

WebGIS of Participants in the Webinar on Communication and Learning Motivation during the Covid-19 Pandemic

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Abstract. Effective communication is the key to the learning process for educators. Strong motivation is needed, especially during the Covid-19 pandemic. Webinars are a good medium for motivators to convey motivation and communication solutions for educators. To map the interests of the webinar participants, a Web Geographic Information System (WebGIS) was built. Online registration is spread through social media networks so that there are 859 participants spread across Indonesia. The first largest was obtained by West Sumatra Province with 21%, East Java Province 16.4%, and West Java Province 10%. Participants were dominated by teachers 48% and students 21.7%. With the presence of information on areas, numbers, and percentages visually through the WebGIS application, universities, institutions or stakeholders can formulate policies and planning programs to improve the quality of teaching and learning through communication and learning motivation, both for teachers and students.

1. Introduction

Communication in education is very important for learning achievement [1]. Students are required to be able to understand every material presented by the teacher [2], One of the conditions can be measured from the achievement of learning outcomes [3]. The Covid-19 pandemic has greatly affected the teaching and learning process in Indonesia [4]. The difference in learning methods becomes an obstacle for teachers and students in communicating [5][6]. Teachers and students need motivation that can increase enthusiasm in communicating their lessons, in order to create characters of honesty, tolerance, hard work, creative, independent, curious, communicative and responsible [7].

Various efforts have been made by universities and institutions in increasing teaching and learning motivation as Online Teaching-Learning [8][9]. One of them is by holding a webinar about communication and learning motivation during the Covid-19 pandemic. Universitas Bung Hatta, especially the Industrial Technology Faculty, took the initiative to hold the webinar activity. This

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webinar was held on Sunday, July 12, 2020 with the speaker, Communication Expert, Dr. Aqua Dwipayana.

In general, participants who take part in this webinar consist of several academic elements from all over Indonesia. The participants are teachers, lecturers, students, and others. The distribution of their locations is recorded in the provinces in Indonesia. The enthusiasm of the participants in participating in this activity was still strong even though only through online media.

Based on the distribution of the participant's locations, a web-based Geographic Information System (GIS) application, known as WebGIS, was built. WebGIS is a computer-based information system that can retrieve geo-referenced data [10]. The purpose of developing this WebGIS is to display and see the percentage of enthusiastic participants in the distribution map. This distribution data is the main dataset [11] needed in the MySQL database.

2. Methods

The research method focuses on the distribution of participant data locations. Starting from data collection, data analysis, system development, system testing, and evaluation, and conclusions. These stages are illustrated in Figure 1.

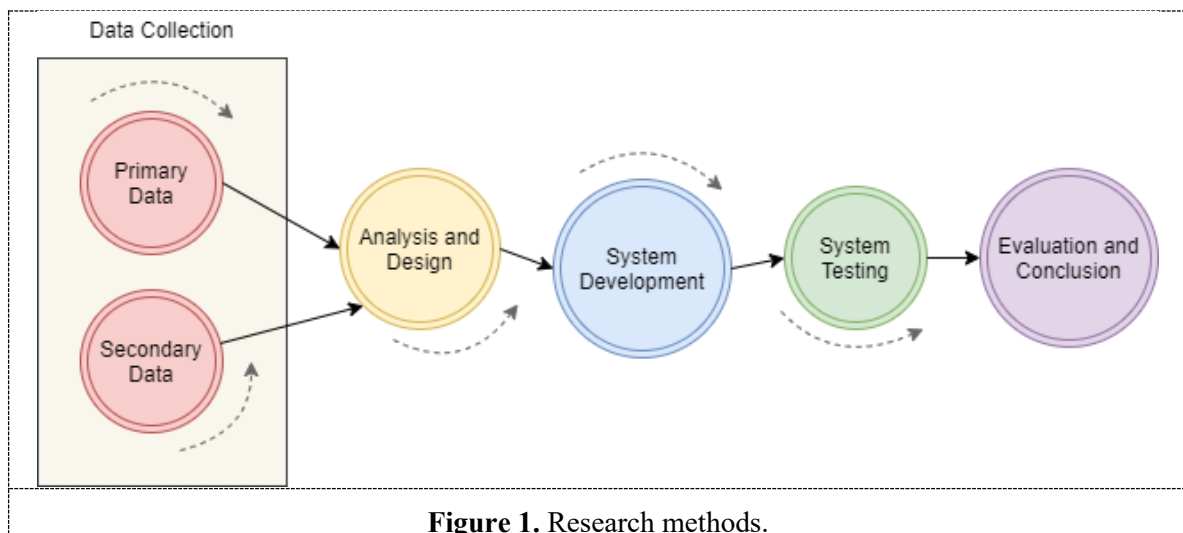


Figure 1. Research methods.

2.1. Data Collection

Primary data were obtained from the results of registration via Google Form as many as 859 participants. In Google Sheets, several data fields are taken, namely e-mail, full name, age, contact number, profession, agency, address, province, and motivation. The field that becomes the focus of research for mapping needs in WebGIS is the province. Secondary data were taken from the shapefile of provinces in Indonesia. The contents of the provincial data field consisting of 34 provinces.

2.2. Analysis and Design

The analysis process focuses on provincial polygon data (secondary data) related to existing provincial data in primary data. This stage produces database design and use cases. The results of this design will be the basis for system development in WebGIS.

2.3. System Development

System development focuses on WebGIS based applications. The results of designing databases and use cases are the foundation in this stage. The database structure is built using MySQL. While the web-based application is built using HTML5, CSS, JavaScript, and PHP. The base map uses Google Maps. Primary and secondary data are converted into CSV files. Then this file is imported into the database according to the structure in MySQL. WebGIS applications and databases are dynamically linked.

2.4. System Testing

System testing stages are based on system functionality. Testing on the WebGIS application using several browsers that are most widely used by users. System testing from the application side uses black-box functionality testing in accordance with ISO 9126-2 with 3 (three) matrices to be tested, namely Functional Adequacy (FA), Functional Implementation Coverage (FIC), and Functional Implementation Completeness (FICM).

2.5. Evaluation and Conclusion

Based on the data and distribution maps of the webinar participants on WebGIS, evaluations, and conclusions can be drawn about communication interests and learning motivation of participants. The parameters are the province and the professional region.

3. Result and Discussion

The results and discussion are described in the technology schema, use cases, database structure, distribution maps, system testing, and the percentage of results from the dataset.

3.1. Technology Scheme

Technological schemes describe the relationship between data and systems. Data is accessed via the WebGIS application based on requests from the user to the server via the internet network. The data sources come from primary and secondary data in CSV format which have been imported into the MySQL database server. The technology schematic process flow is shown in Figure 2.

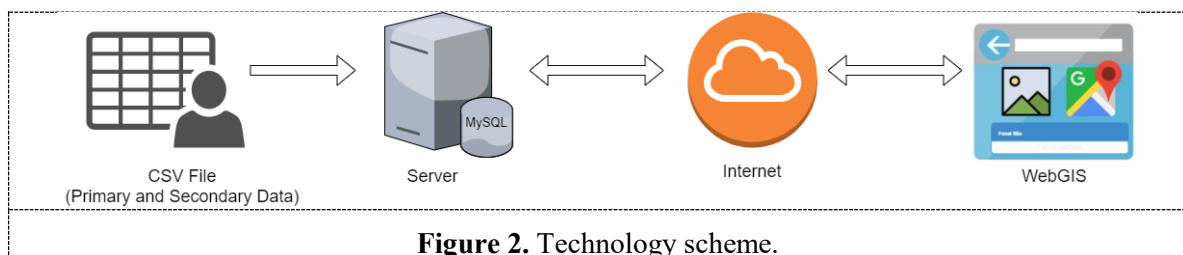


Figure 2. Technology scheme.

3.2. Use Cases

Use cases describe the relationship between the system and the user. Users will get information on participants who take part in the webinar based on their province. The system on the WebGIS application will display provincial info along with the number of participants (Figure 3).

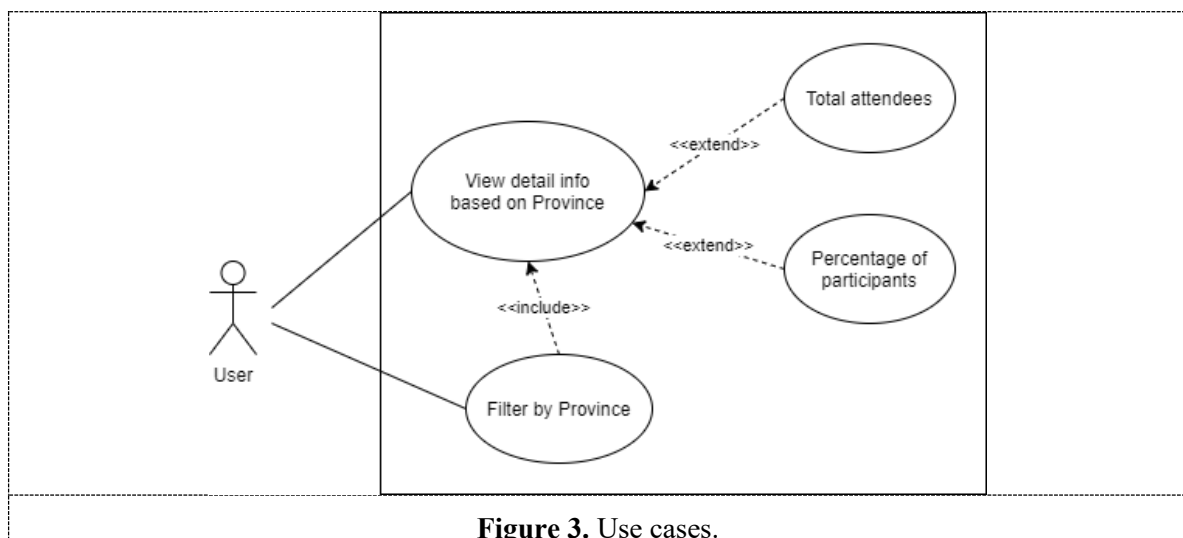


Figure 3. Use cases.

3.3. Database Structure

Based on the fields and contents of the webinar registration data, a database structure is created as the basis for database design. There are two main components that are used as tables in the database, namely participants and provinces. These two tables are interconnected by linking `id_province` as a Foreign Key (FK) in the participant table. This relation uses one-to-many.

The participant table itself has several fields as data entry fields including `id_participants` as Primary Key (PK), `id_province` as Foreign Key (FK), `email`, `full name`, `age`, `profession`, `institution`, and `address`. While the province table has several fields, namely `id_province` as Primary Key (PK), `province_name`, `polygon`, and `total_attendees`. The database structure is illustrated in Figure 4.

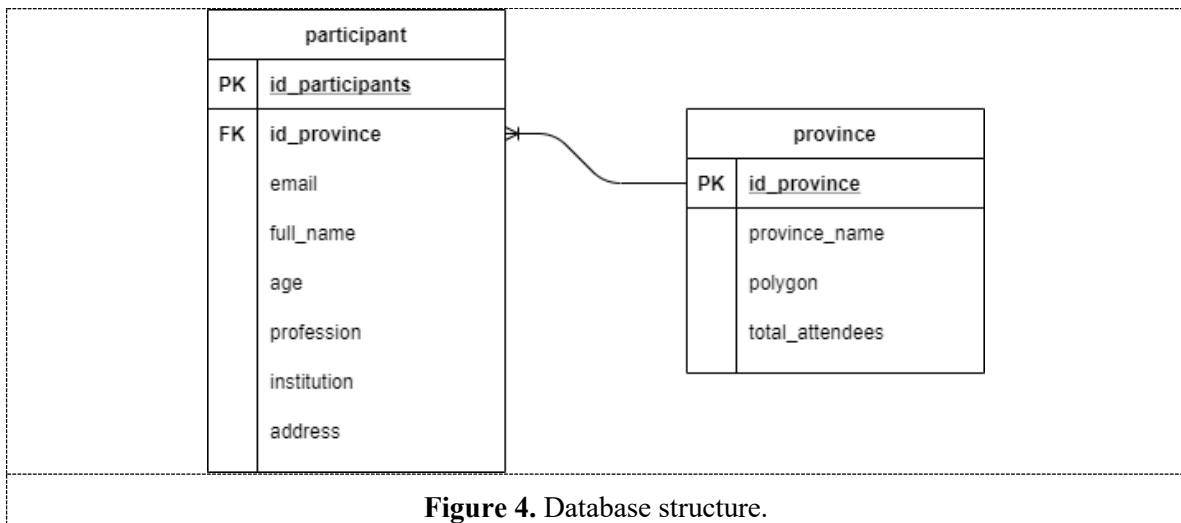


Figure 4. Database structure.

3.4. Distribution Map

The information distribution map or WebGIS of web-based webinar participants is accessed via a browser. In accordance with the technology scheme and use cases, users can access the number of attendees through a map of Indonesia based on their province. In addition, users can also see the percentage amount when clicking on polygons or provincial areas which appear as in Figure 5.

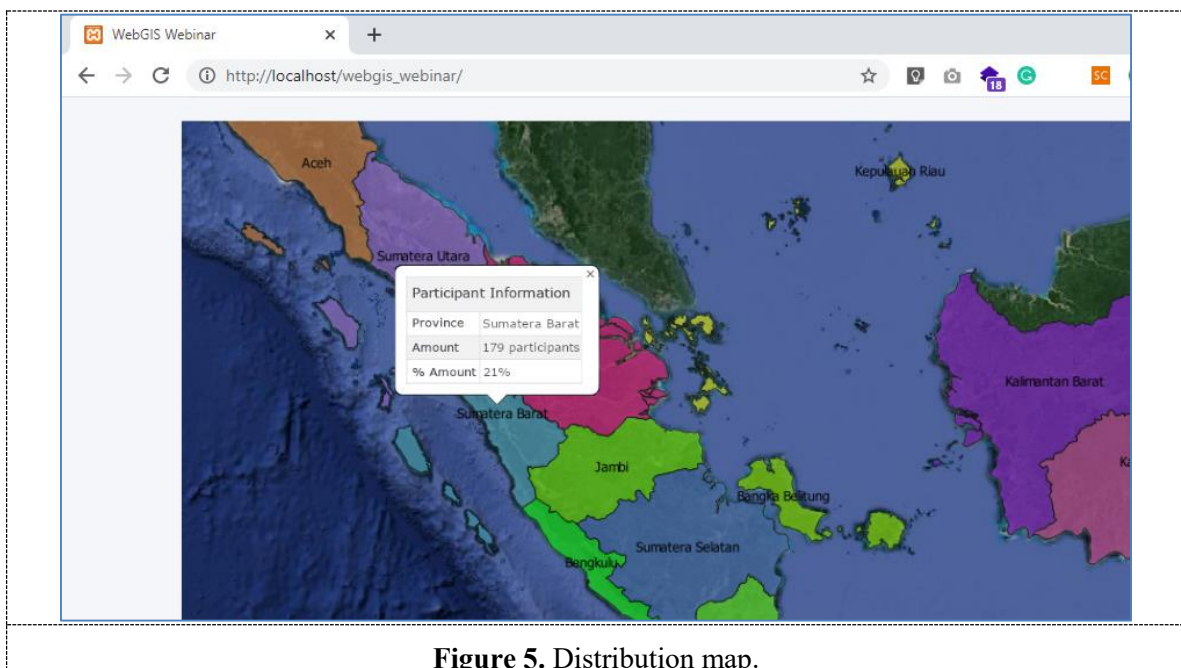


Figure 5. Distribution map.

3.5. System Testing

Based on the WebGIS application, the system testing process is carried out based on the four features in it. These four features are the main test cases in system testing. The test case values in the ISO 9126-2 test standard are in the range of 0 – 1. With a value of 0 (zero) it is said to be not good and a value close to or equal to 1 (one) is said to be good ($0 \leq X \leq 1$). Based on Table 1, it can be seen that all tests have a value of 1, meaning that the features in the WebGIS application can be run well and information on the number and percentage of participants can be seen through the provincial area on the distribution map.

Table 1. Functionality Testing Results.

| No. | Feature | FA | FIC | FICM |
|-----|---|----|-----|------|
| 1 | Displays the base map | 1 | 1 | 1 |
| 2 | Displays a map of the province | 1 | 1 | 1 |
| 3 | Filter by province | 1 | 1 | 1 |
| 4 | Displays info on the number of participants per province | 1 | 1 | 1 |

3.6. Percentage of Webinar Participants

The number of participants who registered for this webinar was 859 people. Participants are spread across several provinces throughout Indonesia. The total percentage of these three professions is 87.2%. The rest are school principals, employees, civil servants, and others.

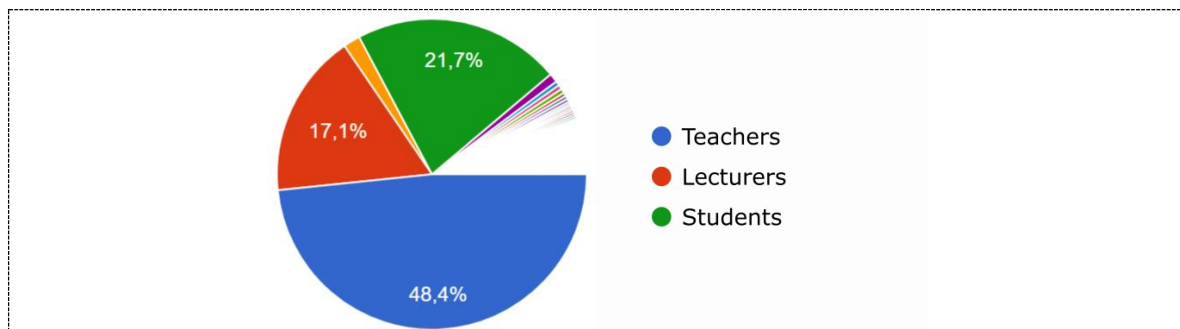


Figure 6. Percentage of Webinar Participants by Profession.

Of the 70 professions selected by the participants, there are three main professions that are related to the theme of this webinar. These professions are teachers, lecturers, and students. The highest percentage was obtained by teachers at 48.4%, students 21.7%, and lecturers 17.1% (Figure 6). Meanwhile, if based on the provincial area, the highest percentage was obtained by West Sumatra at 21%, East Java 16.4%, and West Java 10% (Figure 7).

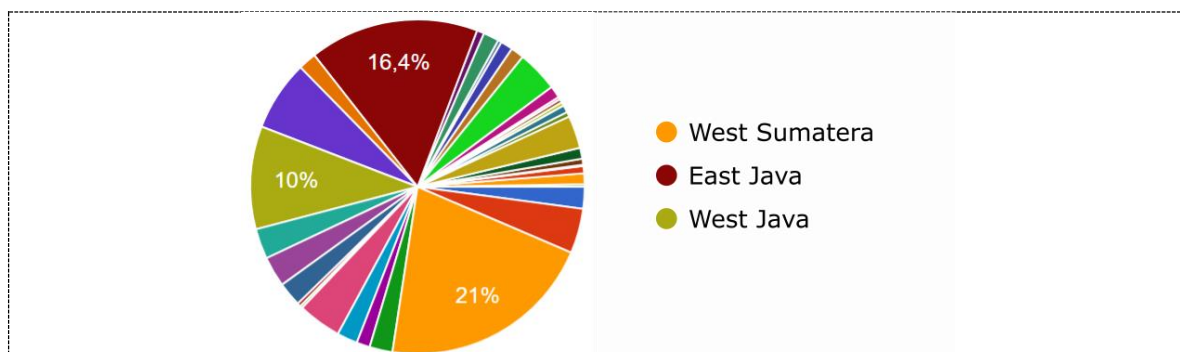


Figure 7. Percentage of Webinar Participants from Provincial Areas.

4. Conclusion

Based on the results of application implementation and data analysis, the participation of webinar participants on communication and learning motivation during the Covid-19 pandemic can be mapped via WebGIS. Of the 859 participants spread across Indonesia, the highest percentage was West Sumatra with 21%, East Java 16.4%, and West Java 10%. Area, amount, and percentage information can be accessed visually through the WebGIS application.

This participant distribution map information can be an illustration for universities, institutions, and stakeholders in the education sector in formulating policy and planning programs to improve the quality of teaching and learning through communication and learning motivation, both for teachers and students.

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