# WEB-Based Geographic Information System For School Maping In Bungo District

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## Abstract

*The Bungo Regency Government has done several things in realizing the Sustainable Development Goals (SDGs) which are the current global focus that are mutually agreed upon, including Indonesia. This is intended to make the data easier to display. Displaying information in web form will make it easier for people to see it. The method in this research is the Waterfall method. In designing maps using Google Maps, the software used in building this application is PHP, HTML, CSS, as a programming language, MySQL as a database server, and Codeigniter. GIS mapping of education in Bungo Regency is a system that provides information to the public about the location of schools in Bungo Regency and their supporting facilities.*

### *Keywords:*
*website, school, geographic, sdgs*

## Introduction

The education sector, which is supported by available facilities and infrastructure, makes a real contribution. The Bungo Regency Government has carried out several evaluations of information on the world of education, through mass media such as newspapers and pamphlets. However, this method is not sufficient to inform education information widely to the public. This will certainly make it difficult to determine the planning in making policies by the relevant agencies. Therefore, through the design and manufacture of educational mapping GIS, it is hoped that it can display a map description or distribution of school information in Bungo Regency so that it is more interesting and can be enjoyed by the wider community. Presentation of information in web form will make it easier for the public to access it.

Geographic Information System is developing very rapidly. GIS is designed with information obtained from data processing, geographic data and data related to the position of objects on the earth's surface. This GIS technology integrates frequently used database-based data processing operations, capturing visualizations and the various benefits that analysis can provide through map images. GIS can be displayed on a variety of platforms. GIS is also able to explain about an event, make predictions, and strategic plans, as well as help analyze other problems such as population, social, defense, economic, education and others.

This technology can represent the real world on the monitor. However, GIS has more power and flexibility. Where a map is a graphic representation of the real world, the objects displayed on the map are called map elements or map features such as roads, parks, gardens, rivers and so on. Maps organize elements based on their location. GIS technology stores all information describing its elements as attributes in a database. This technology also creates and stores them in tables so that these attributes can be accessed with map elements and vice versa, these elements can also be accessed through their attributes. (Prahasta Eddy 2005)

## Library Review

### System

The system is an interrelated or integrated element that connects a unit consisting of two or more components or subsystems that interact to achieve a goal (Hartono, 2000).

### Information

According to Kelly (2011:10), information is data that has been processed into a form that is meaningful to the recipient and useful in current or future decision-making. This definition is the definition of information in the use of information systems.

### Geographic

In 2012, Haris explained the definition of geography, according to him, geography is a field of science that examines all aspects that exist on

the surface of the Earth with the concept of spatial or space for the use of development on the surface of the Earth.

**Information System**

According to Marimin et al (2016: 18), Information System is a component that is interconnected with the process of creating and delivering information within the company, which processes input in the form of data sources, then is processed with hardware, software, and brainware components and produces information.

**Geographic Information Systems (GIS)**

Geographic Information Systems (GIS) according to Aronaf and Burrough are as follows. According to Aronaf (2014), GIS is a computer-based system that is used to collect, enter, store, manipulate, and analyze geographic information.

**GIS capabilities**

Geographic information systems have the ability to connect various data at a certain point on the earth, combine them, analyze and finally map the results: (Prahasta, Eddy, 2019)

1. Enter and collect geographic data (spatial and attribute)
2. Integrate geographic data.
3. Checking, updating (editing) geographic data.
4. Save or recall geographic data.
5. Presenting or displaying geographic data.
6. Manage, manipulate and analyze geographic data.
7. Produce geographic data output in the form of thematic maps (views and layouts), tables, graphs (charts) reports, and others both in hardcopy and softcopy forms.
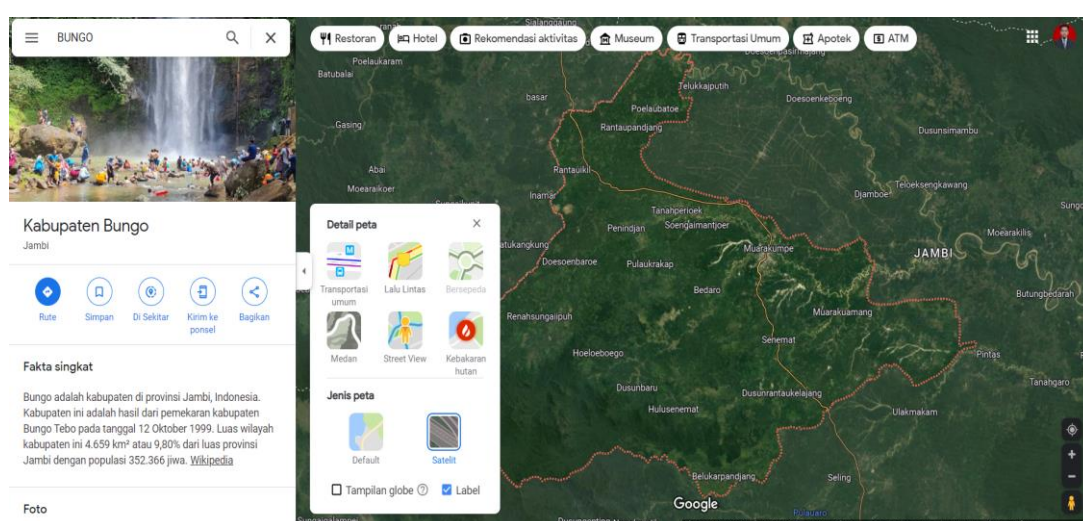
**Google Maps**

Google Maps is a free and online virtual globe map service provided by Google which can be found at http://maps.google.com (Wikipedia.org). It offers draggable maps and satellite images for the entire

world and more recently, the Moon, and also offers a route planner and business locator in the U.S., Canada, Japan, Hong Kong, China, UK, Ireland (city center only) and some parts of Europe. Google Maps is still in beta stage.

Through the Google Maps feature, internet users can browse the following graphical information:

Users can enjoy satellite images of planet earth. Users can also enjoy more detailed satellite photos by zooming in on the desired part of the map.

**Figure 2.1 Satellite Maps**



**Google Maps API**

Google Maps is a JavaScript form library. Like how to make Google Maps displayed on the web and blogs is very easy, here we only need basic knowledge of HTML and basic JavaScript, as well as the availability of a stable internet network. The use of Google Maps can be more effective and efficient in building a very good digital map application, so that we can focus only on the data that will be displayed, we create the data while the map that will be displayed is owned by Google so that we don't bother making a map of a location.

In making the Google Map API program using the following sequence:

1. write the JavaScript Maps code into HTML.

2. Type (div) with the name map_canvas to display the map.

3. Create multiple drawing objects in saving properties on the map.

4. Type JavaScript to create an object on the map.

5. Install the map in the HTML body tag with the onload event with the basic program code:

*Program Model 3.2 Google Maps API Basic Program Example*

```
<html>
<head>
<meta name="viewport" content="initial-scale=1.0, user-scalable=no" />
<!-- Langkah 1 -->
<script type="text/javascript"
src="http://maps.google.com/maps/api/js?sensor=true&amp;key=ABQIAAAA8tt4eKT
uBZMVnLJfP2BZrBT2yXp_ZAY8_ufC3CFXhHIE1NvwkxS4Rz1LFzG0odNPtk8VLkdrQF5grA"></
script>
<script type="text/javascript">
// Langkah 4
function initialize() {
var latlng = new google.maps.LatLng(-6.4, 106.8186111);
var myOptions = {
zoom: 13,
center: latlng,
mapTypeId: google.maps.MapTypeId.ROADMAP
};
// Langkah 3
var map = new google.maps.Map(document.getElementById("map_canvas"),
myOptions);
}
</script>
</head>
<!-- Langkah 5 -->
<body onload="initialize()">
<!-- Langkah 2 -->
<div id="map_canvas" style="width:600px; height:600px"></div>
</body>
</html>
```

In the Google Maps API there are four types of map options presented by Google including:

1. ROADMAP displays a 2-dimensional map.

2. SATELLITE displays satellite photos

3. TERRAIN shows the physical relief of the earth's surface

4. HYBRID displays satellite photos

**Methods**

Linear sequential or better known as the waterfall model has a systematic system development approach, starting from planning, analysis, design, code, testing and system maintenance (Pressman, 2017).

*System planning or engineering and modeling*

In this phase, system identification, user requirement studies, and system feasibility studies both technically and technologically are carried out as well as system development scheduling.

*Software requirements analysis*

In this phase, the collection of requirements is identified and focused on the system to be built, including identification of information domains, system behavior, for work and system interfaces. Requirements for the system are documented and consulted again for users.

*Design*

This phase focuses on the design process of data structures, system architecture, interface representation and program algorithms.

*Code*

After the design process is complete, the results must be translated into a computer program which then produces a system.

*Testing*

Tests are carried out to find errors that may occur in the coding process and ensure that the limited input gives results that meet the needs.

*Maintenance and Operation*

Marked by the delivery of the software to the customer for operation. During the operational period, the software still allows for an error or failure to function, the software still requires processing (maintenance) from time to time.

**Figure 3-1 Waterfal Model**
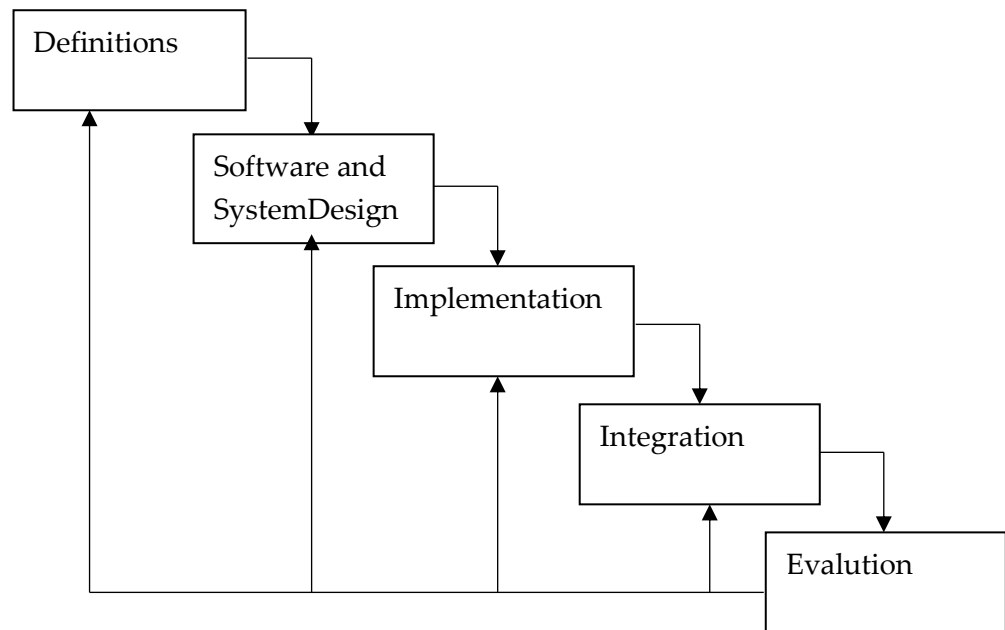


## Analysis and Design

System planning

The main purpose of system design is to provide an overview of the system design to be built, as well as understand information from a process in the system. (design)

1. Process
2. Database
3. User Interface

## Process Design

DFD (Data Flow Diagram) is a model to describe the origin and destination of data storage, processes that will generate data and interactions between data stored in the process (Jogiyanto, 2005).

The data flow design process uses DFD (Data Flow Diagram) which is divided into three levels, namely DFD level 0, DFD level 1, and DFD level 2.

**Figure 3.3 DFD level0**
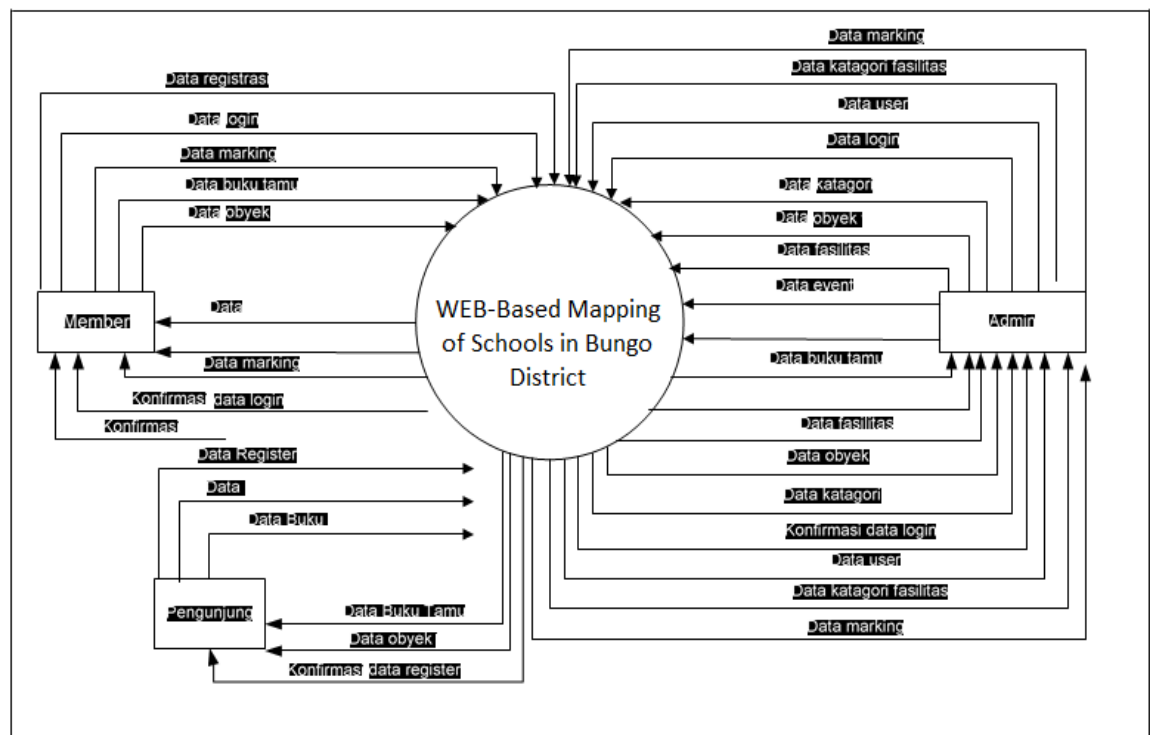


## Database Design

The design of the database on the system includes the creation of database tables. The design of this system uses the ERD technique as the basis for making database tables on this system.

## ERD (Entity Relationship Diagram) design

In the system created there are tourist category tables, tourist tables, facilities category tables, facilities tables, guest book tables, event tables, admin tables, user tables.

## Design Results

1. Users . table

Users table is a database table that is used to store user data containing usernames and passwords to perform the login process. Before logging in, the user must first register. After registration, the user will be

given a link that will be sent to the email. After the link is clicked, the user

status becomes active and can perform the login process.

**Table 4.1 Users Table**

| Fields | Types | Constraint | Descrip |
|---|---|---|---|
| User_id | INTEGER | Not Null auto_increment | User |
| name | CHAR | Null | name |
| Passw | CHAR | Null | Passw |
| Email adress | CHAR | Null | Email adress |
| Levels | VARCHAR | Null | levels |
| Status/ket | TINYINT | Null | Status/aktiv |

2. Events table

Event table is a database table that is used to store event data. Users

can create new events/events and determine when and where the event

will be.

**Table 4.2 The Event Table**

| Fields | Types | Constraints | Descrip |
|---|---|---|---|
| event | INTEGER | Primary Key | event |
| Name | VARCHAR | Null | Events name |
| contents | TEXT | Null | deskription events |
| address | VARCHAR | Null | Street name |
| Creats | DATETIME | Null | the date the events was made |
| Starts | DATETIME | Null | events start date |
| The End | DATETIME | Null | events end date |

3. Admin Table

The admin table is a database table that is used to store admin data such as the admin username and password used for login purposes on the main application page.

**Table 4.3. Admin Table**

| Fields | Type | Constraint | Desciption |
|---|---|---|---|
| Admin_id | V.C | auto_increment | Administration id |
| User_name | V.C | Null | Admin names |
| Pass_word | V.C | Null | Password admins |
| levelS | V.C | Null | levels |

**Index/Home Page Design**

The main page or index is the first page that will appear when the user enters the website address about the school website in Bungo Regency. This main page consists of several main menus, namely the profile menu, the Guestbook menu, and the Mark Place menu. In addition, there are also other menus that are used to make it easier for users to find out what information is contained in the Bungo district education office.

**User Registration Page Design**

The user register page consists of inputting username password, email, and confirming password. Users can register by filling in all the inputs and clicking the register button.

Admin Login Page Design

On the admin login page, the admin can input the name and password to be able to enter the Admin Menu page and can edit some menus on the Bungo Regency Education Office website.



## Implementation

Implementation was carried out in the previous chapter and will be explained in this section, with the aim of understanding the application requirements in a tangible form that is transmitted into computer language, implementation is a design that has been done. At this stage it will be explained about the use of the device, the files built in the system, the web display along with the coding script program to display web pages.

## Hardware (Hardware) Used

The hardware used to operate this Web-based Geographic Information System are:

a. HP OMEN 16 Laptop

b. AMD Ryzen 7 4800H

d. 512 SSD

e. NVIDIA GeForce RTX

**Software used**

The software used in building this Web-based Geographic Information System are:

a. Codeigniter

b. Photoshop CC.2020

c. mozilla firefoxs / Google Chrome

d. .MySQL database

e. Windows 11 Pro

**Implementation Web**

The connection.php file is a php script to connect the web to the database "dinaspendidikankabupaten" contained in the MySQL database.

**Modul 5.1: Connection Script .php**

```php
<?php
$server = "localhost";
$username = "root";
$password = "root";
$database = "dinaspendidikankabupatenbungo";

// Koneksi dan memilih database di server
mysql_connect($server,$username,$password) or die("Koneksi gagal");
mysql_select_db($database) or die("Database tidak bisa dibuka");
?>
```

**Home Page View**

The Home page is the main page of the Web-Based Geographic Information System Website for Scool Mapping in Kabupaten Bungo . This page serves as a place to display information about this Web. The Home Display is as follows:
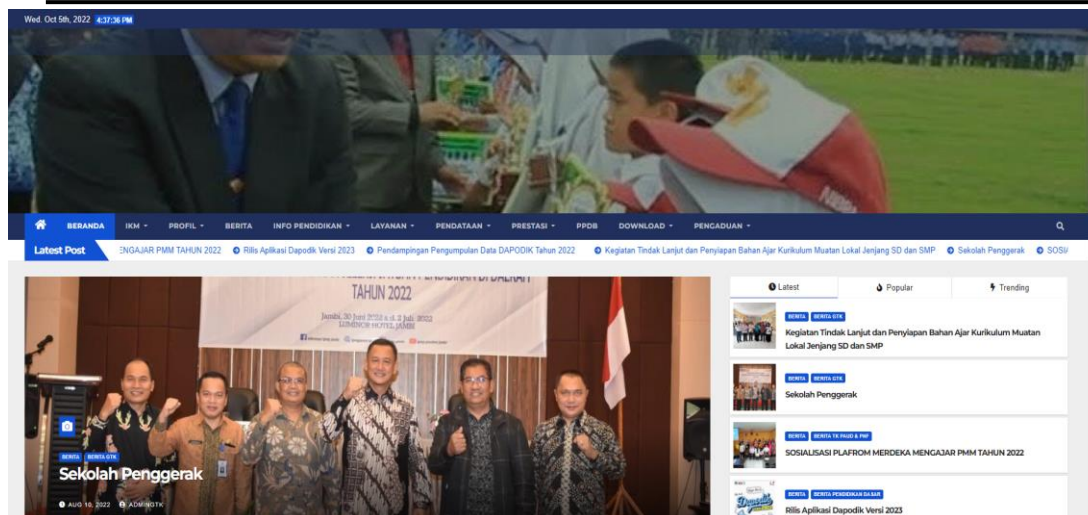
**5.1 home view**



```
<!-- nama web & menu contact -->
<h1 id="siteName">Dinas Pendidikan Kabupaten Bungo</h1>
<div id="utility">
    <a href="index.php"><?php echo Index ?></a> | <a
href="home.php?menu=profil&id=sitemap"><?php echo $m_sitemap ?></a> | <a
href="home.php?menu=profil&id=about"><?php echo $m_about ?></a> | <a
href="home.php?menu=profil&id=contact"><?php echo $m_contact ?></a>
  </div>
  <!--end nama web -->

  <!-- global nav _menu utama-->
    <?php
      include "Menu_utama.php";
  ?>
<!--content paper / kontent utama -->
    <!--menu kanan-->
    <?php
    include "Link_kanan.php";
        ?>
<!-- content/artikel -->
<div id="content">
<?php
                include "Content.php";
                include "blocksekolah.php";
          ?>

    <!--footer-->
        <?php
        include "Footer.php";
        ?>
```
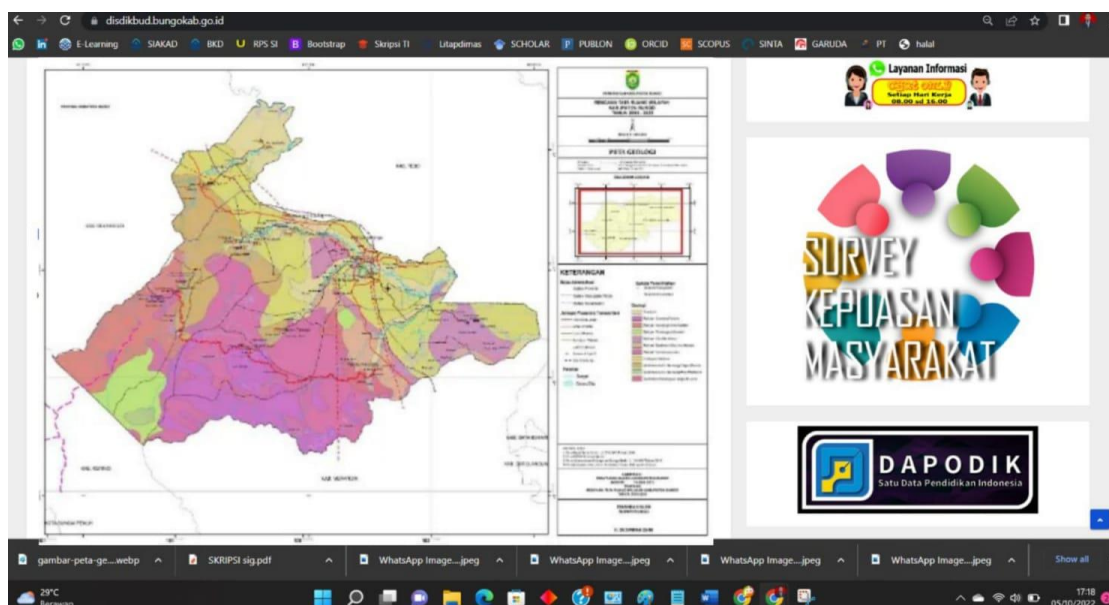
**1.2 Script Home View**

**1.3**

## Map Page View

The Map Page is a Web-Based Geographic Information System for Mapping Schools in Bungo Regency. This page displays a map of Bungo

with several menus and facilities in Bungo Regency. The Index Display is as follows:



*1.4 Display Maps on Website*

## Conclusion

From the results of this study, it can be concluded that a Web-Based Geographic Information System for Mapping Schools in Bungo Regency has been produced, so that it can help the Bungo Regency Education Office to convey information to the community effectively and efficiently.

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