enterprises (MSMEs) is currently growing very rapidly in line with current developments in technology and ICT. The development of information and communication technology or what is commonly referred to as ICT (Information and Communication Technology) and the internet has entered various fields of community activity, including business and trade. One very significant development is the use of the internet via smartphones or mobile devices. Based on researched data, it is known that smartphone usage has reached 5 million and above in 2020 [3].In this era of globalization, MSMEs must be able to use information technology as best as possible because it has many benefits to support the MSME business process itself, including (1) saving marketing costs because the promotion and marketing process is currently based on information or electronic technology so that budget expenditures can be cut but the effectiveness of product marketing targets can still be achieved according to the business plan; (2) speed up business processes, because the existence of information technology such as the internet can overcome distance and time problems both for the process of buying and selling transactions between sellers and buyers as well as managing the stock of products/goods to be produced (3).

One form of implementation of information technology in the trade sector is e-business, e-commerce, e-procurement, e-supply management, and many others. A successful business can be obtained from two important aspects, namely cost efficiency and competitiveness [4]. The way to achieve this can be done by increasing market coverage or potential customers on a large scale and encouraging the trust and loyalty of existing customers. Apart from that, costs are also reduced through the use of information technology-based business services.The use of information technology in this case plays a role in facilitating buying and selling transactions carried out online via the internet and carrying out digital business management. Proper use of technology will certainly be able to improve company performance. Business processes that usually take a long time and are complicated can be more efficient with the information technology used. [5]

Better management of micro, Small and medium enterprises (MSMEs) is very necessary to compete with the demands of the global market, which is growing rapidly at this time. What needs to be done is selling products that have superior value at competitive prices and managing digital-based MSMEs both in internal business management and sales to customers. E-business is an example of a strategy that can be implemented to increase the competitiveness of MSMEs through the use of information technologyE-business can be defined as the use of information technology to improve the performance of business processes, which include buying and selling products or services through website pages that involve contributions from partners such as consumers, suppliers, business owners, and vendors [6]. and also e-business can be a huge opportunity to compete globally. This is done to display its competitive advantages. [4]. The analysis and evaluation process of information technology systems can be carried out using several methods or analysis models that can be used, one of which is using the PIECES Framework analysis process model. To simplify the analysis process, the analysis method is explained using the PIECES framework, which breaks down the 6 focuses of feasibility test analysis, namely performance, information and data, economy, control and security, efficiency, and service. The results of the analysis "PIECES Framework is a document of system weaknesses or shortcomings that become recommendations for improvements that must be made to the system, which will be further developed to improve the previous system" [7]. The objectives of this research are to: (a) analyze and identify the basic system requirements for building and developing an e-business platform; (b) produce a mobile application-based e-business model for managing MSMEs in order to increase the competitiveness of MSMEs; and (c) know the level of user interest and satisfaction in using the system. From the objective points explained above, it is hoped that the results of this research will later become material for consideration by interested parties in decision-making and be able to overcome the problems faced by MSMEs in Payakumbuh City in business competition..

2. Research Method

A. Modeling

Modeling, which is generally discussed, is a process of representing real objects or reality as a set of mathematical and statistical equations, graphics, or charts so that they are easily understood by interested parties in decision-making. Modeling is more specific to the process of describing concepts that represent objects in the development of information systems and technology. The modeling used in information system

development evolves in line with the development of information technology and its development methodology. A common perspective is needed in modeling, which ultimately requires the existence of similarities or standards that have been set. Object technology ,requires relevant modeling, has driven ,creating modeling standards for system development. For example, a business process diagram can be tested by mentally going through a case of imagination, through different possible logical thoughts to see whether it is producing the required output. There are three types of modeling, namely Business Modeling, Application Modeling, and System Modeling.

A. UI/UX

User interface is an interface design process that focuses on the appearance of the home page in the form of beauty and comfort in the eyes of the user, choosing good and appropriate colors, and other things that make the appearance of the e-commerce web more attractive (Rizki, 2019). The UI creates more of an emotional bond with the user through an attractive and beautiful design. Usually the UI will be implemented or worked on after the UX (User Experience) is complete by determining the design of the layout, logo, colors, typography, and other things. UX (user experience) is a design used to increase website user satisfaction through the pleasure and usefulness provided in interactions between internet users or visitors and products (Rizki, 2019). This UX functions to make e-commerce websites easier and less confusing for users. UX can be said to be all the elements of a website, which include arrangement, structure, ease of moving one page to another, and so on.

B. *PIECES Framework*

PIECES Framework is a framework that contains categories for classifying problems and formulating solutions to these problems. The classification is divided into six categories, namely Performances: is a system analysis stage to determine the level of system performance whether it can run well and in accordance with needs, Informations: is an analysis stage to determine the need for information produced by the system in accordance with user needs, Economics: is The analysis stage is carried out to determine whether the system is on target and economically supports the development of the user's business. Control: is the analysis stage carried out to determine whether the level of security and supervision implemented in the system is in accordance with the objectives for which the system was built. Efficiency: is stages of analysis carried out to find out whether the system built is efficient for use by users, and Services: is an analysis stage in examining whether the system built can provide services according to user needs [8]. The following table explains the indicators used to carry out the feasibility test analysis process that will be carried out:

Table 1. Indikator Pieces Framework

No	Indicator	Keterangan
1	*Performances*	is an analysis stage to determine the information needs produced by the system according to user needs
2	*Information*	is an analysis stage to determine the information needs produced by the system according to user needs
3	*Economic*	is an analysis stage carried out to find out whether the system is right on target and economically supports the business towards business development by users.
4	*Control and Security*	is an analysis stage carried out to determine the level of security in the system and whether the supervision implemented in the system is in accordance with the objectives for which the system was built.
5	*Efficiency*	is an analysis stage carried out to find out whether the system being built is efficient for use by users.
6	*Service*	is an analysis stage in examining whether the system built can provide a form of service according to user needs

Research methods

Research methodology includes the sequences carried out in a study. The research methodology was carried out so that the research process was more conceptual and easy to understand step by step, directed and structured, so that at each stage the achievements would be known in accordance with the objectives set in the research.

In this research, the method used was:

a. Literature study is a stage of collecting data obtained through literature study, namely by searching for material from internet media, scientific articles, and theses that are appropriate to the object to be researched in accordance with the objectives set for the purpose of this research. This method is used to find gaps in previous research so that it makes it easier for writers to carry out research..
b. Observation is one of the stages of the method of collecting data obtained from the field by going directly to the field and looking for data at the research location.
c. Interviews and distributing questionnaires are methods used to collect data obtained directly from sources and people who can be trusted, namely the Department of Cooperatives and SMEs of Payakumbuh City, MSMEs of Payakumbuh City, and the community of users/customers by distributing feasibility test questionnaires using the PIECES Framework method so that achieve the objectives set in this research.

3. Result and Discussion

In the research that has been carried out to date, IPR has been obtained for the UI/UX Computer Design Program for E-Business Applications for Marketing MSME Products in Payakumbuh City. The design process was carried out by examining the needs of users and managers of MSMEs in Payakumbuh City and from existing designs. This design carried out a special design feasibility test process to be implemented into the application so that it can be used by MSMEs in Payakumbuh City and is useful for stakeholders. The following are the results of the design and UI/UX feasibility test of the application Payakumbuh City MSME E-Business.:

1. Design the Main Page/Main Menu

This main page is a page that displays information on popular products with the most purchase and sale transactions, displays the name of the item, the number of items, and the price of the item to be traded and this design has a searching menu to browse MSME products in Payakumbuh City according to the desired transaction. purchases by consumers, the following is a display of the main page design.:

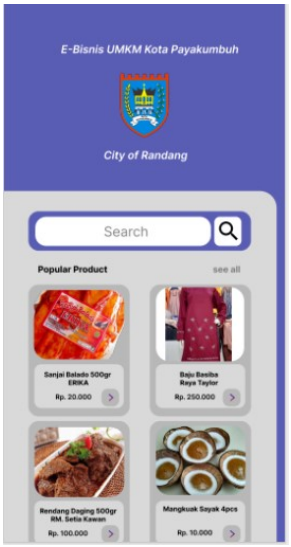

Figure 1. Payakumbuh City MSME E-Business Application Main Page

2. Design the Item Details Menu Page

This item detail menu page displays detailed information about the product that the consumer will purchase, where on this page there is information on the item price and size, and there is a Buy button to continue to the purchase page and a Basket button to enter the product into the purchase basket. The following is the design of the item detail menu page:

Figure 2. Item Details Menu Page

3. Chat Page Design

This page's design facilitates communication between MSME owners and customers throughout the purchasing and selling of goods linked to extra information that customers require, making it simpler for customers to communicate when necessary. A search menu, a button to go back to the site, and a basket are all present on this page.

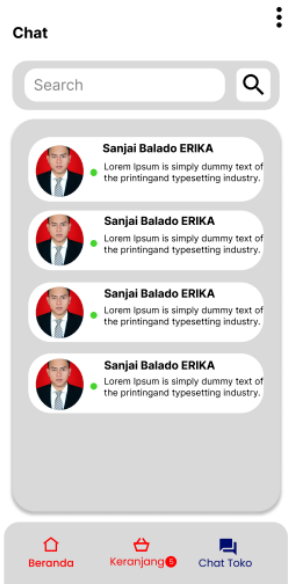

Figure 3. Payakumbuh City MSME E-Business Application Chat Page

4. Cart Page Design

The basket page is a page that is used to place products that consumers have chosen to purchase. On this page, consumers can add or subtract products to be purchased, and on this page, consumers can find out the total shopping they will do.

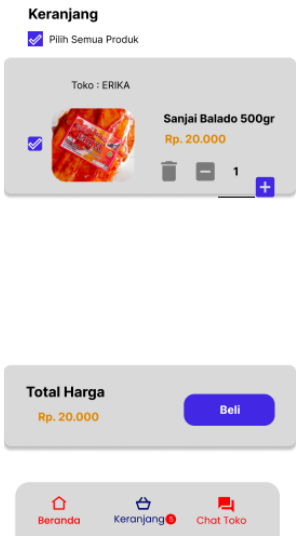

Figure 4. Payakumbuh City MSME E-Business Application Basket Page

The follow-up to this research is to carry out a feasibility analysis of the design that has been created using the PIECES framework, this PIECES Framework is a framework that contains categories for classifying problems and formulating solutions to these problems. The classification is divided into six categories, namely Performances: is the design analysis stage to determine whether the level of design performance can work well and in accordance with the needs of Payakumbuh City MSMEs, Informations: analysis stage to determine the information needs produced by the system in accordance with the needs of the City MSMEs Payakumbuh, Economics: analysis stage carried out to find out whether the system is right on target and economically supports business development by Payakumbuh City MSMEs, Control: analysis stage carried out to determine the level of security and supervision applied within whether the system is in accordance with the objectives of the system built for MSMEs in Payakumbuh City, Efficiency: the analysis stage carried out to find out whether the system built is efficient for use by MSMEs in Payakumbuh City, and Services: the analysis stage in examining whether the system built can provide appropriate services needs of MSMEs in Payakumbuh City [8]. The results of the questionnaire assessment of application users in measuring service quality towards the satisfaction of Payakumbuh City MSMEs in using this application will be measured using a Likert scale. To get the average level of satisfaction using formula [10].

Average Satisfaction = Total Questionnaire Score / Number of questionnaires

In determining the level of user satisfaction, a model defined by Kaplan and Norton is used with the following level scale [10]:
1 – 1,79 = Very dissatisfied
1,8 – 2,59 = Not satisfied
2,6 – 3,39 = Doubtful
3,4 – 4,91 = Satisfied
4,92 – 5 = Very satisfied
The following are the results of the feasibility test using the six PIECES categories, with the number of respondents being 20 MSMEs in Payakumbuh City who gave a feasibility test assessment of the design that had been designed and whether it met the user's needs in achieving goals and business processes for later decision-making:

1. Performances

Table 1. Performance indicator results

R	Indikator Performance			
	d1	d2	d3	d4
1	4	3	5	4

2	4	4	4	5
3	4	4	4	4
4	5	4	3	5
5	4	5	5	5
6	4	4	4	5
7	4	4	4	5
8	3	4	3	4
9	4	4	4	4
10	5	5	4	4
11	4	4	4	4
12	5	5	5	5
13	4	5	4	4
14	4	4	4	4
15	4	5	4	4
16	4	4	4	4
17	5	4	5	3
18	5	4	4	4
19	4	4	5	4
20	4	4	4	4
	4.2	4.2	4.15	4.25

From the results of the performance design feasibility test, an average score of 4.20 was obtained. Based on the provisions of the linkers scale, the performance design feasibility test obtained a PUAS score, so it can be said that the design feasibility of the performance indicators received a fairly good score from users.

2. Information

Table 2. Information indicator results

R	Indicator Information			
	d1	d2	d3	d4
1	3	3	4	4
2	5	4	4	5
3	4	3	4	4
4	5	4	3	4
5	4	4	3	3
6	4	4	4	5
7	4	4	4	5
8	3	4	3	4
9	4	5	4	4
10	3	3	4	4
11	4	4	4	4
12	3	5	3	3
13	4	4	4	4
14	4	4	4	4

15	3	5	4	4
16	4	4	4	4
17	4	4	3	3
18	5	4	4	4
19	4	4	4	4
20	3	4	4	4
	3.85	4	3.75	4

From the results of the information delivery test and ease of accessing information on the design, an average score of 3.90 was obtained. Based on the provisions of the linkers scale, the information feasibility test received a PUAS score, so it can be said that the design feasibility of the information indicator received a fairly good score from users.

3. Economy

Table 1. Economy indicator results

R	Indicator Economy			
	d1	d2	d3	d4
1	4	4	4	4
2	5	5	4	4
3	3	4	3	4
4	4	4	4	4
5	3	3	4	4
6	4	4	4	4
7	3	4	3	3
8	3	4	3	4
9	4	4	4	4
10	5	5	4	4
11	4	4	4	4
12	5	5	5	5
13	4	5	4	4
14	4	4	4	4
15	4	5	4	4
16	4	4	4	4
17	5	4	5	3
18	5	4	4	4
19	4	4	5	4
20	4	4	4	4
	4.05	4.2	4	3.95

From the results of the feasibility test for the economy indicator on the design, an average score of 4.05 was obtained. Based on the provisions of the Linkert scale that have been determined, the performance feasibility test received a PUAS score, so it can be said that for the feasibility of the design, the economy indicator received a fairly good score from users.

4. Control

Table 1. Control indicator results

R	Indicator Control			
	d1	d2	d3	d4
1	3	4	3	4
2	4	5	4	4
3	3	3	4	4
4	4	4	4	4
5	3	5	3	3
6	4	4	4	4
7	4	4	4	4
8	3	5	4	4
9	4	4	4	4
10	4	4	3	3
11	4	4	4	4
12	5	5	5	5
13	4	5	4	4
14	4	4	4	4
15	4	5	4	4
16	4	4	4	4
17	5	4	5	3
18	5	4	4	4
19	4	4	5	4
20	4	4	4	4
	3.95	4.25	4	3.9

From the results of the control indicator's feasibility test on the design, an average score of 4.02 was obtained. Based on the provisions of the linkers scale, the control feasibility test obtained a PUAS score, so it can be said that the design feasibility of the control indicator received a fairly good score from users..

5. Efficiency

Table 1. Efficiency indicator results

R	Indicator Efficiency			
	d1	d2	d3	d4
1	4	4	4	4
2	5	5	5	5
3	4	5	4	4
4	4	4	4	4
5	4	5	4	4
6	4	4	4	4
7	5	4	5	3
8	5	4	4	4
9	4	4	5	4

10	4	4	4	4
11	4	4	4	4
12	3	4	3	4
13	4	4	4	4
14	5	5	4	4
15	4	4	4	4
16	4	3	3	4
17	4	3	4	4
18	4	4	4	4
19	4	4	5	4
20	4	4	4	4
	4.15	4.1	4.1	4

From the results of the efficiency design feasibility test, an average score of 4.08 was obtained. Based on the provisions of the linkers scale, the efficiency design feasibility test obtained a PUAS score, so it can be said that the design feasibility of the efficiency indicator received a fairly good score from users.

6. Service

Table 1. Service indicator results

R	Indicator Service			
	d1	d2	d3	d4
1	4	4	4	4
2	4	5	5	5
3	4	5	4	4
4	4	4	4	4
5	4	5	4	4
6	4	4	4	4
7	5	4	5	3
8	3	4	4	3
9	4	4	4	4
10	5	5	4	4
11	3	4	3	3
12	4	4	4	4
13	3	3	4	4
14	4	4	4	4
15	3	4	3	3
16	4	4	4	4
17	4	4	4	4
18	3	5	4	4
19	4	4	4	4
20	4	4	3	3
	3.85	4.2	3.95	3.8

From the results of the service feasibility test provided by the Payakumbuh City UMKM application design, an average score of 3.95 was obtained. Based on the provisions of the linkers scale, the service feasibility test received a PUAS score, so it can be said that the design feasibility of the service indicator received a fairly good score from the participants.

4. Conclusion

Based on the results of the feasibility test for the design of the Payakumbuh City MSME e-business application using the PIECES Framework with a total of 20 respondents consisting of feasibility tests: The performance indicator obtained an average value of 4.20, the information indicator obtained an average value of 3.90, the economy indicator obtained an average value of 4.05, the control indicator got an average value of 4.02, the efficiency indicator got an average value of 4.08, and the service indicator got an average value of 3.95. This result is in the range 3.4 – 4.91 = satisfied, so it can be concluded that the Payakumbuh City MSME e-business application design is feasible to be implemented in an application form that can be used by MSMEs. However, of the six PIECES Framework indicators whose suitability has been tested, there is a value of 3.90 in the Information indicator, which is the lowest average value of the feasibility test process, so improvements and the addition of better information features are needed to make it easier for users later to use the application.Suggestions for further research are to use more indicators and respondents to obtain maximum results, making it easier for stakeholders to make decisions, and Payakumbuh City MSMEs can implement them to speed up and improve their business processes.

Acknowledgments

With great gratitude, I would like to express my deepest gratitude to all parties who have provided extraordinary support, guidance, and contributions during this research process. The completion of this research cannot be separated from the important role of various parties who sincerely helped, directed and motivated me at every stage of its implementation.

References

[1] S. S. Utami, "Pengaruh Teknologi Informasi Dalam Perkembangan Bisnis, Fakultas Ekonomi Universitas Slamet Riyadi Surakarta," *J. Akunt. dan Sist. Teknol. Inf.*, vol. Vol. 8 No., pp. 61– 67, 2010.
[2] J. Jauhari, "Upaya Pengembangan Usaha Kecil Dan Menengah (UKM) Dengan Memanfaatkan E-Commerce," *J. Sist. Inf.*, vol. 2, no. 1, pp. 159–168, 2010.
[3] "Global Digital Report 2018," 2018.
[4] D. Chaffey, *E-Business and Management E-Commerce*, Fourth. London: Pearson Education Limited, 2009.
[5] G. S. Pranata dan Darma, "Strategi Penerapan E-Commerce Dalam Meningkatkan Keunggulan Bersaing," *J. Manaj. dan Bisnis*, vol. 11, no. 1, pp. 69–81, 2014.
[6] M. S. Raisinghani, L. Meade, and L. L. Schkade, "Strategic e-Business Decision Analysis Using the Analytic Network Process," *IEEE Trans. Eng. Manag.*, vol. 54, no. 4, 2007.
[7] A. Supriyatna and V. Maria, "khazanah informatika Analisis Tingkat Kepuasan Pengguna dan Tingkat Kepentingan Penerapan Sistem Informasi DJP Online dengan Kerangka PIECES," *J. Ilmu Komput. dan Inform.*, vol. 3, no. 2, pp. 88–94, 2017.
[8] W. Bentley, *System Analysis & Design Methods*, Seventh. Mc Graw-Hill, 2007.
[9] N. Azizah and V. Pramandani, "Implementasi supply chain management pada umkm tenun troso jepara," *NJCA*, vol. 3 No.1, pp. 11–16, 2018.
[10] Asbar, Y., & Saptari, M. A. (2017). Analisa Dalam Mengukur Kualitas Pelayanan Terhadap Kepuasan Konsumen Menggunakan Metode PIECES. *Jurnal Visioner & Strategis*, *6*(2), 39– 47.
[11] NOVITA, R., Rabby Nazli, Amrizal, & Agus Nur Khomarudin. (2024). Analisis User Interface dan User Experience Design Pada Website https://www.politanipyk.ac.id Berdasarkan 8 Golden Rules of Interface Design. *SATIN - Sains Dan Teknologi Informasi*, *10*(1), 168-179. https://doi.org/10.33372/stn.v10i1.1059
[12] Nazli, R., Arbah, N., & Jasri. (2023). Analisis UI/UX Website Universitas Islam Kuantan Singingi Berdasarkan 8 Golden Rules of Interface Design. *Technologica*, *2*(2), 61–69. https://doi.org/10.55043/technologica.v2i2.101
[13] NOVITA, R., Nazli, R., & Khomarudin, A. N. (2024). Analisis User Interface dan User Experience Design Pada Website https://www. politanipyk. ac. id Berdasarkan 8 Golden Rules of Interface Design. *SATIN-Sains dan Teknologi Informasi*, *10*(1), 168-179.
[14] Nazli, R. (2019). Pemodelan Aplikasi Mobile Pelayanan Publik Desa (Smart Village) Berbasis Cloud Computing. *Jurnal Teknologi dan Open Source*, *2*(2), 87-95.
[15] Amini, R. P., Pradnyana, I. M. A., & Wirawan, I. M. A. (2019). Evaluasi Usability Pada Sistem Informasi Permohonan Kendaraan Dinas (Simonas) Pt. Pln (Persero) Unit Induk Distribusi Bali Up3 Bali Utara Sesuai Iso

9241-11 Dan Eight Golden Rules. Jurnal Pendidikan Teknologi Dan Kejuruan, 16(1),129. https://doi.org/10.23887/jptkundiksha.v16i1.17062
[16] Ariska, D., & Nurlela, S. (2022). Analisis Dan PerancanganUI/UX Aplikasi Lazada Menggunakan Metode Design Thinking. Jurnal Infortech, 4(2), 86–91.
[17] Budi Susila, C. (2020). Analisis User Interface Pada Website Stainu Pacitan Menggunakan Metode Eight Golden Rules. Jurnal Qua Teknika, 10(1), 26–35. https://doi.org/10.35457/quateknika.v10i1.916
[18] Damayanti, C., Triayudi, A., & Sholihati, I. D. (2022). Analisis UI/UX Untuk Perancangan Website Apotek dengan Metode Human Centered Design dan System Usability Scale. Jurnal Media Informatika Budidarma, 6(1), 551. https://doi.org/10.30865/mib.v6i1.3526
[19] Febrian Retno Sari, M. S. (2023). Evaluasi User Experience Pada Mobile Legends: Bang Bang Menggunakan Metode Cognitive Walkthrough. SATIN : Sains Dan Teknologi Informasi, 9(2), 155–166. https://doi.org/10.33372/stn.v9i2.1035
[20] Hakim, N. F., Muriyatmoko, D., & Dzulkarnain, A. (2022). Analisis Dan Perancangan UI/UX Website Roya La-Tansa Mart Menggunakan Metode User Centered Design (UCD). Seminar Nasional Hasil Penelitian & Pengabdian Masyarakat Bidang Ilmu Komputer, 67–77. http://prosiding.unipma.ac.id/index.php/sendiko/article/view/2210
[21] Nazli, R (2020) "Pemodelan Aplikasi Pendukung Keputusan Makanan Pendamping Air Susu Ibu (Mpasi) Berbasis Android" J*urnal Teknologi dan Open Source* 3(2) 272-283.
[22] Nazli, R (2018) "Pemodelan Aplikasi Mobile Modul Perkuliahan Berbasis Client Server" *Jurnal Teknologi dan Open Source* 1(1) 25-32.
[23] Purbo, Onno W. 2011. One Day Future Networking. Yogyakarta: *Synaptic UII*
[24] Sinambela, Lijan Poltak. 2008. Reformasi Pelayanan Publik Teori, Kebijakan, dan Implementasi. Jakarta : *PT Bumi Aksara*
[25] W. Satzinger, R. B. Jackson and S. D. Burd, Systems Analysis and Design in a Changing World*, Sixth ed*., 2011.
[26] Shelly, Gary B., and Harry J. Rosenblatt. (2012). Systems Analysis and Design Nineth Edition. *United States of America: Course Technology*.
[27] Theo Mandel, P.hd, "Golden Rules of User Interface Design | Theo Mandel," Golden Rules of User Interface Design | Theo Mandel, 14-Jun-2015. [Online]. Available.