Public High School Web-Based Attendance Monitoring System with SMS Notification

Bella Gertrude B. Alpasan [1], Audrey Karyl Maligang [2], Mary Jane V. Esimos [3]

[1,2,3]Northern Iloilo Polytechnic State College, Estancia, Iloilo

ABSTRACT: This study put emphasis on the improvement of the current system used in Estancia National High School for the class advisers, subject teachers, and 4P's Coordinator for the easy viewing and monitoring student's attendance. A Short Message Service (SMS) Support, was added as an additional feature to inform parents or guardians that their child was absent. Reports can be printed in real-time. The developmental-descriptive research was employed in this study. The Rapid Application Development (RAD) was used as the model in the software development. The n-tier architectural design was used in development system. Since the developed system would be deployed at the Estancia National High School, the developed system will be applied by the person-in-charge in monitoring the attendance of the students, it should provide proper maintenance to keep the system work well. A total of 51 respondents were surveyed as respondents of the study. The data were gathered through survey questionnaires that primarily solicited feedbacks from the respondents using the researchers-made survey instrument. The mean statistic was employed to describe the level of usability, understandability, learnability, and operability. Findings revealed that in terms of understandability, learnability, and operability, the developed system was describe as "Very Good" while its level of performance and efficiency in terms of in terms of time behavior and resource utilization was also described as "Very Good". The usability features of the developed system was operational, accessible with effectiveness, efficiency, and the performance was appropriate to the need of the users.

KEYWORDS: SMS, support, develop, emphasis, monitoring, attendance, feedback

1. INTRODUCTION

Attendance management is important to every single organization. It can decide whether or not an organization such as educational institutions, public or private sectors, which will be effective and successful in the future. Organizations will have to keep track of people within the organization such as their employees and students to make the most of their performance. Managing student attendance during lecture periods has become a difficult challenge for educators. The ability to compute the attendance percentage becomes a major task as manual computation produces errors, and wastes a lot of time.

Estancia National High School (ENHS) is a public high school located at the municipality of Estancia, in the province of Iloilo, which has estimated 5,000 students population. The school provides upright education, proper training experience and productive in terms of quality education for the students.In the ENHS, the class advisers/teachers are responsible in monitoring students' attendance in every grade and section. There were students who belong in the PantawidPamilya Pilipino Program (4P's) beneficiaries and all of those were monitored by the 4P's Coordinator. The 4P's (PantawidPamilya Pilipino Program) is one of the educational assistance of the government for the less fortunate Filipino families, through the said program, students beneficiaries can pursue education in high school. In order to maintain this educational assistance from the government the student must attend classes regularly. Those students are only required to have at least four (4) absences every month for they will be eliminated from the master's list of the 4P's beneficiary.

The attendance of students are monitored by the class advisers from grades 7 to grade 12. Every grade level has composed of 15 to 22 sections with 40 to 50 students per section. Because of the large population of the students of Estancia National High School, the class advisers/teachers had difficulty in monitoring the attendance of the students especially for the 4P's Coordinator. In connection to this, the researchers aimed to design and develop the Web-based Attendance Monitoring System for Public High School with SMS (Short Message Service) Notification to help out the class advisers monitor the students daily attendance accurately and efficiently. Since this is a web-based system, advisers can easily access and check students attendance once they are registered in the system they will automatically part of the system's input. In addition, an SMS Notification will also be used as the additional feature that will notify their parents or guardian about their childs' tardiness in real-time.

2. METHODS

2.1 Research Design

The researchers used descriptive-developmental research during the conduct of the study. This research approach is well-suited for this study for it focuses on the security receiving a motion inside the office and sending SMS notification to the parents or guardian.

2.2 Participants of the Study

In this study, the users are the following: (a) Admin /4P's Coordinator, (b) Students and the (c) Class Advisers. The 4P's Coordinator will be the primary user of the developed system where he/she has the full authority to view and control the developed system.

2.3 Validity and Reliability

In this study, the researcher identified two groups of users to evaluate the system. The first group was composed of three (3) experts in the field of study and the second group was composed of the end users. Three (3) experts coming from NIPSC, The IICS which helped the researcher identify if it meets the user's requirement and satisfaction, the user interface design, as well as to test the systems reliability, efficiency, and functionality of the developed system. This group of experts was given questionnaire based from McCall's software evaluation criteria to evaluate the system. The second group of users will be composed of a 4P's Coordinator and the class adviser of Estancia, National Highschool, Estancia, Iloilo. To identify the sample size, the researcher used the random sampling technique wherein the researchers randomly selected the final subject from 40 faculty of ENHS and 1 4P's coordinator. This group of people were given questionnaire based on ISO/IEC 25010 software characteristics to test and evaluate the system.

2.4 Data Gathering Procedure

Requirements Planning Phase combines elements of the system planning and system analysis phase of the System Development Life Cycle (SDLC). Users managers and IT staff members discussed and agreed on business need, scope, constraints, project and system requirements (Vijaynts, 2013).

During this phase the researchers met up with the end users and found out the requirements needed. These includes the projects scope, time allocated and basic functionalities required.

During this stage the outline of the developed system was produced by visualizing the system development process framework that provided the view of the expectations of the researchers and the end-users. The requirements planning stage resulted in the lists of entities as well as the action diagrams defined the relationship between data elements.

2.5 Software Development Life Cycle

Software Development Life Cycle (SDLC) is a series of phases that provides common understanding of the software building process. How the software realized and developed from the business and requirement elicitation phase to convert this business ideas and requirements into function and feature until its usage and operation achieve the business needs (Sami, 2012).

Specifically, this study used the Rapid Application Development (RAD) model for the system methodology allowing the developed system to be done in a short period of time and which emphasizes meticulous specification and planning, the RAD approach means building on continuously involving requirements as more and more learning are drawn as the development progresses.

The RAD model is a development model based on prototyping and iterative approach to software development, means putting lesser emphasis on planning tasks and more emphasis on development and coming up with a prototype. (Rapid Application, 2011). Figure 1 shows the RAD model.
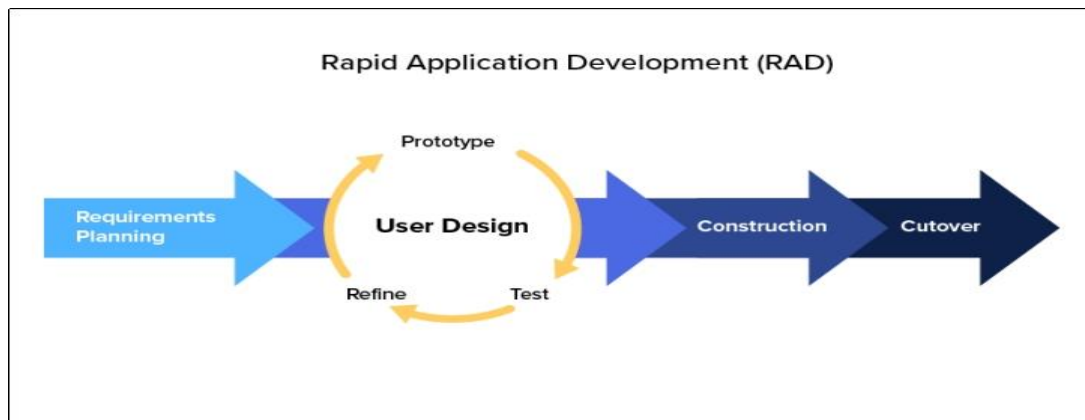

Figure 1. Rapid Application Development Model

The RAD Model falls into the category of Agile development techniques, which are iterative and incremental methods of software development focused on speed and quick development more than the long-end detailed process that the water fall model is usually known for. It is also a software development model in which emphasizes the speed and feedback over long development and testing

cycles. In this model, prototypes are rapidly out and delivered to the clients for feedback on future prototype will be the new functions will be added.

2.6. User Design (UD) Phase

During this phase, the user interacted with the system developers and developed model prototypes that presented all system processes, inputs and outputs. It is continuous interactive process that allow users to understand, modify and eventually approve thea working model of the system that meets their needs (Murguia, 2013).

At User Design (UD) Phase, the researchers meet up with the 4P's coordinator in a Joint Application Development (JAD) workshops. Workshops was conducted to complete the analysis of the researcher's activities and the data associated with the developed system and a detailed system model was completed. During the User Design stage the researchers created working data model which was converted into a functional database.

1.	Data modelling is the process of creating a data model from an information system by applying a certain formal techniques and identification of the relationships among these data objects. In this study, the Entity Relationship Diagram (ERD) was used to describe the data or information and its processes requirements. Entity Relationship Diagram (ERD), also known as an entity relationship model, is a graphical representation that depicts the relationships among people, objects, places, concepts or events within an information technology (IT) system (Jacqueline Biscobing, n.d.).

There are four entities namely the 4P's Coordinator, Class Adviser, Students List, SMS Notification as the independent or strong entity and the Weekly Attendance Report as the associative or weak entity. Relationships were set between among these entities through cardinalities. There was the only relationship class adviser and 4P's coordinator which means, for every class adviser there was a corresponding class adviser ID, same as weekly attendance report of the student lists, where you can find their corresponding student ID. The 4P's Coordinator has one to many relationship between the weekly attendance report which means only the 4P's Coordinator can access the student lists and class advisers. Same as weekly attendance to SMS notification which means one SMS can send many SMS notifications to the parents/guardians of the students for data retrieval to generate weekly report. Figure 2 shows the Entity Relationship Diagram of the developed system.
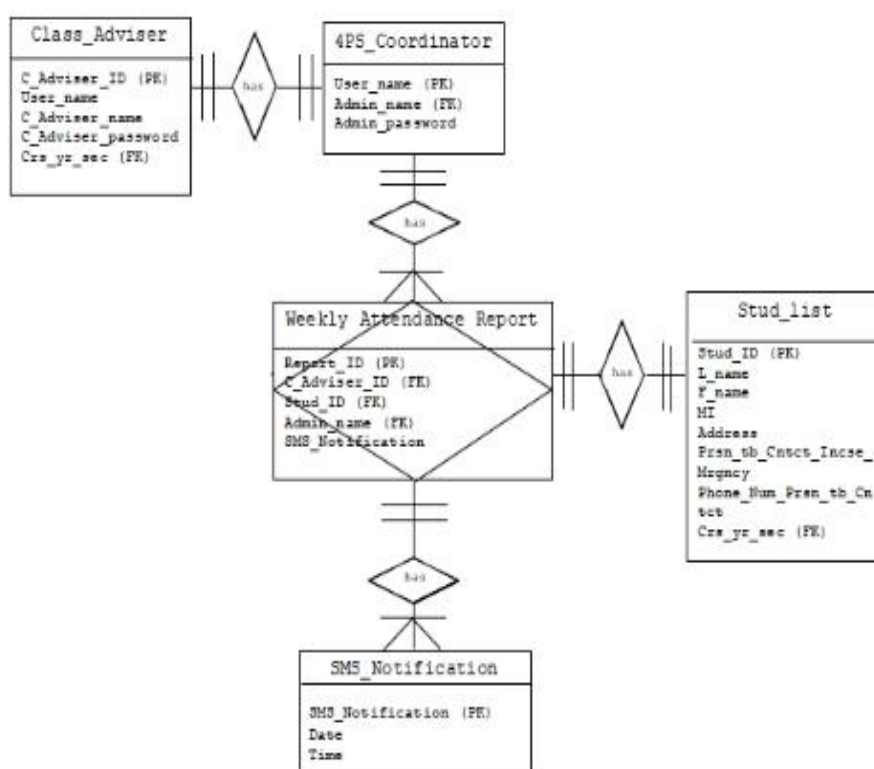

Figure 2.The Entity Relationship Diagram

3.   RESULTS AND DISCUSSION

Table 1. Actual Distribution of Software Evaluators/Respondents

Evaluators	No. of Evaluators
User Acceptance Testing	41
Expert Testing	3

4. Finalizing the System Product. After each beta testing of the system prototype was subjected to conformity test with the target users. Revisions was made based on feedback coming from the users. However, the researcher allowed up to three major revisions so that the project timeframe will not be a drag by excessive revisions. After the third major revision, the final system product was presented for acceptance and became ready for deployment.

Cutover Phase

Cutover phase resembles the final tasks in the System Development Life Cycle (SDLC) implementation phase, including the data conversion, testing, changeover to the new system, and user training. Compared with traditional methods, the entire process was compressed.

As a result, the new system was built, delivered, and placed in a faster operation.

After the beta testing of the system prototype was selected by the jury, it was subjected to conformity test with the 4P's coordinator and the class advisers which served as the end users of the developed system. Revisions and changes was made based on the feedback and suggestions coming from the jury and from the end users. Minimal revisions was applied to meet the exact time frame. After the revisions, it was presented to the 3 juries and the end users for acceptance, and the product of the developed system was ready for deployment.

Maintenance

The developed system lies in the availability of the Information Technology personnel who possess programming skills for the maintenance of the system. There were enough IT people in the area hired to maintain the system. A user's manual was made for the end user's reference. Maintenance must be always kept up rigorously. Users of the system should keep up to date concerning the latest modification and procedures.

Table 1 reflects the mean score in determining the usability of the developed feature Web-based Attendance Monitoring System with SMS Notification for Public High School among the identified users group. Usability is the capacity of a system to provide a condition for its users to perform the tasks safely, effectively, and efficiently while enjoying the experience (Wikipedia, 2014).

Understandability was the property of being understandable (Your Dictionary, n. d.). Learnability was the quality of the products and interfaces that allowed users to quickly become familiar and used all the features and capabilities (Wikipedia, 2012). Operability was the ability to keep a piece of equipment, a system or a whole industrial installation in a safe and reliable functioning condition, according to pre-defined operational requirements. Operability is the ability to keep a piece of equipment, a system or a whole industrial installation in a safe and reliable functioning condition, according to pre-defined operational requirements (Wikipedia, 2012).

Based from the respondents' feedbacks in terms of usability of the Web-based Attendance Monitoring System with SMS Notification for Public High Schoolwas composed with a mean the (M = 4.72, S.D. = 0.458) was verbally interpreted as "Very good" while for itssystem Understandability (M = 4.60, S. D. = 0.563) was also interpreted as "Very good", the system learnability (M = 4.68, S. D. = 0.572) was also interpreted as "Very good", and the systems operability (M = 4.60, S. D. = 0.563) was also interpreted as "Very good".

Findings implied the gradation in which using the features of Web-based Attendance Monitoring System with SMS Notification for Public High School can be used by specified users to achieve definite goals with effectiveness, efficiency, freedom from risk and satisfaction in a identified context. Feature was easy to operate and controlled, wherein reports generated by the system such as collection of students attendance and especially the 4P's students can easily viewed, retrieved and printed in real-time by the teacher/adviser and the 4P's Coordinator.

The end-users also believed that through this system features improve performance level in monitoring the abstract of Attendance Monitoring in an easy and convenient way. Furthermore, it reduces hours spent in retrieving the attendance of all students.

Table 1. Level of Usability of the Develop System in Terms of its Understandability, Learnability and Operability.

Implementation Indicators	Mean	SD	Verbal Interpretation
A. Level of Usability	4.72	0.458	Very Good
A1. Understandability	4.60	0.563	Very Good
A2. Learnability	4.68	0.572	Very Good
A3. Operability	4.60	0.563	Very Good

Legend: 1.00 - 1.80 (Poor); 1.81 – 2.60 (Fair); 2.61 – 3.40
(Average); 3.41 – 4.20 (Good); 4.21 – 5.00 (Very Good)

Public High School Web-Based Attendance Monitoring System with Sms Notification

The Level of Performance Efficiency Evaluation of the expert with regards to the Developed System based on McCall's Software Quality Model in terms of Time Behavior and Resource Utilization.

Table2 presents the evaluation of the experts on the developed system. The table reflects the mean score rated by the experts. Performance efficiency the capability of the software product to provide appropriate performance, relative to the amount of resources used, under stated conditions." It consists of time behavior, resource utilization, and capacity as its sub-characteristics (AmandeepKaur, 2018). Time behavior refers to the capacity of subjects to perceive, estimate, and discriminate time intervals (Buhusi and Meckn.d.). Resource utilization defines the procedure of making the most out of the resources, which are accessible to sort, achieve your purpose. This is an efficient and effective procedure for an organization (SowmyaKusumanchi, 2018)

The rating of the experts with regards to the Web-based Attendance Monitoring System with SMS Notification for Public High School for the overall performance has the computed mean of (M = 4.55) which interpreted as "**Very Good"**while the system time behavior has the computed mean of (M= 4.62 was also interpreted as **"Very Good"** and in terms of Resource Utilization was has a computed means of 4.5 and was also interpreted as **"Very Good"**.

Findings implicit that the degree in which the response and processing time and throughput rates of the product or system, when performing its functions, meeting the requirements by using the developed Web-based Attendance Monitoring System with SMS Notification for Public High School. The said system is very useful in reducing the time for the researchers and provide them with better monitoring of the attendance of students.

Findings revealed that the System was equipped with features needed to provide information needed by the three a 4P's Coordinator and the teachers/advisers. It also shows that the expert believed the system was useful and necessary to Estancia National High School in monitoring students' attendance.

Table 2. Level of Performance Efficiency of the Develop System in Terms of its Time Behavior and Resource Utilization based from the evaluation of the experts group.

Implementation Indicators	Mean	Verbal Interpretation
Level of Performance Efficiency	4.55	Very Good
A1. Time Behavior	4.62	Very Good
A2. Resource Utilization	4.5	Very Good

Legend: 1.00 - 1.80 (Poor); 1.81 – 2.60 (Fair); 2.61 – 3.40
(Average); 3.41 – 4.20 (Good); 4.21 – 5.00 (Very Good)

4. CONCLUSION

This study placed emphasis on the improvement of the current system used. TheWeb-based Attendance Monitoring System with SMS Notification for Public High School is needed in Estancia National High School for the class advisers, subject teachers, and 4P's Coordinator for the easy viewing and monitoring students attendance.

Enhancing the current system with a better automated system, information gathering and processing had became more reliable and accessible. Class advisers, subject teachers, and the 4P's coordinators are currently using manual based in terms of scanning and keeping all the records of the students, which is time consuming. The developed system is big improvement and help to the respondents for it lessen and lighten the work of the program beneficiaries.

Based on the information stated, data gathered from the interviews and surveys conducted the researchers realized that, with the use of the developed system, transactions can be done easily, accurately, reliable, accessible and not time consuming.

REFERENCES

1) Basea, Kenneth John D., Desales, Jade Ann B., Dumagit, Madelin G., Santiago, Princess Diane B., Tamayo, Rufa A., (2019). Automated Security Light Motion Sensor with SMS Notification.Unpublished Undergraduate Thesis.Bachelor of Science in Computer Science.Institute of Information and Computer Studies. Northern Iloilo Polytechnic State College, Estancia, Iloilo.

2) Barosa, Medelyn S., Candido, Johnna P., Distajo, Joan May B., Ganawan, Harold James M., Gregorio, Nick L., Onadia, Krystel Ann M., (2017). NIPSC Guidance Office Students Attendance Monitoring System with SMS Notification Service.Unpublished Undergraduate Thesis.Bachelor of Science in Computer Science. Northern Iloilo Polytechnic State College, Estancia, Iloilo.

3) Electronic Attendance System. (2012). Retrieved from https://www.bioenabletech.com/electronic-attendance-system

4) Programming Fundamentals. (2018). Retrieved from
https://press.rebus.community/programmingfundamentals/chapter/input-process-output-model/

5) Learn About Being a Coordinator. Retrieved from https://www.indeed.com/career-advice/careers/what-does-a-coordinator-do

6) Administrator. Retrieved from https://www.merriam-webster.com/dictionary/administrator

7) PantawidPamilya Pilipino Program. (2015, June) Retrieved from https://www.officialgazette.gov.ph/programs/conditional-cash-transfer/#:~:text=The%20Pantawid%20Pamilyang%20Pilipino%20Program,of%20children%20aged%200%2D18.

8) Parent. Retrieved from https://www.vocabulary.com/dictionary/parent

9) Short Message Service. (2021, May 24). Retrieved from https://www.webopedia.com/definitions/short-message-service/

10) Student. Retrieved from https://dictionary.cambridge.org/us/dictionary/english/student?q=students

11) Class Adviser. Retrieved from https://www.oxfordlearnersdictionaries.com/us/definition/american_english/adviser