Implementation design of monitoring attendance for teacher at elementary school with scattered location

Y Yulianingsih1* , Z Niswati1, I B Rangka2 and S Marti’ah1

1Informatika, Universitas Indraprasta PGRI, Jakarta, Indonesia
2Bimbingan Konseling, Universitas Indraprasta PGRI, Jakarta, Indonesia

*Yuliagniya@yahoo.co.id

Abstract. The current location of educational institutions is generally not in the same location due to lack of land availability or educational institutions has the goal of accommodating a number of students from certain regions equally, in other words expanding the reach of these educational institutions. Generally, the institution will provide a solution by constructing a number of rooms vertically and grouping them based on the type of activity given. But the impact is the difficulty of monitoring business administrators and students when they want to conduct guidance or face-to-face counselling in addition to the teaching schedule. Thus it is deemed necessary to have a monitoring instrument regarding the presence of teachers to facilitate students and school administrators to monitor their existence. The system development method was designed using Rapid Application Development (RAD) based on observations of boarding-based elementary schools in Bogor, West Java. The system is designed based on the needs of students and business administrators, through the system there will be a number of information about teacher attendance, substitute staff, the location of the teacher's existence, current activities and other planned activities so that the parties can optimally utilize the information. With this instrument it is expected that students can learn to manage time effectively so that the character of students who are devoted, knowledgeable, skilled, independent and able to adapt to the development of information technology are formed.

1. Introduction

Information technology in the world of education is entities that can no longer be separated. Its existence has a considerable influence on the progress of education in a country. Technology development in the world of primary and secondary education has been carried out in several countries, including in Bangladesh which has been launched in its development program in 2021 [1] and Mongolia with four e-education programs namely Achievement of an average international ICT literacy level by 2012 (80% of all capable people), 70% of soums, 100% of province centers, cities will attend the 2012 learning distance system, Creation of the model schools (50% of schools will have an eschool capability by 2012) and Development of R & D [2].

Information Technology in its implementation, the development can be carried out by certain parties independently to be adjusted to the needs, but clear regulations must still be monitored by the government as the regulator. Thus, innovations that do not require large resources and the latest technology are needed, using existing devices instead that are capable of adapting to all conditions necessary for users of these technologies. In this journal a proposed attendance monitoring plan is proposed that can be used as a solution based on these conditions.
2. Theoretical basis

2.1. Information
Information is data that is processed into a form that is more useful and more meaningful to those who receive it. And the quality of information itself depends on three things, namely that information must be accurate, timeless and relevant. Information value (value of information) is determined from two things, namely the benefits and costs on acquiring it. Although an information value cannot be assessed directly with money, it can be judged from its effectiveness [3].

2.2. Service
According to Addy [4] service is covering the following:
- A help or assistance;
- A system consisting of organized human resources and material that is mobilized to meet customer needs;
- Supply, installation or maintenance of goods provided by suppliers;
- Communities that are usually not visible and are usually consumed together with the production process.

A service must focus on three things, namely: what we need to do now, what needs to be done if something goes wrong and how it can run smoothly all answers can be found by involving humans, processes.

2.3. Standard Operating Procedure (SOP)
Is a document relating to the procedure for carrying out activities carried out chronologically to complete a work that aims to obtain the most effective work done by system users. Benefits of Standard Operating Procedure [5]:
- As a standardization of the way that employees perform in completing specific work, reducing errors and negligence;
- SOPs help staff become more independent and not dependent on management intervention, so that it will reduce the involvement of leaders in the implementation of daily processes;
- Improve accountability by documenting specific responsibilities in carrying out tasks;
- Creating a standard measure of performance that will provide employees. Noticeable ways to improve performance and help evaluate the efforts that have been made;
- Create training materials that can help new employees to quickly carry out their duties;
- Demonstrate performance that the organization is efficient and well managed;
- Providing guidance for each employee in the service unit in carrying out daily service delivery;
- Avoid overlapping the implementation of service delivery tasks;
- Helps search for procedural errors in providing services. Ensuring the service process continues in various situations.

Appropriate and clear governance will affect service improvement in managerial aspects, governance can run well if management has an implementation guide to conduct business process activities. And the guideline is collected into a Standard Operating Procedure (SOP) which is compiled based on the gap analysis that occurs between the ideal conditions desired by the organization and the facts found in the field [6].

3. Method
Design and Creation focuses on developing new IT product is a strategy overall approach to answering research question. New IT product is a computer-based system and model about monitoring. Qualitative
data is all other types of data: words, images, sounds and so on and we look data generation methods is observation, watching and paying attention to what people actually do in university.

3.1. Rapid Application Development (RAD)
It is an incremental software development process model, especially for short work times and is an adaptation of the waterfall model and divides the work into several modeling groups, namely: Business modeling, Data Modelling, Process Modeling, Application Development, Testing and Replacement.

3.2. Unified modelling language
UML is a visual modelling language that enables system builders to create blueprints that capture their visions in a standard, easy-to-understand way, and provides a mechanism to effectively share and communicate these visions with others.

4. Results and discussion

4.1. Basic requirement for attendance monitoring system
Based on the results of observations on the location of the boarding school's presence in several locations, the following conditions are found that the average distance locations are as follows table 1:

| Building | Name              | Total (unit) |
|----------|-------------------|--------------|
| A        | Class room        | 1-5 (MI)     |
| B        | Dormitory         | 3            |
| C        | Mosque            | 4            |
| D        | Laboratorium      | 3            |
| E        | Library           | 1            |
| F        | Hall              | 3            |
| G        | Sports Field      | 1            |

Therefore, it is deemed necessary to have an attendance monitoring system that is built to suit the needs of application users by paying attention to the devices they have and the location. These needs include the hardware, software and network devices requirements described in table 2 below where the required technology is not the latest technology but is commonly used in the daily operations of a school.

| Attendance Monitoring System Requirements Specifications |
|-----------------------------------------------------------|
| **Hardware**                                              |
| 1. Server                                                 |
| Intel Xeon RAM min 2 GB                                   |
| 2. Storage                                                |
| HDD Min 250 GB                                           |
| **Software**                                             |
| 1. Operating System                                      |
| Ubuntu 16.04 LTS (Xenial Xerus)                           |
| 2. Web Server                                            |
| Apache web server                                        |
| 3. Programming Language                                  |
| PHP + GDLib                                              |
| 4. Database                                              |
| MYSQL                                                    |
| **Networking**                                           |
| 1. Switch                                                |
| 1 Gbps                                                   |
| 2. Router                                                |
| Interconnecting different networks                       |
| 3. Networking Cables                                     |

4.2. Networking topology requirement
At each building location connected with a router as a communication device and in the same location consisting of several floor used for teaching can be connected to the switch. Attendance monitoring is placed in each building or one of the buildings which as the center of the implementation of
administrative activities with a monitor screen as a tool to monitor the presence of teacher. While the attendance monitoring control center is only placed at the location of the administration which is intended with the purpose of control being carried out by one-gate policy. Every teacher comes in reports their attendance through the attendance tool that has been provided on each building where the tool has the same database as attendance monitoring system. In particular, the importance of IT governance in designing effective systems to support research and teaching through the capture, creation, and use of information may not be operating as efficiently as possible. In addition, performance measurement and appropriate metrics still lack a comprehensive and structured implementation in many important areas [7].

![Figure 1. Attendance monitoring system network topology.](image)

4.3. Attendance monitoring system
The Attendance Monitoring system involves actors or system entities that consist of system administrators, implementing systems, lecturers and students. Each actor has the rights and obligations described in Figure 2 below. The system administrator is a person who has the rights and obligations to configure the system and the entire system activities that can only be done on the central system.

The Office Administrator is a person who has the obligation to monitor the presence of lecturers and input data on the system. Teachers is a person who has the responsibility to report attendance and conduct teaching process activities. Students are those who have the right and responsibility to use a monitoring system as a tool to get information about the presence of lecturers. Described that the components of the system check and settings can be obtained in stages, with the aim that each information needed can be tailored to the needs of information seekers. This setting can be done by the system administrator. When student enters the building, reader sends that location to the server and the student is tracked easily. Server checks the timetable of that student if he/ she is unable to attend teacher according to timetable then notification will be directed to the admin. This system guarantees that attendance record of the students would be preserved appropriately and efficiently. The system will accordingly generate detention list of the students. It is minor scale automated application, which is easy to govern as well as time redeemable and trustworthy [8].

The attendance monitoring system was created and it changed the way attendances were marked. The attendance monitoring system has made the lives of teachers and employers easier [9].
A system administrator can set up an information input system and system settings to provide information limitations that can be received by information seekers and through the same system the business stylist can carry out similar activities except setting up the system. This maintains information security and the convenience of teacher given by the school. Described in Figure 3 below. The monitoring system is built with the concept of a module consisting of input modules and display modules.
The difference in access rights between the executing system and the system administrator is set in the user access section. The control function value set to "false" indicates that the settings are given not to display the information display for enlargement or the overall information. LinkType "B" is a view of the overall information as shown in Figure 4 below.

![Figure 4. Display module.](image)

The method of surveying the effectiveness and user feedback of the system is also discussed. The main advantage of the system is a more accurate and quicker method of recording and monitoring student attendance. With this system, it will be quantitatively easier to discern the students based on their diligence in attending classes, and thus also predict their performance due to the correlation between attendance and academic performance. We found positive feedback for the system in the design phase with some parties interested in commercialization. This encouragement motivates the deployment of the system in a number of trials which will be useful for further development and wider application [10].

The captured data is then authenticated by comparing with the pre-entered data to give access or authorization to the corporate resources, as well as recorded for attendance purposes. Our experiment shows that the automated attendance system is more effective, efficient and reliable, due to its real time capability, remote monitoring and attendance reports that it provides to the institution [11].

4.4. Steps of the attendance monitoring system Standard Operating Procedure (SOP)

After the system is structured, a number of rules are established as SOPs that can be used by relevant parties that can be used as a reference for the workload process which includes:

4.4.1. Limitation of service users. System administrators are users who have the right to input data, backup data, maintain systems and configure the settings on the system as required. Every system
regulation action must get the approval of their respective leaders. In this case, the head of the implementation of the respective study program.

Data Entry is a user who has the right to input data and obtain information but cannot make arrangements for the system. Each user has a user and password that must be kept confidential. Information users are all parties who only receive information through the system in accordance with the rules given by the system administrator.

4.4.2. Service hours of service. The system can be used to obtain information in accordance with the working hours of the implementing system, namely during the learning process. Apart from that the system is used as an incidental status which requires the use of permission from the person in charge of the system, namely the chief executive officer.

4.4.3. Location to be served. The location that receives system services is every part of the campus under the auspices of the relevant institutions.

4.4.4. Process review from management. At the end of each learning period, the number of attendance meetings is done by backing up the data conducted by the system administrator and then used by the implementing committee or other relevant parties to be used according to needs. Data stored on the system can be used as a teacher performance and attendance assessment.

5. Conclusion

Building a system does not mean that you have to use the latest technology, but you can use the presence of simple technology. An efficient and effective system is a system that generates new innovations by adjusting the needs of current users and can be developed to become a more complex system following user requirements. There requirement of a Standard Operating Procedure (SOP) to maintain the quality of the system services provided. The Attendance Monitoring system can be used on several other services that require the same information system processing.

References

[1] Shahadat M, Khan H, Hasan M and Clement C K 2012 Barriers To the Introduction of ICT Into Education in Developing Countries: the Example of Bangladesh Int. J. Instr. July
[2] Uyanga S 2005 The usage of ICT for secondary education in Mongolia Sambuu Uyang Int. J. Educ. Dev. using Inf. Commun. Technol.
[3] Jogiyanto H M 2005 Analisis dan Desain Sistem Informasi (Yogyakarta: C.V Andi Offset)
[4] Addy R 2007 Effective IT Service Management. (New York Springer)
[5] Permenpan 2008 Manfaat Standar Operasional Prosedur (SOP) Menurut Permenpan No.PER/21/M-PAN/11/2008
[6] Y Yulianingsih and DI Sensuse 2011 Governance Design Based on Service Desk Information Technology Infrastructure version 3 - Case Study on Hasnur Group. Exacta Factor J. 4 4 327–39
[7] Hicks M a Case Study of Improving
[8] Nadu T and Students Y 2017 Smart Attendance Monitoring System to Avoid Fraudulence by Synchronizing Results of RFID and Face Recognition System 3–6
[9] Singh S, Shenoy T and Matharu H Automatic Attendance Tracking and Monitoring System I
[10] Rahni A A A, Zainal N, Zainal Adna M F, Othman N E and Bukhori M F 2015 Development of the online student attendance monitoring system (SAMS™) based on QR-codes and mobile devices J. Eng. Sci. Technol. 10 28–40
[11] Yeboah-boateng E O, Asamoah E O and Segbedzi V D 2015 An Automated Attendance System based on NFC & X Bee Technologies with a Remote Database 9–15