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Design and Build an Industrial Work Practice Presence Information System Using Web-Based GPS

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ABSTRACT

The design of this industrial work practice attendance information system can help the SMK Model PGRI 1 Mejayan to speed up the attendance process. This system is designed and built to make it easier for the school to find out the activities and positions of students who are doing industrial work practices by locking latitude and longitude. With the construction of this information system, the attendance process will be more closely monitored and reduce attendance manipulation. The purpose of this study was to determine the design and development of an industrial work practice attendance information system using a web-based GPS (Global Positioning System) at SMK Model PGRI 1 Mejayan. This system development method uses a system development model with the Rapid Application Development method and in its design uses the UML model. The result of this research is an industrial work practice attendance information system using a web-based GPS at SMK Model PGRI 1 Mejayan, and made using the programming language PHP, HTML 5, CSS, Java Script, Code Igniter 3 framework and using the MySQL Database Management System. In making this system using the Visual Studio Code text editor.

Keyword: Design and Build, Information Systems, Presence, GPS, Codeigniter 3.

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1. INTRODUCTION

Attendance is the presence of a person who is recorded in the book list, while absence is the absence of someone who is recorded in the book list [1]. His intentional or intentional absence is very very influential on the value [2]. At SMK Model PGRI 1 Mejayan the industrial work practice attendance system still uses the manual method, namely by filling out activity books and signatures, as well as 362 students who will take part in industrial work practices in 2021, so not all students can be well organized. This makes some students who are absent can manipulate their attendance and the SMK has difficulty in monitoring the attendance of their students during industrial work practices. Prakerin or Industrial Work Practices are part of the Dual System Education (PSG) as a form of togetherness between Vocational Schools and Industry carried out by students in the industrial world and the business world [3]. SMK Model PGRI 1 Mejayan is the largest PGRI school in Madiun Regency, and one of the best flagship schools in Madiun Regency [4].

In a study conducted by Herdiana dan Rustiyana where attendance using manual or file methods turned out to have an easier risk of being lost, which made errors during data recapitulation [5]. further research conducted by Kristiadhy and Gundo showed that the attendance system using gps during the pandemic was also effective because during the pandemic it used distance learning [6]. The technology that can solve the

problems that exist in the SMK Model PGRI 1 Mejayan is Global Positioning System (GPS) technology. GPS is a navigation system that uses technology in the form of satellites that can receive signals [7]. This GPS system receives coordinates from satellites without weather constraints [8]. In general, GPS is used as directions. With the presence system using GPS, the homeroom teacher and the school can easily monitor their students who are doing industrial work practices.

In the design of this system using GPS as the technology used to lock the location using latitude and longitude when filling in attendance made by students. Latitude divided into 2, namely positive latitude and negative latitude, positive latitude is part of the north equator while negative latitude is part of the south equator. Longitude is also divided into 2, namely positive longitude is the eastern part prime meridian and negative longitude is the west prime meridian [9]. Furthermore, the SMK and homeroom teachers can see the positions that are directed to the google maps. Google maps is a web developed by Google as a mapping service [10]. After that, the system will lock the location determined by GPS (Global Positioning System) [11].

This system is built using a web-based PHP language with a MySQL database, using the Codeigniter 3 framework and Bootstrap to make it look more responsive. PHP or Hypertext Preprocessor is a programming language used to create a web and is server-side scripting [12]. While Codeigniter is an application framework for creating dynamic web applications with the MVC concept or Model View Controller Development Pattern [13]. Because Codeigniter is a framework that has been separated in MVC, the researcher uses the CodeIgniter framework. This system requires the latest version of HTML so that when data retrieval using GPS can run smoothly.

This system was built with the aim that students do not manipulate attendance data, and homeroom teachers can easily check the location of students during internships without having to come directly to students' industrial work practices. So that the system can run as expected, it is necessary to test, the test in this study is black box testing. Black box or black-box testing approach is an approach taken to test an operational function of the software [14]. In addition, this test will also provide information on any activity in the system [15]. From the results of research conducted by Trenggina z et al. that the black box testing method, in addition to being able to see functionally, turns out to be able to see system weaknesses and can be developed in the future [16]. The results of research conducted by Cholifah et.al that the black box testing method used can find out the errors that exist in the interface and are in accordance with its function [17].

In a research journal conducted by Herdiana and Rustiyana, this study discusses the Design of Student Attendance Applications to Identify Student Attendance in Android and GPS-Based School Environments. This study uses the Waterfall system development method. The results of this study are the finished product in the form of a student attendance application using an Android-based GPS that previously used a file system. There is a problem with the old system, namely the frequent loss of attendance files which makes errors during data recapitulation. Where this system can replace and solve existing problems [5].

Therefore, this research is expected to help the SMK in monitoring the attendance of student internships. As well as assisting the school in using the latest information technology that has been built. Therefore, a presence information system and industrial work practices were designed and built using a web-based *Global Positioning System* (GPS).

2. RESEARCH METHOD

In this study, the researcher used the system development method Rapid Application Development (RAD). Rapid Application Development is a system development System development Life Cycle (SDLC) for simple development [18]. The following is a system development Rapid Application Development:
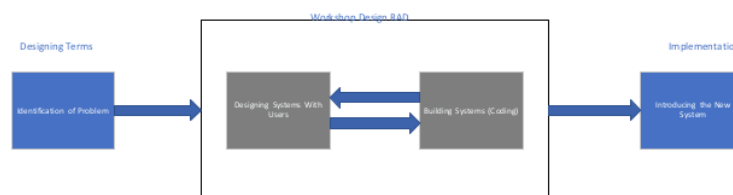

Figure 1 Method RAD [19]

The picture above shows the research methods carried out in the development of this system, the first stage is the design of requirements, the RAD design workshop, and implementation.
1. Designing Terms

At this stage the researcher analyzes the needs needed in building the system. Through the process of interviewing, observing, and identifying the purpose of the system and the conditions that arise because of these goals.

2. Workshop Design RAD

At this stage the researcher begins to design the system to be built, in its design using object-oriented modeling. After that, analyze the system to be made, then build the system or programming stage (Coding). Next, submit a visual representation of the design and work pattern to the user.
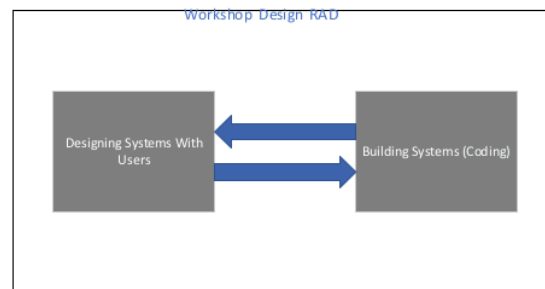

Figure 2 Workshop Design RAD [19]

3. Implementation

At this stage, after all aspects are approved and the system has been built and filtered, the system will enter the testing phase using the blackbox method. After testing the system, it will be introduced to the organization or user, where students who enter do attendance filling activities. With the following process:

Program Jurnal

```
Start
  Input PresenceData
    If empty(presencedata)) then
      Print 'Presence data still empty'
    Else
      Read presencedata
      Result = Store
      presencedata
    If (result = true) then
      Print 'Presence data saved'
    Else
      Print 'Presence data failed to save'
    End if
  End if
End
```

3. RESULTS AND DISCUSSION

The result of this research is in the form of an industrial practice attendance information system using GPS. Where students log in and then fill in the username and password, then fill in the attendance, when filling the attendance there is a location check button, when the button is pressed it will automatically detect the student's location and automatically lock the latitude and longtitude. Then the admin or homeroom teacher can see the student's location by logging into the system, looking for the student's name, then pressing the go to maps button, the page will automatically be taken to google maps.

With the system design as follows, the design of this system uses object-oriented programming design. The following are the stages in the RAD method described by a flowchart as follows:
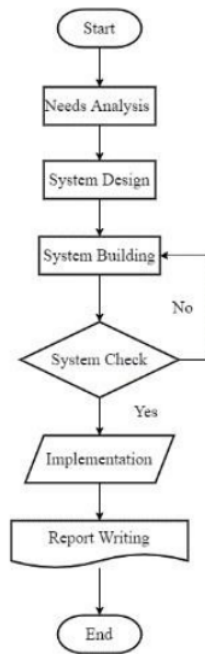
Figure 3 Research Design Flowchart

The following is an explanation of the flowchart image above:

1. Needs Analysis

   At this stage is the initial stage, where identification of problems and data collection obtained from users aims to identify the purpose of the system, and the desired information needs, and is oriented to solving problems in the absence of industrial work practices at SMK Model PGRI 1 Mejayan.

2. System Design

   At this stage the researcher makes a system design to be built such as interface design and making flowcharts, use case diagrams, sequential diagrams, activity diagrams, class diagrams, which are in accordance with the data obtained in the previous stage, at this stage the user responds to the prototype that has been made.

3. System Development

   At this stage the researcher started to build the system using the Visual Studio Code text editor, CodeIgniter 3 Framework, PHP programming language, MySQL database and XAMPP as the database server. Then will be tested using the Black Box method if at this stage it works well, it will proceed to the next stage, namely implementation.

4. Implementation

   After the system is built and tested, it will be implemented in SMK Model PGRI 1 Mejayan. Researchers also have the task of optimizing the system and performing maintenance on the finished system.

5. Report Writing

   At this stage is the stage of writing a report which is done in accordance with the Informatics Engineering thesis manual.

The following is a use case diagram of this system:
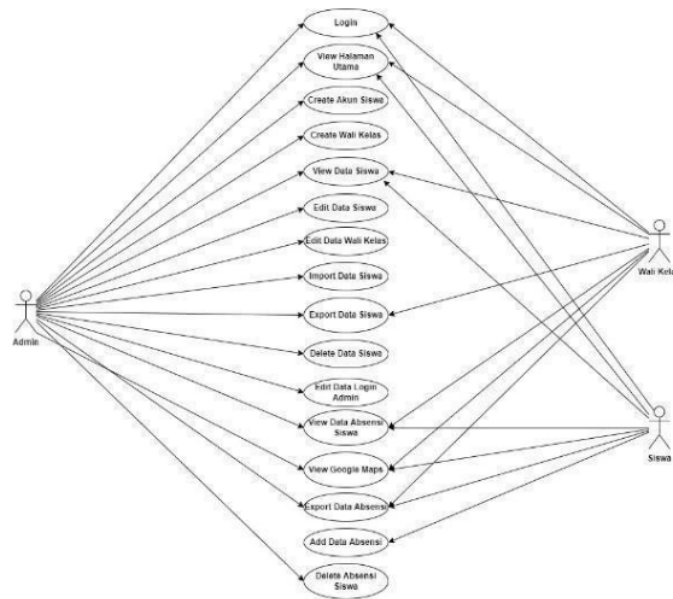
Figure 4 Use Case Diagram

In Figure 4 the use case diagram above there are 3 actors, namely admin, homeroom teacher, and students. where each actor has different access rights. in Figure 4 it is explained that the admin can access all access except adding a presence. then the homeroom teacher can only view, export and view on google maps the results of student attendance in his class. and students can only fill in attendance, export attendance results, and view attendance results on google maps.

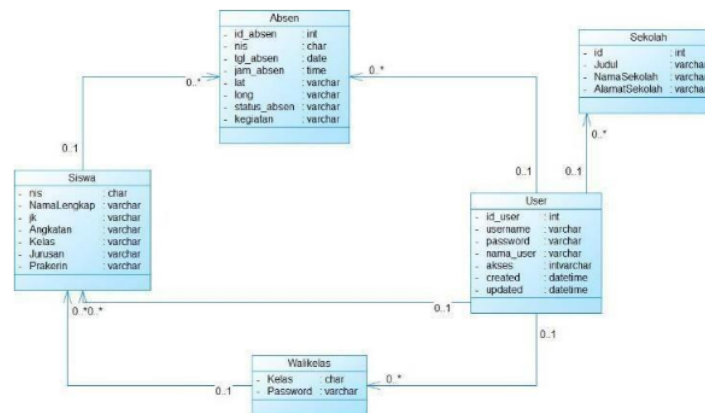The following is a class diagram of this system:

Figure 5 Class Diagram

In Figure 5 is a class diagram of the system created by the researcher. where the image is an overview of the database used to create the system. There are absent tables, student tables, homeroom tables, user tables, and school tables. where each table is related to each other. The user table is related to the homeroom table, the user table is related to the student table, the user table is related to the school table, the user table is related to the absent table. then the homeroom table is related to the student table, the student table is related to the absent table.

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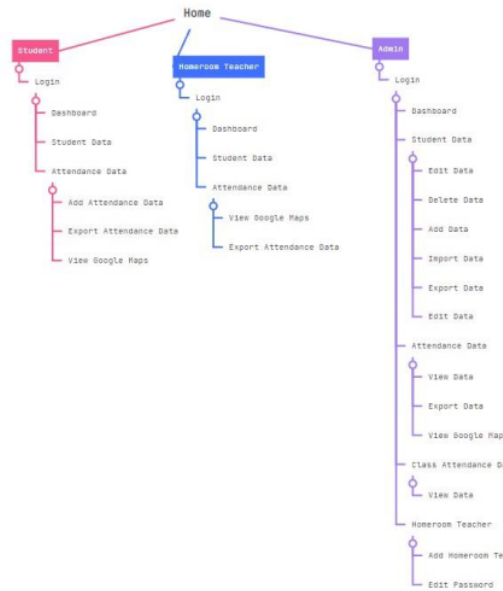The following are sitemaps of the system to be implemented

Figure 6 Site Maps

In Figure 6 is the system sitemap, which describes what page access the actor can do. starting from students who can access the home page, login, dashboard, student data, attendance data. then the admin can access the home page, login, dashboard, student data, attendance data, class student data, and homeroom teacher. while the homeroom teacher can access the home page, login, dashboard, student data, and attendance data.

The implementation of this system consists of many main pages including the home page, login page, add student attendance, view student attendance data, print attendance data, and view attendance locations in *google maps*.
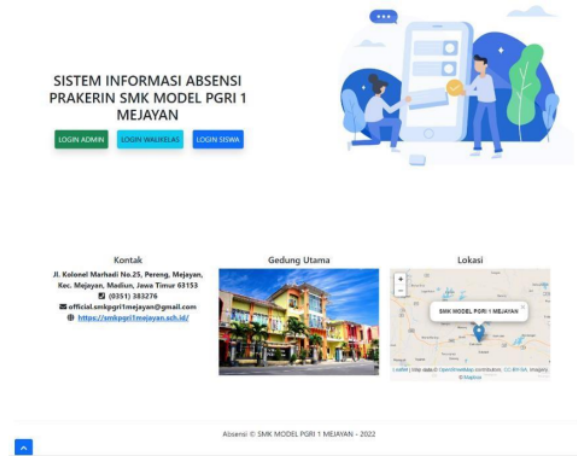

Figure 7 Homepage

In Figure 7 there is a home page, where there are student login buttons, homeroom logins, and admin logins, and there are contacts from schools, school buildings, and school locations.

Figure 8 Login Page

In Figure 8 is a student login, where students enter using the student ID and password.

Figure 9 Add Student Attendance

In Figure 9, students check their current location to find out latitude and longitude, then fill in activities and information and press the presence button. Then the inputted data will be displayed on the presence data page. The attendance data displays the place of internship, activities carried out, time of attendance, date when making attendance, attendance status, select attendance, view *google maps*, and export.

Figure 10 Student Presence Data

In Figure 10 there is a check menu for attendance data that has been filled in.

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Figure 11 Presence Print Pages

In Figure 11, students, homeroom teachers, and admins can download attendance data that has been filled out by students in pdf form, in addition to being able to print students, homeroom teachers, and admins can also see the students' locations when filling out attendance which will be explained in Figure 12.
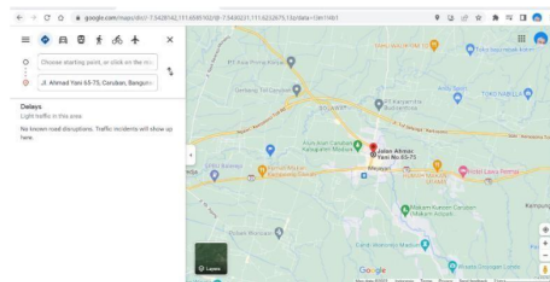

Figure 12 Location Pages *Google Maps*

After the system is finished, it is continued with system testing, in this study the researcher used the black box testing method, to find out whether everything was functioning with the results in the form of a table as follows:

Table 1 Testing Add Presence

Cases and Test Results			
Data Enter	Which is expected	Test Results	Conclusion
Click Check Location	Show long and lat Coordinates	Show long and lat coordinates	[√] Normal[ ] Error
Click save	Saved in database	Saved in database	[√] Normal[ ] Error

Table 2 Testing Student Presence Data

Cases and Test Results			
Data Enter	Which is expected	Test Results	Conclusion
Click the menu for the presence here	Enter the menu add student attendance	Enter the menu add student presence	[√] Normal[ ] Error
Click *go to maps*	Go to the *google maps* application	Go to the *google maps* application	[√] Normal[ ] Error
Click Export Student Attendance Data	Print in pdf format	Print in pdf format	[√] Normal[ ] Error

Based on the above test, it can be concluded that all buttons function properly and normally.

4.   CONCLUSION

Based on the results of the research and discussion above, the researcher can draw the first conclusion that this industrial practice attendance information system uses the Global Positioning System (GPS) and its location is displayed on google maps on a computer or smartphone. Then, this information system makes it easier for the SMK, especially homeroom teachers and students to monitor their students while doing industrial work practices. Finally, this information system can reduce attendance manipulation by students.

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