



vol. 17 / 2023



The 7th International Conference on Science Technology

organized by
Faculty of Social Science and
Law Universitas Negeri Manado and
Consortium of International Conference
on Science and Technology

The Innovation Breakthrough in Digital and Disruptive Era

Web-Based Geographical Information System Mapping High School and Vocational School In The City Of Ternate

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Abstract. The government of the Education Office of North Maluku Province is trying to overcome the problem of student distribution for schools in the city of Ternate, especially SMA/SMK/equivalent which aims to make all schools quality and there are no more superior schools. However, new problems arise related to the zoning system itself, sometimes some parents of prospective students and prospective students themselves do not know the schools in their domicile zone. The problem formulation is how to create and compile a Geographic Information System Mapping SMA and SMK in Ternate City. Designing a geographic information system that can provide information about web-based SMA and SMK Mapping in Ternate City and become a reference for the community in choosing their or their children's schools according to the zoning system. For testing the system is in accordance with the stages tested where for testing the system is used black box testing, namely testing to see the suitability of data accessed. The high school and vocational recession geographic information system was built using the PHP programming language, Mysql as a database, while for making locations of high school and vocational high school vulnerable places using google maps, maps API. All high school and vocational tracking information system uploads use black boxes, run as expected on the system upload carried out. From the results of this design, it will make it easier for parents to find information on SMA and SMK schools, such as the domicile zone of the school where they live.

Keywords: SIG, SMA/SMK Kota Ternate, WEB

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1 Introduction

Education is one of the most important factors in life that needs to be developed, especially in Indonesia. Education is a process of conscious and planned effort to create a learning atmosphere and learning process so that students actively develop themselves to have the strength of self-control, personality, intelligence, morals and skills needed by them.

The government of the North Maluku Provincial Education Office is trying to overcome the problem of student distribution for schools in the city of Ternate, especially SMA/SMK/equivalent which aims to make all schools quality and there are no more superior schools, by implementing New Student Admissions (PPDB) using the zoning system, which means that prospective students can only choose schools that are in their domicile zone, both public and private [2]

However, new problems arise related to the zoning system itself, sometimes some parents of prospective students and prospective students themselves do not know the schools along with information from schools in their domicile zones, maybe what will be known is only a school that has been well-known/favorite, so there are still many who choose schools not according to their zoning, so the cases experienced by parents Olos is due to not domiciled at the school.

Based on the background above, the author will design a web-based system that can be used to determine school locations and information. Namely with the title "Geographical Information System for High School and Vocational High School Mapping in the City of Ternate" or called a webgis in presenting information on the location of high school and vocational schools in the city of Ternate, as a solution to the problem above.

2 Literature Review

2.1 Geographic Information System

Geographic Information System (GIS), hereinafter referred to as GIS, is a computer-based information system that is used to process and store geographic data or information. A component consisting of hardware, software, geographic data and resources that work together effectively to input, store, repair, update, process, manipulate, integrate, analyze and display data in a geographic-based information

2.2 Kota Ternate

The city of Ternate is a city located under the foot of the Gamalama volcano on an island of Ternate in North Maluku Province, Indonesia. The city of Ternate is an archipelago city which has an area of 547,736 km², with 8 islands namely Ternate Island, Hiri Island,

Moti Island, Mayau Island, and Tifure Island which are five inhabited islands, while there are three other islands such as Maka Island, Mano Island and Gurida Island which are small uninhabited islands.

2.3 Research Flowchart

The flowchart aims to describe the implementation of the research process which is carried out starting from the initial process, namely data collection which is continued to the analysis stage GIS design then testing, up to the conclusion as the final stage.

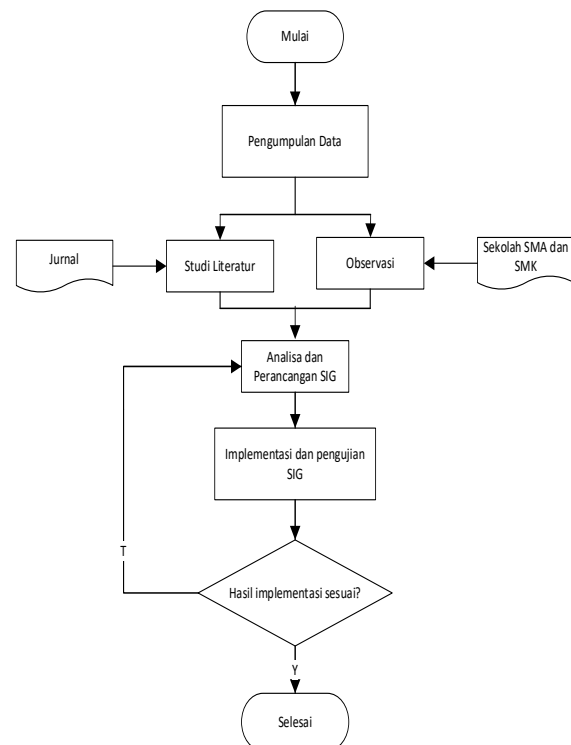


Fig. 1. Research Flowchart

2.4 Leaflet Javascript Library

The most popular Leaflet or JavaScript Library that is open source to create interactive maps that are mobile friendly. Leaflet can be said to be a new alternative for making online maps that are lightweight, open source, compatible both on desktop and mobile. Compared to other Map APIs such as OpenLayer, GMAP API, ArcGIS JS API or MapboxAPI, leaflet has advantages in access speed and small file size. Despite having a small file size, leaflet has a fairly complete web mapping function. The functionality of this leaflet can be enhanced by using a plugin which is available for free.

2.5 Database Design

Database design is the process of determining the contents and settings of the data needed to support

various system designs. Database design using ERD (Entity Relationship Diagram). Design ERD (Entity Relationship Diagram) is a model to explain the relationship between entities and attributes.

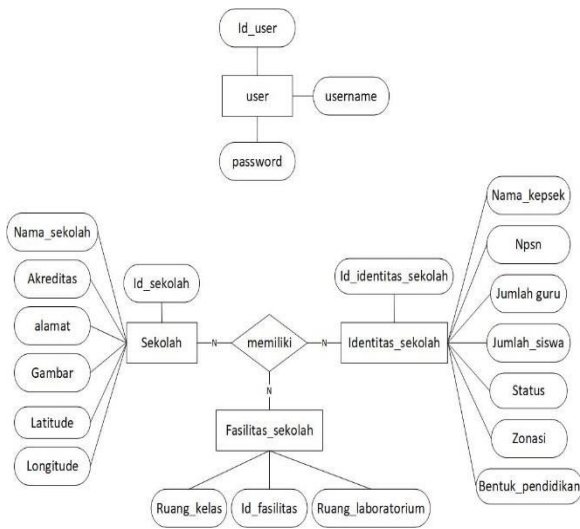


Fig. 2. ERD Design

3 Results and Discussion

The initial stage of data collection used is observation. The data needed for this research is data on school information and school locations in Ternate City. In order to obtain more complete data, descriptions and descriptions, the researcher used a literature study by collecting and studying literature related to geographic information systems theory. Literature sources in the form of textbooks, papers, journals, and scientific papers.

3.1 Activity Diagrams and Sequence Diagrams

Activity diagrams describe the activities that occur in the system. As well as a sequence diagram depicting the interactions between objects in and around the system from the first to the last, this diagram shows the steps in the work process the system is made of

3.2 System Implementation

The design of the "High School and Vocational High School Mapping Information System in the City of Ternate", this application consists of several views that are built, including the start page display, login page, school data display, location mapping display, added school display and added user display. The following displays in the system.

1. Start Page View

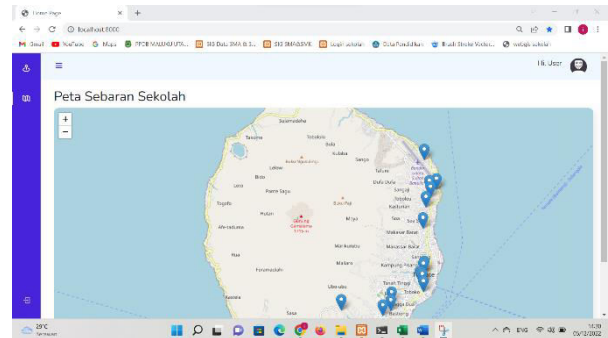


Fig. 3. Start Page View

2. School Data Display

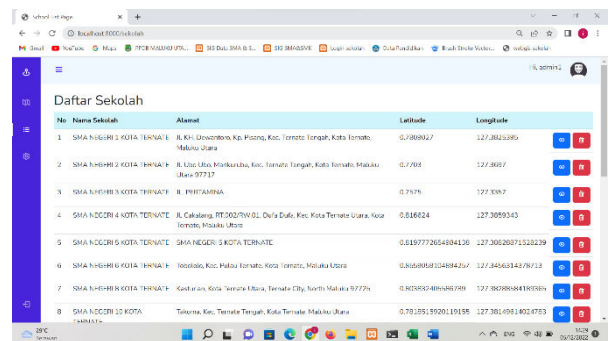


Fig. 4. School Data Display

3. School Information Page Display

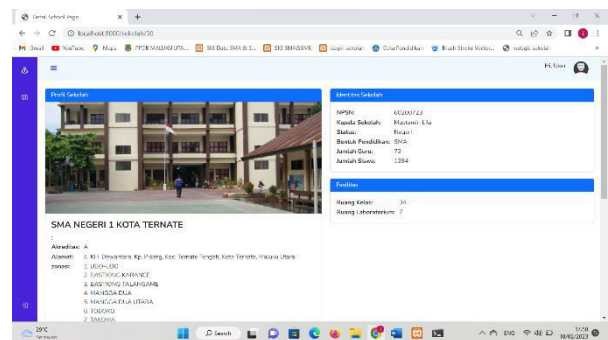


Fig. 5. School Information Page Display

3.3 Test System

At this system testing stage, the system will be tested using black box testing, where black box testing does not reach the system algorithm that is built, but black box testing is a test that tests the functions of each menu on the system. The following are the results of testing the system

Table 1. School Location Menu Testing

School Location Menu Testing	
Actor	Administrator
Menu	School Data
Design process activities	<ol style="list-style-type: none"> 1. Access the high school and high school mapping GIS website 2. The school location icon appears 3. Select one of the

		school location icons 4. Then click view details 5. School information and data appears
Sign	Error Warning	
	System Suitability	
Results	<i>Warning</i>	OK
	<i>Accept</i>	OK
Information		-

3.4 Analysis

From the results of the GIS-based SMA and SMK design in Ternate City, the system built from the design stage using use case diagrams, activity diagrams, sequence diagrams can run according to the menu functions in the system, there are two views in the system being built, namely the front page which consists of the user page menu and the back page which consists of the homepage menu, school data menu, edit user menu and logout.

Testing the software used, namely the blackbox method, this method tests the specific functions of the designed software. In blackbox testing, the test does not reach the system algorithm that is built, but blackbox testing is a test that tests the functions of each menu on the system. Like testing the login menu, if the username and password data is entered incorrectly, it will display a message that the login failed, the username and password are incorrect, if the username and password are correct, the page will display

back which consists of the home menu, school data menu, edit user menu and logout. Then all the tests carried out showed valid results, this shows that the functional system on the menu that has been tested is correct.

In addition, school locations displayed on the system can function properly because they utilize leaflet maps, the system can be connected to a database server so that it can store and retrieve data. Thus the system is running according to design.

The advantages of this SMA and SMK mapping GIS information system can help the North Maluku government, especially in Ternate City, in recording and monitoring SMA and SMK schools so that they meet standards and assist parents in finding information on SMA and SMK schools such as the domicile zone of the school where they live and also

SMA and SMK schools that have met the standards set by the government.

With the existence of a geographic information system presenting school mapping data, it can be used for problems faced by researchers, therefore researchers are trying to create a system with the title "Web-Based Geographic Information System Mapping High School and Vocational High Schools in Ternate City" to make it easier for parents to find high school and vocational school information such as the domicile zone of their residential school and also high school and vocational schools that have met the standards set by the government.

4 Conclusion and Recommendations

4.1 Conclusion

The general conclusions based on the research conducted and discussed in the previous chapters, the following conclusions can be drawn:

1. The design of a mapping information system for high schools and vocational schools in Ternate City with stages starting from making a design which is described using, flowcharts, Class Diagrams, where each diagram discusses the whole system, how actors operate the system being built, a description of the activities that occur in the system, and what is done by the user in the system to an overview of what tables are in the system database, how these tables can be related, and an overview of the flow in the system being built.
2. The geographical information system for SMA and SMK mapping that was built uses the PHP programming language, Mysql as a database, while for SMA and SMK mapping locations maps use leaflet maps, maps API, and for testing this system uses a black box.

Specific conclusions based on the research conducted and discussed in the previous chapters, the following conclusions can be drawn:

1. This geographic information system for SMA and SMK mapping helps the North Maluku government, especially in Ternate City, in recording and monitoring SMA and SMK schools in Ternate City.
2. The geographic information system for mapping SMA and SMK helps local and foreign communities in finding the mapping locations for SMA and SMK in Ternate City. As well as making it easier for parents to find high school and vocational school information such as the domicile zone of their school where they live and also high school and vocational schools that have met the standards set by the government.

4.2 Suggestion

The results of the GIS-Based SMA and SMK mapping application in Ternate City are still available

deficiencies that have not been met by the designer, it is hoped that in the future an application can be developed so that it can be utilized by parties who need the application, including:

1. Add more SMA and SMK locations in Ternate City.
2. Make a determination of the distance from the user's location to a destination location that is close by using the Algorithm.
3. Can develop another geographic information system mapping SMA and SMK in the form of Android
4. Future research is expected to use different data or locations. For example elementary, middle school, etc.

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