e-ISSN: 2614-8404
p-ISSN:2776-3234

Bayah Dome Geopark Information System Based On Website Using Prototype Method

Dentik Karyaningsih[1*)], Donny Fernando[2] , Reza Pramudita[3], Fauzan Wahyu Ramadhan [4]
[1,3,4]Informatics Engineering Study Program, Faculty of Information Technology, Serang Raya University
[2]Information Systems Study Program, Faculty of Information Technology, Serang Raya University
Email: [1]karya.tiek@gmail.com , [2]mr.donny2008@gmail.com , [3]hanyqueen14@gmail.com,
[4]fauzanwahyu785@gmail.com

Abstract – To realize a national Geopark and a World Geopark, it is necessary to socialize and disseminate information that can be accessed by the people of Lebak Regency in particular and the wider community in general to introduce all the geological heritage that has been determined by the Minister of Energy and Mineral Resources. Nowadays, digital information system technology has become an undeniable need, and has even become a source of information that can be accessed by all people in the world. The Bayah Dome Geopark management body in Lebak Regency does not yet have a website-based information system, so it is necessary to create a website-based Bayah Dome Geopark information system so that the Bayah Dome Geopark is known nationally and internationally. This research uses a Research and Development approach. Research procedures include: (a) analysis, (b) design, (c) implementation and (d) evaluation. Stage (a) analysis consists of two steps, namely literature study and field survey. The literature study examines concepts and theories relating to Geoparks and the Bayah Dome Geopark, while a field survey was carried out to collect data relating to the Bayah Dome Geopark. Stage (b) design is carried out by designing a website with UML (Unified Modeling Language) which is a program design based on the results obtained in the analysis stage which includes: use case diagrams, activity diagrams using the prototype system development method. In stage (c) implementation, the results of the design are outlined and implemented into a website.

Keywords – Information Systems, Bayah Dome Geopark, Website, Prototype

I. INTRODUCTION

Based on Presidential Regulation Number 9 of 2019 concerning the Development of a Geopark, it is a single or combined geographical area that has geological heritage sites (Geosites) and valuable natural landscapes, related to aspects of Geological Heritage, Geological Diversity, Biodiversity and Cultural Diversity, then every region throughout Indonesia that has geological heritage and natural landscapes along with other diversity must be designated as a Geopark. Geoparks which have aspects in the field of education as knowledge in the field of earth sciences regarding the uniqueness and diversity of earth heritage and economic aspects of the role of society in managing the area as geotourism.(Darsiharjo et al., 2016)Geoparks are managed for conventional purposes, education and sustainable community economic development with active involvement from the community and local government, so that they can be used to foster community understanding and concern for the earth and its surrounding environment. A Geopark is a single or combined geographic area, which has Geological Heritage Sites (Geosites) and valuable natural landscapes, related to aspects of Geological Heritage (Geoheritage), Geological Diversity (Geodiversity), Biodiversity (Biodiversity) and Cultural Diversity (Cultural Diversity), and managed for conventional purposes, education and sustainable community economic development with active involvement from the community and regional government,(Haryanto & Pirgana, 2021)

Lebak Regency has a lot of geological heritage as well as biodiversity and culture which has the potential to be developed into a national or even international class Geopark. Geoparks are a tool for sustainable development for people's welfare, which combines three diversities, namely geological, biological and cultural diversity so that with the Minister of Energy and Mineral Resources Regulation Number 1 of 2020 concerning Guidelines for Determining Geological Heritage (Geoheritage), Lebak Regency, Banten Province has Geological Heritage (Geoheritage) that meets the criteria to be protected, preserved and utilized as an object of research, earth education and geotourism.

The Bayah Dome Geopark is still an aspiring Geopark towards becoming a national Geopark. It is necessary to introduce the Bayah Dome Geopark to the wider community with information system technology. Bayah Dome Geopark is geotourism so the information system technology currently developing is expected to help disseminate information and promote geotourism widely both nationally and internationally. Not many people around and the wider community are familiar with the Bayah Dome Geopark, therefore there is a need for outreach or disseminating information to the community by utilizing an information system that can be accessed anywhere and at any time. The natural landscape of the Bayah area consists of hills and valleys, very interesting and unique. The whole thing forms an area known as the dome and is called the Bayah Dome. Three large rivers flow in this dome area, namely Ci Bareno on the east wing. Ci Madur is in the middle, and Ci Peucangceuri is in the western part of the dome. From the center to the south coast, this dome stretches the karst area.(Permadi, 2015)Therefore, it is necessary to build a Website-based Bayah Dome Geopark information system that can be accessed online. Currently, technology is widely used as a means of promotion and information, especially in the field of websites which are currently an information medium that offers various conveniences in presenting information. Speed and convenience are positive values of the internet.

e-ISSN: 2614-8404
p-ISSN:2776-3234

Websites are more easily accessed by people in various regions just by using the internet.(Ismai, 2018)Geotourism destinations should be equipped with a clear and easy to understand information system. With a good information system, for example about the history of the formation of geological formations, it is hoped that tourists will understand the natural processes that occur. With information, people are also expected to be aware not to damage the beauty of the environment around geotourism.(Hermawan, 2018)The Bayah Dome Geopark management body in Lebak Regency does not yet have a website-based information system, so it is necessary to create a website-based information system for the Bayah Dome Geopark so that the Bayah Dome Geopark is known nationally and internationally.

This is also supported by the Strategic Plan and Research Master Plan of Serang Raya University which carries the theme "Development of Science and Technology, Economy and Culture of a Competitive Nation towards a Smart City" that the industrial era 4.0 encourages the use of the Internet of Things (IoT), the use of big data (big data), and quality engineering. It is hoped that Lebak Regency will become a smart city area in particular and the Banten Province region in general.

II. RESEARCH METHODOLOGY

This research uses a research and development (R&D) approach. Software development in the form of an Online Website Based Information System through an engineering approach with stages of analysis, design, implementation and evaluation. The following are the research stages:

Fig 1. Research stages

The analysis stage is the first step in development, this stage consists of two steps, namely literature study, interviews and observations at the Bayah Dome Geopark Management Agency, Lebak Banten Regency. The literature study examines concepts and theories relating to the Information System and the Bayah Dome Geopark, while a field survey was carried out to collect data relating to the Bayah Dome Geopark data as well as information from the Bayah Dome Geopark Management Agency which is the object of the Information System.

The design stage is carried out with a program design based on the results obtained in the analysis stage, program design using UML (Unified Modeling Language). UML is a modeling language for systems or software with an 'object oriented' paradigm. Consists of: Class Diagram, Object Diagram, Use case diagram, Sequence diagram, Collaboration diagram, Statechart diagram, Activity diagram, Component diagram and Deployment diagram.(Wati & Kusumo, 2016)The program design in this research is based on the results obtained in the analysis stage which include: use case diagrams, activity diagrams, class diagrams. This website-based information system was built using the PHP, Javascript, CSS programming languages. Laravel Bootstrap Framework and MySQL database.

The system development method used in this research is the Prototype method. The Prototype method is a software development method, which is in the form of a physical model of the system's work and functions as an initial version of the system.(GILANG RAMDHANI PUTRA, 2020)The prototyping model focuses on presenting the aspects of the software that will be visible to the user. The stages of this prototyping development model are depicted in Figure 3 below.

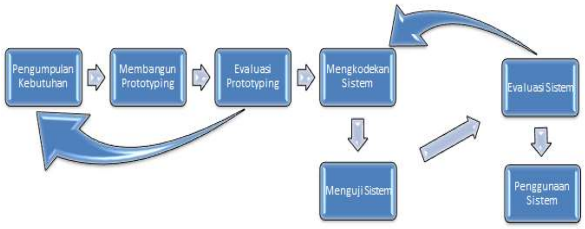


Fig 2. Prototyping Development Model

In the implementation stage, the results of the design are expressed through a program, while the material components are implemented with content in the Bayah Dome Geopark Information System. then the system testing stage uses the System Usability Scale (SUS). Usability testing can be carried out on small or large software and on multiplatforms such as web-based, desktop or mobile. The focus of usability testing is that users find it easy to use the software.(Sembodo et al., 2021)The results of the program evaluation are used as material to carry out revisions both in terms of design and implementation.

III. RESULTS AND DISCUSSION

The results of this research include:

A. System Design

1. Use Case Diagrams

Use case diagram is a model to describe the relationships that occur between actors and activities contained in the system. A use case is a modeling of the behavior of the information system that will be created. A use case describes an interaction between one or more actors and the information system to be created.(Rahma et al., 2019)The use case diagram for this application can be seen in the following image.

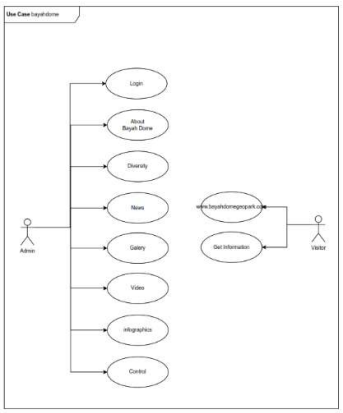


Fig 3. Use Case Diagram

e-ISSN: 2614-8404
p-ISSN:2776-3234

In the application Use Case Diagram there are 2 actors, namely admin and visitor. Visitors have the role of receiving information from the website www.geoparkbayahdome.com. Meanwhile, the admin is the one who manages the entire contents of the website.

2. Activity Diagram

a. Visitor Activity Diagram

*User activity diagrams*is a diagram that describes the work flow or visitor activities of a system. From the use case in Figure 4, the Visitor Activity Diagram will be explained, including:

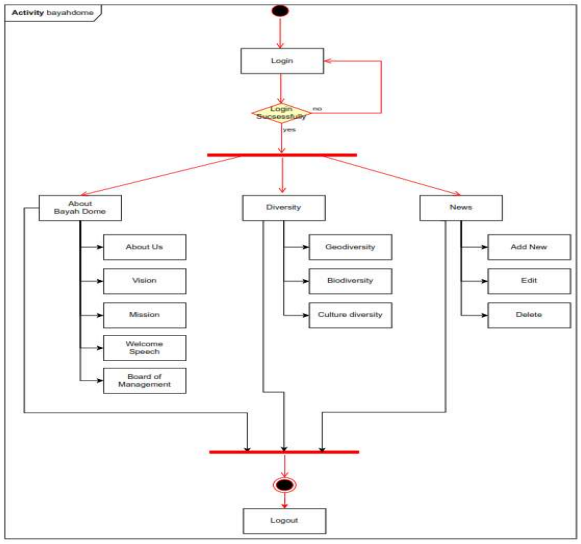


Fig 4. *Visitor Activity Diagram*

*Activity diagram*above is user activity using the Bayah Dome Geopark Information System. The system will display all information about the Bayah Dome Geopark including news, Geodiversity, Cultural Diversity, Biodiversity, Management Agency, photos and videos, and others.

b. Activity Diagram admin

Activity Diagrams describes the various activity flows in a system that is being designed.(Kirana & Wahdaniyah, 2018)An admin activity diagram is a diagram that describes the work flow or admin activities of a system. From the use case in Figure 5, the admin Activity Diagram will be explained, including:

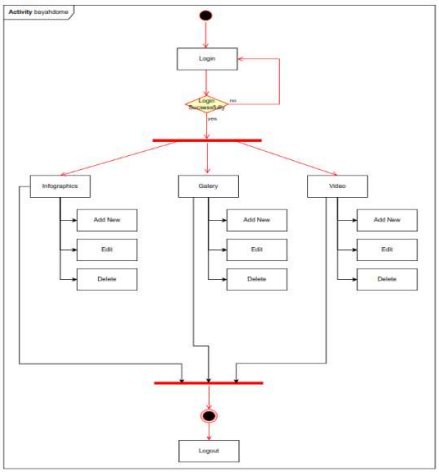


Fig 5. Activity Diagram admin

The activity diagram above is admin activity in managing the Bayah Dome Geopark Information System. Admin manages all contents of the Information System about the Bayah Dome Geopark including news, Geodiversity, Cultural Diversity, Biodiversity, Management Agency, photos and videos, and others by adding, editing and deleting.

c. Class Diagrams

The next system design plan is a class diagram. A class diagram is a diagram used to describe the objects in the system and the relationships between these objects. Apart from that, class diagrams function as descriptions of the types of objects that exist in the system and the various types of static relationships that occur.(Karyaningsih & Siswanto, 2020)The following is a class diagram design for the application being built. The class diagram contains 14 classes including user, setting, about, vision and mission, opening remarks, board, slides, geodiversity, cultural diversity, biodiversity, infographics, news, gallery and video.

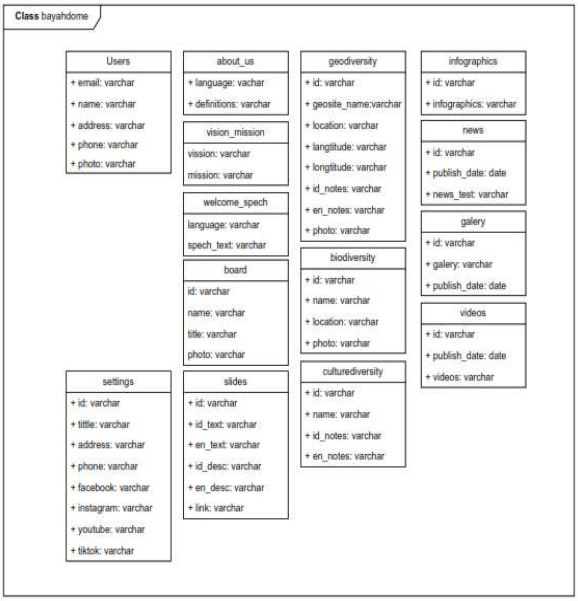
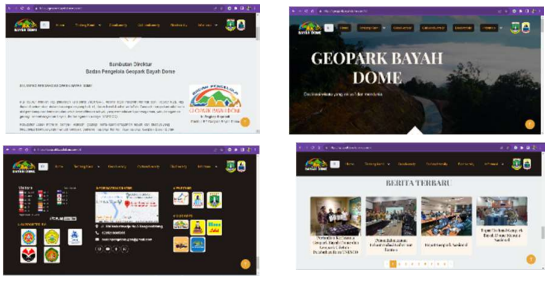


Fig 6. Class Diagram

B. Bayah Dome Geopark Information System Website

1. Main page

Website main pageis the page that first appears when opened in a web browser by opening www.geoparkbayahdome.comn amely displaying menu information on the website as well as displaying remarks from the Director of the Bayah Dome Geopark Management Agency, news, as well as infographics on website visits, sponsorships and connected applications.



e-ISSN: 2614-8404
p-ISSN:2776-3234

Fig 7. Main page

2. Menu About Us

This menu is a menu page to explain about the Geopark and the Bayah Dome Geopark Management Agency, including about the geopark, management and vision and mission. By pressing/clicking the About Us menu section.

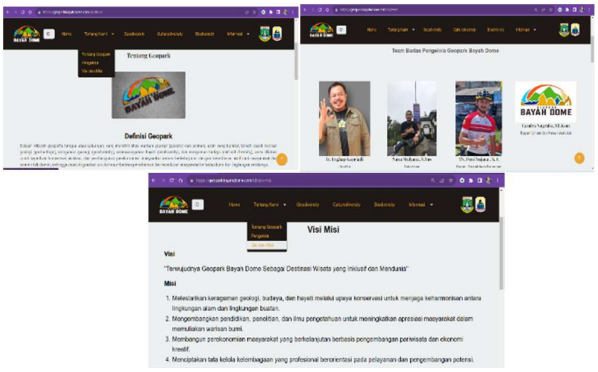


Fig 8. Menu About Us

3. Geodiversity Menu

This page is a menu page that displays Geodiversity information contained in the Bayah Dome Geopark. Complete with maps and Geosite information for 32 Geosites.

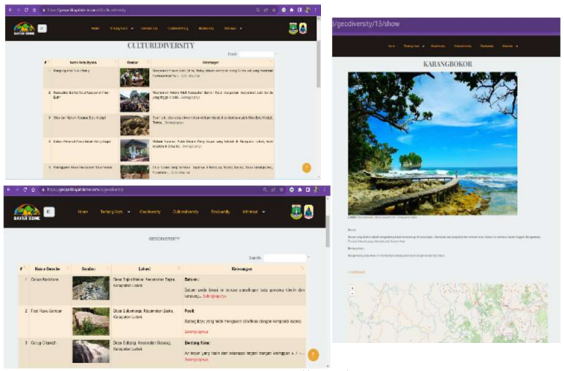


Fig 9. Geodiversity menu

4. Cultural Diversity Menu

This page is a menu page that displays information on Cultural Diversity found in the Bayah Dome Geopark.

Fig 10. Cultural Diversity Menu

5. Biodiversity Menu

This page is a menu page that displays Biodiversity information contained in the Bayah Dome Geopark.

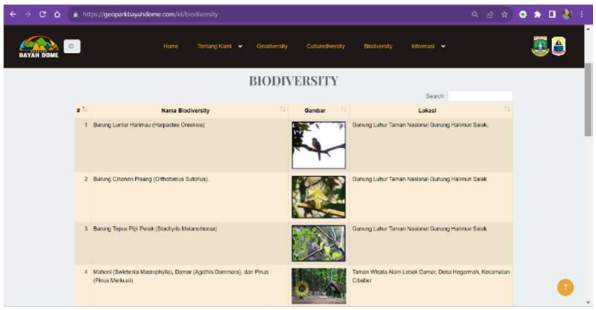


Fig 11. Biodiversity menu

6. Information Menu

The Information Menu is a page that displays information from the Bayah Dome Geopark Management Agency including news, infographics, videos and photo galleries.

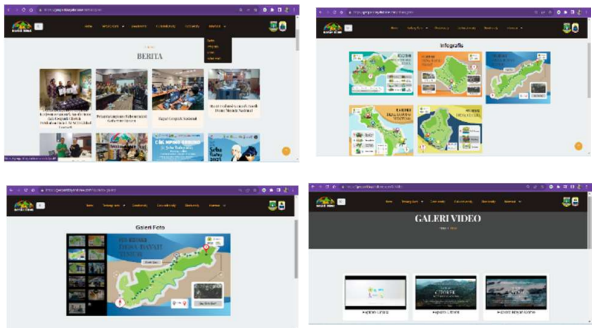


Fig 12. Information menu

7. Admin Page

The page on the admin website is for managing all contents of the Bayah Dome Geopark Information System website which is website-based with website pages www.geoparkbayahdome.com. By logging in admin via the login option with an account/email that is registered as admin/manager.

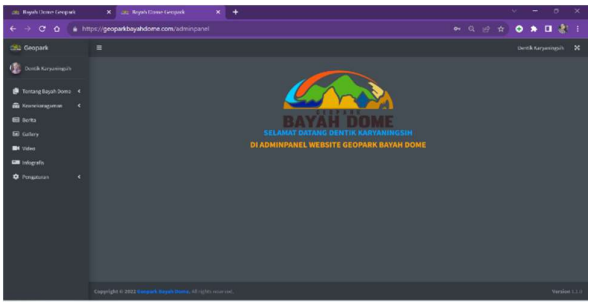


Fig 13. Website-based admin page

C. System Testing

Testing on the Geopark Bayah Dome Information System website at www.geoparkbayahdome.com uses the System Usability Scale (SUS) testing system. The System Usability Scale (SUS) is a questionnaire that can be used to measure the usability of a computer system according to the user's subjective point of view, consisting of 10 question items. This test was carried out on correspondents with various work and educational backgrounds.

The following are questions from the System Usability Scale (SUS) system testing:

e-ISSN: 2614-8404
p-ISSN:2776-3234

Table 1. SUS Questions

NO	Question
1	I think I will use this system again.
2	I find this system complicated to use.
3	I find this system easy to use.
4	I need help from other people or technicians in using this system.
5	I feel that the system features work as they should.
6	I feel there are many things that are inconsistent (not harmonious in this system).
7	I feel like others will figure out 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 need to get used to it first before using this system.

In its assessment, this test uses the following assessment scale:

Table 2. Rating scale

Mark	Scoring scale
1	**STS**: Strongly Disagree
2	**T.S**: Don't agree
3	**RG**: Doubtful
4	**ST**: Agree
5	**SS**: Strongly agree

The following is the System Usability Scale (SUS) test which was carried out online via Google form for 33 respondents.

Table 3. User Assessment Results

No	Name	Question									
		1	2	3	4	5	6	7	8	9	10
1	A	3	2	4	2	4	2	4	2	4	2
2	B	3	3	3	3	3	3	3	3	3	2
3	C	2	1	4	4	4	1	4	3	4	4
4	D	4	3	3	3	2	4	4	3	3	5
5	E	4	2	4	3	4	2	4	2	4	3
6	F	4	2	5	1	4	1	5	1	5	2
7	G	3	3	3	3	3	4	3	3	3	3
8	H	4	2	4	2	5	2	4	2	4	2
9	I	4	4	5	4	4	4	4	4	5	5
10	J	4	1	5	4	5	1	4	3	3	4
11	K	5	1	5	1	5	1	5	1	5	1
12	L	5	5	1	5	5	5	5	5	5	5
13	m	4	1	5	2	5	1	5	1	5	1
14	N	5	2	5	2	5	2	4	2	4	4
15	O	3	4	3	3	3	3	3	3	3	3
16	P	4	2	4	2	4	1	5	1	4	2
17	Q	4	4	5	5	4	4	5	4	4	4
18	R	4	1	4	1	4	2	4	1	4	2
19	S	5	1	5	1	5	1	5	1	5	1
20	Q	4	1	4	1	4	1	4	1	4	4
21	U	1	2	1	2	1	3	1	2	1	3
22	V	4	2	4	4	4	1	4	2	4	4
23	W	5	5	5	5	5	5	4	4	5	1
24	X	4	2	4	1	3	3	4	2	4	3
25	Y	4	2	4	4	4	3	4	2	3	3
26	Z	5	1	5	1	1	5	5	5	5	5
27	A A	1	3	3	3	3	3	3	4	3	4
28	Ab	4	1	4	1	4	1	4	1	4	1
29	AC	4	3	3	5	4	3	4	3	4	4
30	Ad	4	3	3	5	3	3	5	4	1	4
31	Ae	5	1	5	3	5	1	5	1	5	3
32	Af	1	4	1	3	3	1	2	3	2	2
33	Ag	4	2	4	1	5	2	4	1	5	5

From the assessment results, calculations are carried out based on the System Usability Scale (SUS) test. Following are the calculation results:

Table 4. SUS calculation.

Calculated Score Results (Data C example)										Amount	Mark
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		(Amount x 2.5)
2	3	3	3	3	3	3	3	3	3	29	73
2	2	2	2	2	2	2	2	2	3	21	53
1	4	3	1	3	4	3	2	3	1	25	63
3	2	2	2	1	1	3	2	2	0	18	45
3	3	3	2	3	3	3	3	3	2	28	70
3	3	4	4	3	4	4	4	4	3	36	90
2	2	2	2	2	1	2	2	2	2	19	48
3	3	3	3	4	3	3	3	3	3	31	78
3	1	4	1	3	1	3	1	4	0	21	53
3	4	4	1	4	4	3	2	2	1	28	70
4	4	4	4	4	4	4	4	4	4	40	100
4	0	0	0	4	0	4	0	4	0	16	40
3	4	4	3	4	4	4	4	4	4	38	95
4	3	4	3	4	3	3	3	3	1	31	78
2	1	2	2	2	2	2	2	2	2	19	48
3	3	3	3	3	4	4	4	3	3	33	83
3	1	4	0	3	1	4	1	3	1	21	53
3	4	3	4	3	3	3	4	3	3	33	83
4	4	4	4	4	4	4	4	4	4	40	100
3	4	3	4	3	4	3	4	3	1	32	80
0	3	0	3	0	2	0	3	0	2	13	33
3	3	3	1	3	4	3	3	3	1	27	68
4	0	4	0	4	0	3	1	4	4	24	60
3	3	3	4	2	2	3	3	3	2	28	70
3	3	3	1	3	2	3	3	2	2	25	63
4	4	4	4	0	0	4	0	4	0	24	60
0	2	2	2	2	2	2	1	2	1	16	40
3	4	3	4	3	4	3	4	3	4	35	88
3	2	2	0	3	2	3	2	3	1	21	53
3	2	2	0	2	2	4	1	0	1	17	43
4	4	4	2	4	4	4	4	4	2	36	90
0	1	0	2	2	4	1	2	1	3	16	40
3	3	3	4	4	3	3	4	4	0	31	78
Average Score (Final Result)											**70**

Following are the Scores for SUS testing:

Table 5. SUS Assessment Range

No	Value Range	Mark	Information
1	>81	A	Excellent
2	68-81	B	Good
3	68	C	OK/Fair
4	51-67	D	Poor
5	<51	E	Worst

e-ISSN: 2614-8404
p-ISSN:2776-3234

System Usability Scale (SUS) testing in the study with a average score of 70 fell into the 68-81 category with a score of B Good.

IV. CONCLUSION

Based on the results of research conducted regarding the Website-Based Bayah Dome Geopark Information System Using the Prototype Method, it can be concluded that this research produces a website-based information system with a prototype method that can be used, and in testing the System Usability Scale (SUS in the research with an average score 70 falls into the 68-81 value range category with a B Good value meaning the system is well used by the user.

V. ACKNOWLEDGEMENT

I would like to thank Serang Raya University for funding this research using an Internal Grant scheme with contract number: 009/HIBAHINTERNAL/UNSERA/I/2023 On 26 Januari 2023, and I would also like to thank the Bayah Dome Geopark Management Agency, Lebak Regency, which supported this research until it was completed.

REFERENCES

[1] Darsiharjo, Supriatna, U., & Saputra, I. M. (2016). Pengembangan Geopark Ciletuh Berbasis. *Jurnal Manajemen Resort Dan Leisure*, *13*(1), 55–60. File:///C:/Users/User/Appdata/Local/Temp/2036-3625-1-Sm.Pdf

[2] Gilang Ramdhani Putra. (2020). *Rancang Bangun Sistem Informasi Geografis Untuk Pemetaan Lokasi Wisata Alam Dengan Menggunakan Metode Prototyping Berbasis Mobile (Studi Kasus: Pulau Lombok) Rancang Bangun Sistem Informasi Geografis Untuk Pemetaan Lokasi Wisata Alam Dengan Menggunakan Me* [Universitas Mataram]. Http://Begawe.Unram.Ac.Id/Index.Php/Ta/Article/View/282

[3] Haryanto, D., & Pirgana, W. (2021). Pengembangan User Interface Pada Website Geopark Belitong. *Jurnal Ilmiah Informatika Global*, *12*(1), 53–58.

[4] Hermawan, H. (2018). *Geowisata Sebagai Model Pemanfaatan*.

[5] Ismai. (2018). Perancangan Website Sebagai Media Promosi Dan Informasi. *Journal Of Informatic Pelita Nusantara*, *3*(1), 82–86.

[6] Karyaningsih, D., & Siswanto, P. (2020). Rancang Bangun E-Learning Pronounciation Bahasa Inggris STKIP Setiabudhi Rangkasbitung Berbasis Web. *Jurnal Sisfokom (Sistem Informasi Dan Komputer)*, *9*(2), 236–241. https://doi.org/10.32736/sisfokom.v9i2.907

[7] Kirana, C., & Wahdaniyah, R. (2018). Implementasi Aplikasi Alumni Berbasis Mobile Application. *Jurnal Edukasi Dan Penelitian Informatika (JEPIN)*, *4*(2), 179. https://doi.org/10.26418/jp.v4i2.25752

[8] Permadi, R. (2015). Merintis Geowisata di Gunungsewu. *Geomagz, Vol.5 No.1*, *5*(1), 32–33.

[9] Rahma, P., Nasir, M., & Putra, A. (2019). Implementasi Metode Weighted Product dalam Sistem Pendukung Keputusan Kelayakan Pemberian Tunjangan Profesi Guru Lanjutan pada Dinas Pendidikan Kabupaten Ogan Komering Ilir (OKI) Bina Darma Conference on Computer Science 2019. *Fakultas Ilmu Komputer Universitas Bina Darma*, 263–269.

[10] Sembodo, F. G., Fitriana, G. F., & Prasetyo, N. A. (2021). Evaluasi Usability Website Shopee Menggunakan System Usability Scale (SUS). *Journal of Applied Informatics and Computing*, *5*(2), 146–150. https://doi.org/10.30871/jaic.v5i2.3293