Investigating the Effects of ICT for Parents and School Communication

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Abstract— *With the advancement of technology and the widespread use of the internet, it is becoming essential for teachers to utilize technology in a variety of ways. Also the role of ICT in the development of education sector has been a popular research subject area. Nowadays parent-child-teacher cannot regularly meet up and discuss about their children education growth because of the time constraint, distance to the school and many more reasons. Even though it is a time consuming process, it is very essential to maintain the communication between parents and the school. Web based Parent-Teacher Communication Portal will be a portable solution to above matter because it can provides parents, students, and teachers a favourable communication environment that serve as a platform for parents and teachers to exchange ideas about the children's academic performance. It helps to obtain big idea while comparing their results, academic growth with others because students are running into very challenging and competitive world with others. Therefore parent can always up to date with their child's performance and education statistics, exam results and can communicate with the teacher through online forum. Moreover, the research was conducted using a mixture of quantitative and qualitative methodologies. To elicit quantitative values, document reviews were used. To elicit qualitative values, interviews, observations and case studies were used. Furthermore this system has been developed using web technologies with ASP.net and C# to run on Windows operating system and Microsoft SQL server fulfilled the database facility. This developed portal is acting as a 3rd party between teacher, parent and student. So children, information of the education growth, Parent-Teacher meetings and necessary communication is not that much tedious.*

Keywords— *ICT, parent-teacher communication system, web based system*

I. INTRODUCTION

Software solution has introduced new aspect of handling real world issues. Software provides cost effective, accurate, user friendly and reusable solution for almost all applications. Among other software technologies programming, databases, web and multimedia have been the most widely used development application software. This paper discusses about the project to develop a software solution for the domain of government school environment. In doing so, this chapter outlines the background and motivation for the project, problem in brief, hypothesis, proposed solution, resource requirement and overview of the structure of the rest of the paper.

Sri Lanka is a developing country. So the main ambition of the Sri Lankan nation is to be a developed country. So according to the criteria of the development, education plays a major role. Literacy in Sri Lanka is at a higher level according to the records of UNICEF. So transferring education becomes the responsibility of the family and the parent. Therefore they are always trying to provide very good education to their future generation. "Giving good education" is the main ambition of the parents. Therefore they are seeking to get update with their children's education level, behaviour at school and the performance in studies. So parents have to wait until they got a chance to visit or a parents' meeting will schedule. Furthermore currently there is no specific procedure to see students' day to day performance. Sometimes some students do not show their exam results, assignment marks to their parents. Because of that parents have not being updated with their children's performance.

Another problem is that some of the students are accommodated near to the school and away from family because of the distant travelling from their homes. So it tends to have lack of communication between student and the parent and the school. Therefore the parent does not know what their children do in the hostels or boarding places. So the bond between children, parents and the teachers are not that much solid. Unfortunately some children are misuse their freedom of not under the control of their parents.

Online communication between parents and the teachers are very important and it has been one of the major concerns in the modern world. If the parent engagement for students' studies is neglected, it may create many problems. To solve above problems the researcher propose online Collaborative Parent-Teacher Communication Portal for Government schools. It will consist with capability to exchange ideas between parents and teachers & enhance the child-parent-teacher relationship. Furthermore online communication between parents and the school is a web based method that serves as a platform for parents and teachers to exchange ideas and this solution works as a third party between parent, teacher and the student. It allows parents to receive real-time day to day information about their child's performance and activities at the school, and flexible opportunities to ask questions and provide information to teachers and school administrators.

This paper is organized as follows. Section II describes the evaluation on parent communication systems. Section III contains the methodology and Section IV depicts experimental design of parent-teacher communication portal. Section V includes the implementation of the system and Section VII contains the evaluation and finally, the conclusion is presented.

II. EVALUATION ON PARENT COMMUNICATION MANAGEMENT SYSTEMS

Many parent communication systems [Communicating with Parents: Strategies for Teachers, Susan Graham-Clay] have been operated in the manual mode. One of the existing parent communication system is indicated in Susan Graham-Clay's paper. According to the Susan Graham-Clay's proposed system he presented that the paper is about communicating with parents strategies for teachers. Susan Graham-Clay has discussed the importance of communication between parents and teachers.

This paper has identified teachers struggle to establish partnerships with parents to support student learning. Because of that strong communication is fundamental to this partnership and to building a sense of community between home and school. For that teachers must continue to develop and expand their skills in order to maximize effective communication with parents. Furthermore this research paper presents a range of communication opportunities available to teachers, including the emerging use of technology. Some of these practical suggestions may seem very basic to those already actively promoting parental involvement, but unfortunately, many teachers have not been trained in nor are they practicing proactive communication with parents. Barriers to effective communication are considered in conjunction with potential solutions. Furthermore researcher discussed the difference between one way communication and the two way communication. Even though parent communication is essential, writer identified that many teachers are not specifically trained with the skills they need to communicate effectively with parents. And also this paper obviously shows the importance of communication through technology.

Another parent communication system is HomeworkNow. It is also created for schools and it can be customized according to user's preferences. HomeworkNOW is the school-to-home communication solution used by parents, teachers, administrators, and students. It connects your children's school and classes with the My HomeworkNOW & School Alerts mobile application. With this HomeworkNow app parents can receive school alerts such as closings, emergencies, back pack notices, announcements with real time notifications, view the latest school wide notifications on-demand, view classroom information and homework on-demand, get notifications when teachers update a class page or homework assignment. Furthermore HomeworkNOW.com makes it possible for schools to communicate to parents and students in any manner the parent or student choose through a web browser, Facebook, email, Text Messages, Mobile Apps for Android, iPhone and more. This system is used by teachers, administrators, and parents and students by serving separate user accounts.

Moreover, HomeworkNOW.com makes it possible for schools to easily communicate school alerts and classroom information with parents and students in the manner they prefer. Also teachers quickly and easily communicate classroom related information such as **homework, classroom activities, reminders, newsletter, notes, files, photos, videos, references, extra credit and more** with parents.

Raj Mestry and Bennie Grobler have presented a paper about another major current system. This paper is about collaboration and communication as effective strategies for parent involvement in public schools. Raj Mestry and

Bennie Grobler have discussed the importance of communication between parents and teachers.

This paper has identified parents are playing an active role in the homework and study programs of their children contribute to their good performance in schools. Therefore this paper shows that parents are not all participating meaningfully in their children's education. Also they are not participating the parents' meetings of their child's school. Furthermore this paper examines two factors, namely collaboration and communication, as effective strategies for active parental involvement in schools. Moreover quantitative research was used to determine the perceptions of teachers regarding aspects of parental involvement in school governance that were considered essential. Matthew A. Kraft and Shaun M. Dougherty presented that teacher-family communication increased the odds that students completed their homework by 40%, decreased instances in which teachers had to redirect students' attention to the task at hand by 25%, and increased class participation rates by 15%. Drawing upon surveys and interviews with participating teachers and students, we identify three primary mechanisms through which communication likely affected engagement: stronger teacher-student relationships, expanded parental involvement, and increased student motivation.

III METHODOLOGY

In this section it puts forward the approach to automated solution as Parent-Teacher Communication Portal. For this purpose researcher presents the methodology then go into the discussion of input, output, process, users and features. Furthermore presents the selection of a suitable research method, techniques and their justification, the mode of data collection and analysis are presented.

Researcher collected primary data from Sri Sumangala Girls' School Panadura to build the system. The sourcing parties are the principle of Sri Sumangala Girls' School, teachers, parents and the administrative staff of the school. Other than them researcher collected information from some teachers and parents of other schools to get more ideas. Furthermore considering the nature of the research researcher used combination of "Quantitative" and "Qualitative" methodologies as the research method because researcher has collected and analysed quantitative information as well as qualitative information. For that have to go for quantitative and qualitative protocols. To elicit quantitative values,

document reviews were used. Interviews, observations and case studies were used to elaborate qualitative values. Researcher has conducted interviews with the principle, some teachers and parents of the school. Further, researcher has distributed questionnaires among teachers and parents of the school.

The data obtained through questionnaires and other elicitation methods which have been stored in spreadsheets in a systematic manner will be presented in structured forms using different representational tools like charts, graphs and tables. In addition, the qualitative data gathered in the research using techniques like interviews, case studies and observation are represented in the representational modes of tables, charts and graphs after a thorough analysis.

By analysing the gathered data researcher has decided the functional and non-functional requirements. Functional requirement of the proposed solution are insert and view student results, monitoring the student performance by using reports and results charts, all users have capability to upload and download materials, users have ability to send and read messages and emails through message board, send a SMS to parent's mobile phone once occurring some important thing or update in the system, online chat facilities between parents and teachers, generate reports and track student history. Moreover system facilitates online payment facility. Non-functional requirements are fast access data, enable multi user functionality, enable quick access to the application, storing information in appropriate manner, different user access level permissions, responsiveness for mobile and web view and etc.

It is very vital to use appropriate tools in order to develop a successful system. Use of any inappropriate tools will only leads to develop a system with unnecessary errors and faults. Also use of these badly chosen technologies also will lead to be crashed after the new system implementation. Badly chosen technologies which may be highly advanced and complex will allow producing a system with a high quality, but these technologies may also leads to develop a system that use up lots of time and resources in order to perform a task which is expected by the system.

It is very vital to use appropriate computer language, database and any other necessary tools in order to develop a successful system. The main objective of the

Parent-Teacher Communication Portal is to provide parents, students, and teachers a favourable communication environment that serves as a platform for parents and teachers to exchange ideas about the children's academic performance.

Following factors are very important when select the most appropriate tools available in the market to develop the system.

Technological considerations - followed during the development of the system
- Efficiency and Performance
- Re-usability and flexibility
- Object oriented development support

The programming language used for this as the developing language for the system development was greatly depended on accuracy, efficiency. C# with ASP. Net platform has used for development of Parent-Teacher Communication Portal. C# is fully object-oriented by design and more flexible in handling. C# is used in programming with ASP.net platform which provides an easier and flexible environment for the programming purposes. Furthermore HTML controls are used to design the User interface design because it reduces the load of browser.

The database which is a most important aspect of the overall system where all the processing data of the communication management system. Therefore it stored should be established in precise manner. The database implement on the server should capable of providing operations with higher efficiency. In order to fulfil the need of database operations it has used MS SQL. MS SQL provides all need features for database scripting and stores the data. Furthermore Local Area network is implemented to ensure multi user simultaneously access methodology.

IV EXPERIMENTAL DESIGN OF THE SYSTEM

This section will describe the design of the software solution for school domain. In order to describe the design, researcher has illustrated the various modules and their connections in the software solution. Furthermore it describes about the each layer of the software system architecture, the modules embedded in the application and the interaction among them.

The design of Parent-Teacher Communication Portal is primarily a client server web based system with multiple user access through various devices. Top level architecture of Parent-Teacher Communication Portal is shown in figure 1.
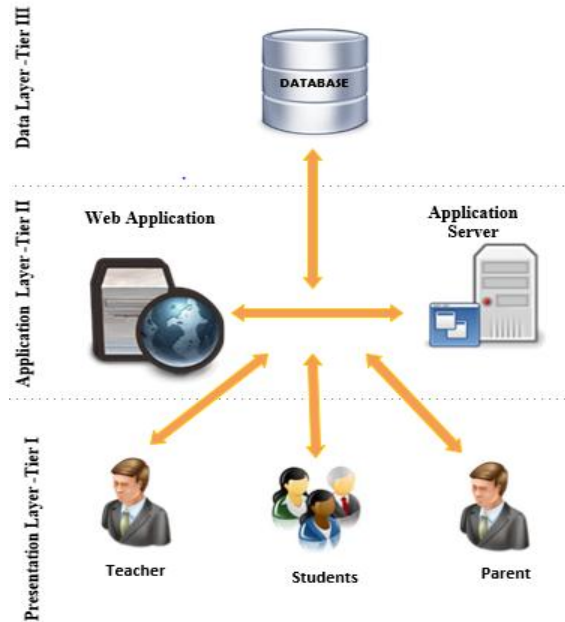

Figure 1 Overall System Architecture

Next, researcher will briefly describe the role of each module and the connection.

Mainly there are five modules in this system as registration, results, complaint, chat and payment. System can register parents, teachers and students through registration module. Then the result module is used to add student results, edit results and prepare result reports and charts.

Furthermore complaint module has capability to add complaints and give feedbacks. Moreover parents can view complaints. The fourth module, Chat has capability to message and do conversation between parents and teachers. The Payment module facilitates parents to pay school fees through online.

The user interfaces give the access to parents, teachers, and students. They also allow administrator access for the maintaining and upgrading purposes. Teachers and parents can access the user interface through mobiles, tablets and PCs.

In this design ordinary users can access the MS Sql database only through the server. In contrast, system administrators can directly access the database without going through the server and authorized users over the ordinary users are given some extended access to the system regarding certain tasks.

The user interfaces enable the inputs such as username, password, and student details. And also user interfaces support with user friendly manner. The inputs for this system will be finger print, teachers' parents' and students' information. In this parent-teacher communication portal, teachers have to upload students' performance like results, complaints, and appraisals. In this system all parents and teachers have separate accounts and each user has username and password. Furthermore students and their parents are linked through student's admission number. In addition to that students and administrations also have separate user accounts. Through this system parents can see the student attendance, time table, student results, academic performance, inquires against their children, school event calendar etc. Also teachers and parents can comment on student's performance.

Server provides access to all kind of users. The server also has direct connection to the system database. This particular server has been designed to handle more than 1000 requests at a given time. It is also supply with backup services. Then the database plays a vital role in any of the software application. For design the database of this proposed system it used MS sql.

Moreover the information which is gathered includes qualitative and quantitative data. Therefore the system should include the both types of data. This project use agile DSDM methodology to develop this system. This leads the system to use a mixture of qualitative and quantitative methodologies in gathering data for the development of the system.

The research design is mainly connected to accomplish the above mentioned objectives of the parent teacher communication portal.
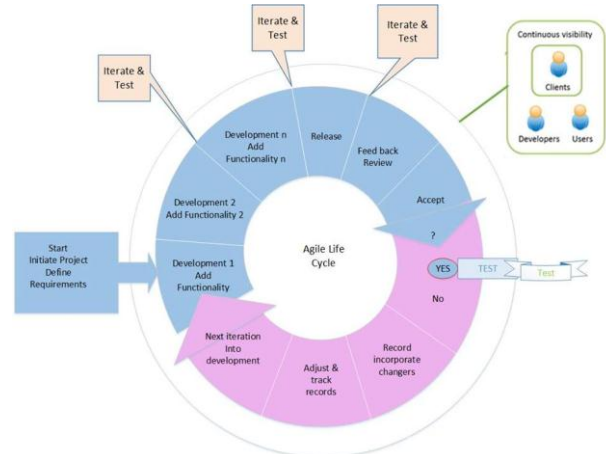

Figure 2 Research Design

VI IMPLEMENTATION OF PROPOSED PARENT COMMUNICATION SYSTEM

The proposed system has been primarily implemented as a client server system, which is predominantly working as web based system that runs on windows operating system. The backend database will be design using MS SQL and it helps to have a quick access to the system. Next, I will briefly describe information of each module.
Server for the proposed parent communication system has been implemented with open source MS sql database server. The choice of MS sql has been influenced by various reasons including it is being open source, widely used, runs on any OS.

When a user registers to the system their registering information goes to the PTCP_DB database and stores them. When teacher wants to put a complaint about a student to his/ her parents, teacher can go to the complaint module, select the particular student, type the complaint and click the send button. Teacher can find the parents by giving student admission number or student email address. Then parent will get a mobile alert that the teacher has complained on their children. Afterwards parent can read the complaint and if necessary he can comment on that. When parent wants to find a teacher's email address parent can find it by giving teacher's class and subject.

Furthermore this system allows uploading and downloading materials. Report on the student performance which is visible only to particular student's parent. When a teacher updates student account, that student's parent will receive a SMS to his/her mobile phone. Moreover students can see their exam results

through this system. Parents can see the exam results as a result report. Moreover student results can view and monitor by using charts.

VII EVALUATION

This section describes the evaluation of the approach. For this purpose, first researcher has presented the result from informal evaluation of the solution. Then it proceeds to describe how the researcher has formally evaluated system approach to check for meeting the objectives of the project.

There are two types of evaluation called Informal evaluation and Formal evaluation. During the implementation process, the modules in the system have been incrementally tested. The integrated solution has also been tested by running the system in the actual work setting of school domain. In these informal testing administrators, teachers, parents and some students have been involved. Accordingly some improvements were done, and identified training requirements for the settings.

In order to test the achievement of objectives of the project, the experiment has been carried out as follows. Note that achievements of problems and technology related objectives are evident from the material in chapter III. This section has critically reviewed about 50 research papers to formulate the problem.

The solution related objectives are concerned with realizing the features of the solution stated in the chapter IV. These features together with the inputs and outputs are as follows.

- User friendliness
- Speed
- Accessibility

The experiment had one control group and one experimental group that use the system for testing purpose. Each group comprised of 20 participants with basic knowledge in the use of computers. Both groups were given the same task and collected their feedback as per above features to be tested. The test is used to register lectures, parents and students. The feedback gathered through a questionnaire and interviews.

VIII CONCLUSION

In this paper researcher has discussed about the problems in parental engagement of education in government schools. Furthermore it discussed about the literature review, methodology, and experimental design of the system, implementation and evaluation of the proposed solution.

Furthermore in this paper, researcher has presented a novel approach for collaborative parent-teacher communication portal for government schools. As per the evaluation results, a clear improvement has been achieved in resource utilization and depth perception. Parent communication is very essential but in the modern world it is in a minimum level. For solve that problem this paper has described collaborative parent-teacher communication portal. Because of that parents can see their children's day to day performances without visiting the children's school. Therefore this proposed solution is very useful to upgrade the student academic performance.

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