SCHOOL ATTENDANCE AND HEALTH GUIDE APP

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ABSTRACT

The Department of Education's step in reopening the classes at the elementary level is very challenging as the virus still exist and dangers students and teachers from contracting the virus. For the teachers and the principal, performing the tasks set by the national and local IATF including manual getting of temperature, attendance, and sending notifications to parents is time-consuming and still, both the students and them face the risk of contracting the virus. Using the scrum framework of the agile methodology, the researchers conducted a series of interviews with the personnel in-charge to discuss the challenges experienced while performing these tasks. All the challenges were listed as user stories, given priority,and designed corresponding modules as solutions. Using raspberry pi, thermal sensors, Mobile System for Global Communication (GSM) modules, and a web application, the researchers designed anInternet of Things-based solution. The researchers presented the output to the principal and receiveda go signal for implementation. During the run of the implementation, the system performed well according to its design and received positive feedback from the teachers and the principal. However, as the needs of the real world change with time, it is recommended to do further research to furtherenhance the system whenever the real world demand.

Keywords: Micro-controllers, Internet of Things, Ultraviolet C, Covid Response, Sensors, Wireless Technology, Web Application

INTRODUCTION

In 2019, Corona Virus Disease 2019 overwhelmed the world and has been declared a pandemic by the world health organization a few months after it spreads worldwide. Following the pandemic, declarations are tighter restrictions including travel, jobs and education. In the Philippines, most of the educational institutions shiftedfrom face to face to remote learning. This new learning system has huge drawback as students experienced technological difficulties. This prompts the Department of Education to resume classes even if the pandemic is not yet over. Leonor Briones, 2021 said that the department had to find ways to keep thelearning process going despite of

challenges and uncertainty posed by covid-19. She further added thateducation must continue to give hope and contribute to the normalization of activities in the country and facilitate the development of our learners and the restoration of normalcy in their lives.

Following the regulation of the Inter-Agency Task Force, classes are permitted but with strict compliance to the regulations they set like checking temperature, checking attendance, and washing hands. In the current state of technology use, the establishments are performing these routines in separate processes. First, they check the temperature, disinfect and check the attendance via logbook or biometrics. Aside from consuming much time during the process, the disinfection process only disinfects the hands using an alcohol dispenser. The risk of being a virus carrier is high. In addition, attendance via logbooks and biometrics is one of the fastest ways of transmitting the virus.

According to the school principal, having an automated system for doing these tasks is very much helpful to save time and minimize the chanceof spreading the virus.

There are plenty of systems already existed but the closest idea to implement a solution to this is based on the works of S. Amendola et al, 2014. Whichtalks about the use of the internet of things and radio frequency identification (RFID) in patient monitoring.

W. De Chen et.al. 2008 and Ula, M. et.al. 2018, developed a school attendance system using RFID to simplify and speed up attendance activities short messaging service notifications to parents

The studies mentioned above performed well in monitoring student attendance and sending parent notifications. However, in the new normal, an additional requirement needed upon entry inside the school premises is the checking of temperature.

The problems and gaps mentioned above prompt the researchers to develop a system based on the user requirements that could automate the processes in checking attendance and temperature scanning.

OBJECTIVES OF THE STUDY

This study thus aims to determine the problemsencountered in:

- getting student temperature;
- checking the attendance during the entry inside the school premises;
- real-time parent notification during student time-in and out; and printing of needed reports.

METHODOLOGY

This project used Agile: Scrum methodology ofsoftware engineering. It is a type of methodology thatenables the researchers to deal with a task by breaking it into phases which includes consistent effort with project stakeholders and constant development and iteration in every phase. The phases of this methodology include stakeholder meetings, product backlogs, sprint planning, sprint backlogs, the actual project sprint, daily standup meetings, sprint review, and the potentially shippable product.

The researchers conducted a series of meetingswith the school principal to identify the problems experienced using the current system in terms of checking attendance, getting temperatures, parent notifications, and generating reports.

The data gathered were compiled as user stories. Each of the user stories was analyzed and discussed by the whole team, given a proposed solution and priority according to the urgency of its needs.

Using Gantt Chart, the tasks are scheduled and divided into specific workloads based on the number of persons in the team. One is in charge of the Software Requirements Specification (SRS), Hardware Development and Integration, and Software Development. The scrum master conducts daily scrum meetings to check if the project went as scheduled until the potentially shippable product is achieved.

RESULTS AND DISCUSSION

Stakeholder meetings result in user stories. Figure 1 shows the user stories gathered during the stakeholder's meetings.

Table 1
User Stories

Story No.	User Story
1	Manual attendance in the logbooks still bring big risk to the students of being infected by covid-19. I want an attendance system that is automated. Meaning, the attendance system must minimize the use of pen and paper.
2	Getting the temperature and recording it in the logbooks takes time. I want a system in getting temperature that is integrated in the attendance system to save time.
3	Sending notifications to parents one by one during the entry of the student is very time consuming on the part of the teacher on duty. It is very much easy if during the entry, after tapping the ID and getting temperature, an SMS must be sent automatically to parents.
4	Creating of reports and sorting it per student in daily basis like daily time records are time consuming. Rewriting the data on forms duplicates the job. It would be very convenient if report can be generated automatically while having detail such as, student name, attendance record such as date and time, and temperature history.

1. Getting student temperature

During the data-gathering phase, the principalsaid that getting the temperature using the thermal scanners was not the problem. What consumes them is the time spent writing the temperature into the student log books and integrating them into reports.

2. Checking the attendance during the entry insidethe school premises

To them, aside from consuming too much time that results in a larger queue of students waiting at the gate, using the same pen, and writing the same page on the logbook still poses a risk of spreading the virus.

3. Real-time parent notification during student time-in and out.

One of the rules set by the local IATF, the parents must send and fetch students from school and are not allowed to wander anywhere. If in-case the parents were not able to do so in case of schedule conflicts, the guardian will do the parent's job instead.The school needs to notify the parents and doing it one by one would take too much toll on the teacher'stime as students queuing outside for their turn.

4. Printing of needed reports

During the interview, the principal stated that creating reports and sorting them per student on daily basis like daily time records is time-consuming. Rewriting the data on forms duplicates the job. It would be very convenient if the report can be generated automatically while having detail such as student names, attendance records such as date and time, andtemperature history.

5. School Attendance and Health Guide App

The user stories collected were given a project backlog. The project backlog consists of the task priority number, user story number, and the modules developed to close the gaps mentioned in the stories.

Table 2
Project Backlog

Priority No.	Story No.	Proposed Modules
1	1	• Development of Raspberry Pi as server. • Development of web application that is consist of dashboard and other related interfaces • Development of and integration of RFID scanner for identification card scanning. • Normalization of databases used.
2	2	Development and integration of temperature module.
3	3	Development and integration of SMS module.
4	4	Development of dashboard and other reports related module.

To deliver the solution needed the researchers sorted all the features needed and listed the importantmodules to be developed. This starts with the development of Raspberry Pi as a server, the developmentof a web application that consists of a dashboard and other related interfaces, the development of and integration of RFID scanner for identification cardscanning, the normalization of databases used, the development and integration of temperature module, development and integration of SMS module, development of dashboard and another reports related module. Figure 1 below shows how the system works.

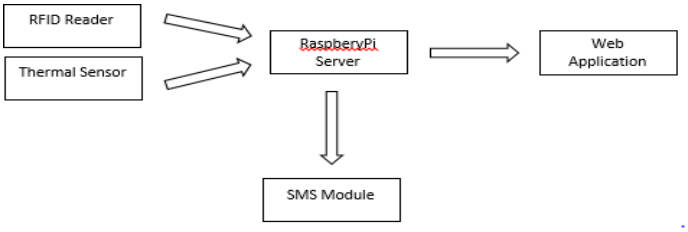

Figure 1. School Attendance and Health Guide App Process Workflow

The system process starts with the reading of RFID stickers attached to the student's identification cards. The sticker has a unique value assigned to the student that serves as his/her unique identification in the system. After tapping the identification card, the student's information will be displayed in the web application as well as the temperature after the student submits himself for the temperature scanning. The web application is viewable on a desktop computer, laptop, smartphone, or tablet as long as it is connected to the local network where the raspberryPi server is connected. After a successful time-in, a message via sms will be sent to the parentsconfirming the entry and exit of his/her child in the school premises. The message is sent in a gap of a millisecond to the parents after a successful in and out. The reports are auto-generated. All of the data isfrom the database and fetched if needed. However, a summary of the performance and data of the system is displayed in the web application via the dashboard.

CONCLUSIONS

After presenting the finished product, the project has been used at Cogtong Elementary Schoolduring the reopening of classes. Based on the overall feedback of the teachers and the principal, the systemworked well and performed according to its design.

RECOMMENDATIONS

Technological evolution never stops and continues to evolve in the future. It is very practical forus humans to adopt and make use of it for the better. School Attendance and Health Guide App performed well, however, it is recommended that the study mustbe continued because requirement changes over time.

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