

The Effectiveness Monitoring Information System an Android-Based for Student Attendance

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Abstract: The purpose of this study is the availability of an android-based student attendance monitoring information system at 26 Jakarta Vocational High School which can provide android-based information quickly and integrated without data redundancy, through processing automation. from an android based application. The research method used in this research is a research and development method with a quantitative approach. This study involved 33 respondents who were divided into two groups. The first group is a team of experts to validate the product developed which consists of 3 respondents, namely software, hardware, and design experts. While the second group of 30 respondents used the product effectiveness test developed. The instruments used were pre-test and post-test. The results of the effectiveness test were analyzed with the T- a paired test that the system developed was significant at 0.000 or with $t_0 = 19.581 > t_{table} = 1.671$. The results of research on an effective monitoring information system provide real-time student attendance information. The application system can process data automatically, thereby minimizing the gap (error/difference) between input data and output information. The effectiveness of providing information with this system is beneficial for the convenience process and monitoring student attendance.

IndexTerms – Monitoring Information System, Student Attendance, Android-Based, Effectiveness System.

I. INTRODUCTION

The education process is a system consisting of inputs, processes, and outputs. Input referred to are students who will carry out learning activities, the process is an activity of learning, and output is the result of the learning process carried out. The implementation of the learning process is expected to produce quality human resources and be ready to compete to face competition in the globalization era. To provide information to the school management and parents about the attendance of students up to date and realtime, we need a student attendance information system that can be accessed anywhere and anytime by the school management and parents directly. Previously, several high schools equivalent in Indonesia had used a fingerprint system with a Short Message Service (SMS) gateway as a media liaison between schools and parents. But there are still schools that only use fingerprints as absences and do not have a media liaison between the school and parents as informing the presence of students.

An android-based real-time monitoring system can provide precise, fast, and up to date information [1]. Smart real-time monitoring system using GPS and GSM based technology provides information in real-time and effectively with an error rate of 0.78% [2]. Real-time monitoring systems provide remote information in real-time and effectively [3]. Android technology-based monitoring system provides distance information by the time of occurrence [4]. A real-time monitoring system using a hybrid technology application provides information in real-time and is connected to Google Maps [5]. The purpose of this research is to develop student and attendance monitoring information systems in real-time android-based at SMK N 26 Jakarta that can provide android-based information quickly and integrated without data redundancy, through the automation of processing of a smartphone application

II. LITERATURE REVIEWS

The system is a network of interrelated procedures, gathered together to carry out an activity or to complete a certain goal [6]. The system approach which is a procedural network of workplaces more emphasis on the sequence of operations in the system. Procedural is a sequence of clerical operations (writing), usually involving several people in one or more departments, which is applied to ensure uniform security of business transactions that occur [7].

The system is a series of components that are interrelated with clear boundaries and work together to achieve goals by accepting input and producing output in an organized transformation process [8]. The system is a network for carrying out an activity or completing a certain target[9]. Whereas the McLeod system is a group of integrated elements with the same intention to achieve a goal[10]. Information is data that has been processed into a form that is useful for users and has a real thought value for decision making when it is running or for prospects [11]. The quality of the information produced must contain the following three things, namely: a) Accurate, meaning that information must be free of errors and not biased or misleading; b) On time, it means that information that comes to the recipient must not be too late. Outdated information will no longer have value; and c) Information must be relevant, meaning that information has benefits for the user [12].

Information can have value. The value of information can be determined by two things, namely the benefits and costs to get it. Information is said to be valuable if its benefits are more effective than the costs of obtaining it. An information system is a system within an organization that meets the needs of daily transaction processing, supports operations, is managerial and strategic activities of an organization, and provides certain external parties with the necessary reports[13]. Information systems are a combination of work procedures, information, people, and information technology that are organized to achieve goals in an organization[14]. An information system can be an organized combination of people, hardware, software, communication networks, and data resources that collect, transform, and disseminate information in organizational processes [15]. Information systems can be defined as a collection of interconnected components that collect, process, store, and distribute information to support decision making, coordination, and control, information systems can also help managers and workers analyze problems, visualize complex subjects and create new products [16]. An information system is a system within an organization that meets the needs of daily transaction management, supports managerial operations and strategic activities of an organization, and provides certain parties with the

necessary reports [17].

Monitoring is the act of following continuously or continuously the implementation of activity [18]. Observed are 1) Inputs/inputs and activities related to it (monitoring Inputs). The process of achieving the outputs and impacts of activity is very dependent on the implementation of the activity. Therefore monitoring each step is very important for the manager and the person in charge of the activity. 2) Time of Activity Implementation (time monitoring) of each activity is strictly limited by time, meaning there must be a target of the outcome to be achieved for a certain period. To achieve the target by the specified time, it is very important to know as early as possible the problems that might hinder the implementation of activities, as well as observing / recording, transportation, location of the industrial world, and others. So that time can be monitored properly, then the schedule of scheduling activities is necessary to be prepared carefully and with full calculation, so that it can be obeyed, and implemented. 3) Output / Output achieved (Monitoring Output). Each activity certainly has a goal to be achieved. This objective is spelled out in benchmarks (quantitative and qualitative), outputs can be physical, the number of trained personnel, time, or money.

Monitoring is done to get a measure of the efficiency and effectiveness of the implementation of industrial work practices. Specifically, studying how output can be achieved by carrying out savings activities in input activities. The focus of monitoring input-output is to manage the supply and use of available resources to obtain the output. The purpose of the monitoring system can be viewed in several aspects, for example in terms of the objects and subjects being monitored, as well as the results of the monitoring process itself. The several objectives of the monitoring system are (Amsler, et al, 2009), namely: a) Ensuring a process is carried out according to applicable procedures. Thus, the process runs according to the path provided (on the track); c) Provides a high probability of data accuracy for monitoring actors; c) Identify unwanted results in a process quickly (without waiting for the process to finish); and d) Developing motivation and positive habits of workers.

Indicators that serve as a reference for monitoring output per process/activity. Generally, monitoring actors are parties who are interested in the process, both process actors (self-monitoring), as well as supervisors or supervisors of workers. A variety of tools are used in the implementation of the monitoring system, both direct observation or interview, documentation, and visual applications. According to Collin (2019), monitoring has four functions, namely: a) Obedience (compliance). Monitoring determines whether the actions of administrators, staff, and all involved follow the established standards and procedures; b) Examination (auditing). Monitoring determines whether the resources and services intended for certain parties (targets) have reached them; c) Reports (accounting). Monitoring produces information that helps to "calculate" the results of social and community changes as a result of implementing policies after a certain period; d) Explanation. Monitoring produces information that helps explain how policies impact and why planning and implementation are incompatible [19].

Monitoring has two basic functions that are related, namely compliance monitoring and performance monitoring[20]. Compliance monitoring functions to ensure that the process is in line with expectations/plans. Meanwhile, performance monitoring functions to find out the organization's development in achieving the expected targets. Generally, the monitoring output is in the form of a progress report process. The output is measured both descriptively and non-descriptively. Output monitoring aims to determine the suitability of the process is running. Monitoring outputs are useful in improving the process/activity mechanism in which monitoring is carried out.

Community Monitoring systems will have a good impact if they are designed and carried out effectively. The following criteria for an effective monitoring system [20]: a) Simple and easy to understand (user friendly). Monitoring must be designed in a simple but well-targeted manner. The concepts used are concise, clear, and concise. Short means simple, clear means easy to understand, and solid means meaningful (weighted); b) Focus on several key indicators. Indicators are defined as critical points of a particular scope. The number of indicators makes the actors and object of monitoring unfocused. This has an impact on the implementation of the system is not directed. Therefore, the focus is directed at the main indicators that truly represent the part being monitored; c) Good planning of the technical aspects. Realtime is an operating condition of a hardware and software system that is limited by a period and has a clear deadline, relative to the time an event or operation occurs[21].

A real-time system can be defined as a system that is not only oriented towards the output issued but there is also a system that is required to be able to work well in certain time needs. In real-time systems, time is a very important factor to consider [22]. The time factor becomes something very critical and as a measure of whether or not the overall performance of the system. However, there is one thing to remember, real-time systems are not the same as fast-systems. Fast-system is a system that works in the shortest possible time, in the sense that the faster the output produced by the system means the better the performance.

A real-time system is a system that must meet the response deadline or have severe risk consequences, including failure [23]. A real-time system is a software system where the function of the system, depends on the results produced by the system and time[24]. Real-time systems have unique characteristics where the system must be able to respond to an event in a short period. Real-time systems on a smartphone, used to control various systems from factory machines (these computers interact directly with the hardware). A smartphone system is called real-time if the system can support program/application execution with time constraints [21].

III. RESEARCH METHODOLOGY

The research method used in this study is a research and development method with a quantitative approach. Research and development methods are research methods used to produce certain products and test the effectiveness of these products [25]. Educational research and development is a process used to develop and validate educational products [26]. It can be interpreted that educational development research is a process used to develop and validate educational products. The results of development research are not only the development of an existing product but also to find knowledge or answers to practical problems. The learning system design model of Dick, Carey, and Carey is The Systematic Design of Instructional that is used to create effective, efficient, and interesting learning programs ([27]. In developing the system using secondary data in schools, after the system has been developed, a trial will be carried out. The first trial was conducted by an expert team consisting of 1 software expert, 1 design expert, and 1 hardware expert. The expert team test results are used for product revision. Furthermore, field trials are carried out for the effectiveness of the product being developed. In a field trial involving 30 students, it was carried out for 30 days. The results of field trials were analyzed using the paired T-test.

The ultimate goal of education research and development is the emergence of new models as a result of improvements from the old model to improve educational performance. With research and development, the education process is expected to be more effective and efficient by needs. Validation is carried out by material experts, design experts, and media experts to get input and responses to the initial development product so that based on product input and responses can be revised. The data analysis technique used is descriptive qualitative statistics. Qualitative descriptive statistics are used to analyze data by describing or describing data that has been collected as it is without intending to make conclusions that apply to the public or generalizations.

IV. RESULTS AND DISCUSSION

4.1 Results System Development

The design model used in the development of the monitoring information system application for the Industry Work Practicum android-based is the waterfall model or also called the life cycle development system model as explained in the research method sub-chapters in the following sequence. The system requirements analysis phase is carried out after the system planning stage and before the system design stage. This analysis phase is very important and critical to do, then this stage must be done after the system planning stage and before the system design stage because if something goes wrong at this stage it will cause errors in the next stage. In identifying problems in the 26th Vocational High School Jakarta, an analysis is conducted using a framework of performance, control, effectiveness, and service. Inputs needed in this student attendance monitoring information system application are Student Data with attributes, Name, Student Identification Number, Gender, school origin, Username, password, and access level. The output required in the application system for monitoring student attendance is the attendance of students.

The user diagram is a model with a Unified modeling language (UML) to describe the expected functional requirements of a system. The user diagram emphasizes who does what in the software environment to be built. In essence, in the user diagram, a user can do anything into the requirements or requirements of the software to be made. User diagrams are graphical depictions of some or all actors, users, and interactions between these components which introduce a system that will be built. The user diagram explains the benefits of a system when viewed according to the views of people outside the system. This diagram shows a system of class and how the system interacts with the outside world. Figure 1 explains that there are 4 (four) users who use this application, namely: Admin who do input data and registration of students, principals, students, and students' parents.

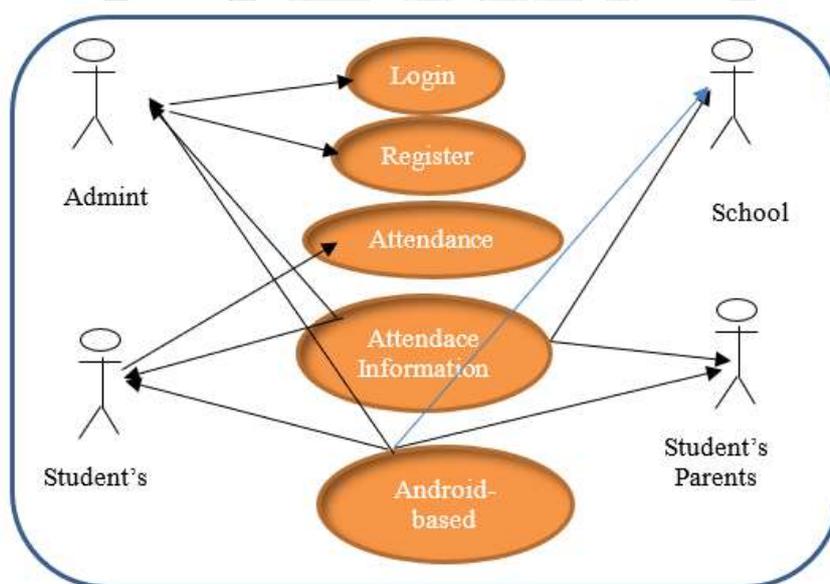
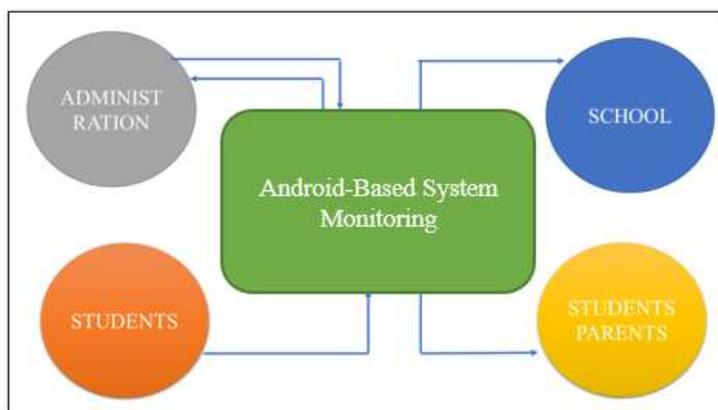


Figure 1 Use Case Diagram

After the analysis phase is completed, the system analyst thinks of how to shape the system. This stage is called system design. Data Flow Diagrams are system design tools that are oriented to the modeling process that can be used to describe the results of analysis and system design that is easily communicated by the system to users and programmers. This data flow is one way to create a system design that will be applied. In the first process, the login process for android users requires a username and password to enter the system. A check on the username and password will be carried out on the login page and then sent to the user database whether the data entered has been registered in the database or not. In the process of user administration, each user can only make changes to their respective data. Figure 2 below illustrates the flow of user administration and data processing globally.



Picture 2. Diagram Flow

Data processing, all users can do data processing, but in the process of changing data, not all users can do it. The process of changing data is indeed limited depending on the level of access that has been set for each user. The next activity is the coding system. Writing program code is the stage of translating the system design that has been made into commands that are understood by hardware using a programming language. This stage is a real stage in working on a system. The programming language used in designing this system is Hypertext Preprocessing (PHP), with the CodeIgniter framework, My SQL database for the android platform, and Ionic Framework, SQLite for the mobile platform.

PHP is an open-source scripting language that is very popular today. It is free and easy to learn and there are many references and is one of the reasons for choosing an Android information system. In running PHP, so that it can be displayed in the client browser, a web server is needed, in this case, Apache is used, to translate the PHP language into HTML language. Does this PHP syntax begin with <? PHP or <? and ends with?>, where the syntax contains the PHP language which will be translated by the web server, then sent to the browser on the client.

Meanwhile, MySQL is a database server that is also free and easy to learn, accompanied by many references that are circulating both in book form and in cyberspace. To simplify android based operations on the MySQL server, in PHP certain commands will be used to add, modify, delete the contents of the tables in the database. The application systematics as described above has been developed into an Android-based real-time student attendance monitoring information system application. The application in the physical development of the product is referred to as Draft1.

4.2 Expert Team Validation Results

After the monitoring system application is developed, the next step is to evaluate the product developed to revise the product being developed, namely the Android-based real-time student attendance monitoring information system application. The stages in the evaluation are validation by a team of equipment, design, and hardware experts, the results of the expert team validation are called the results of the feasibility of the product developed as drafts.

Based on the results of the questionnaire data analysis of the three experts' assessment of the feasibility of the monitoring system product developed, it shows that the product is suitable for use as an Android-based real-time monitoring system for student attendance. However, there are some suggestions from the three experts to make revisions so that the product being developed is even better. The suggestions from the three experts included design precision, the letters used were too small and the monitoring report had to include hours and information, all suggestions had been implemented in the product revision. The product of the validation results from the three experts after a revision was made based on the suggestions of the expert team, product is referred to as draft 2. A complete description of the average presentation of the feasibility of the monitoring system according to the evaluation of the three experts can be seen in Figure 3 below.

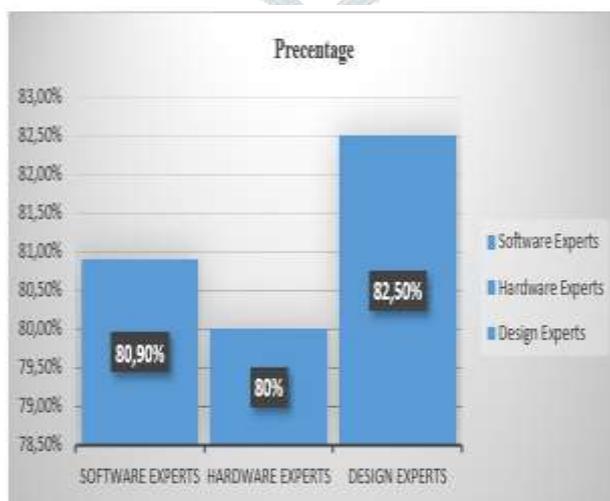


Figure 3 Results Experts Validation

4.3 Field Trial Results

Based on input and suggestions from the expert team, after revisions were made, field trials were carried out. The field trial aims to see the effectiveness of the monitoring system application in achieving the goal of providing information about student attendance at school. Also, to obtain information about system function components, system design, and system convenience.

The trial was conducted with 30 students, adjusted to the number of students in one class at SMK N 26 Jakarta. The main trial process is carried out like a small group trial, only the population or number of students is more than the small group trial. Students are given access to or download applications contained in the Play-store and are allowed to try the monitoring system application, this is done because it is done to identify deficiencies or weaknesses in the monitoring system application, regarding the functioning of the system being developed. By the main objective of developing a monitoring system application to obtain real time information about student attendance at school and convey this information to parents of students. As for the comparison of the results of student attendance before using the system and after using the system in this field trial, the T Paired test was carried out with SPSS which can be seen in Table 1 below.

Table 1 Field Test Results

	Mean	Std. Deviation	df	T ₀	T _{table}	p-Value
Pre_Test-Post_Test	6,767	2,677	29	19,581	1,671	0.000

Based on table 1 above, the value of $T_0 = 19,581$ is obtained when compared with the t table in DF 29. If $t_0 = 18,581 > t_{table} = 1,671$ can be interpreted as significant, meaning that the pre-test is different from the post-test. You can also look at the Sig. (2-tailed), the probability value / p-value of the Paired T-test: Result = 0.000. Meaning: there is a difference between before and after using the system. Because: p-value < 0.05 (95% confidence level). The Mean value of 6,767 is Positive: This means that there is a tendency to increase the score after using the system. The average increase was 6,767. It can be concluded that the monitoring system application is effective for monitoring student attendance in schools. The product from the field trial is called the final product which is effectively used to monitor student attendance in real-time and is up to date at school.

Based on the results of trials with potential users, it can be concluded that it is effective to use. The findings of this study are a system that facilitates information services to parents of students and is effective in implementing school absences because it produces real-time and up to date reports on student attendance at school. This opinion is supported by research by Aprisa and Monalisa[28] that monitoring information systems can make it easier for leaders to monitor developments every day without having to come directly to the location. This opinion is also supported by Afrina and Ibrahim [29] that the monitoring system to support the information process becomes more effective. Furthermore, the monitoring system in real-time provides environmental information to be effective compared to the previous system [30]. It is also supported by Athanasiou[31] that an integrated information system monitors the efficiency and accuracy of monitoring management. It is reinforced by Wang's research[32] that the monitoring information system is effective in continuous monitoring.

IV. CONCLUSIONS

The product developed is an android based real-time student attendance monitoring information system application. This product can help teachers and parents of students in knowing student attendance information in real-time and up to date. With the application of an Android-based real-time student attendance monitoring information system application, it is hoped that it will meet the needs and information services so that students or parents can just operate via a smartphone. To support the use of an Android-based real-time student attendance monitoring information system application, teachers need to disseminate it to students and parents because this application is easy to operate or use.

Teachers due to limited time in facilitating information services, it is necessary to develop an application for an Android-based real-time student attendance monitoring information system that is suitable to support innovative, effective, efficient, and fun student activity processes. For this purpose, it is recommended that teachers be able to become information developers not only as educators, therefore an understanding of development research is needed to support the information service process. Education organizers should be able to take advantage of the Android-based real-time student attendance monitoring information system application that has been developed, due to the obstacles that have been faced by parents of students in obtaining information about their children's attendance at school.

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