Study On The Impact And Effectiveness Of QR Code And SMS-Based Attendance Monitoring System Among The Students Of Callang National High School

Ronald B. Rivera, Joe G. Lagarteja

Abstract—In this study, a new and enhanced attendance monitoring system using QR Code and SMS technology in tracking and monitoring students' attendance for Callang National High School, District 04, San Manuel, Isabela was introduced. It was developed primarily to improve the monitoring of students' attendance through the use of modern technology. The system records students' information, automates generation of IDs equipped with QR Code, facilitates tracking and monitoring of students' attendance through casting and sending notification to parents/guardians of students. The system starts with students' registration and printing of IDs with QR Codes. IDs with QR codes are tapped on a reader to cast a student attendance. Once cut-off time has been initialized, attendance information (non-casting of attendance notification) is disseminated and reported to the parents via SMS. In addition, the system provides a classroom attendance report for advisers and an individual students monthly attendance report. The innovation greatly affects the improvement of students' attendance rate through information dissemination via SMS to parents and automated attendance monitoring report generated by the system. The impact of SAMS to the students were identified by gathering the previous students' attendance record and GWA for the SY 2018-2019 which was compared to the attendance record generated by developed program and the computed GWA for the first quarter of SY 2019-2020.

Index Terms—Automated Student Attendance, Quick Response Code (QR), Short-Messaging-System (SMS)

1 INTRODUCTION

Students drop-out rate has been the primary problem of Callang National High School. Dropping out can be described as a process, rather than a single event, and is often the end result of a long period of disengagement [1]. Students drop out of school for many reasons, some external to school and some education-related. As a result, it is difficult to predict which students will drop out [2]. It has been identified that students are prone to drop-out because of poor school attendance and poor academic achievements [2]. Low academic achievement, being retained or overage, and poor attendance are significantly linked to dropping out across elementary, middle, and high school levels [3]. These factors are readily identifiable and may be targeted by dropout prevention efforts. Meanwhile, better school attendance and more positive engagement are complementary strategies to decrease and prevent students from dropping out of the school (A Proven Solution for Dropout Prevention: Expanded Learning Opportunities).

According to [4], class attendance got a positive impact on students’ academic performance. Attendance has a statistically significant and quantitatively relevant effect on student learning. As of now, Callang National High School is using a conventional attendance monitoring. One common method is by having students to manually sign the attendance sheet, which is typically passed around the classroom while a teacher is giving the lecture. This approach could undoubtedly allow the students to cheat on their attendance, a student may sign for an absent student. Besides, such an attendance sheet could easily be misplaced or lost. A stricter approach especially to prevent students cheating about their attendance is additionally tedious [5], where a teacher calls out the individual names from the student's list and validate the presence of every single student. Such manual methods of taking students attendance have been proven to be difficult and time-consuming [6]. Thus, there is a need for an automated system that would eliminate all of these troubles. With these problems, the researchers made a system that could ease the burdens of the school in monitoring the attendance of the students. This study introduced an automated attendance system. It uses a QR Code and SMS technology in tracking and monitoring students’ attendance for checking their presence. This study was also conducted to make the monitoring of the student’s attendance faster, accurate, consistent and effective.

2 MATERIALS AND METHODS

2.1 Data Gathering

To determine the key features that will be added to the study the researchers asked the concerned staffs or end users for features and add-ons to be included in the system. Moreover, the researchers also gathered the student's attendance report (SF2) of the Grade 8 students of the previous school year which served as a basis in identifying the impact of study in improving the students’ attendance rate.

2.2 Prototyping

To develop a working interface of the program, prototyping and actual programming was done. The researchers used Visual Basic.Net as the front-end programming language, and MySQL as its back-end.

2.3 Alpha Testing

It was done by the researchers to test bugs and other technical errors that may occur during system development.

2.4 Beta Testing

It was done to test and deploy the system with the users (Students, IT Administration and the Class Advisers).

2.5 System Implementation

This was done to determine the effectiveness of the developed program. The following procedures cover the implementation
1. **Student Registration**  
The student registration was done through the use of the Excel Template which was filled-out by the class advisers.

2. **ID Picture Taking**  
Once the data entry excel template is uploaded, students were called to have their ID picture taken and this was done during 4:15-5:00 PM to avoid disruption of classes.

3. **Printing and Distribution of ID**  
This was done to provide the students their identification card to be used to cast their attendances.

4. **Casting of Attendances**  
Students used their ID to cast their attendances. Once a student was not able to cast his/her attendance a message will be sent to his/her parent / guardian that he/she was not able to cast attendance.

2.6 **System Evaluation**  
This was done to determine the extent of impact of the project on the drop-out rate and performance rating of the students. The researchers gathered the attendance report grade 8 students of SY 2018-2019 which served as the basis of comparison with the attendance rate of the current school year when the system was implemented.

3 **RESULTS AND DISCUSSIONS**

3.1 **Comparative Analysis**  
The implementation of the developed program (Student Attendance Monitoring System) automatically facilitates students’ registration, generation of students’ ID and monitoring of students’ attendance. Class advisers had less time consumption in preparing their class attendance report through the auto-generated class attendance that can be used as a basis of making SF2s. Moreover, awareness among parents of their children’s attendance in school are assured through SMS Notifications.

The graph in Figure 1 shows the comparison of class attendance rates during the first quarter period of both SY 2018-2019 and SY 2019-2020.

The result shows that there was an improvement in students’ attendance through the use of the developed program. Students were also mandated to always bring their IDs to cast their attendances. Therefore, developed program can be considered as one of the effective tools in improving students’ attendance that reduces dropout rate and improves students’ performance rating. Meanwhile, there were still extraneous factors that affect the students’ attendance, it is highly recommended that aside from the automated monitoring and notification of the developed program, teachers particularly the advisers are encouraged to conduct home visitations and parent’s consultation to achieve a higher attendance rate in the near future.
3.2 Development of the Program Interface

The Register Students information window registers basic information of the students like LRN, name etc. It also captures student photo that will be used in their IDs. It allows the system user to capture student images and generates QR Code that will be embedded on their IDs. The window contains class information where grade level, Section, Adviser and SY is printed.

Another way to register students’ information is through the Classroom Information Data Entry Form (Excel Template). The template will be read by this window so that batch registration can be made for every section.

The disseminate Information window allows the user to notify parents via SMS. The user just filters the classroom information by selecting grade level and section to identify message recipients.

The Generate Identification Cards window allows the user to print pre-formatted IDs equipped with QR Codes can be be
used by the students to cast their daily attendances.

The pre-printed IDs are generated automatically by the developed program. The back of ID which has a QR code are used by the students to cast their attendances.

4 CONCLUSION
This paper presented a developed program that uses QR Code and SMS technology in tracking and monitoring students’ attendance for Callang National High School, District 04, San Manuel, Isabela. The system developed by the researchers featured an automated students’ attendance monitoring by implementing an innovative and modernize technology. The innovation greatly affects the improvement of students’ attendance rate through information dissemination via SMS to parents and automated attendance monitoring report generated by the system. The impact of developed program to the students were identified by gathering the previous students’ attendance record and GWA for the SY 2018-2019 which was compared to the attendance record generated by developed program and the computed GWA for the first quarter of SY 2019-2020 respectively.

ACKNOWLEDGMENT
The authors wish to thank Callang National High School and Isabela State University for the support of this study.

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