

A Cloud-based School Communication: Parent, Teacher and Student Online Collaboration System for Monitoring the Performance of the Student

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Abstract— This research aimed to develop a collaboration system for teachers, parents and students that will be used to monitor the performance of the students. The developed prototype system is a web-based type of application and deployed on a cloud-based server for an efficient and cost effective implementation. It was designed for private schools to enhance parental involvement and collaboration between the teachers and parents through online communication. This proposal is purposively for parent monitoring of the performance of their children in school. The system includes also a tool for communications between parents and teachers to strengthen their partnership. A descriptive research method was employed to complete the system. A survey was conducted to gather information pertaining to the problems encountered in monitoring the students' performance; rate the level of acceptance of the developed prototype system in terms of functionality, reliability, usability and efficiency; the appropriate features of the system that will promote parent-teacher collaboration in fostering students' academic success; and the suggested recommendations for the improvement of the system. A survey questionnaire was administered to evaluate the developed software and served as primary tool for gathering data. The results of gathered data indicates a strong accord in overall assessment on the use of the system.

Keywords— Cloud-based, Collaboration System, Parental Involvement, Online Communication.

I. INTRODUCTION

Communication is an essential part of everyday life. It is generally regarded as an essential part of the inner workings of any organization, school and eventually at home. Communications now a days integrates technology, information technology in particular where lots of new communication services, systems, protocols and devices to help ensure that people are communicating in the most effective and efficient manner possible. Sharing, storing, retrieving and communicating information almost anywhere can be done rapidly.

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In school, communication is very important to achieve student's better education, future personal and professional success. The entire thing that occurs within a school, and particularly in the classroom comprises communication, the act of sharing information. It is the medium for instruction, assessment, interpersonal relationships, group interactions, community, parent relations and counselling. The better the communication is in a teaching environment the more enhanced the learning will be. However, most behaviour problems in schools and their solutions, comprise some type of communication.

When there is failure in communication things start to wander and become disordered. Same is true to teachers who are having difficulties in dealing with their students due to insufficient parents' involvement wherein one of the categories of parent involvement identified by Epstein is communication. Based on her "Framework of Six Types of Involvement", parents can be involved by designing effective forms of school-to-home and home-to-school communications to inform school programs and children's progress [1]. Besides, the education of students is a shared responsibility, benefiting all students. Therefore, parents and teachers have a joint responsibility to collaborate in schools to guide and support their students. We know that schools are better able to support students' achievement by developing strong engagement with and between parents and teachers. Communication between home and school aids a teacher in understanding a student better, which lets the teacher find ways to teach them more effectively.

Furthermore, teachers are using technology most effectively to improve their teaching and increase student learning. Technology can be used to improve learning indirectly: for example, the ways technology can foster greater communication between home and school [2]. Through the use of technology, schools can provide tools that allow parents and teachers to communicate and collaborate in an efficient manner to ensure student's achievement. Moreover, parents will have opportunity to monitor how well their child/children are doing in school on a daily basis. Specifically, the use of a monitoring system designed to measure attributes of effective schools offers information about school processes that can guide development of foundational solutions to student achievement.

II. THE DEVELOPED ONLINE COLLABORATION SYSTEM

The developed system is a web-based program that used open source application/language developing tools like PHP, HTML, CSS, Ajax and JQuery. These are all open source software that are well known and advance web-based development tools nowadays. The system runs on different environment due to its multiplatform front-end (Interface) and back-end (Database). The whole system was developed both front-end and back-end. MySQL were used for the back-end deployments for the database of the system. The entire system were hosted in the cloud server facility for efficient operation and cost effective service. The system is accessible in any updated browsers such as Google Chrome, Firefox, Safari, Opera, and Internet Explorer. The system can also be accessed on mobile and tablet devices due to its responsive web design.

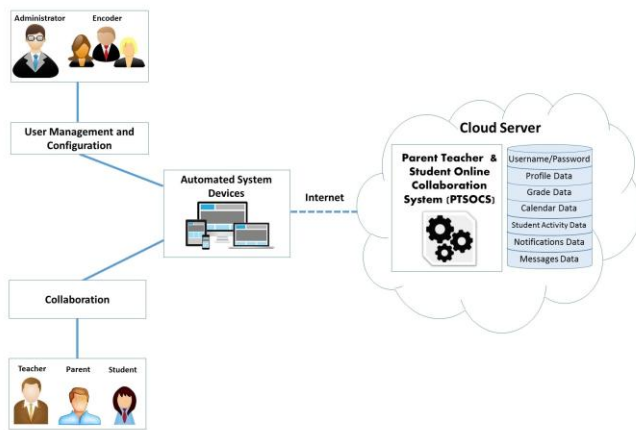


Fig. 1. System Architecture

Figure 1 illustrates how the system architecture of the Database structure of the Parent Teacher and Student Online Collaboration System (PTSOCs) works. The system is hosted on a cloud-based server that can be accessed using different devices such as laptops, desktops, tablets, cellphones and other gadgets used for Internet browsing. This shows also the different access role of the users such as Administrator, Encoder, Teacher, Parent and Student.

The collaboration system Database structure comprises with segmented data tables for username and password, user profile, messaging, notifications, student activity, calendar and grade. Before the teacher, parent and student users can collaborate, the Administrator who manages the system should configure first the User Management to add username and default password and then performs the Configuration Management to add subjects, sections and grade levels.

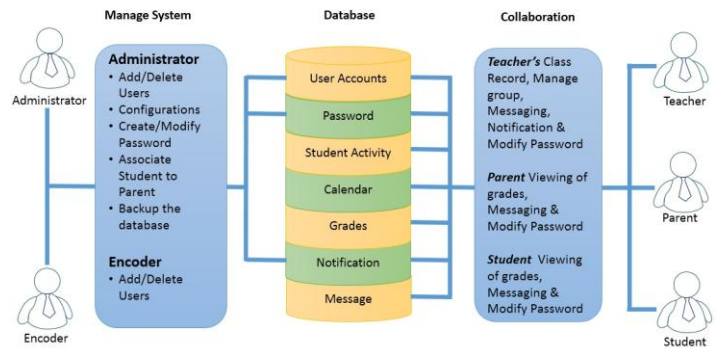


Fig. 2. System Flow

Figure 2 shows the system flow of accessibility of different types of users. It illustrates the two user group, the Administrator and Encoder who manages the system and then the Teacher, Parent and Student who are collaborating through it.

The procedure to access the system, each user should open the web interface login menu to prompt the page with three login options and select the type of user assigned to them. Then, each type of user will enter their username and password to open the main menu. Successful login will open the page where all system functionality will be used for participating Parent, Teacher and Student collaboration. Each type of user has specific restrictions according to the design that was programmed in the system. The teacher has all the right to manage the group of students and parents belonging to his class or group. Unlike the teacher, parents can only view the associated account of their child/children to their user account. A teacher can notify everyone who belongs to his/her class or group, the System Administrator, parents and other teachers in one posting. Moreover, for the Parent and Student type of user, they can view the notifications, student's activities and grades on their individual account. They can download the files that the teacher have attached like written works, performance task and related activities.

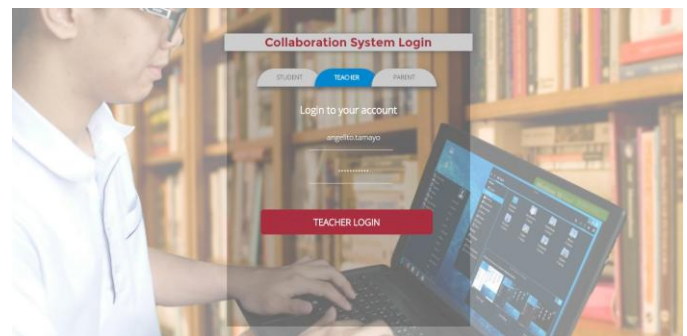


Fig.3. Collaboration System Login – Teacher Login Main Menu

Figure 3 shows the main menu login. There are three login options to decide which user to access the system, the Teacher, Parent and Student. Each user must enter a correct Username and Password in order to access in to the system. A warning phrase “Incorrect username and password. Please try again.”

will appear on the screen every time an incorrect username and password had typed in.

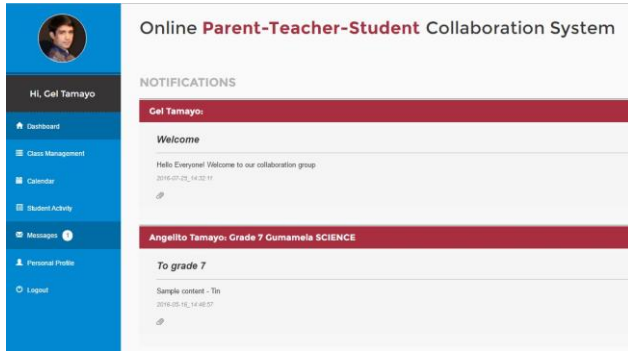


Fig. 4. Dashboard

Figure 4 depicts the homepage where the user can navigate the system using the six (6) menus: Dashboard, Class Management, Calendar, Student Activity, Messages and Personal Profile. This page also shows all the notifications sent by the teacher to the parents, students and other teachers. To use the notification feature, click the add notification to open the “New Notifications” submenu.

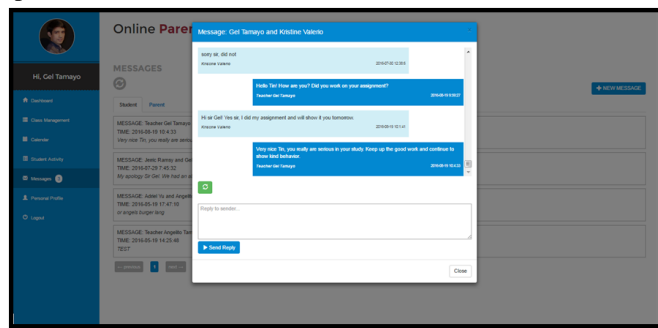


Fig. 5. Message – Message Chat Panel

Figure 5 shows the online message interactions of the teacher (user account) to a parent or student (user account). This feature allows teachers to communicate with parent and student.

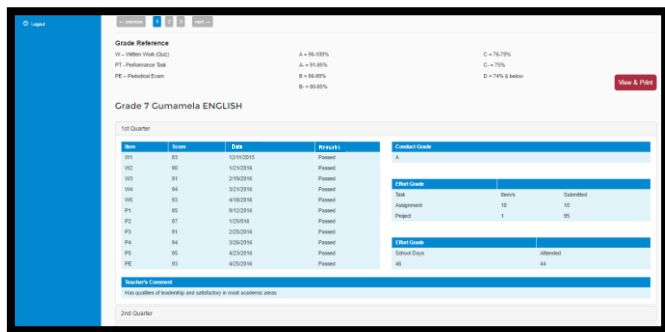


Fig. 6: Academics – Student Grade Details Page

Figure 6 illustrates the student’s profile that the parent can see the grade details and accumulated subject grades from 1st to 4th quarter in a school year. This is an avenue for parents to monitor the performance of their child/children base on the grades appears on their individual user account.

TABLE 1. FREQUENCY AND PERCENT DISTRIBUTION OF THE RESPONDENTS

Respondents	Frequency	Percentage
Teachers	11	31%
Parents	25	69%
Total	36	100%

III. RESEARCH METHODOLOGY

This study proposed the development of the prototype collaboration system that will be used by the teachers, parents and students to monitor the performance of the students. The researcher performed surveys to seek the perceptions of the respondents. Using descriptive research method, survey questionnaire was administered to be used for evaluation of the developed software and served as primary tool for gathering data. There were 36 respondents who evaluated the software, the respondents were teachers and the parents of the students.

This is a descriptive research where a survey was administered to a selected sample from a specific population identified by the researcher. Parents and teachers were the respondents of the study. Surveys are used to obtain data from individuals about themselves, their households, or about larger social institutions. Sample surveys are an important tool for collecting and analyzing information from selected individuals. They are widely accepted as a key tool for conducting and applying basic social science research methodology [3].

There are distinct advantages in using a questionnaire vs. an interview methodology: questionnaires are less expensive and easier to administer than personal interviews; they lend themselves to group administration; and, they allow confidentiality to be assured [4].

For these reasons, the researcher selected a descriptive research methodology and designed a questionnaire survey instrument to assess the perceptions of selected respondents about the system for parents and teachers of Philadelphia High School. The descriptive method of research which was used is according to Calderon and Gonzales [5].

The sampling technique use here, since the respondents involved in this study were the teachers and parents in the High School level of Philadelphia High School, only one sampling techniques was used. It is called Convenience Sampling Technique. The *convenience sampling* is a non-probability *sampling* technique where subjects are selected because of their convenient accessibility and proximity to the researcher. The non-probability sampling concentrates on sampling techniques where the units that are investigated are based on the subjective judgment of the researcher. Teachers and parents were selected by applying convenient sampling for data collection. By doing so, a total of 11 questionnaires were distributed among the teaching staff and 25 questionnaires among the parents. Furthermore, to obtain accuracy on their responses, the system was presented

to the respondents before getting their responses to the questionnaire.

Table 1 shows the frequency and percent distribution of the respondents. There are two groups that are involved in the study with a total of 36 respondents which is the maximum allowed and that will be enough to pursue the study.

The description respondents of this study were the teachers and parents of Philadelphia High School. Questions in the survey questionnaire regarding the effectiveness and the acceptability of the system were asked to know whether accuracy and other attributes will be attained by the system. Their answers are important to contribute in improving the system.

Questionnaires were prepared by the researcher to collect data from the answers of the respondents regarding the proposed system. The purpose of the study was to examine the perceptions of the respondents of the effectiveness and the acceptability of the use of the Parent, Teacher and Student Online Collaboration System.

TABLE II.: LIKERT RATING SCALE CRITERIA

Rating	Verbal Interpretation		
	4.21 – 5.00	Strongly Agree	Highly Acceptable
3.31 – 4.20	Agree	Acceptable	Strong
2.61 – 3.30	Partly Agree	Moderately Acceptable	Moderate
1.81 – 2.60	Disagree	Fairly Acceptable	Weak
1.00 – 1.80	Strongly Disagree	Not Acceptable	Very Weak

Table 2 exhibits the used of Likert scale to address the measurement of the perceptions of the respondents about the proposed system. A Likert Scale is a psychometric response scale often used in questionnaires, and most widely used scale in survey research. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement. The researcher used ranks from one to five: five being the highest and one being the lowest rank.

Furthermore, a standard criterion for evaluating transaction processing system was used in this study as software evaluation instrument. It defined the usability of the system in terms of functionality, reliability, usability, and efficiency. These were some of the external and internal quality models presented by the ISO/IEC 9126.

The data gathering instruments was used the survey questionnaires and the related research documents read. Questionnaires were prepared by the researcher in gathering data to obtain the necessary information such as observation, internet research and survey. The researcher conducted a survey to determine the assessment of respondents in terms of the different issues of the developed system and used the gathered information to further enhance the system. A letter was given to the school administrator to ask permission to conduct the survey, then after it was granted the researcher proceeded. Preferably, pre-test and post-test designs were the methods to compare participant groups and measure the degree of change occurring as a result of treatments or

interventions. Moreover, post surveys would also clarify the respondents' acceptability of the proposed system in the Parent, Teacher and Student Online Collaboration System.

The statistical treatment of data used to determine if it was valid and reliable were the frequency percentage and the simple arithmetic mean. The frequency percentage was used to evaluate problem one and two. Then mean from mean score of the total perception was used to determine the forgoing rating scale (1 to 5) to the effectivity of the study.

This was used to show the relative share of a certain variable in relation to the whole. The number of a variable was divided by the sum of all the variables in the list, and quotient was multiplied by 100. This was the formula used:

Frequency percentage was derived by multiplying each of the relative frequency values by 100%.

The formula is:

$$P = (f / N) \times 100\%$$

Wherein:

P = percentage

f = value of the variable

N = the total value of all variables

Weighted mean was used in this study to interpret the data. The data were defined in terms of their quantitative and qualitative ratings. The simple frequency count was used to compute the responses. The weighted arithmetic mean was used in determining the average responses in relation to the sample. The formula to compute the weighted mean is the following:

$$Me = \frac{\sum(wf)}{N}$$

Wherein:

Me = weighted mean of the population

Σ = summation of the values of the variable

w = weight

f = frequency

N = total number of values of the variable

IV. RESULTS AND DISCUSSION

This presents, analyzes and interprets the findings of this research based on the problems presented at the outset of the study. The first part presents the respondents' problems encountered in monitoring the performance of the students. The second part exhibits the respondents' level of acceptance on the developed prototype in terms of functionality, usability, reliability and efficiency. The third is determining the appropriate features of the developed system that will promote parent-teacher collaboration in fostering students' academic success and the fourth part shows the respondents' responses on the recommendation for the improvement of the developed system prototype.

TABLE III. LEVEL OF ACCEPTANCE PROTOTYPE

Statements	Mean	Interpretation	Rank
1. Functionality	4.31	Highly Acceptable	2
2. Usability	4.33	Highly Acceptable	1
3. Reliability	4.27	Highly Acceptable	4
4. Efficiency	4.28	Highly Acceptable	3
Overall Mean	4.30	Highly Acceptable	

Table 3 can be concluded that the respondents considered the developed system prototype 'Highly Acceptable' as revealed by the overall mean of 4.30 percent.

TABLE IV. LEVEL OF ACCEPTANCE PROTOTYPE.

Suggested Recommendation	Frequency	Rank
Deploying the system in an On-Premise Server (DB Backup, Redundancy and Failover)	31	1
Imply database audit trail/activity logs	26	2
Notifications will have like and reply function	24	3
Badge icon or live notification bubble for new messages and notifications	23	4
File sharing capability	21	5

Based on the survey result, the respondents recommended that the system should also be deployed in an On-Premise Server setup for database backup, Redundancy and Failover with 31 votes; followed by imply database audit trail with 26 votes; notifications will have like and reply function with 24 votes; badge icon or live notification bubble for new messages and notifications gathered votes of 23; and lastly, file sharing capability got the least votes of 21.

The first part presents the respondents' problems encountered in monitoring the performance of the students. The result of the data interprets a strong agreement that stakeholders are having difficulty in monitoring the performance of the students. The second part indicates the high level of acceptance on the developed prototype in terms of functionality, usability, reliability and efficiency. Third part determines a very strong approval with the appropriate features of the developed system that will promote parent-teacher collaboration in fostering students' academic success. Lastly, the fourth part shows good perceptions on the recommendation for the improvement of the developed system prototype. However, the following may also help in the improvement: the teachers and parents need automated system devices that can navigate the system through a web browser; it is recommended that the system be implemented in private schools and must provide a higher Internet speed to accommodate large network traffic to avoid problems. School administration should recognize the imperative role of the proposed system in improving the private school. Consider implementing the suggested recommendation of the respondents to improve the system and its potentials.

V. CONCLUSION

The result of the study will merit the stakeholders. It serves as an efficient way of communication strategy to further enhance collaboration between teachers and parents. This also

may increase teacher's diversity and use of communications to the parents of their students and the awareness to communicate clearly. Teachers will be appreciative in communicating with parents and giving them information they need to know about their children. Furthermore, the study will give parents awareness of what is happening to their children in school on a daily basis. In addition, the parents can easily be informed with all coming activities and programs of the school. Lastly, students will get higher grades, test scores and graduation rates, better school attendance and performance, increased motivation, better self-esteem, lower rates of suspension, and decreased use of drugs, alcohol and avoidance of violent behavior.

VI. RECOMMENDATION

Based on the findings and conclusions, the researcher offers the following recommendations: Teachers and parents need automated system devices that can navigate the system through a web browser. The school must provide a higher Internet speed to accommodate larger network traffic that the system will utilized. It is recommended that Parent, Teacher and Student Online Collaboration System be implemented in the private school. The school administration should recognize the imperative role of the proposed system in improving the private school. Consider implementing the suggested recommendation of the respondents to improve the system and its potentials.

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