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Implementation of Website-Based Student Attendance System Using Codelgniter Framework at NU Ungaran Vocational High School

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Abstract

Nowadays, the use of technology is really needed by all levels of humans and education to make it easier to process data. The attendance information system at Vocational School NU Ungaran is currently still implemented conventionally or manually, such as the teacher taking the attendance data book in administration, then the teacher calls the students one by one for the process of filling in the attendance, then the teacher hands it over to the picket officer after finishing class time to be attended to. recap of attendance data, according to one of the teachers and picket officers, it was less efficient, which often resulted in damage or loss of the attendance book. The aim of this research is to make it easier for teachers and picket officers at Vocational School NU Ungaran when recording attendance data for all students. In this way the author designed my attendance using PHP and MySQL to process the database. My absence website is equipped with a QR code which is supported by using a camera or laptop camera which functions to take photos of students' barcodes for attendance. The results of this research aim to make it easier for teacher picket officers at Vocational School NU Ungaran to carry out attendance recaps.

Keywords: Implementation, Student Attendance System, Website, Codeigniter Framework

1. INTRODUCTION

Modern schools face the challenge of managing increasingly voluminous and complex student data. Manual attendance systems are prone to human error, data loss, and require significant time and resources. Manual attendance systems often produce inaccurate or incomplete data. The use of information technology in the education sector is increasingly important to improve the quality of learning and school management [7]. This research is in line with that trend and contributes to the effective utilization of information technology in the school environment. Entering today with the advancement of globalized technology has affected various aspects of life in the fields of politics, economy, culture, art and even education [4]. Technological progress in the development of this era is

something that we cannot avoid in life, because technological progress goes according to scientific progress [1].

The development of this technology has an impact on the increasing needs of the community for the data and information presented. The information received is easily accessed from various places, which at that time is also very easy to be consumed by the general public through technology [16]. Technology provides major changes to the current human lifestyle [5]. In the school world, especially in the academic field, attendance is one of the important data. Before starting or after participating in learning activities, each student is asked to fill out an attendance list or attendance as proof that the student has attended the class. In addition, attendance data is also needed by academics to monitor student activities in participating in every academic support activity [17]. Website is a collection of pages that contain certain information and can be accessed easily by anyone, anytime and anywhere via the internet. We can access the website by writing the site address of the website that we will browse. To access the Padang State University website, we can type the website address https://unp.ac.id/ then we can get the information presented by the manager [18].

NU Ungaran Vocational High School which is located at Jl. Kaligarang No.9 and was founded by K.H Adul Wahab on May 19, 2003 is an Islamic private school whose attendance system at SMK NU Ungaran still uses conventional or manual, for example the teacher takes the attendance data book in the administration, then the teacher calls the students one by one for the attendance filling process, then the teacher hands it over to the picket officer after finishing the lesson hours to recap attendance data, according to one of the teachers and picket officers is less efficient which often occurs damage or loss of the attendance book. This causes the teacher to re-record student attendance then submit it to the picket officer which requires energy and time. This causes the teacher to record student attendance again and then submit it to the picket officer which requires quite a lot of energy and time, therefore a website-based student attendance system is needed which is equipped with a qr code feature and requires a device in the form of a camera that students use to scan the qr code and the system will display student data when taking attendance according to the time of entry and return.

This research is expected to provide several benefits, including for Schools: Improving the efficiency and effectiveness of student attendance data management, reducing administrative errors, and providing easier and faster data access. This can contribute to improving the quality of school management. For Teachers: Facilitate and speed up the student attendance process, reduce administrative workload, and provide easier access to student attendance data. For Students: (If integrated with relevant features) Allows students to monitor

their own attendance recap. For Parents: (If integrated with parent information system) Allows parents to monitor their child's attendance at school. For Researchers: Adding knowledge and experience in web application development using the CodeIgniter framework, as well as contributing to the development of school information systems. For Society: Indirectly, this research contributes to improving the quality of education through the application of effective and efficient information technology in school management.

The main objective of this research is to design, develop, and implement a reliable, efficient, and effective web-based student attendance system using the CodeIgniter framework at NU Ungaran Vocational High School. The specific objectives include: Developing an online attendance system: Build a system that allows teachers to conduct student attendance online, eliminating the need for time-consuming and error-prone manual attendance. Improving administrative efficiency: Implementing a system capable of automating the process of recording and reporting student attendance, thus reducing the workload of school administration. Improve attendance data accuracy: Ensure that attendance data recorded is accurate and integrated, minimizing the possibility of data loss or recording errors. Facilitate access to attendance data: Provide easy and quick access to attendance data for teachers, students (if required) and parents (if integrated with parent information system). Test and evaluate system performance: Perform testing to ensure the system functions properly, is stable, and meets user needs. Learn and apply the CodeIgniter framework: Mastering and applying the CodeIgniter framework in PHP-based web application development.

2. METHODS

The waterfall method is something that describes a systematic and sequential approach (step by step) in software development [6]. According to the problems faced, the author makes a student attendance system with a qr code feature using the observation and interview methods for collecting student data which will be designed using the PHP programming language.

The waterfall method has sequential stages which are divided into five parts, including requirements analysis, system design, implementation, system testing and system maintenance [15]. The following is an example of a picture of the waterfall method can be seen in Figure 1.

2.1. Needs analysis

According to [3] data analysis is one of the research processes carried out after all the information needed to solve the problem being studied is fully available. the

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author conducted an analysis of the use of the attendance system at NU Ungaran Vocational High School by conducting interviews with one of the teachers and the duty officer, the results of the research refer to school attendance which still uses a manual system, by using this system there are still many shortcomings, including attendance not being brought by the teacher or forgotten, attendance books being damaged or even lost, and also left behind in class. Therefore, this website-based attendance system is needed. the author can help the school in processing attendance accurately.

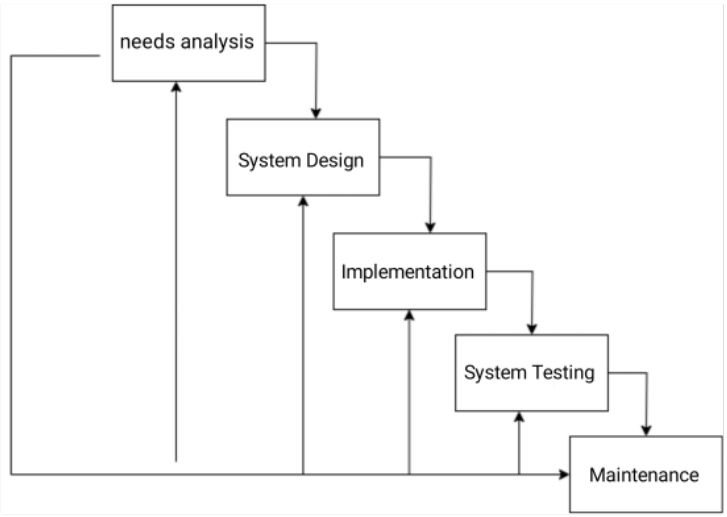

Figure 1. Waterfall Method

2.2. System design

System Design, after analyzing the needs of the next system, the author begins to design the system and explain the basic abstractions of the software system created [8]. According to [13] Some of the advantages of using CodeIgniter are free, written using PHP 4, small size, using the Model View Controller (MVC) concept, simple Uniform Resource Locator (URL).

2.3. Implementation

According to [2] In general, implementation in the big Indonesian dictionary means implementation or application. The term implementation is usually associated with an activity carried out to achieve certain goals. The author makes this website-based student attendance system using the PHP (Hypertext Preprocessor) program language and uses the CodeIgniter 4 framework, using this framework because of the simplicity of design and lightness to develop web

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applications without overloading the server. By adding the qr code feature, students can take attendance by scanning the qr code on the camera provided by the officer. According to the problems faced by the author, the author makes a student attendance system with the qr code feature using the observers and interview methods for collecting student data which will be designed using the PHP programming language.

2.4. System testing

Furthermore, testing the system on student attendance aims to find out any obstacles or errors from the attendance system so that the output results can display data in accordance with the expectations of its users. In this test the author uses Blackbox testing. According to [10] the Black Box Testing method is a test to show errors in the application system such as errors in the application system functions, as well as the missing application menu.

2.5. System maintenance

At the last stage, maintenance of the system is carried out. According to [12]. This stage of information system maintenance can generally be done by backing up the system code and guarding against malware, viruses, or other dangerous programs that will interfere with the running of the system. The system maintenance stage is carried out periodically when the system has started to be used. In addition, the purpose of system maintenance is also [11].

2.6. Method of collecting data

In writing articles using a common, common and standardized research method. When writing the results of research into an article form, it is usually directed to include a research method [9]. in collecting this data, the author conducted an interview with one of the picket officers, observations and literature studies. The interview itself aims to find out the problems experienced by teachers or picket officers in absenting students using a manual system in the use of attendance found various problems such as inefficiency and ineffectiveness, damage or loss of attendance books that make teachers have to write again manually after that the subject teacher submits the results of the attendance to the picket teacher to be recapitulated again then submitted to the principal. Observations aim to see firsthand the condition of the problems that exist in the field [14]. Furthermore, data collection using a bibliography is carried out as a source for solving problems experienced, namely a website-based attendance system to make it more relevant to the author.

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3. RESULTS AND DISCUSSION

3.1 Systems Requirement

Analysis is the initial stage of a study that must be carried out before designing a system or application that aims to find out the problems in the study in order to create a solution to the problem such as the problem experienced by teachers or duty officers where when the teacher is absent or has permission, the duty officer is the one who takes attendance of his students at NU Ungaran Vocational High School because they still use conventional or manual attendance which still checks the attendance column and has the potential for damage, besides that the attendance book is often left behind in class.

Based on the problems faced by the teacher, a website-based attendance system is needed to help solve the problem. Therefore, the author provides an alternative way that is more efficient and practical by presenting a website that contains attendance using a smartphone and laptop camera so that teachers do not need to take attendance of their students and there is no more damage or loss of the attendance recap, because the student attendance system uses a qr code that has been done by the duty officer or teacher and the student attendance list goes directly to the database.

The next stage is that the author designs or plans a website-based student attendance system using the CodeIgniter framework with the waterfall method after knowing the needs, the following is a diagram of the attendance process. In Figure 2, it can be explained the flow of officers or teachers on duty to see their students' attendance information. Officers or teachers on duty can see the attendance data that has previously been scanned to students using a QR code through the student attendance feature on the system according to class with each major, by using the QR code feature, teachers or teachers on duty no longer need to do attendance manually because attendance using QR codes is more efficient and saves time. Figure 3 explains the flow or features contained in the website-based attendance system using QR codes, which contain student attendance, student data, class and department data, and generate QR codes.

In Figure 4, the super admin use diagram, Figure 5, the login diagram, Figure 6, add data, Figure 7, delete data, explains how the website-based attendance system works when the super admin on duty wants to add student data, delete data, input officer data, delete officer data, then the system will display an add or delete data form. When successfully adding data or deleting data, the system will display a notification in the navbar section.

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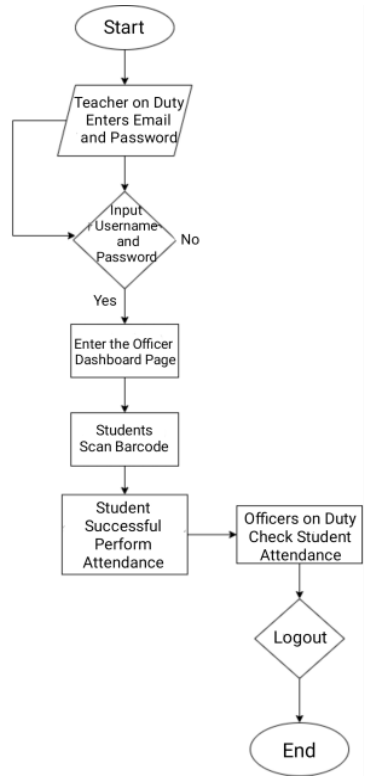

Figure 2. Student attendance flow

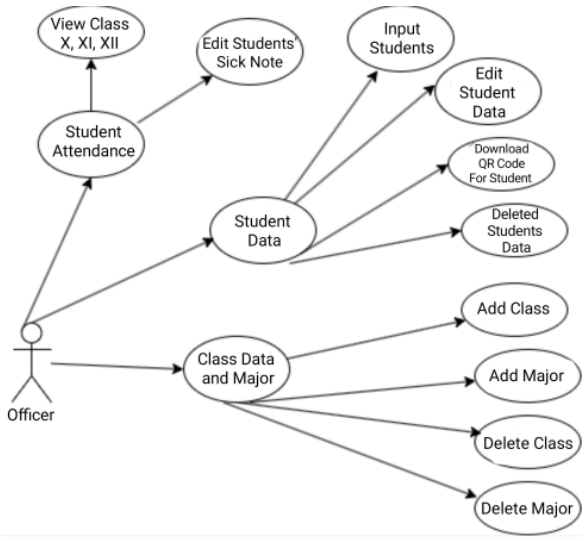

Figure 3. Use of officer diagram

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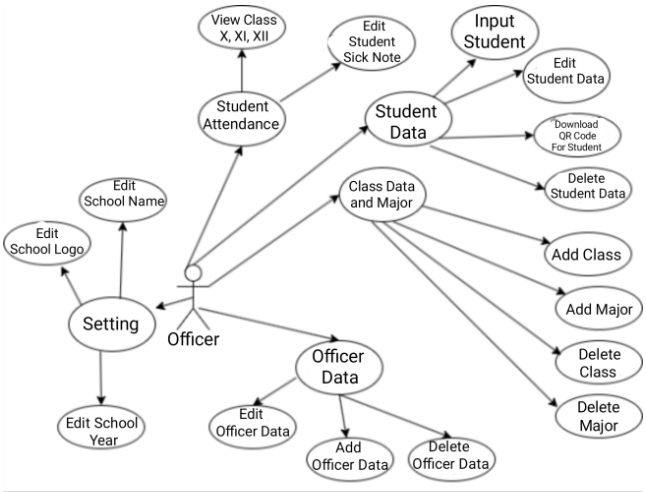

Figure 4. Use super admin diagram

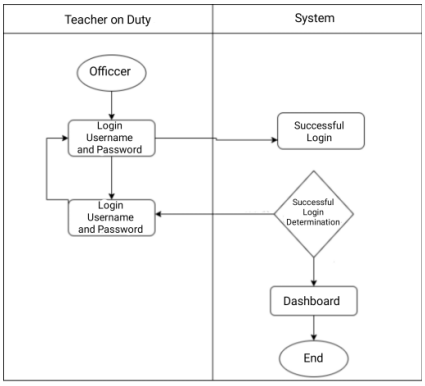

Figure 5. Login diagram

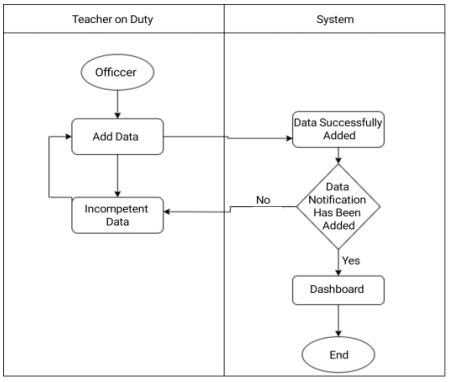

Figure 6. Data addition diagram

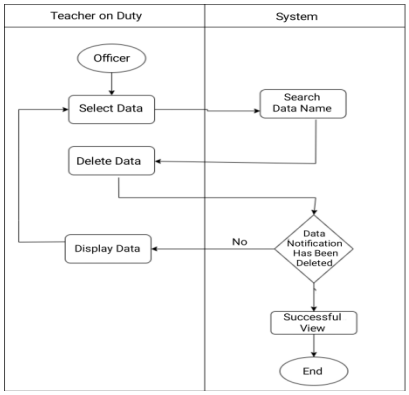

Figure 7. Data deletion process diagram

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Figure 8. Website attendance application page

The implementation of this website-based attendance system begins with development using the CodeIgniter framework using a combination of MySQL which functions as a database on localhost. This process uses PHP version 8.2.12. Figure 9 shows the appearance of the landing page as well as the admin and super admin login pages can be seen in Figure 8.

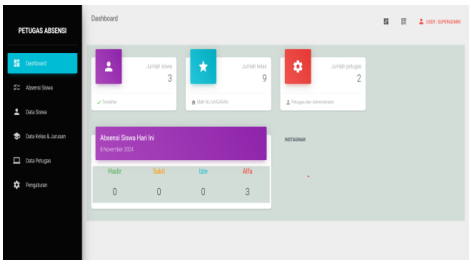

Figure 9. Dashboard page

Figure 10. Student attendance page

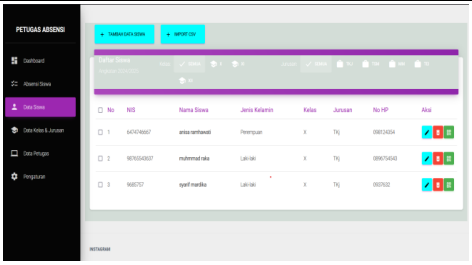

Figure 11. Student data page

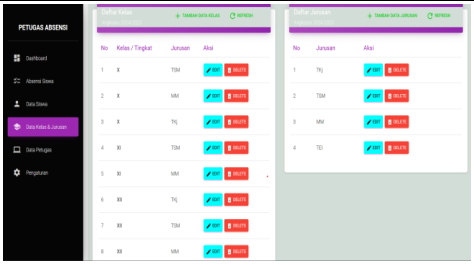

Figure 12. Class and department page

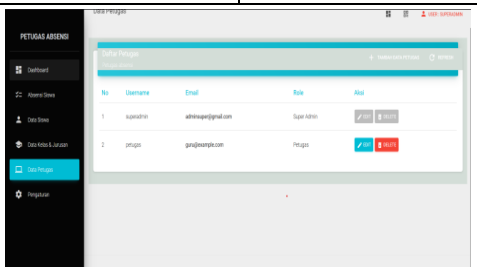

Figure 13. Officer data page

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After logging in, the super admin or admin system will go to the dashboard in Figure 9, Figure 9 explains the dashboard that contains the features of the student attendance system. Next, in Figure 10, it goes to the main feature system for student attendance, officers or teachers can see their students' attendance per class or department. Next, Figure 11 shows student data containing the names of students with their respective departments or classes, officers or teachers on duty can add student names or edit student names and can also print barcodes on the system. Next, Figure 12 goes to the class and department data feature, officers or teachers on duty can input or edit and delete class names and department names. Next, in Figure. Next, in Figure 13, it goes to the officer data feature which can be input or edited and deleted by the super admin only.

The next stage is the testing stage for the student attendance website system using black-box. This testing is carried out according to the description expected by the author. In order for the author to know whether the system is running or not, the results of the test can be seen in Table 1.

Table 1. Black box test results

Number	Testing	Hope	Results	Conclusion
1	Student attendance data per class or department	Successfully Showing	Attendance data successfully displayed	Valid
2	Add data or edit student data All majors and classes	Can add or edit student data	Data successfully added or edited	valid
3	Deleting student data	Can delete student data	Notification that student data has been successfully deleted	Valid
4	Display each student's qr code	Can download qr code for each student	Qr code successfully downloaded	valid
5	Add class data	Can add class list	Data notification successfully added	valid

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Number	Testing	Hope	Results	Conclusion
6	Editing class list	Can edit class list	Class edit notification successful	valid
7	Delete class list	Class list can be deleted	Notification to delete class data	valid
8	Add major data	Can add major data	Notification of successful major addition	Valid
9	Edit department name	Department can be edited	Notification of successful editing of department	Valid
10	Deleting major data	Can delete majors	Notification of successful major deletion	valid
11	Adding officer list	Can add officer data	Successfully added officer data	Valid
12	Edit officer name	Can edit officer name	Notification of successful officer edit	Valid
13	Delete officer data	Can delete officer data	Notification officer data can be deleted	Valid

3.2 Discussion

The research conducted by the author is the analysis of student attendance data. The results of this analysis can implement website-based student attendance needed by NU Ungaran Vocational High School. Data collection through interviews and observations, then the author makes a flowchart that shows the flow when the system process is successfully logged in, the flow of the website-based attendance system as in Figure 2, in Figure 3, namely explaining how the picket officer works on the website-based attendance system implemented at NU Ungaran Vocational High School to process attendance data to make it easier and more effective. The student attendance data will be stored directly in the phpMyAdmin database which is created using the Codelniter 4 framework using the PHP language.

The implementation of this absentku website can manage the attendance data of all students at NU Ungaran Vocational High School aims to make it easier for picket officers so that they do not recap the student attendance data provided by the class teacher and the teacher does not need to take attendance of their students again because the attendance is carried out by students directly by scanning the qr code according to the name and major, with this absentku student attendance data goes directly to the school database.

In this final stage, testing the system using the black-box method, to find out whether this attendance system is running as desired, such as adding data, editing data, and deleting data, but one of the systems does not run as expected, namely invalid in downloading all student data and downloading student data per class, the results of the black-box test can be seen in table 1.

This attendance system is a website-based attendance system to make it easier for teachers and on-duty officers not to manually recap data, likewise teachers do not need to take student attendance recaps in the administration then teachers take attendance by calling students one by one, which Where it takes quite a long time to start learning, by using this system it makes it easier for teachers and on-duty officers when taking attendance at NU Ungaran Vocational High School.

4. CONCLUSION

The results of the study revealed that this website-based attendance facilitates the management of student attendance data which was previously carried out manually by teachers and picket officers at SMK NU Ungaran including: Making it easier for picket officers to recap student attendance data provided by the teacher after completing the lesson and shortening the teacher's time to start learning time because the attendance is carried out by students directly using a qr code scan. The implications of this research are that the attendance system that has been developed can be expanded with additional features to increase functionality and user satisfaction. For example: integration with face or fingerprint recognition systems for attendance verification, automatic notifications to parents about student absences, a more comprehensive and customizable reporting module, integration with a more integrated academic information system, and attendance data analysis features to identify student absence trends. Future research needs to pay more attention to the security aspects of the system. This includes the implementation of strong authentication and authorization mechanisms, protection against cyber attacks, and data encryption to maintain the confidentiality of student attendance data. The system needs to be designed to handle a large number of users and data. Future research can focus on system performance optimization to ensure system responsiveness

and stability, especially during high loads. System testing needs to be done more comprehensively, including functionality testing, performance testing, security testing, and user acceptance testing. This testing needs to involve various users with different roles and levels of expertise. Future researchers can explore the integration of attendance systems with other technologies such as IoT (Internet of Things) for attendance process automation, or with data analytics systems to generate deeper insights into student attendance.

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