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Potential Mapping Workshop through Web-Based GIS Application Towards a Digital Village

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ABSTRAK

Untuk memetakan potensi dan permasalahan di Desa Matesih, sebuah aplikasi GIS berbasis web telah dikembangkan dan disosialisasikan kepada perangkat desa setempat. Namun, dalam rangkaian kegiatan pengabdian masyarakat ini, telah diadakan lokakarya pemetaan potensi dan permasalahan untuk membantu perangkat desa memahami proses teknis dalam menggunakan GIS. Sebagai salah satu desa di Kabupaten Karanganyar, Desa Matesih memiliki beberapa potensi alam, pariwisata, komoditas pertanian, serta berbagai potensi lainnya. Namun, hingga saat ini belum banyak peneliti yang mencoba mengeksplorasi potensi Desa Matesih. Implementasi aplikasi berbasis web ini diharapkan dapat membantu perangkat desa dalam memetakan potensi dan permasalahan yang ada di desa tersebut. Secara umum, terdapat tiga langkah utama dalam pelaksanaan pengabdian masyarakat ini, yaitu: 1) persiapan, 2) pelatihan penggunaan aplikasi, dan 3) pengumpulan konten data. Hasil pelatihan menunjukkan peningkatan dalam pemahaman dan keterampilan peserta dalam menginput dan mengelola data spasial terkait potensi dan permasalahan desa pada aplikasi yang telah dikembangkan.

Kata kunci: Desa Digital; GIS; Pelatihan; Pemetaan Potensi

ABSTRACT

To map the potentials and problems in Matesih village, a web-based GIS application has been developed and socialized to local village administrators. However, in this series of community service activities, a workshop on potential and problem mapping was held to help the village administrator understand the technical process to use the GIS. As a village in Karanganyar Regency, Matesih Village has some natural potential, tourism, agricultural commodities, and various of potential. However, not many researchers have tried to explore the potential of Matesih Village yet. The implementation of this web application is expected to help the local village administrators to map the potential and problems in the village. In general, there are 3 main steps that should be taken to implement the community service, namely: 1) preparation, 2) training in the use of applications, and 3) data content collection. The training results indicated an improvement in participants' understanding and skills in inputting and managing spatial data related to village potential and issues using the developed application.

Keywords: *Digital Village; GIS; Potential Mapping; Workshop;*

INTRODUCTION

Basically, every village has certain sectors that become the driving force of the economy. Certain sector might be able to improve the standard of living of its citizens [1]. However, the potential of the need to be documented properly. By knowing the potential and existing problems, the community around the villages can be empowered [2]. Empowerment is considered as a process that allows individuals or groups to change the balance of power in social, economic and political terms in a society or community [3]. Examples of relevant services that emerged, for example, were

activities on empowerment through training in making various crafts from unused flannel cloth that had been carried out in [4] and activities on community empowerment through vocational village programs in the Girilayu batik tourism village carried out by [5].

Digital village is a program concept that implements government services, community services, and community-based empowerment on the use of information technology [6]. In Matesih Village, there is a lot of potential that can be explored, especially when it is associated with the concept of a Digital Village. To carry out the concept of digital village, digitizing village archives and services is very necessary. When it comes to village potential, digitizing village assets and potential are considered as a part of the process to carry out the digital village concept. To map the potential and problems in Matesih Village, a GIS (Geographical Information System) application has been developed, and its benefits have been disseminated to local village administrators as an initial discourse to carry out the concept of a Digital Village. The parts of the developed application can be seen in Figure 1 and Figure 2. Figure 1 shows the application's dashboard, while Figure 2 displays the detail page of potential and issues.

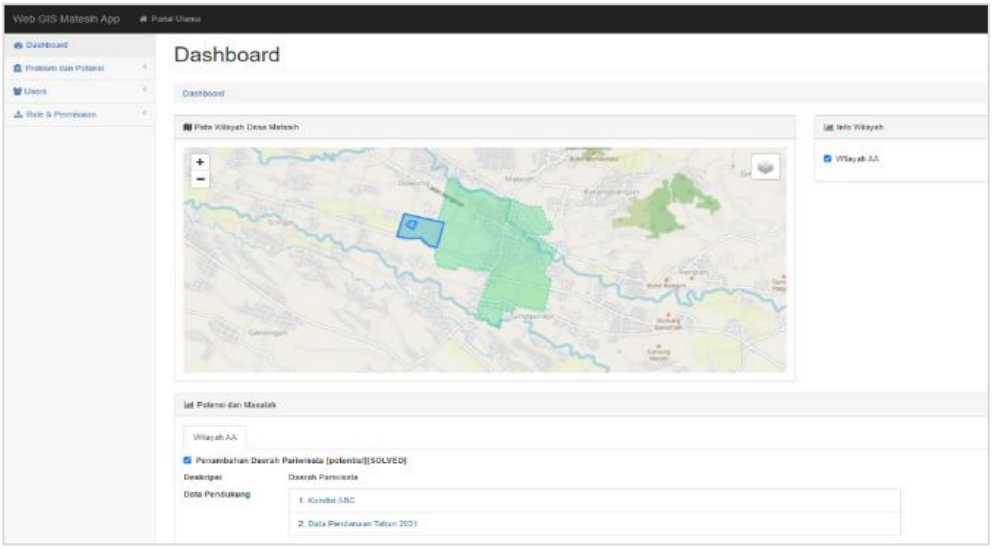

Figure 1. The application dashboard

Matesih Village Management welcomed this innovation and has helped many things for the process of developing web-based GIS applications. This opens an opportunity for the community service team to continue their service to the next stage. However, the process of mapping potential or problems will certainly require the next effort.

GIS is a form of information system that integrates a collection of hardware, software, data, and liveware that operates in an institutional context. What distinguishes GIS from other information systems is its general focus on spatial entities and relationships [7]. Thus, GIS can be used to inform spatial information and can also be used to support decision making. According to, the realization of the independence of the Village/Kelurahan community through the development of superior potential and institutional strengthening and community empowerment is the general goal of developing village potential [8]. The equitable process of decentralization of resources is expected to support sectoral/regional potential strengthening. One of the benefits of GIS is related to decentralization. Decentralization ensures equality between competing regions for resources or service delivery through continuous follow-up and assessment [9]. Spatial information plays an important role in the decentralization process. The existence of GIS can provide consideration in the decentralization process. The allocation of regional resources will certainly be adjusted to the potential and problems that exist in each region. This also can be applied to Matesih Village. The existence of a GIS application if accompanied by the right data will provide many benefits, both direct and indirect effect for the users of the application. This information is expected to be a catalyst in the decision-making process, allocation of resources, and equitable distribution of resources based on local wisdom in an area.

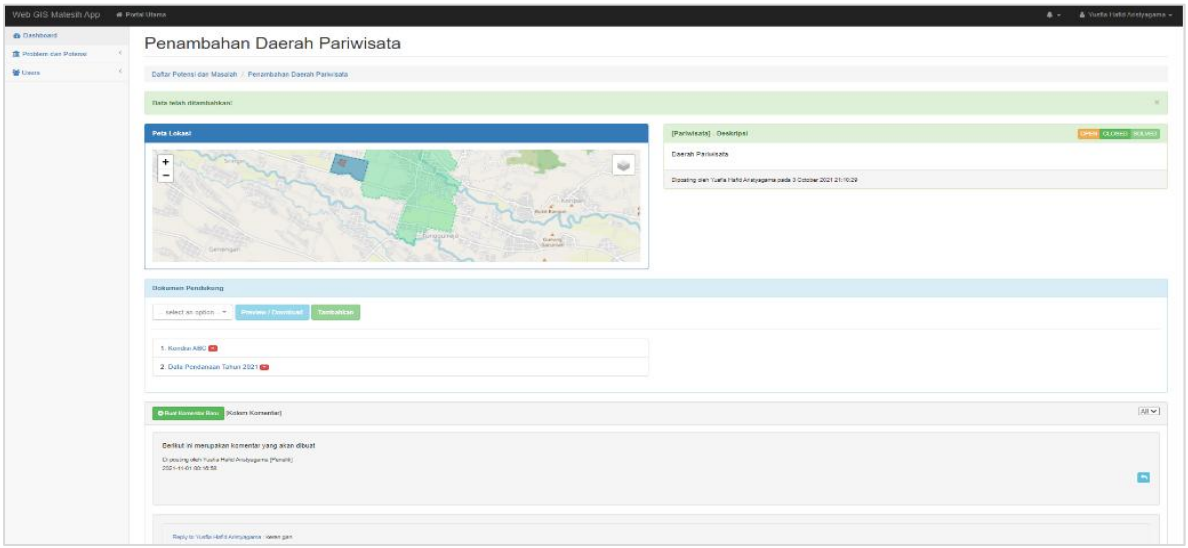

Figure 2. Potential and Problem Page Details

Workshops play a crucial role in disseminating information and developing strategies across various fields. They are effective in producing changes in practice, particularly when they engage participants personally and address individual needs [10]. In medical education, workshops are distinct from tutorials and small-group teaching, offering unique learning opportunities from undergraduates to continuing professional development [11]. In the business world, strategy workshops have become commonplace, with managers taking time away from daily tasks to consider strategic situations and plan future directions [12]. These events are seen as important processes for strategy development, complementing traditional strategic planning systems. Workshops also serve as spaces for constructing meaning in research processes. Overall, workshops are valuable tools for disseminating information, developing strategies, and facilitating learning across various professional contexts. Workshops may enhance the audience skills and learning quality significantly [13]–[16].

In our previous community service activity, we developed a GIS-based application to map village potential and issues. To ensure its usability, prospective users need training in the basic use of the developed web-based GIS application. As a continuation of that initiative, a workshop was held in the current community service activity to assist the Matesih village administration team in using the application.

METHOD

In general, there are 3 main stages to carry out this service, namely: 1) preparation of activities, 2) training on the use of applications, and 3) data content collection.

1. Preparation of activities. In this stage the service team together with the local village government will discuss the potential in terms of what needs to be documented more specifically so that it can be included in the previously designed GIS application. The service will ask for input from the local village government regarding improvements or revisions to applications that are still possible. At this stage, the community service team plans in more detail the technical implementation of its activities to be carried out in the future. This includes a discussion process on involving Matesih Village government to collect data as well as planning related to how training will be carried out.
2. Training on the use of the application. The training activity aims to introduce the procedures for using the web-based GIS applications to stakeholders who will be involved in the data collection process or act as operators of the application. In this stage, the people who will be involved in collecting data as well as the people who will be involved as operators are involved in the simulation process through workshop on the use of applications which will be carried out offline according to the considerations that may have been discussed in the preparation stage. The initial training phase of training will be conducted using demonstration methods in order to help the users understand the workflow and features of the application. In the next phase, the workshop

participants will be given a specific case that should be accomplished with some scenario related to the application functionality.

3. Data content collection. After going through the training process related to application usage and simulation, the long-term process of data collection will continue to be carried out on an ongoing basis to complement the data that is likely to continue to grow in the future. This can be done by collecting as much information as possible regarding the village problems or potential based on the division of the hamlet area into specific fields.

The selection of village partners for this community service activity is based on two main criteria:

1. Willingness of Village Officials to Actively Participate in Training.
2. Village Need for Mapping Potentials and Issues for Development Planning.

The participatory approach used in this activity is the Participatory Training Approach, where village officials are actively involved in every stage of the training. In this approach, the training is conducted collaboratively, encouraging participants to share their experiences and challenges, as well as discussing solutions relevant to the context of their village. Additionally, participants are directly engaged in practical simulation sessions using the web-based GIS application, designed to reflect real-life scenarios in the village, such as mapping potentials and issues. This approach aims to ensure that village officials not only understand the theory behind the application but also can operate it directly and use it for data-driven development planning.

In this activity, participants are observed based on the prepared simulation scenarios. During the simulation, participants use the web-based GIS application to complete the assigned tasks. The facilitator observes how well participants operate the application, follow the correct steps, and complete the tasks according to the scenario. The results of these observations are used to assess participants' understanding and provide necessary feedback.

DISCUSSION AND RESULT

The implementation of the stages of these activities can be explained as follows:

Preparation of activities. Most of the service activities will be carried out at this stage. The activity preparation stage begins with the signing of an agreement that the local village government will support the service activities that will be carried out in the village. The signing of the collective agreement is proof that the village government is willing to be a partner in the service activities that will be carried out considering that this is for the benefit of the relevant village government as well. Discussions related to the improvements needed to develop the application further have been carried out. Some suggestions and input from village administrators have also been accommodated regarding things that might be done in technical improvements. One of them is by including hamlet representatives as part of the users for the long-term plan. Revisions related to these cases have been made. It's just that involving representatives of each hamlet cannot be implemented soon because the local village government itself needs more time to involve representatives of hamlet residents. It has been agreed that it will be included as a plan or agenda outside of a series of service activities.

Figure 3. Preparation activities

The internal community service team has discussed various needs that should be prepared to implement the process. Several meetings were held by the internal team to discuss this matter. This includes discussing the proposed activity plan that will be reported to the local village government.

After the proposed activity plan was discussed, the internal community service team discussed the matter with the local village government to re-offer an activity plan and implementation plan. This discussion covered various aspects, including the number of participants from both the village and the community service team, the necessary

equipment for training, equipment borrowing arrangements, the training schedule, its duration, and the overall timeline of activities. However, all forms of facilities and infrastructure are prepared before the date of the activity. Some of the facilities and infrastructure, including the tools used in these activities, have been prepared, although not all the needs have been met. At this stage, the theme of the workshop/training that will be held is "Training on the Use of GIS Applications to Map Village Potentials Towards a Digital Village".

Training on the use of the application. The activity was carried out for 3 hours of training and took place in Matesih Village. There were several participant representatives from the community service team and several participant representatives from the Matesih Village management. According to the plan, the activities have been carried out from 08.00 WIB to 11.00 WIB. Prior to the training, the users already had a basic understanding of the application's purpose and general concept. However, they had not yet acquired the technical skills needed to operate the application effectively. In this training activity, the community service team provided training related to how to use the application to simulate in making regional maps, marking potential or problems in Matesih Village, editing an object in the map, deleting an object in the map, creating a discussion topic about potential or problem, and looking at the spatial summary in the dashboard as their main tasks/cases. The activity participants carried out the activities well during that time interval, starting from the simulation, as shown in Figure 4, to the closing, as shown in Figure 5. From the result of the training, all the participants were able to complete the tasks given. The simulation scenario is based on the features that have been developed, as documented in the user guide [link]. A summary of the participants' conditions before and after the training, based on our observations throughout the session, is presented in Table 1. The training significantly improved participants' understanding of the application, especially in basic and operational features, though some advanced administrative tasks still require further reinforcement, which is why certain features of the application may need improvements in the future to make them more familiar and user-friendly for users with varying technical expertise. An intuitive interface leverages existing user knowledge, minimizes learning relative to task complexity [15].

Table 1. Training Impact on User Capability Based on Key Application Features

Role: Common Users	**Before**	**After**
Registration	Partial understanding	Fully Mastered
Login	Fully Mastered	Fully Mastered
Dashboard Access	Partial Understanding	Fully Mastered
Logout	Fully Mastered	Fully Mastered
Role: System Administrator	**Before**	**After**
Create new topic category	No Knowledge	Partial Understanding
View list of potential/problem topic	Partial Understanding	Fully Mastered
Check for potential/problem topic discussion	No Knowledge	Partial Understanding
User management	No Knowledge	Partial Understanding
Create new user (from admin page)	Partial Understanding	Fully Mastered
User Approval/Activation	No Knowledge	Partial Understanding
Role and permission management	No Knowledge	Partial Understanding
Role: Village Government	**Before**	**After**
View list of Hamlet areas	Partial Understanding	Fully Mastered
Hamlet area data management (Add, Edit, Delete)	No Knowledge	Partial Understanding
Check for potential/problem list	No Knowledge	Fully Mastered
Potential and Problem management (Add and Remove)	No Knowledge	Partial Understanding
Supporting Data Management for each potential / problem topic (add, edit, and delete)	No Knowledge	Partial Understanding
Set potential/problem topic status	No Knowledge	Partial Understanding

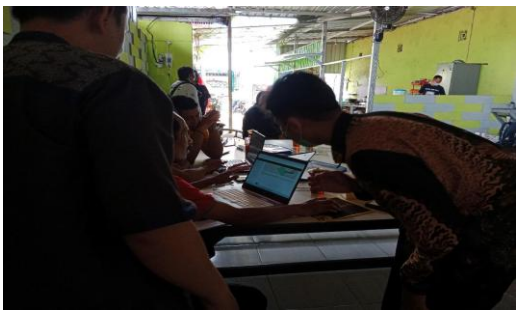

Figure 4. Workshop Activity

Figure 5. Closing Activity

Data content collection. Data collection is carried out after the training process is complete. This can be done by collecting as much information as possible regarding village problems or potential based on the division of the hamlet area. Until now, a list of data related to the potential of micro small and medium enterprises in Matesih Village has been collected which is grouped by Dusun. Currently, 164 potentials of micro small and medium enterprises in Matesih village have been collected in various hamlets. There are still many potential categories or other problems that are possible to make. This data can be digitized in the future through a web-based GIS application that has been created.

CONCLUSIONS

A web-based potential and problem mapping application has been developed for Matesih Village. Improvements to several features have been carried out in stages based on input from the local village government. All stages of activities starting from activity preparation, application use training, and data collection have been carried out. As a result, the training activity with the theme "Training on the Use of GIS Applications to Map Village Potentials to Digital Villages" has been done. The participants able to complete the basic task given, and 164 potentials of micro small and medium enterprises have been captured in various hamlets in Matesih Village. The training results indicated an improvement in participants' understanding and skills, particularly in inputting and managing spatial data related to village potential and issues using the developed application.

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