IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed journal / Refereed journal ⁜ Vol. 12, Issue 10, October 2023

DOI: 10.17148/IJARCCE.2023.121021

Development of Geographic Information System with Location Based Service Method Approach for Marine Tourism Mapping

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Abstract: The number of marine tourist attractions in the Gunungkidul area makes tourists or visitors confused to choose a marine tourist spot. In addition, the availability of information about marine tourist attractions is very limited so it is difficult to see the development of these tourist attractions. Therefore, a web-based marine tourism location mapping geographic information system was created which aims to implement a geographic information system using map visualization that can make it easier for tourists to find information about marine tourism in the Gunungkidul area and can help show the route to be traversed by users and monitor its development. This system was created using the SDLC method which produces a systematic and structured system design. In making this system design using data flow diagram (DFD). The test method used is the beta method which uses the SUS type of testing with 40 respondents and uses 3 parameters to measure speed, ease, and failure when users use the system and get results above average, The results of the tests conducted by researchers get a value of 84.5 which states that the system is feasible to use and implement to users so that the creation of this web-based marine tourism location mapping geographic information system can provide information to users to make it easier to find marine tourism locations and other information such as routes, addresses, pictures of these marine tourism locations.

Keywords: Marine Tourism, Geographic Information System, SDLC, SUS.

I. INTRODUCTION

Gunungkidul Regency is one of the tourism sector areas in Yogyakarta, the beauty of marine tourism continues to develop tourism objects to support the plan and vision, among others, to improve the standard of living of the Gunungkidul people. One of the attractions that is the favorite of tourists in Gunungkidul Regency is a marine tourism object that presents various forms and beauty of each beach. Various kinds of beaches have their own beauty and beauty, and also each beach has its own uniqueness, with the uniqueness offered by the area will increase the economic sector if juxtaposed with technological advances that will continue to develop, the Gunungkidul district government continues to strive to promote the marine tourism sector in Gunungkidul district by spreading photos of the beauty of marine tourism on social media such as Instagram and on the website to attract tourists from domestic and foreign communities to visit and enjoy natural beauty and can increase the revenue of the Gunungkidul district government, in order to encourage the rate of economic growth to be more advanced.

However, the beauty offered by the Gunungkidul Regency government has not been recognized by foreign countries because the methods used by the Gunungkidul Regency government are less efficient and the information conveyed to users or tourists has not been conveyed optimally. Tourists will have difficulty choosing a travel plan to marine tourist attractions because in the area there is no description of the tourist attractions, such as the unavailability of visualization of places, distances, between tourist areas and also the roads that must be passed, one of the technologies that can help display the beauty of the Gunungkidul area is geographic technology which is equipped with useful information in accordance with the field under study. In addition to these technologies, researchers use location-based service (LBS) technology as a supporting technology in the research conducted. Location based service technology itself is a technology that shows a location in a certain area. Many previous studies have used location based service technology.

Geographic Information System (GIS) technology has developed rapidly. GIS is formed by using information derived from the processing of some data, namely geographic data or data related to the position of an object on the earth's surface. GIS can be presented in the form of web-based applications. GIS can also provide clarity about an event, make forecasting events, and other strategic planning and can help analyze general problems such as economic, population, social government and tourism problems.

DOI: 10.17148/IJARCCE.2023.121021

There are several previous studies that use GIS technology, one of which is Sodikin, Erliyan Redy Susanto, a researcher who has successfully developed a geographic information system for searching tourist attractions in the tenggamus area, the result of the research conducted is a website-based and mobile tourist search application, but when usability testing is carried out, features are still found that have not run according to the initial design. Both technologies used can make it easier for users to find the intended location, the use of this technology is very popular in various different fields, one of the uses is in the field of transportation and tourism related to the research conducted, while the main objective of this research is to help increase the income of Gunungkidul residents and local governments and make it easier for tourists to find Gunungkidul marine tourism locations which are famous for their beauty.

Based on the problems that have been described, the researchers concluded to develop a marine tourism geographic information system specifically designed for the Gunungkidul area, with the development of this tourism system, it is hoped that the photography of tourist attractions in the Gunungkidul regency can attract more attention to tourists who want to visit and can be enjoyed by the wider community. Presentation of information in the form of a *website* so that people can access it easily.

II. LITERATURE REVIEW

Prasetyanti et al, (2023) conducted research that developed a vehicle parking mapping application that utilizes location-based service technology, with the system developed parking lot processing becoming more organized and monitored in real time. However, there are still some shortcomings during testing, namely features that have not run according to the supposed functionality.

Welda, Desak, Ayu Manik, (2020) conducted research that tested a website using the system usability scale (SUS) testing method, the tests carried out used parameters including Acceptability, Grade Scale, and Adjective Rating which supported the test results to be more convincing, clearly conveyed the results of the tests carried out with the system usability scale method on the website and these results can be trusted and accurate by processing the data obtained, and described that the method used for testing is a suitable method for testing website usability.

Vinandari et al, (2019) developed a tourist gographic information system that can display a map overview and provide detailed information on tourist attractions in an area, the development uses the PHP programming language and javascript in the process carried out and the system can be used by two different parties, namely admins and users, explained in detail that GIS technology can be used in the development of geographic information systems and facilitate the search for tourist locations, GIS technology in the study is used to show a map overview of tourist attractions equipped with other additional information.

Nadhia & Suwarno (2023) designed an information system that uses the Sytem Development Life Cycle (SDLC) method as a system development method, in the research conducted the process or stages of the SDLC method are explained in detail and implemented well, carefully explained that the SDLC method is a method that can be used by other information system developers because it has structured stages. It is conveyed very clearly the stages of the SDLC method starting from analysis, system design, implementation, to system testing carried out by researchers.

III. RESEARCH METHODS

The research conducted uses the *System Development Life Cyle* (SDLC) method for system development, the method has several stages of a structured process that will facilitate the development process carried out by researchers. In the SDLC method, the stages that present each process are as follows The processes and stages in this method start from analysis, design, implementation, testing, operation, maintenance.

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DOI: 10.17148/IJARCCE.2023.121021

Figure 1 Stages of the SDLC Method

3.1 Requirments

Gunungkidul Regency with its beautiful marine tourism is one of the livelihoods for local residents and the local government, with limited information about tourist attractions in the Gunungkidul area resulting in tourists not getting specific information, the impact of this lack of information makes local residents and local governments not develop in the field of tourism, tourists who will visit will have difficulty getting information and this will make tourists confused to get specific information.

The results of interviews with local residents and tourists when researchers go to the field to get data that will be used as a reference in developing features according to the needs of system users. The data obtained is in the form of user needs information which can be seen in Table 1, with this data researchers can adjust the features on the system to user needs.

TABLE I USER REQUIREMENTS DATA

Needs	Shown To
Maritime Tourism Location Information (Route information, complete address)	User
Marine tourism information (Name, Description, Rating)	User
Marine tourism map information	User

3.2 System Design

At this stage the researcher describes the overall design of the system to be developed. Starting from the system architecture which can be seen in Figure 2, to the data flow of the developed system.

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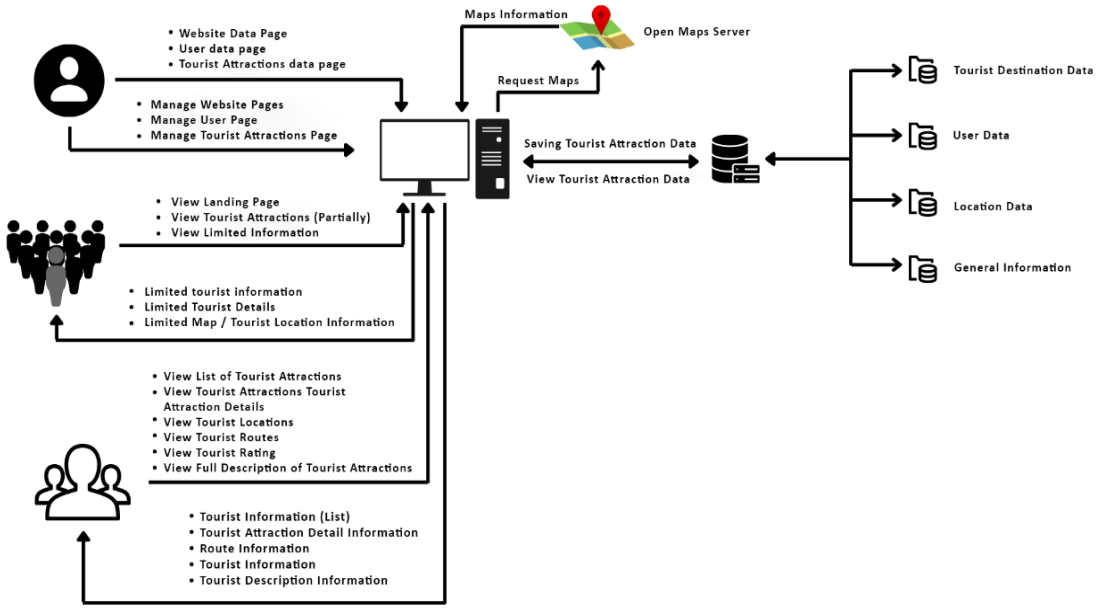

Figure 2. System Architecture

The architecture model in Figure 2 has 3 relations or outside entities, namely public. Public is a user who can access the *web* directly. While users are users who can have the advantage of being able to see more information than the public because the user has registered an account or has an account and can search for tourist attractions. Scientifically, system development will not run smoothly when the developer does not have a clear picture of the system structure. The system structure consists of 4 objects and each object describes the process in detail.

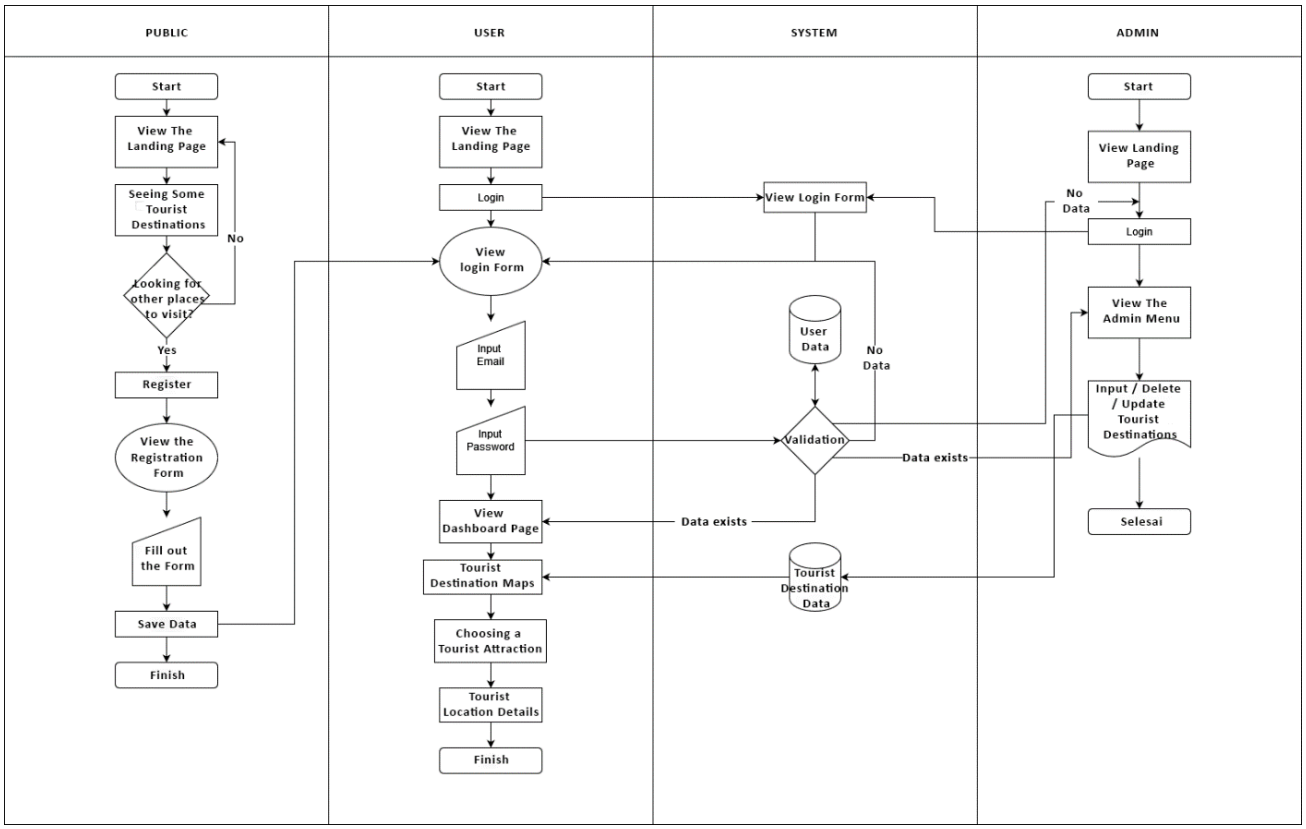

Figure 3. Flowchart of the Proposed System

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3.3 Implementation

At the implementation stage, the researcher explains how the testing procedure is carried out. The test method used is the *System usability scale* (SUS) beta testing method, testing that involves system users to provide responses to the system that has been developed by researchers, the purpose of this test is to evaluate the development that has been carried out by researchers. The main purpose of this test is to determine the level of user satisfaction in using the system.

Researchers developed a system that will be used by 2 types of users, namely ordinary users who only access information and admins who act as users who have full access to the data in the system, researchers use the MySQL platform for data storage. User data and data used in system development can be accessed by the admin and only the admin can take action on the stored data.

The marine tourism geographic information system is equipped with menus that contain information about marine tourism in Gunungkidul kecemata, including: home menu, map, marine tourism details, marine tourism list, about us. The five menus can be accessed by users to get complete information. The core menu of the developed system is tourist details, because it has very complete information up to location information that can be clarified by *zooming in.*

3.3.1 Page View

After carrying out the design stages using the SDLC method, the result of these stages is the appearance of the system page. The core display of the research conducted will be explained in the next explanation.

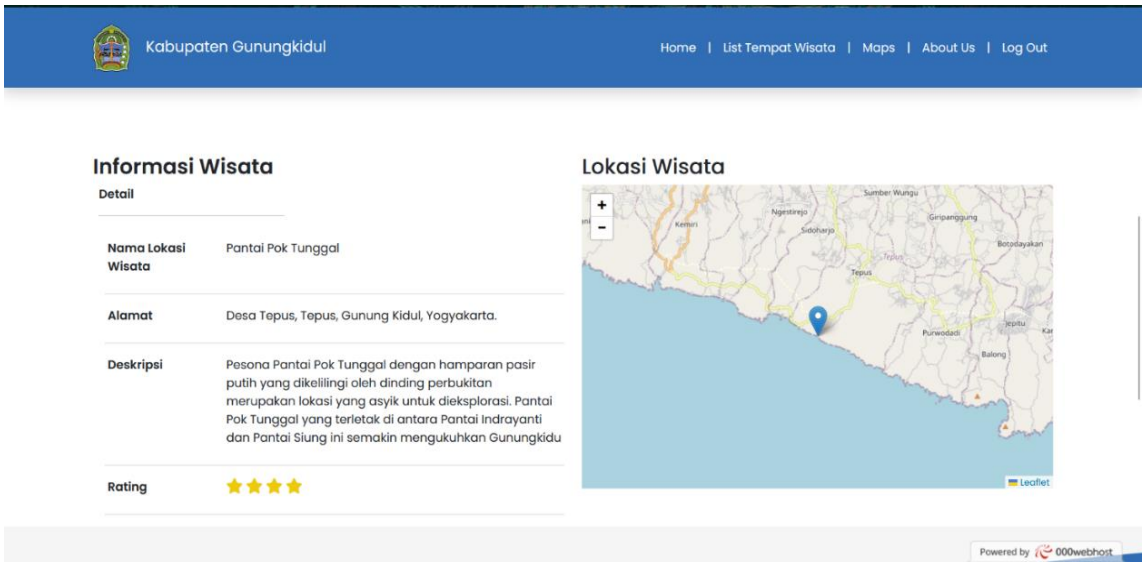

Figure 4. Detail Page View

The development was carried out by including several supporting menus that provide more detailed information, on the initial page of the website that has been developed is a page that displays a list of tourist attractions that aims to provide a general overview of tourist attractions, then equipped with a search feature to search using keywords related to the tourist attractions being searched. The information displayed on this page is complete information about the tourist attractions selected from the previous page, not only that this page is equipped with pictures of tourist locations that can be clarified by zooming. The maps page is a page that displays the location of tourist attractions in Gunungkidul regency, this page provides information to users about the location and surrounding places.

IV. RESULTS AND DISCUSSION

At this stage the researcher conducts testing with the alpha method and uses the SUS test type. This type of testing is one type of accurate system testing because it involves several users directly. The author distributes questionnaires to users and experiments with the web that has been developed. The system before being used by users must go through the testing stage first to find out whether the system can be implemented directly to users, the assessment can be related to the appearance of the interface, system functionality, in general there are 3 parameters used to measure the success of the system, namely the success rate of users when using the system, the speed of time used by users when accessing the system, then the system interface design, errors made by system users and user satisfaction in using the system.

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There are many methods for conducting tests that aim to find out some of the parameters previously described, one of which is by using the *System Usability Scale* (SUS) method. In the method used by researchers, namely the SUS method to calculate the level of user success when using the system can be calculated using equation 1.

$$\text{Success rate} = \frac{\text{Success} + (\text{Partial Success} \times 0.5)}{\text{Total Task}} \times 100\% \qquad (1)$$

Description:

Success rate, is measuring the success rate of users to complete tasks in an application. Success (S) indicates that the task given to the respondent has been successfully done. Partial Success (PS), indicates that the task given to the respondent was successfully done but there were still some errors when completing the task. Failure (F), indicates that the task given to the respondent was not successfully completed.

The next parameter is the level of speed required by the respondent when working on the given task using question number 2. The third parameter is the error made by the respondent when working on the given task, which can be calculated using equation 3.

$$\text{Eror rate} = \frac{\text{Total of attempts that had errors}}{\text{Total of attempts}} \times 100\% \qquad (3)$$

The method that has been described or known as the SUS method is a very popular usability testing tool because this method is very effective which consists of 10 questions and is answered with Likert points which are the provisions of the SUS method. SUS calculations have a rule where each positive question is calculated using equation 4 and negative questions are calculated using equation 5.

Equation for positive questions:

(x-1) (4)

Equation for negative questions

(5-x) (5)

In the equation above, x is the value chosen by the respondent on each available question. The SUS test value itself is obtained by summing the negative and positive questions and then multiplying by 2.5. Determination after testing with the SUS method will be seen in the results or average obtained, if the average SUS value is < 68 then the system is considered a good system.

The scenario of this test is that each respondent from the three predetermined groups carries out their respective activities then the researcher gives a questionnaire which is of course related to the system developed, after which the questionnaires from the three groups will be collected again and the data obtained is processed so as to get the final conclusion. In the questionnaire that has been filled in there are 10 questions that are in accordance with the rules of the SUS testing method which can be seen in Table 2, with 5 answers which can be seen in Table 3.

TABLE II SUS QUESTION TABLE

No.	SUS Question
1	I am thinking of using this system again.
2	In my opinion, this system is complicated to use.
3	I found the system easy to use.
4	I need help from other people or technicians in using this system.
5	I feel that the features of this system work well.
6	I feel that there are many things that are inconsistent (not appropriate in this system).
7	I feel that others will understand how to use this system quickly.
8	I find this system confusing.
9	I feel there are no obstacles in using this system.
10	I needed to familiarize myself before using this system.

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TABLE III SUS ANSWER

No.	Answer	Value/Scores
1	Strongly agree (ST)	5
2	Agree (S)	4
3	Undecided (RG)	3
4	Disagree (TS)	2
5	Strongly disagree (STS)	1

4.1 Testing Results

4.1.1 User Success Rate

This test has been carried out involving 5 respondents in each group and the results can be seen in Table 4. The conclusion of the results of user success testing that has been carried out and produces data as in Table 8. Different results were obtained, some users still made mistakes when using the system and not a few were successful in all its uses. The score obtained in testing using this success parameter obtained a score of 8% where this figure has succeeded in showing that success from the user side when using the system is above average. The score was obtained through calculation using equation 1.

$$\text{Success rate} = \frac{\text{Success} + (\text{Partial Success} \times 0.5)}{\text{Total Task}} \times 100\%$$

$$\text{Success rate} = \frac{7 + (3 \times 0.5)}{10} \times 100\%$$

$$= 85\ \%$$

TABLE IV SUCCESS TEST DATA

Task Scenario	Respond	Task 1	Task 2	Task 3	Task 4	Task 5
Search for marine tourist attractions on the system, view location points, search for locations	Travelers	S	S	PS	S	S
Check the development of marine tourism, conduct location searches	Gunungkidul natives	PS	S	S	S	PS

4.1.2 Working Time

In the type of parameter related to the respondent's processing time of the related application, this test gets the results as in Table 5. The conclusion from the test results carried out in Table 4 has obtained the results of the level of speed used by respondents to do their tasks is quite good where the results obtained are 94%, calculated using equation 2.

$$\text{Time on task} = \frac{\text{Time} \times \text{Success Rate}}{\text{Total Processing Time}} \times 100\%$$

$$\text{Time on task} = \frac{48}{27s + 24s} \times 100\%$$
$$= 94\ \%$$

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TABLE V PROCESSING TIME TEST DATA

Task Scenario	Respondents	Task 1	Task 2	Task 3	Task 4	Task 5	Total
Search for marine tourist attractions on the system, view location points, search for locations	Travelers	5(1)	5(1)	6(1)	5(1)	6(0,5)	24s
Check the development of marine tourism, conduct location searches	Gunungkidul Natives	5(1)	4(1)	5(1)	4(1)	6(1)	24s
Total							48s

4.1.3 Respondent Error

Testing using this parameter to determine the error rate of respondents, by calculating the opportunities for each task for each section and defined, the next step is to calculate the number of errors for tasks that respondents have done when working on tasks then calculate the error rate. Data on errors made by users can be seen in table 6.

TABLE VI RESPONDENT ERROR TEST DATA

Task Scenario	Respondents	R1	R2	R3	R4	R5	Total
Search for marine tourist attractions on the system, view location points, search for locations	Travelers	1	0	0	1	2	4
Check the development of marine tourism, conduct location searches	Original Gunungkidul Residents	2	0	1	1	0	4
Total							8

4.1.4 Respondent Testing Results

Further testing was carried out by involving 40 respondents consisting of 5 native residents of Gunungkidul Regency and 35 tourists from outside the region. These 40 respondents can represent other potential users so that researchers can find out the functionality of the system that has been developed on the user side whether it is running well. Testing was carried out by distributing questionnaires in just a week in October. From the distribution of questionnaires that have been carried out, the authors have succeeded in collecting data, the data generated is questionnaire data that has not been processed to get conclusions from the tests carried out, to perform calculations using the SUS test type using a certain formula which will be explained in equation 6.

$$\bar{x} = \frac{\sum x}{n} \quad (6)$$

Description:

$\bar{x}$ = Average score

$\sum x$ = Number of SUS scores

n = Number of respondents

TABLE VII DISTRIBUTION OF WEB USER RESPONDENTS

Respondents	Total	Percentage
All Respondents	40	100%

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fter distributing questionnaires to obtain data to be processed with the aim of seeing the usability of the developed system running well, the researchers obtained data and processed it to produce conclusions from the tests carried out and the data can be seen in Table 8. The conclusion from the SUS test results obtained a score of 84.5 which indicates that the system is very feasible to use. SUS test result data can be seen in Table 8. In the table there are 40 respondents who have tried the system directly, by involving 40 respondents researchers can find out directly the functionality of the system. The score obtained shows that the features run according to their respective functions.

TABLE VIII SUS CALCULATION RESULT

Respondents	Calculated Score		Respondents	Calculated Score	
	Total	Value		Total	Value
R 1	36	90	R21	32	80
R 2	37	92,5	R22	40	100
R 3	32	80	R23	28	70
R 4	39	97,5	R24	35	87,5
R 5	33	82,5	R25	29	72,5
R 6	37	92,5	R26	33	82,5
R 7	31	77,5	R27	34	85
R 8	40	100	R28	40	100
R 9	35	87,5	R29	35	87,5
R 10	25	62,5	R30	40	100
R 11	25	62,5	R31	36	90
R 12	24	60	R32	33	82,5
R 13	37	92,5	R33	33	82,5
R 14	39	97,5	R34	35	87,5
R 15	29	72,5	R35	31	77,5
R 16	35	87,5	R36	32	80
R 17	36	90	R37	34	85
R 18	35	87,5	R38	37	92,5
R 19	36	90	R39	33	82,5
R 20	26	65	R40	36	90
Average Score					
84,5					

From the results of SUS testing carried out, a score of 84.5 was obtained, where the system already has usability that can be accepted by users but is still in the average value range and certainly not at a value where users will recommend it to other users, for this reason it is necessary to further analyze and discuss by analyzing several questions on the SUS questionnaire so that recommendations can be made to improve the SUS score that has been described. The following researchers present some additional analysis on several questions.

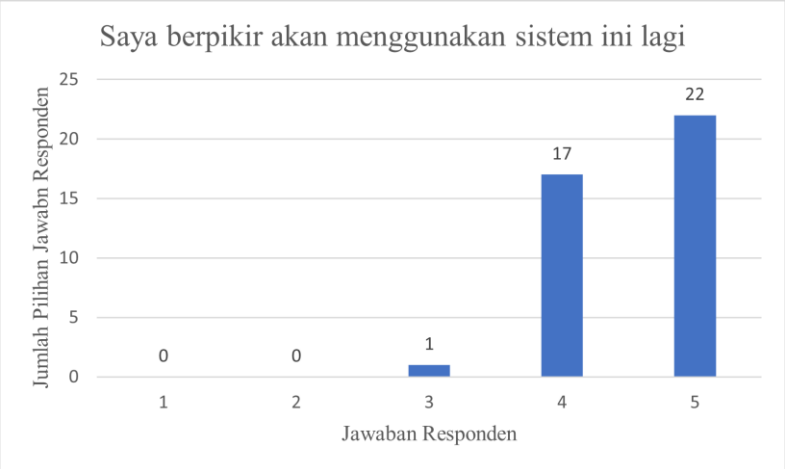

Figure 5. Positive Questionnaire Results

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Question 1 is a positive statement where respondents give a statement agreeing if they do not support the statement, from Figure 7 it can be seen that 55.0% strongly agree and 42.5% agree, which means that some respondents want something more interesting from the system developed.

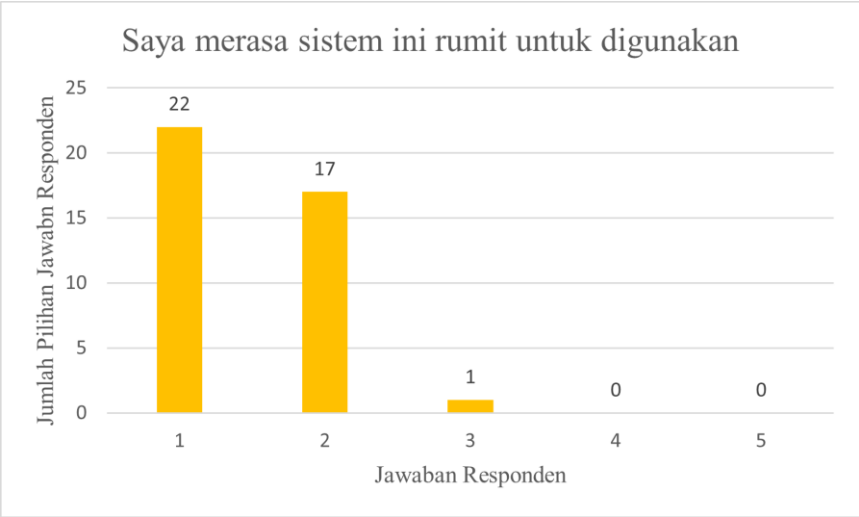

Figure 6. Negative Questionnaire Results

Question 2 is a negative question which means that it will give a statement agreeing if it does not support the statement, from Figure 8 it can be seen that 55.0% strongly disagree with the statement and there are 43.5% who disagree with the negative statement, which means that respondents already feel that the system developed is very easy to use.

V. CONCLUSIONS

This geographic information system for mapping marine tourist attractions has been tested for feasibility for use by users. from the tests carried out using 3 parameters related to usability testing, namely the success parameter of the respondent getting a value of 85%, then the speed used by the respondent getting a value of 94% and the last evaluating the error rate made by the respondent getting a value of 0. From the results of the tests that have been carried out using SUSPECT5, these results indicate that the system is feasible to use and implement directly to the user and see the results that have been obtained from the tests carried out the system is running very well.

with the score obtained after testing using the SUS method getting a score of 84.5 which indicates that the system developed is very feasible to use because it is considered to be above average. With the score obtained after testing using the SUS method obtained a score of 84.5 which indicates that the system developed is very feasible to use because it is considered above average. Further development is carried out with more advanced technology because technology will continue to develop and be carried out with more diverse tests.

REFERENCES

[1] S. Wahyuni, “Analisis Pola Daya Tarik Wisata Berdasarkan Potensi Sumberdaya (Supply) Sebagai Aset Dan Daya Tarik Di Daerah Istimewa Yogyakarta,” *Kepariwisataan J. Ilm.*, vol. 14, no. 01, pp. 13–22, 2020, doi: 10.47256/kepariwisataan.v14i01.14.

[2] A. P. Windarto, M. R. Lubis, and S. Solikhun, “Model Arsitektur Neural Network Dengan Backpropogation Pada Prediksi Total Laba Rugi Komprehensif Bank Umum Konvensional,” *Klik - Kumpul. J. Ilmu Komput.*, vol. 5, no. 2, p. 147, 2018, doi: 10.20527/klik.v5i2.148.

[3] Dwi Novia Prasetyanti, R. Purwanto, and Rostika Listyaningrum, “Penerapan Location Based Service (LBS) dan QR Code Detection pada Aplikasi Pemetaan dan Penjemputan Retribusi Parkir Kendaraan Berbasis Android,” *Infotekmesin*, vol. 14, no. 1, pp. 111–118, 2023, doi: 10.35970/infotekmesin.v14i1.1662.

[4] M. Tinambunan and S. Sintaro, “Aplikasi Restfull Pada Sistem Informasi Geografis Pariwisata Kota Bandar Lampung,” *J. Inform. dan Rekayasa Perangkat Lunak*, vol. 2, no. 3, pp. 312–323, 2021, doi: 10.33365/jatika.v2i3.1230.

[5] Z. Hidayah and D. B. Wiyanto, “Pemodelan Sistem Informasi Geografis untuk Pemetaan Kesesuaian Wilayah

DOI: 10.17148/IJARCCE.2023.121021

Perairan dan Pesisir Selat Madura," *Rekayasa*, vol. 14, no. 1, pp. 17–25, 2021, doi: 10.21107/rekayasa.v14i1.9987.

[6] N. R. F. Ramadhani, E. Prasetyaningrum, and L. Bachtiar, "Sistem Informasi Geografis Apotek di Kotawaringin Timur Berbasis Web," *Build. Informatics, Technol. Sci.*, vol. 2, no. 2, pp. 141–150, 2020, doi: 10.47065/bits.v2i2.549.

[7] A. Septian *et al.*, "Identifikasi Zona Potensi Banjir Berbasis Sistem Informasi Geografis Menggunakan Metode Overlay dengan Scoring di Kabupaten Agam, Sumatera Barat," *J. Geosains dan Remote Sens.*, vol. 1, no. 1, pp. 11–22, 2020, doi: 10.23960/jgrs.2020.v1i1.25.

[8] M. B. Alghifarry, M. Wahdini, Oktaviana, and A. I. Anestatia, "Identifikasi Potensi Mineral Tambang di Daerah Tanggamus Menggunakan Citra Landsat 8," *J. Geosains dan Remote Sens.*, vol. 1, no. 2, pp. 97–104, 2020, doi: 10.23960/jgrs.2020.v1i2.46.

[9] A. A. Mutezar and Umniy Salamah, "Pengembangan Sistem Manajemen Event Pameran Karya Mahasiswa Menggunakan Metode Extreme Programming," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 5, no. 4, pp. 809–819, 2021, doi: 10.29207/resti.v5i4.3249.

[10] G. Gurung, R. Shah, and D. P. Jaiswal, "Software Development Life Cycle Models-A Comparative Study," *Int. J. Sci. Res. Comput. Sci. Eng. Inf. Technol.*, vol. 3307, pp. 30–37, 2020, doi: 10.32628/cseit206410.

[11] O. J. Okesola, A. A. Adebiyi, A. A. Owoade, O. Adeaga, O. Adeyemi, and I. Odun-Ayo, *Software Requirement in Iterative SDLC Model*, vol. 1224 AISC. Springer International Publishing, 2020. doi: 10.1007/978-3-030-51965-0_2.

[12] R. Sistem and L. L. Application, "JURNAL RESTI Implementation of System Development Life Cycle (SDLC) on IoT-Based," vol. 5, no. 158, pp. 982–987, 2023.

[13] Y. Syahrul, "Penerapan Design Thinking Pada Media Komunikasi Visual Pengenalan Kehidupan Kampus Bagi Mahasiswa Baru Stmik Palcomtech Dan Politeknik Palcomtech," *J. Bhs. Rupa*, vol. 2, no. 2, pp. 109–117, 2019, doi: 10.31598/bahasarupa.v2i2.342.

[14] S. N. Suhariyanti, Sabrina Aulia Rahmah, "Jurnal Kependidikan : Pemanfaatan Aplikasi WPS dalam Meningkatkan Minat Belajar Siswa pada Materi Dongeng Bermuatan Bahasa Inggris di Era New Normal Suhariyanti *, Sabrina Aulia Rahmah , Sarah Nasution Universitas Dharmawangsa * Corresponding Author . Ema," *J. Kependidikan J. Has. Penelit. dan Kaji. Kepustakaan di Bid. Pendidikan, Pengajaran dan Pembelajaran*, vol. 7, no. 1, pp. 176–184, 2021.

[15] A. C. Hutauruk and A. F. Pakpahan, "Perancangan Sistem Informasi Organisasi Kemahasiswaan Berbasis Web pada Universitas Advent Indonesia Menggunakan Metode Agile Development (Studi Kasus: Universitas Advent Indonesia)," *CogITo Smart J.*, vol. 7, no. 2, pp. 315–328, 2021, doi: 10.31154/cogito.v7i2.328.315-328.

[16] R. D. Kusumaratri and P.- Purwanto, "Perancangan Sistem Informasi Akuntansi Piutang Pada Cv Menang Sentosa," *Sistemasi*, vol. 9, no. 2, p. 246, 2020, doi: 10.32520/stmsi.v9i2.712.

[17] H. Jalma, R. E. Putera, and K. Kusdarini, "E-Government dengan Pemanfaatan Web OpenSID dalam Pelayanan Publik di Nagari Tanjung Haro Sikabu-kabu Padang Panjang," *Publik (Jurnal Ilmu Adm.*, vol. 8, no. 1, p. 24, 2019, doi: 10.31314/pjia.8.1.24-37.2019.

[18] D. Hidayat, L. K. Gustini, and M. P. Dias, "Digital Media Relations Pendekatan Public Relations dalam Menyosialisasikan Social Distancing di Kota Bandung," *J. Ilmu Komun.*, vol. 18, no. 3, p. 257, 2020, doi: 10.31315/jik.v18i3.3575.

[19] A. B. Rosidin and A. Hamid, "Media Online Dan Kerja Digital Public Relations Politik Pemerintah Dki Jakarta," *WACANA J. Ilm. Ilmu Komun.*, vol. 19, no. 2, pp. 164–174, 2020, doi: 10.32509/.v19i2.1046.

[20] M. Manuhutu and J. Wattimena, "Perancangan Sistem Informasi Konsultasi Akademik Berbasis Website," *J. Sist. Inf. Bisnis*, vol. 9, no. 2, p. 149, 2019, doi: 10.21456/vol9iss2pp149-156.

[21] W. Wahyudi and D. Sunarsi, "Manfaat penerapan manajemen pengetahuan bagi kinerja dosen di masa pandemi Covid-19," *JPPI (Jurnal Penelit. Pendidik. Indones.*, vol. 7, no. 2, pp. 285–291, 2021, doi: 10.29210/020211155.

[22] A. M. Marpaung, "Tinjauan manfaat bunga telang (clitoria ternatea l.) bagi kesehatan manusia," *J. Funct. Food Nutraceutical*, vol. 1, no. 2, pp. 63–85, 2020, doi: 10.33555/jffn.v1i2.30.

[23] R. Giawa, A. R. Harefa, and T. Waruwu, "Pengembangan Modul Pembelajaran Berbasis Discovery Learning Pada Materi Perubahan Lingkungan," *Educ. J. Pendidik.*, vol. 1, no. 2, pp. 411–422, 2022, doi: 10.56248/educativo.v1i2.59.

[24] H. D. Lestari and D. P. Parmiti, "Pengembangan E-Modul IPA Bermuatan Tes Online untuk Meningkatkan Hasil Belajar," *J. Educ. Technol.*, vol. 4, no. 1, pp. 73–79, 2020.

[25] F. Darwati, Lilis, "Analisis Pengukuran Tingkat Kepuasan Pengguna Aplikasi OVO Menggunakan Metode End User Computing Satisfaction (EUCS)," *JUST IT J. Sist. Informasi, Teknol. Inf. dan Komput.*, vol. 12, no. 2, pp. 34–42, 2022.

[26] E. H. Orsi, "Implementasi Cloud Storage (Studi Kasus SMK Negeri Mojosongo)," *Emit. J. Tek. Elektro*, vol. 19, no. 1, pp. 22–28, 2019, doi: 10.23917/emitor.v19i1.7584.

[27] Y. W. Sejati and B. Handaga, "Digitalisasi sistem jimpitan Dukuh Ngluar Desa Tepisari," *J. Inov. Teknol. Pendidik.*, vol. 8, no. 2, pp. 185–198, 2021, doi: 10.21831/jitp.v8i2.40457.

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed journal / Refereed journal ⁜ Vol. 12, Issue 10, October 2023

DOI: 10.17148/IJARCCE.2023.121021

[28] A. Mailangkay and K. Sinaga, "Penerapan Metode User Centered Design (Ucd) Pada Ui/Ux Aplikasi Mobile Komik," *J. Darma Agung*, vol. 31, no. 1, p. 952, 2023, doi: 10.46930/ojsuda.v31i1.3089.

[29] A. H. Sumitro and M. Taufiq, "Manajemen Praktek Kerja Lapangan Menggunakan Metode RAD dan Pengujian SUS pada Instansi SMK dan CV," *Res. Comput. Inf. Syst. Technol. Manag.*, vol. 2, no. 2, p. 51, 2019, doi: 10.25273/research.v2i02.5172.

[30] U. Ependi, T. B. Kurniawan, and F. Panjaitan, "System Usability Scale Vs Heuristic Evaluation: a Review," *Simetris J. Tek. Mesin, Elektro dan Ilmu Komput.*, vol. 10, no. 1, pp. 65–74, 2019, doi: 10.24176/simet.v10i1.2725.

[31] F. S. Handayani and A. Adelin, "Interpretasi Pengujian Usabilitas Wibatara Menggunakan System Usability Scale," *Techno.Com*, vol. 18, no. 4, pp. 340–347, 2019, doi: 10.33633/tc.v18i4.2882.

[32] M. Yusuf and Y. Astuti, "System Usability Scale (SUS) Untuk Pengujian Usability Pada Pijar Career Center," *Komputika J. Sist. Komput.*, vol. 9, no. 2, pp. 131–138, 2020, doi: 10.34010/komputika.v9i2.2873.

[33] Y. Yusmaida, N. Neneng, and A. Ambarwari, "Sistem Informasi Pencarian Kos Berbasis Web Dengan Menggunakan Metode Hill Climbing," *J. Teknol. dan Sist. Inf.*, vol. 1, no. 1, pp. 68–74, 2020, doi: 10.33365/jtsi.v1i1.212.

[34] D. W. Ramadhan, "PENGUJIAN USABILITY WEBSITE TIME EXCELINDO MENGGUNAKAN SYSTEM USABILITY SCALE (SUS) (sTUDI KASUS: WEBSITE TIME EXCELINDO)," *JIPI (Jurnal Ilm. Penelit. dan Pembelajaran Inform.*, vol. 4, no. 2, p. 139, 2019, doi: 10.29100/jipi.v4i2.977.