iHadir: Web-Based Student Attendance System Using RFID Technology

Mohd Hatta Mohamed Ali @ Md Hani[1]*, **Mohamad Haikal Hussin**[1], **Aiman Syafiq Kamisan**[1], **Muhammad Hafez Nadzrin Shabudin**[1], **Abdul Halim Omar**[1]

[1]Department of Information Technology, Centre for Diploma Studies (CeDS), Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, MALAYSIA

*Corresponding Author Designation

Abstract: The Web-Based Student Attendance System Using Rfid Technology is a system that we developed to record student attendance using Radio-Frequency Identification (RFID) equipment in schools. The RFID is made up of several components like a small transponder radio, radio receiver and transmitter. When it triggered, the electromagnetic interrogation pulse from the nearby RFID tags will transmits digital data from the RFID tags and back to the reader. The data that were transmitted can be used as identification or record. It integrates the principles of the web base system by using devices such as RFID cards and RFID card readers to record student attendance. This system is designed to facilitate teachers' ability to review and store school attendance data. These data are stored in a database, which is designed specifically to store student data, where it integrates attendance data for each student on a daily basis using RFID techniques. It's difficult for the teacher and the class to build their skills and progress if a large number of students are frequently absent. Unlike other system, the RFID tags were developed to allowed the teacher easily track down the students throughout when they still school. The data also kept well in school database. Moreover, the data allows the teacher to find information of their students even thought they had left the school. This system also have a huge potential for commercialization.

Keywords: RFID Technology, Student Attendance System, Quality System

1. Introduction

The use of existing unconventional attendance system that requires the teacher to tick their students name in student attendance record book manually every time they attend the first class that they had. As common as it seems, such system is lack of effective in managing the student record attendance, where several problem may occur in future. This include more usage of time must be use by teacher to find and their students name sometimes teacher can mistakenly check the wrong students name. Also the student record sheet may get misplaced or corrupted.

*Corresponding author: hatta@uthm.edu.my
2021 UTHM Publisher. All right reserved.
penerbit.uthm.edu.my/periodicals/index.php/mari

By having the system implemented in school, it can help to resolve the problems. This is due to the ability of the system automatically manage capturing students attendance while flashing the RFID card at the RFID reader. This is our main goal in developing this system and in addition is having a functional online system so that teacher can monitor the students attendance anywhere and anytime. Looking at the bigger scope, having the system running in school can be use throughout the academic because students attendance is also the key to monitor student performance based on the quality of teaching.

2. Literature Studies

The Literature review is survey of books, articles, research that we can conclude or make a summary of what we have review or investigated. The main purpose of literature review is to gather all the information and sources that is related to our application in one place and evaluate themes.

2.1 Observations On Disadvantages of Using Old Methods In Recording Attendance.

Due to the use of old methods of recording student attendance which also involved large numbers of students, the process of recording was difficult and time consuming. Moreover, the old process is also inefficient and requires a lot of staff and the use of manpower to manage this process. Therefore, in most schools or educational center records student attendance is important as it can serve as a benchmark for student academic. The process of recording attendances for students was in the form of hardcopy papers and the system was manually done. Besides wasting time and taking efforts for preparing sheets and documents, another disadvantage that may be visible in the old process is the damage to the records and the loss of the attendance records [2].

2.2 Implementation of RFID

Not only that, the systems we have developed also have features such as RFID or known as radio frequency identifications, such technology allows data to be stored and retrieved on a card or identification RFID tag without the use of a physical touch [3]. RFID systems usually have some basic components such as RFID Tags, RFID Reader, middleware and a back end database to store data. These RFID systems depend on each component to ensure maximum system performance and performance so it's important to ensure that each component is properly installed and according to the system specifications it will use. Due to its high degree of flexibility, it enables the RFID to be adapted to many types of systems such as small inventory systems to food supply management systems that spread through country.

2.3 RFID and Attendance

Furthermore, RFID have several function that can measure the environmental factors like temperature. The RFID system are used in academic and industrial sectors to take the challenges and opportunity e.g. track and manage the attendance report cards, check the students and staff verification as well as identification when necessary[3,4]. The system that were build prove that it can eliminate uncertainties that cloud conventional attendance system in term of time used to manage the attendance process as well as possibility of the proxy attendance [5]. The system also is free from error, faster and authenticating students attendance. **Table 1** shows the comperative studies on attendance systems than has been done.

Table 1: Comperative Studies On Attendance Systems

Item	Features	Advantages	Disadvantages
RFID Students Attendance System	Students simply need to carry their RFID card and place it on the RFID card reader.Then their	Reduce the amount of work needed for attendance management, Greater precision and	Rural implementation is quite limited and Requires monitoring and knowledge in computer literacy.

	attendance on that day was automatically recorded.	eliminating errors and More transparent performance tracking.	High possibility of human error.
Manual Students Attendance System	Students write their name and matric card on a sheet of paper or attendance sheet.	No expense in technology. Easier to use and manage and Does not require electricity.	Information can sometimes be inaccurate and can be manipulate.

3. Methodology

The method used to develop this system is to use Software Development Life Cycle (SDLC) as per shown in **Figure 1**. The preferred SDLC model is ADDIE. It consists of analysis, design, development, implementation, and evaluation-represent a dynamic, flexible guideline for building effective training and performance support tools.

Figure 1: The ADDIE Model

3.1 Analysis

For the analysis phase, we have determine what the pros and cons of our system to our clients and the function that may be used. Other than that we have to make are research about the project that we want to make from other people journal or research, so from that we can take a note about their advantage and disadvantage in their project to we fix it in our project.

3.2 Design

This phase is about overall view of structure ,design media type and technology that are suitable for nowadays. So for our project   we have created a storyboard for our guided line when developing the interface for our client as per shown in **Figure 2, 3** and **4**.
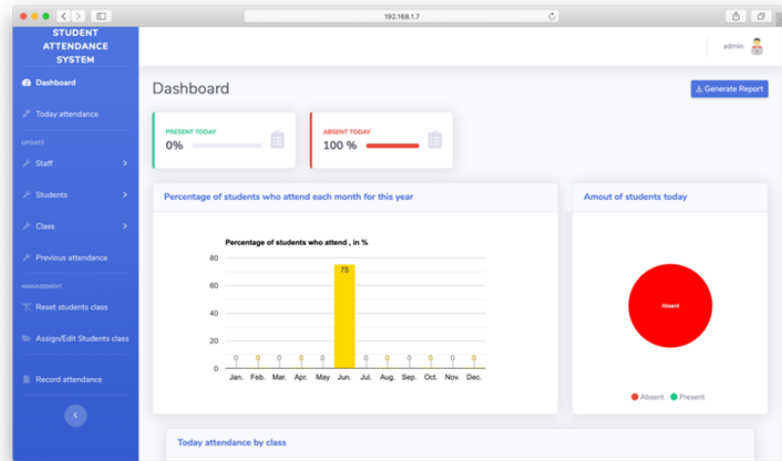
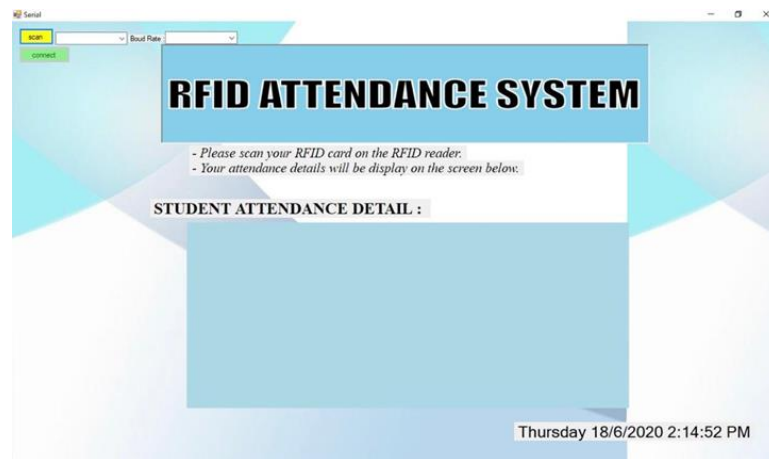**Figure 2: Design of Admin Interface**
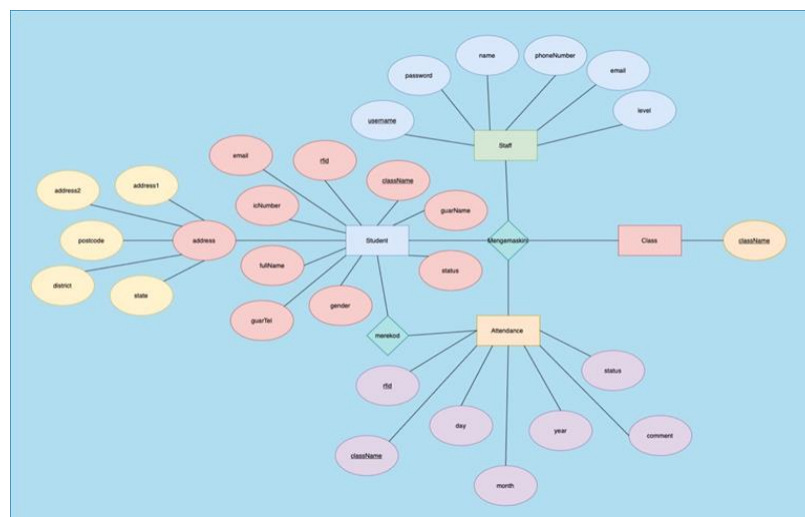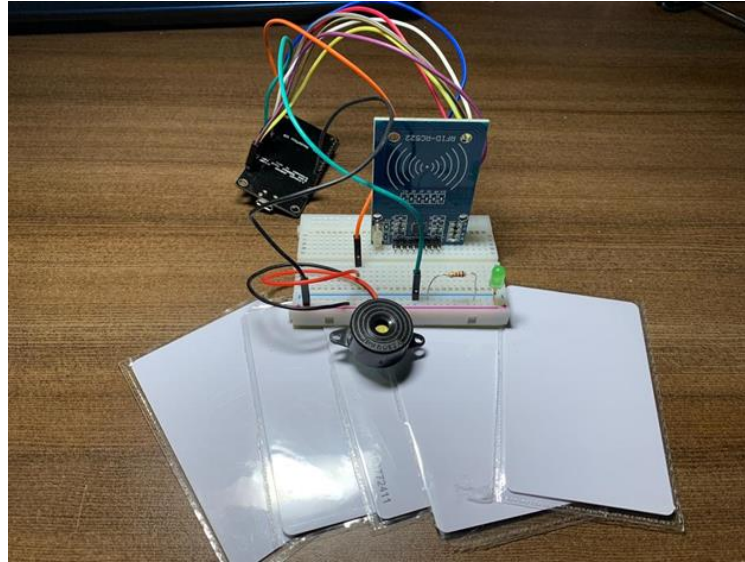

Figure 3: Design of User Interface

Figure 4: Design of Database

3.3 Development

The Development phase is a phase where we started to make our product that is RFID and system, we write the coding so that the system can function smoothly and make a setup for our RFID equipment and make a suitable database for our record about their student attendance. Next step are we link our database, RFID and system together as per shown in **Figure 5**.

Figure 5: RFID Reader and RFID Card

3.4 Implementation

In the Implementation phase is the system ready to be tested but we have to test by our self before we test in public and be evaluated by our client .All the comments from our panel or client will be record to use in the next stage.
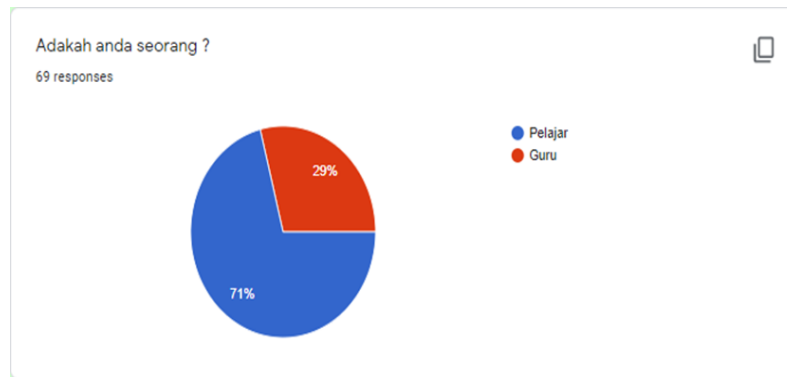
3.5 Evaluation

The final phase is the assessment phase where the system will be evaluated by the respondent through the questionnaire in Google Form. The implementation of this phase will find out whether the system is built to achieve the objective or not.

4. **Results and Discussion**

Based on the research and implementation of this system we are developing, we have conducted a survey on the use of student attendance books that is commonly used by school teachers and to get their views on whether the use of attendance books is still relevant today.

As we can see in **Figure 6**, we had received 69 respondents as a result of our survey. It consists of 20 teachers and 49 students that attending to *Sekolah Menengah Kebangsaan Dato Onn* and *Sekolah Menengah Kebangsaan Munshi Sulaiman*. Comments from the respondents as shown in **Figure 7**.

Figure 6 : Respondents For The Survey

Figure 7: Respondents Comments

From the opinions and comments of the teachers and students regarding the weaknesses in the use of student attendance records that have been taken as evidence to strengthen the development of our system. From their point of view as per shown in **Table 2** and **3**, we are also able to develop a system that meets the needs of our users, teachers and student.

Table 2: Feasebility Studies On Attendance Systems

Question	Strongly Disagree	Disagree	Less Disagree	Agree	Strongly Agree
The use of student attendance record books increases the workload in recording student attendance.	0	3	18	25	22
Does using an attendance scan card (RFID) help facilitate the process of recording student attendance?	0	1	11	21	36
Do you agree that the use of RFID scan cards can provide more effective results?	0	3	10	35	21

Table 3: Survey Results From The Respondents

Question	Yes	No
Have you ever experienced the loss of student attendance data?	32	37
Are you having trouble finding the old attendance record data that has been recorded from the attendance record book?	45	24
In your opinion, is it still relevant to use the old way (use of attendance record book).	22	47
If the use of card scanning (RFID) is applied in the process of recording student attendance data, can you accept the use of attendance scan card, even if you are familiar with the use of Attendance Record Book?	69	0
In your opinion, is it appropriate for the newly introduced technology system to record student attendance.	69	0

5. Conclusion

As a conclusion, the objective to build an RFID based attendance system was successfully achieved. In terms of performance and efficiency, this project has provided a convenient method of attendance marking compared to the traditional method of attendance system. By using databases, the data is more organized. This system is also a user friendly system as data manipulation and retrieval can be done via the interface, making it a universal attendance system. Thus, it can be implemented in either an academic institution or in organizations.

However, some further improvements can be made on this RFID in order to increase its reliability and effectiveness. An indicator or an LCD screen can be incorporated into the system to indicate when any unregistered card is scanned. Finally, this attendance system can be improved by adding a feature where the attendance system indicates when a student is late for classes as the case maybe.

Acknowledgement

References

[1]   Mohd. Firdaus Bin Mahyidin. (May-2008). "Student Attendance Using RFID System". in University Malaysia, Pahang.

[2]   Karwan Jacksi,Falah Ibrahim,Shahab Ali. (February-2018). "Students Attendance Management System". in University of Zakho, Iraq Duhok Polytechnic University, Iraq University of Zakho, Iraq.

[3]   V. Hoang, V. Dang, T. Nguyen & D. Tran. (2018). "A solution based on a combination of RFID tags and facial recognition for monitoring systems", 5th NAFOSTED Conference on Information and Computer Science (NICS), Ho Chi Minh City, pp 384-387, 2018. doi: 10.1109/NICS.2018.8606895.

[4]   K. Ashwin, P. Aswin, S. Krishnakumar & M. Maheshwari. (2015). "RFID Based Student Attendance and Monitoring System". International Journal of Innovative Research in Computer and Communication Engineering, 3 (1), 305-310.

[5]   O. Shoewu, O. M. Olaniyi & A. Lawson. (2014). "Embedded Computer-Based Lecture Attendance Management System", African Journal of Computing & ICT, 4(3), pp. 27-36.

[6]   Zulkifli C Z, Noor N M, Zamzuri A, Ali M, Semunab SN. (2016). Utilizing active RFID on wireless sensor network platform for production monitoring. Jurnal Teknologi.

[7]   Zulkifli C Z, Semunab S N, Ibrahim A B, Noor N M. (2017). Integrated Wireless Mobile RFID Reader in Real World Industry Environment. In International Conference on Engineering Technology, Vocational Education and Social Science,78(2):63-72

[8]   Hussain E, Dugar P, Deka V, Hannan A. (2014). RFID based student attendance system. In National Conference cum Workshop on Bioinformatics and Computational Biology, pp. 30-32

[9]   C. Z. Zulkifli* , H. N. Hassan, A. A. Zalay, S. M. Kamis and N. H. A. (2018). Hassan. INTEGRATED RFID TECHNOLOGY AND WIRELESS MESH NETWORK PLATFORM FOR BOARDING SCHOOL MANAGEMENT.

[10]   Adedokun, E. A1. Soja J. S.1, Tekanyi A.M. S2 , Adedokun, O. A3 . (2018). Theoretical Framework on Applications of RFID Technology in Healthcare, Education and Agricultural Sector.