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DIGITALIZATION OF MENGKARANG GEOPARK MINIATURE UNIVERSITAS JAMBI AS AN EFFORT TO SUPPORT THE SUMMER COURSE PROGRAM

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Abstrak: Perkembangan ilmu pengetahuan di era Revolusi Industri 4.0 dan Society 5.0 merupakan fenomena yang serba digital, termasuk ilmu kebumian. Konsep ini menggunakan ilmu pengetahuan berbasis kecerdasan buatan untuk kebutuhan pendidikan yang serba cepat dan nyaman. Kaitannya dengan bidang pendidikan ilmu kebumian adalah studi tentang fenomena bentang alam dan singkapan batuan sebagai hasil dari proses alamiah. Situasi Universitas Jambi yang jauh dari keberadaan singkapan batuan sebagai objek pembelajaran memberikan tantangan besar untuk dapat mengidentifikasi batuan yang ada dengan cepat. Keberadaan miniatur Geopark Mengkarang di Universitas Jambi dapat menjadi solusi yang efektif dalam pembelajaran di bidang kebumian. Sehingga, melalui digitalisasi dapat menjadi alternatif yang diminati dalam media pembelajaran, khususnya untuk kegiatan *short summer course* yang berkaitan dengan geopark. Upaya digitalisasi ini merupakan bagian dari kegiatan pengabdian dan peran serta civitas akademika Universitas Jambi dalam melakukan inovasi pembelajaran. Dalam pelaksanaan kegiatan pengabdian ini pengumpulan data dilakukan dengan mendeskripsikan 28 sampel batuan dari Kawasan UNESCO Global Geopark Merangin Jambi. Digitalisasi meliputi pembuatan label informasi untuk setiap tampilan batuan yang dilengkapi dengan barcode untuk memudahkan akses. Akses ini bertujuan untuk memberikan informasi yang lebih detail mengenai proses pembentukan setiap batuan. Kegiatan pengabdian ini secara signifikan berkontribusi dalam mendukung kegiatan summer course di Fakultas Sains dan Teknologi, Universitas Jambi. Selain membantu kegiatan summer course, diharapkan melalui digitalisasi ini, Universitas Jambi dapat memainkan peran penting dalam mendukung situs yang telah diakui sebagai situs warisan dunia oleh UNESCO ini.

Kata Kunci: digitalisasi, geopark, *summer course*, Universitas Jambi

Abstract: The development of science in the era of Industrial Revolution 4.0 and Society 5.0 is an all-digital phenomenon, including earth science. This concept uses science-based artificial intelligence for fast-paced and comfortable educational needs. Its connection to the field of earth science education is the study of landscape phenomena and rock outcrops as a result of natural processes. The situation of Jambi University, which is far from the existence of rock outcrops as learning objects, presents a big challenge in identifying existing rocks quickly. The existence of the miniature Mengkarang Geopark at Jambi University can be an effective solution in learning in the field of the earth. Thus, digitization can be a desirable alternative in learning media, especially for short summer course activities related to geoparks. This digitalization effort is part of the service activities and the role of the Jambi University academic community in carrying out learning innovations. In implementing these service activities, data collection involved describing 28 rock samples from the UNESCO Global Geopark Merangin Jambi Territory. Digitization included creating information labels for each rock display, completed by a barcode for easy access. This access aims to provide detailed insights into the formation process of each rock. Such service activities significantly contribute to supporting summer course at the Faculty of Science and Technology, Jambi University. Beyond aiding summer course activities, the aspiration is that through this digitalization, Jambi University can play a pivotal role, acknowledged as a world heritage site by UNESCO

Keywords: digitalization, geopark, summer course, Jambi University

Introduction

Acclimatization of education and development of science in the era of Industrial Revolution 4.0 and Society 5.0 is a phenomenon that has shifted to digital, including the earth sector. Almost all activities related to the field of earth sciences use geological data and geological concepts that are integrated and sustainable, such as carrying out exploration activities, exploiting geological resources, and mitigating geological disasters requiring digital information in order to shorten the time needed to handle them. The diversity of rocks exposed on the surface is something related to the earth field and is the core of science and engineering in the earth field, such as geological resources like geothermal green energy (Utama et al., 2021; Prayoga, 2018; Utama, 2020; Mulyasari et al., 2019; Nusantara, 2019; Rahman, 2017). Natural landscape phenomena and rock outcrops are clear forms and can be seen in real terms in outcrop conditions in the field. The situation of the Jambi University campus, which is far from the existence of rock outcrops as learning objects, presents a big challenge in recognizing the existing rocks quickly. So, it requires learning media that are effective and efficient solutions and alternatives. It is hoped that digitalization of a concept can become an appropriate medium for learning, especially for short courses or summer lectures "*Summer Course".* This digitalization concept takes into account educational needs which aims to speed up the provision of information about earth or rock parks in Jambi Province, especially in the Merangin Jambi UNESCO Global Geopark Territory (Ningsih et al., 2023; Utama et al., 2023; Syaifullah & Utama, 2021).

The current curriculum emphasizes learning innovations that make it easier for everyone to carry out education through the Independent Campus Learning Curriculum "Merdeka Belajar Kampus Merdeka" (Zahra et al., 2023). The Faculty of Science and Technology, Jambi University, as the education organizing unit that oversees the Department of Earth Engineering, has implemented a learning innovation to fill the time gap between the even and odd semesters, namely short lectures or short summer courses known as summer courses.

Jambi Province currently has an international geopark, namely the Merangin Jambi UNESCO Global Geopark which has been recognized as a world heritage, which includes elements of geological diversity, biodiversity and cultural diversity. The aim of this service activity is that with the presence of this geopark miniature is the best location to carry out summer course activities which combine activities on campus and in the field, with campus activities at Jambi University, and fields in the Merangin Jambi UNESCO Global Geopark Territory. The connection with Jambi University's Mengkarang Geopark Miniature is that all the rock displays in the geopark miniature come from the Merangin Jambi UNESCO Global Geopark Territory. The rocks in this geopark miniature will represent the ages of the oldest to youngest rocks exposed in Jambi Province, even Sumatra Island (Hakim & Wibowo, 2023; Hutchison, 2014; Metcalfe, 2017; Said & Utama, 2021; Said & Utama, 2023; Crow et al., 2019; Ariani & Utama, 2022; Nabella et al., 2019).

Jambi University's commitment to learning innovation through community service activities in digitizing the Mengkarang Geopark Miniature of Jambi University. So, it is hoped that through this digitalization, summer course participants will get information and a general overview of the

existence of geological diversity in the Merangin Jambi UNESCO Global Geopark Territory with a miniature in the Mengkarang Geopark, Jambi University. Organizing short summer course activities is a form of higher education Tridharma activity and the role of Jambi University in the Independent Learning Curriculum, Independent Campus as a pioneer in providing leading higher education in Jambi and even in Indonesia (Sudarmiani, 2022). Based on the field of expertise possessed by Jambi University through the Department of Earth Engineering, the Faculty of Science and Technology is committed to carrying out summer course activities through digitalization efforts at the Mengkarang Geopark Miniature, it is hoped that this can help accelerate the implementation of programs that will be carried out through these activities.

Method

Activities to carry out community service with partners from the Faculty of Science and Technology, Jambi University in the form of digitalization activities at the Mengkarang Geopark Miniature, Jambi University are broadly divided into three stages. These stages include the first stage of taking rocks in the Merangin Jambi UNESCO Global Geopark Teeritory and the arrangement of rocks in the Mengkarang Geopark Miniature, Jambi University, which will be carried out in the 2022-2023 period, the second stage is the digitization of the Mengkarang Geopark Miniature which will be carried out in the 2023-2024 period, and the The final one is the implementation of short summer courses which will start in 2024 (Figure 1).

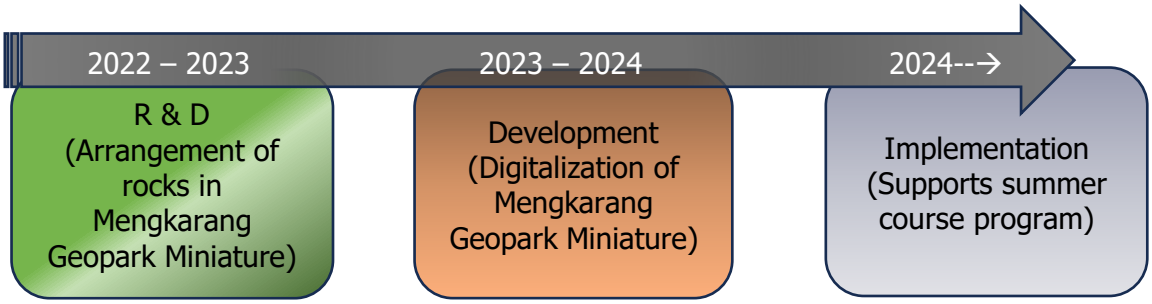

Figure 1. Roadmap from the initial stages, development to implementation of the use of Jambi University's Mengkarang Geopark Miniature as an innovation in learning

Efforts to digitize Jambi University's Mengkarang Geopark Miniature as part of service activities and the role of the Jambi University academic community in carrying out learning innovations. Thus, to support these activities, detailed stages are needed in developing the digitalization of Mengkarang Geopark Miniature which is generally included in the second stage (see Figure 1). The detailed implementation of the activities carried out is as follows (Figure 2):

1. **Observation** includes licensing activities and work contracts for implementing activities at the Faculty of Science and Technology, Jambi University, then followed by a location survey for implementing activities
2. **Problems Identification** includes collecting and describing existing problems from educational activities for implementing short summer courses. Then, detail and group the problems based on the priority of current learning needs the method used is to look directly at the evidences regarding the need for rock diversity as learning for students

3. **Problems Formulation** is the most important part of preparing activities which includes finding, assessing and formulating a problem with an emphasis on problem identification. Problem formulation process by analyzing student needs related to learning activities that require direct objects, in this case rocks. Thus, in order for this to be fulfilled, rock displays are needed that represent the four types of rock on earth. An important consideration in this activity is that each existing rock represents the age of the rock on a geological time scale, especially the oldest to youngest rocks in Jambi Province with Carbon – Quarter aged, in this case it can be represented by the Jambi Merangin Geopark.
4. **Implementation of Activities** include rocks megascopic description, compiling and retrieving documentation and explanations about the geopark, and digitizing of the geopark miniature.

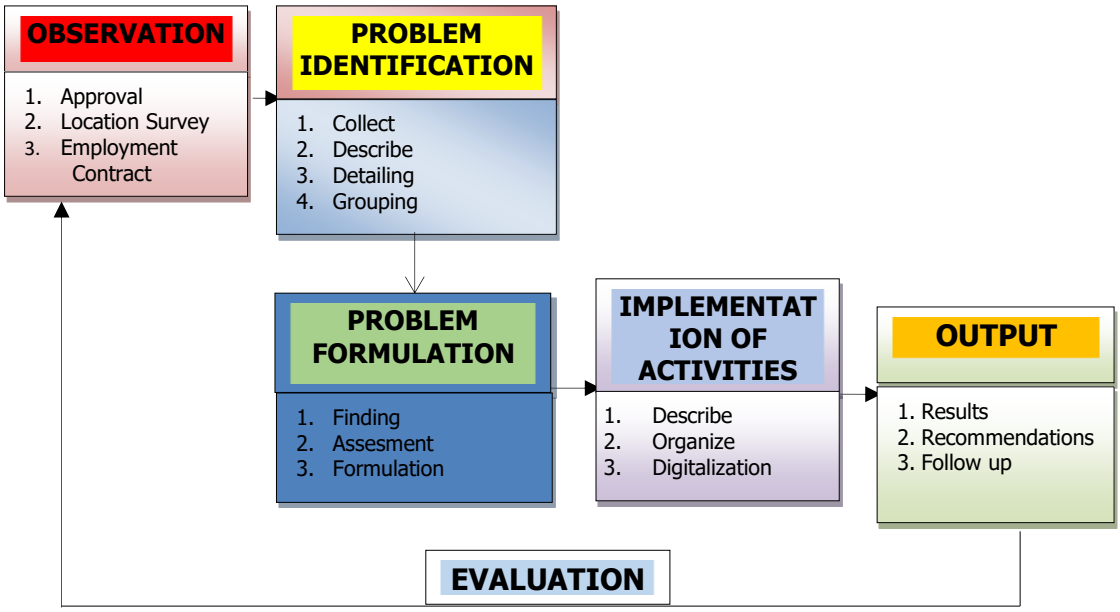

Figure 2. Concepts and flow in problem solving to obtain a result from carrying out activities

5. **Output** includes results, recommendations and follow-up. This activity creates a geological model with the historical sequence of rock formation in the Mengkarang Geopark Miniature, Faculty of Science and Technology. The most important thing about digitalization is the sustainability of the existence of the geopark, including the cleanliness of the geopark and the layout of the existing rocks. Barcodes are integrated with descriptions that have been created and stored in the drive. So everyone can access it by scanning a barcode, and there is no special application
6. **Evaluation** is the final stage of perfecting geopark miniature digitalization activities. This program includes socializing and introducing Mengkarang Geopark Miniature to the entire Jambi University academic community with the concept of digitalization. Submit the results of activities to the Faculty of Science and Technology, Jambi University and also to the Research and Community Service Institute, Jambi University as a form of implementation of the activities that have been carried out. The digitalization referred to in this community service activity is the labeling of rock names with rock information, the availability of barcode

searches to find details about rocks, and also videos of community service activities. Monitoring activities will be carried out after service activities, especially regarding the latest information and discoveries from rocks existing

Results and Discussion

In the implementation of service activities carried out at the Faculty of Science and Technology, Jambi University, data collection was carried out from the description of 28 samples of display rocks in Mengkarang Geopark Miniature (Table 1). The display rock samples in Mengkarang Geopark Miniature are arranged properly according to the age of the rocks, then the rock information will be placed on each display rock sample stand. The 28 demonstration rock samples represent at least the four existing rock types, including igneous rock, pyroclastic rock, sedimentary rock and metamorphic rock.

Table 1. Data on 28 rock samples in the Mengkarang Geopark Miniature, Jambi University

No.	Rocks Name	Rocks Sample Location	Value of Geosite Diversity
01	Silicified Schist	Merangin-Jambi UGGp	Local
02	Glaucophane Schist	Non Merangin-Jambi UGGp	Local
03	Fussulinacea Limestone	Non Merangin-Jambi UGGp	Local
04	Ignimbrite	Merangin-Jambi UGGp	Local
05	Araucarioxylon Wood Fossil	Merangin-Jambi UGGp	International
06	Pandan Fossil Sandstone	Merangin-Jambi UGGp	International
07	Leaf Fossil Tuffaceous Sandstone	Merangin-Jambi UGGp	International
08	Tuffaceous Conglomerate	Non Merangin-Jambi UGGp	Local
09	Conglomerate	Merangin-Jambi UGGp	Local
10	Granodiorite	Merangin-Jambi UGGp	Local
11	Gabbro	Merangin-Jambi UGGp	Local
12	Quartz Monzodiorite	Merangin-Jambi UGGp	Local
13	Conglomerate	Non Merangin-Jambi UGGp	Local
14	Schist Breccia	Non Merangin-Jambi UGGp	Local
15	Tuffaceous Phyllite	Merangin-Jambi UGGp	Local
16	Quartzite	Merangin-Jambi UGGp	Local
17	Marble	Merangin-Jambi UGGp	Local
18	Metagranodiorite-Gneiss	Merangin-Jambi UGGp	Local
19	Granite	Merangin-Jambi UGGp	Local
20	Feldspar Alkali Granite	Merangin-Jambi UGGp	Local
21	Volcanic Breccia	Merangin-Jambi UGGp	Local
22	Shale	Non Merangin-Jambi UGGp	Local
23	Claystone	Non Merangin-Jambi UGGp	Local
24	Granodiorite	Merangin-Jambi UGGp	Local
25	Sungkai Wood Fossil	Merangin-Jambi UGGp	Local
26	Basalt Lava	Merangin-Jambi UGGp	Local
27	Bomb Basalt	Merangin-Jambi UGGp	Local
28	Tuff	Merangin-Jambi UGGp	National Caldera Series

Explanation -) The sampling area in the Merangin-Jambi UNESCO Global Geopark Territory (Merangin-Jambi UGGp). Non-Merangin-Jambi UGGp means it is outside the UGGp Merangin-Jambi area but is still included in the administrative area of the Merangin Regency.

-) The Geosite Diversity Value refers to the results of the assessment by UNESCO, which are listed in the official Merangin Jambi Geopark document dossier

Jambi University's Mengkarang Geopark Miniature's digitization includes information in two languages: Indonesian and English Languange. Information available on rock labels such as rock name, rock type and rock formation, rock age on a geological time scale in eras and periods which are also equipped with rock age ranges, location of rock sampling, equipped with a bar code which can be reviewed via bar code provided on the information label (Figure 3).

Figure 3. One form of rock information label in the Mengkarang Geopark Miniature, Jambi University. To find out more detailed information about existing rocks, students or visitors can search for the barcodes available on the rock name labels using Android or iPhone. The results obtained are in the form of rock information including genesis or formation (Figure 4)

The digitalization of this geopark miniature certainly cannot be separated from its main objective as a learning innovation at the Faculty of Science and Technology, Jambi University and also as an effort to support the short summer course program. The digitalization of this geopark miniature will of course be directly felt by the academic community of Jambi University, because by studying the rocks in the Mengkarang Geopark Miniature, you can at least get a general idea of the oldest to youngest rocks in Jambi Province which are exposed in the UNESCO Global Geopark Merangin Jambi Territory.

The rock name labeling activity was carried out by the service team on each available rock with a total of 28 demonstration rock samples with existing rock information (see Table 1 and Figure 3). This activity is part of the community service activities carried out at Mengakrang Geopark Miniature (Figure 5). This rock name labeling activity is also accompanied by education for students or visitors who often use the Mengkarang Geopark Miniature for learning activities such as Earth Engineering students, Faculty of Science and Technology, Jambi University.

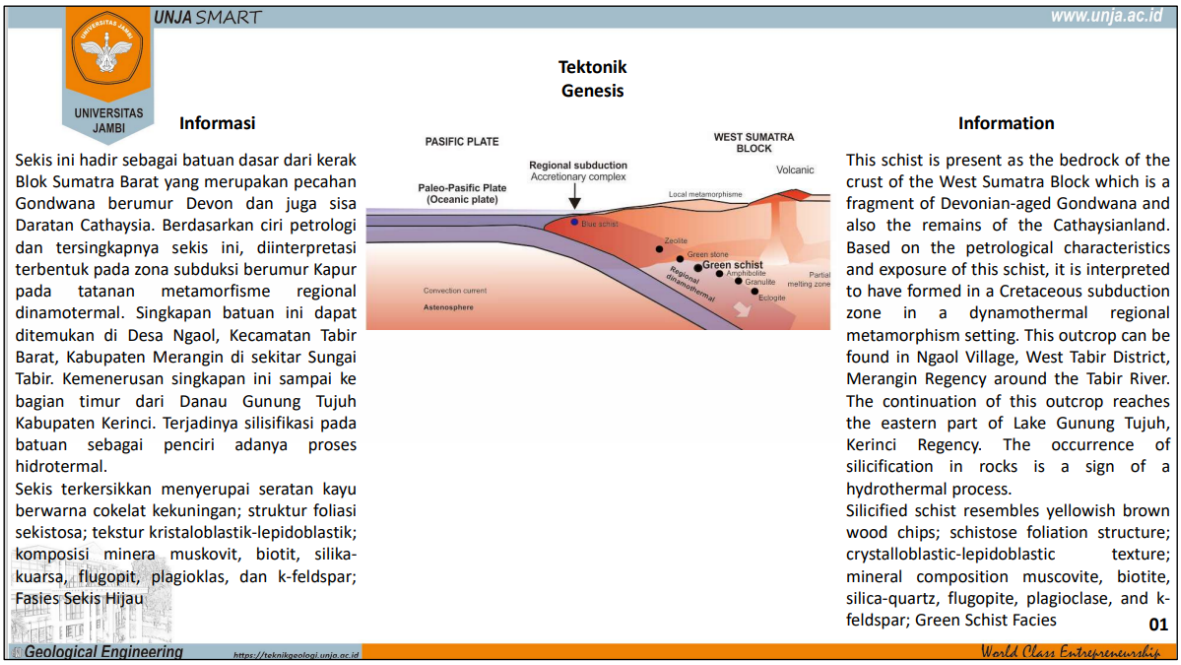

Figure 4. A form of explanation of the search results on the barcode page available in the rock name information in the Mengkarang Geopark Miniature

Figure 5. Information labeling of rocks in Mengkarang Geopark Miniature with a) rock serial number 21 is volcanic breccia rock and b) serial number 05 is Araucarioxylon Wood Fossil. These two photos are examples of rock labeling carried out in the Mengkarang Geopark Miniature

By reviewing the barcodes listed on the information labels for display rocks in the geopark miniature, everyone can find out more information about rocks, such as the natural process of rock formation from an earth science perspective from geology. Then it is also equipped with a simple geological model of the rock formation process that uses earth science concepts, either from the results of previous research or using the latest geological data. This information is also complemented by a rock sampling information map available on the Mengkarang Geopark Miniature information board (Figure 6). This information board is equipped with the history of the formation of the Mengkarang Geopark Miniature at the Faculty of Science and Technology and of course there is also an earth history of the exposure of rocks in the Mengkarang Geopark Miniature.

Figure 6. Jambi University's Mengkarang Geopark Miniature with the western backdrop is Building A, Faculty of Science and Technology, Jambi University. This geopark is informed by the Mengkarang Geopark Miniature

The existence of Jambi University's Mengkarang Geopark Miniature at least contributes to learning media for the Jambi University academic community apart from supporting activities for short summer courses. The use of this geopark is also used directly by students of the Department of Earth Engineering to study rocks directly by describing them and also trying to review the rock information on the labels provided to see in detail the rock information, such as the process of rock formation due to natural scientific processes. geology. The implementation of this service activity was carried out by Hari Wiki Utama, Rakhmatul Arafat, Yulia Morsa Said, Bagus Adhitya, Jarot Wiratama, dan Mega Aulia. This activity also involved students, namely Dhinda Ayu, as an implementation of the Higher Education Tri Dahrma by involving student activity. Of course, this activity is supported by the entire academic community of the Department of Earth Engineering, Faculty of Science and Technology, Jambi University and students in its implementation (Figure 7).

Figure 7. Forms of learning activities and trials of digitizing geopark miniature in the academic community of the Geological Engineering Study Program, Department of Earth Engineering. Digitization includes labeling the name of each rock which is equipped with barcode tracing which aims to find out details of the rock, as well as about Mengkarang Geopark Miniature (Figure 8)

Figure 8. Digitilization of the Mengkarang Geopark Miniature with a-e) video footage explaining the Mengkarang Geopark Miniature by the Geological Engineering Service Team, f) handover of Community Service activities for the Mengkarang Geopark Miniature to partners, namely the Dean of the Faculty of Science and Technology, Jambi University, g) a view of the Mengkarang Geopark Miniature taken from Floor 2 of Building A, Faculty of Science and Technology, Jambi University, h) display of the questionnaire link to determine user responses as part of the evaluation

Table 2. Evaluation of activities by providing respondents with links to Mengkarang Geopark Miniature users, link https://forms.gle/oDHcRCskAggvXxp39

No	Questions	Response Options
01	Is this your first time visiting Mengkarang Geopark Miniature?	Yes No
02	How can you find out about the existence of the Mengkarang Geopark Miniature?	Information from friends Information from lecturer
03	How often do you visit to Mengkarang Geopark Miniature?	Often Sometime Never
04	How many rock samples are there in the Mengkarang Geopark Miniature?	15 samples 28 samples
05	Is this composing Mengkarang Geopark Miniature informative?	Very Informative Informative Tidak informatif
06	Does the presence of this Mengkarang Geopark Miniature contribute to the benefits of the Earth Engineering Department?	Yes No
07	Is it necessary to digitize the Mengkarang Geopark Miniature?	Need No
08	How easy is access to use learning at Mengkarang Geopark Miniature?	Access is very easy Easy access Access is not easy
09	Does the existence of this Mengkarang Geopark Miniature have a positive impact or real contribution to you?	Yes No
10	Asking and giving suggestion to Mengkarang Geopark Miniature	Descriptive

Evaluation of Community Service activities at Mengkarang Geopark Miniature was also carried out to find out responses from user partners, including students, lecturers and the entire Jambi University academic community. This evaluation was carried out by providing a questionnaire regarding the existence of Mengkarang Geopark Miniature with questions related to responses from users (Table 2).

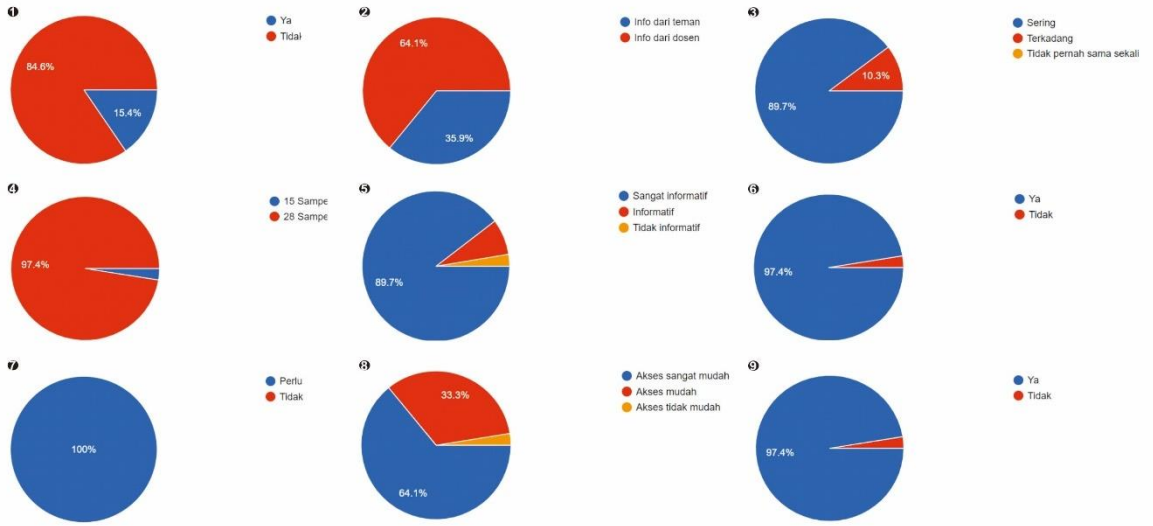

Figure 9. Results of responses from users of the Mengkarang Geopark Miniature which aims to find out the use of the existence of the geopark miniature. Questions (see Table 2), while for question No. 10 is only explanatory. Information in English (see Table 2)

Based on the results of respondents from Mengkarang Geopakr Miniature users, it can be seen that visitors who visit the geopark miniature are generally very frequent, require digitalization, and are informative, have easy access to study, and contribute or have a positive impact on Earth Engineering students in studying various types of rocks on the surface. earth through the Mengkarang Geopakr Miniature.

This geopark miniature digitalization service activity cannot be separated from providing socialization and introduction to the Mengkarang Geopakr Miniature, Faculty of Science and Technology, Jambi University, not only for the Jambi University academic community, but for global purposes. The digitalization of this geopark miniature is an effort to innovate an interactive learning method in understanding and studying rocks and the dynamic phenomena of changes in the earth's crust through geological diversity in the Mengkarang Geopakr Miniature, Faculty of Science and Technology. Of course, the existence of this geopark miniature is also a place for Jambi University academics to discuss the uniqueness of rocks which represent the diversity of geological settings in the Merangin Jambi UNESCO Global Geopark Territory and Jambi Province in general.

This program plays an important role in efforts to support short summer courses at the Faculty of Science and Technology, Jambi University. Apart from supporting short course activities, the hope is that through digitizing this geopark miniature, Jambi University will at least play a role in promoting the Merangin Jambi Geopark which has been designated as a

world heritage by UNESCO. With this world heritage label, it can at least increase the attraction for foreign students to take part in short summer course activities at the Faculty of Science and Technology, Jambi University. In the long term, Jambi University will collaborate a lot with the universities where the summer course participants come from, and ultimately with the shared hope that Jambi University can be known globally.

Conclusion

This community service program for digitalizing Mengkarang Geopark Miniature is a form of service activity that supports the university's Tridharma program. The implementation of this service activity also plays an important role in implementing learning innovations at Jambi University. Socialization through digital media of the existence of the Mengkarang Geopark Miniature in the Faculty of Science and Technology as an effort to promote the Merangin Jambi Geopark which has become a UNESCO Global Geopark world heritage. The important thing in this service activity is supporting the planning of the Jambi University Faculty of Science and Technology which will prepare the implementation of short lectures or Summer Course which is part of supporting the Independent Campus Learning program from the Ministry of Education, Culture, Research and Technology. The problem with service activities is in promotional media. So that in the future this service activity can continue, especially the latest information or discoveries from rocks in the Mengkarang Geopark Miniature. Future programs will try to create 3D anaimation for the Mengkarang Geopark Miniature.

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