Parent-Teacher Portal (PTP): A Communication Tool

Mudasser F. Wyne, Matthew Hunter, Joshua Moran, and Babita Patil

1 Introduction

In this paper we discuss the importance of research in maintaining good school-home partnership through parent-teacher relationship. In [1], the authors conducted a review of two studies analyzing risk factors of outcomes of student's lack of involvement. The paper details the importance of parent involvement in relation to the outcomes of students' correlated success. This study analyzed three areas of focus with regard to a parent's involvement in their child's academic studies. These categories were broken down into two main categories, the parent-child involvement and the parent-school involvement. Parent-child involvement measured three categories that measured how much communication the parent and child had when discussing homework and general school discussion. The parent-school involvement measured how much communication was occurring and at what intervals parents were actively engaging on behalf of their child [1]. We were curious of the results in the findings in Finn's analysis in [1] and continued to conduct additional research. We reason that if parent involvement was a factor that was strongly considered in his analysis, there must be a body of evidence that has correlated in the past. The authors in [2] state that it is difficult to base findings of academic success and correlating factors because there is a large body of variables that are nearly impossible to factor. The authors reiterate that there is a large body of evidence to suggest parent involvement is beneficial to a child's success and teachers and parents need to partner together in helping children reach their full potential.

High school teachers are not completely opposed to the idea of communication with parents of their students. They think that this communication, via email or

M. F. Wyne (✉) · M. Hunter
School of Professional Studies, National University, San Diego, USA
e-mail: mwyne@nu.edu

phone, should only be in case of emergency and not on routine basis. On the other hand, we also acknowledge and understand that some teachers may not communicate at all. Research shows that children do better in school when parents talk often with teachers and become involved in the school. There are number of ways that parents and teachers can communicate with each other, rather than relying on the scheduled parent-teacher conferences. Close communications between parents and teachers can help the student. In addition, parents who participate in school activities and events will have added opportunities to communicate with teachers. Becoming involved with parent-teacher organizations gives the teacher and parent the possibility to interact outside the classroom. This will also present an opportunity for the parent to provide input into decisions that may affect their child's education. Sometimes teachers conduct welcome meeting with their students' parents early in the school year, in an effort to better understand parents and their children and how to support their education. Teachers appreciate knowing that parents are concerned and interested in their child's progress; this also helps open the lines of communication between teachers and parents.

Parent-teacher conferences are often scheduled at the time of the first report card for the school year. For parents and teachers, this is a chance to talk one-on-one about the student. This conference is a good occasion to launch a partnership between parent and teacher that will function during the school year. A good investment in one's children education is to volunteer, depending upon parent's availability, interests, skills, and the needs of the school; the opportunities are endless, at times school personnel may not know what parents want to do as a volunteer. Some suggestions include lunchroom monitor, tutoring, library aid, classroom speaker on a specific topic of interest, and concession worker at school events. Phone calls and visits to the classroom are also good ways to discuss appropriate times and means of contact with the teacher to open communication channel between parents and teachers and stay informed about child's progress.

The study conducted by the National Household Education Surveys Program reports that 59% of parents whose children are going to public schools complained that they never had any communication from teaching staff [3]. Lack of communication from teachers of the public school can also be attributed to the fact that each teacher is responsible for a large number of students, so they do not have time for one-to-one communication with parents. Some of them have also reported that they have, at time, outdated phone number and/or email address, thus making it impossible to establish any kind of communication.

Schools need to require teacher communication with their student's parents and not an optional responsibility. This will result in teacher either making time during school day or spending additional time. In addition, teacher will also need some kind of guidance and training on the form of communication as well as contents of the messages to be sent. One must keep in mind that low-income school with underachieving students will present additional challenges. During parent-teacher or back-to-school meetings is an excellent opportunity of parents to talk to their children's teachers but only a few parents generally show up for such meetings, especially not the ones that you really need to talk to.

Texting can be considered as for the most underused and promising form of parent-teacher communication [3]. These days, phones, even for poor families, can be considered as a convenient and inexpensive mode of communication for pushing vital news as well as allowing teachers to reach out to parents with a personalized message. These messages can be very short and sweet to remind parents of the upcoming tests, assignments, or even future school trips and meetings. With continued and clear communication from the start of the academic year by the teacher, it can avoid any misunderstanding on the parents' side as well as will keep them informed on class, school, and community activities. Such approach may lead to having very understanding and supportive parents [4]. The authors in [5] suggest that communication should be initiated with parents as soon as the list of students in the class becomes available; it would be very helpful especially for teachers who are new in the field. The communication may include a brief self-introduction and contact information. In addition, the authors in [6] present factors that affect the development of effective parent-teacher relationship. These factors include matching between parent-teacher culture, societal forces for school and family, and how parents as well as teachers view their individual roles.

The work reported in this paper is an attempt to fill the communication gap between teachers and parents. At the heart of this issue is a lack of involvement or ability to communicate using traditional methods. By developing a web-based portal, we are attempting to provide tools and methods that are in use and utilized by millions of users. We hope to use tools such as a web portal, email, text, calendars, and event reminders to assist teachers and parents to engage in their students learning experience.

2   Parent-Teacher Portal

Good two-way communication between parents and teachers is necessary for student's success. Research shows that the more parents and teachers share relevant information with each other about a student, the better equipped both will be to help student to succeed academically. In addition, an effective parent-teacher communication also helps children do better socially. This is especially important for a child who is struggling in school, as seeing his parents and teachers working together to solve the problem can be tremendously reassuring. When children are in elementary school where they are just starting the school or transitioning between one grade to another, it becomes even more important for the parent and teacher to be knowledgeable about the student's progress. Although teachers and parents recognize the importance of effective parent-teacher communication, few gleefully anticipate the actual occasions of that communication. Many teachers, while fully aware of the importance of effective parent-teacher communication, still dread the actual occasions of that communication. It is not easy to maintain or promote home-school partnership since it also depends on size of the community where the school is located; in smaller communities, it is much easier because of intimate

connections. In any case, it is not easy to either initiate or maintain communication with the parents; especially with difficult parents, it can be very stressful. In order to support communication between teacher and parents, [7] presents four tools such as *Remind*, *ClassDojo*, *Bloomz*, and *ClassTag*. Comparison of these tools with our PTP will be presented later in this paper.

To help make parent-teacher communication easier, clear, and precise, having an app that both the parent and the teacher can use with ease would be of great benefit; hence we decided to develop an online parent-teacher communication app named *Parent-Teacher Portal (PTP)*. The PTP app can help bridge communication gaps between the parent and teacher. The proposed portal is based on the following:

- What do teachers and parents need to talk about?
- How can learning experiences be designed that require the parent-teacher interaction?
- How can we make app a reliable and effective tool in child's development?
- Will using an app make it easier for the parent and teacher to initiate and have a continuous communication?

For Teachers The app makes it easier for teachers to send out assignments, reminders, and progress reports as well as communicate with parents about conferences, field trips, volunteer opportunities, and school material donations. Teachers can send messages to individual parents, to a group, or to the whole class. They can also attach pictures to messages or conduct polls to ask for parent feedback. Teachers can also choose to share classroom events and photos, giving families a chance to feel more connected to the classroom.

For Parents The app provides parents a reliable medium to contact teachers, reply to the teacher's message, and ask questions pertaining to their child. Class group chats can be created where parents can submit generic questions, suggestions, etc. Parents can also participate in one of the existing group chats.

3 Existing Tools

In this section we are highlighting important functionality potential and a comparison to our proposed PTP.

3.1 Remind

Remind provides some of the features that we have but more centered on messaging. This messaging would provide translation services, text messaging, read receipts, and provide quick references to what was covered during the school day. There are additional services, but they would require an upgrade for additional cost.

We were unable to receive pricing information for these services. To receive this, one would need to continue through with the registration/upgrade process. These additional services include broadcast messaging and longer messages (presumably 255 characters is the max.), rostering, admin controls, and statistical analysis. There is also a limit on the number of classes that can be added per account. The class size is limited to 10 per account. However, it is unclear if that number is for each teacher or each school. If that limit was on teachers, 10 is an acceptable size limit as most teachers in elementary school will only have 1–2 classes a year. The biggest issue here is that there would be no ability to achieve this information if it would be needed at a later date. If the limit is opposed on a school level account, this would not adequately address the demand and only serve individual teachers who chose to use the *Remind* app. Using a quick search on the support page of *Remind* site, the very first support entry is titled "My district is banning *Remind* this year. What can I do?" For this reason, we envisioned the PTP being more of an integral part of a school/district to avoid issues of privacy, support, or law. For this reason, the application would first need to be deployed in a more regional setting. As a national enterprise, there would be a strong argument to not allow a third party the ability/opportunity to perform data analytics on children. This application would be a direct competitor to our PTP application and would provide similar services when compared to our functional requirements in communication. As far as we could tell, *Remind* does not provide a calendar service.

3.2 ClassDojo

ClassDojo provides a system in which teachers are actively engaging students and providing real-time updates to the student's parents. *ClassDojo* provides a means to integrate communication with curriculum and provides students a fun interactive way to participate within that communication system. The biggest limitation with *ClassDojo* was there are character limits (255 characters) for messages. When communicating important information with parents, one needs to provide large amounts of details to ensure everyone understood the request or information. *ClassDojo* is not supported by older devices. This is probably not the biggest issue; however, this can cause problems regarding support. *ClassDojo* provides all the same functionality that we had planned to deliver, with the exception of a calendar and platform support..

3.3 Bloomz

Bloomz provides all of the same communication features that our PTP would deliver. This application is very similar to *ClassDojo* in the way it would be used as an integral part of the classroom. From the use in the classroom, one can provide

feedback on how your student is doing as well as activities they are working on in school. A few quick searches and this app have received high marks on sites that are comparing similar communication tools. Like ClassDojo, *Bloomz* seems to be a more all-in-one app. These means that these apps would be much more appealing to teachers. A limitation on the *Bloomz* site is that they have a beta version of their application for Windows phones. *Bloomz* support suggests using a browser for the best experience when using a Windows device. There is very little information about using the browser version, so we are unsure if you retain all the features of the app. This would also be the option when using a PC. The PTP that we have designed can be used through the browser. This eliminates these types of platform-dependent apps like *Bloomz*. This will also cut down on the management overhead.

3.4 ClassTag

ClassTag provides all of the same communication features that our PTP would deliver with the exception of a class calendar. A class calendar can be generated, but it will need to be synced to other tools like Google accounts, Outlook, etc. Unlike the other three tools, ClassTag would provide the platform independence that our app would also provide. *ClassTag* is free and utilizes both browser and apps to connect parents. This will create more overhead hours devoted to maintenance and upkeep. However, ads are displayed in exchange for reward points. We believe this system is only displayed for teachers, but we could not find any information if the ads are used on parents. Their site says that this system helps to offset the costs of maintaining the site and helps keep *ClassTag* free. *ClassTag* is more closely related to our proposed PTP than the other three tools. *ClassDojo* and *Bloomz* attempt to be more integrated within the classroom. We feel that those two tools will run into legal troubles and lose customers because of controversy revolving around collecting data on children and the over focus of technology in the classroom.

   ClassDojo and *Bloomz* are also more mature in their development and aim to be an all-in-one tool. This is very appealing, especially for teachers. However, we believe they will be subject to more risk as they are competing as for-profit companies in a non-profit environment. Also, since they are more greatly integrated in the classroom, we also feel that there will be a debate whether these tools meet curriculum requirements. Both areas run the risk of losing support of school systems in our opinion.

4 System Implementation

The goal for Parent-Teacher Portal (PTP) is to provide a forum for teachers and parents to collaborate and be able to provide the highest possible level of learning for students. The challenge is that the information that is delivered by teachers will be

received by parents, not students. To ensure that our idea was grounded in evidence, a series of interviews with actual teachers of elementary age students was also conducted. While performing risk analysis for the PTP, we have identified pertinent risks for our proposed system: system breach and privacy/loss of information.

We have secured the domain name http://www.parentteacherportal.com for our portal from Google domains. We have developed webpages using HTML, CSS, and JavaScript codes. For the webpage icons, we are using Bootstrap Glyphicons. Development tools Brackets and Eclipse IDE are used, and for database MySQL Community Edition is used, integrated with webpage using Java servlets pages.

The PTP being hosted and accessed through the Internet will be exposed to all the security vulnerabilities that are being associated with similar sites and technologies. Since we use HTML, CSS, and SQL and each of these tools have past, present, and future vulnerabilities, so to mitigate these vulnerabilities, we used the most up-to-date versions of these software tools and continue to install known good patches. Additionally, we hosted our portal through GitHub for initial deployment. GitHub has put in place several safeguards to protect data in transit during login, and they perform internal and external audits. Privacy and the protection of personal identifying information are a very important area of contention. The data that will be used by our application will consist of names and phone numbers stored in a database and will be transmitted. To mitigate this risk, we limit the types of data that will be needed to create a parent account and the identifying information of their children. This data will be limited to their phone number and first and last name. Secure protocols will be used when data is sent to and from the PTP, and data will remain private using secure coding standards in Java and HTML. The root password for MySQL shall be changed and will not be used for system functions such as running queries. In addition, the MySQL Enterprise version provides the ability to encrypt date at rest encryption in the database using Transparent Data Encryption (TDE). If required, we can upgrade from the free MySQL to the Enterprise version.

The risk of our target audience not using or liking our PTP is one of our biggest risks. The concern regarding parent involvement was mentioned in our stakeholder interviews and comes from the belief that parents that are engaged will be early adopters of the portal, but uninvolved parents will continue to not participate. To mitigate this risk, we will need to develop a deployment plan. This plan shall facilitate and encourage parent involvement. The PTP personnel shall work with the school to host an open house to familiarize parents and introduce the benefits of the portal. During this time, local administrators can assist parents with the processes for setting up and accessing the application functionality on their devices. During the implementation phase and during the beginning of the school year, local administrators will be available during times when parents are more likely to be present on school grounds, for example, when dropping off or picking up their children.

5   Functional and Non-functional Requirements

Parent-Teacher Portal (PTP) app must work on all web and tablet devices. User interface must be consistent on all devices. In addition, the app must also meet the following functional requirements.

1. *Class group creation:* The teacher must first create a class group with name of her choice. The class group will be assigned a system-generated unique ID on the application.
2. *Adding parent\guardian to the class group:* Teacher must be able to register parent\guardian for the application through a valid phone number. There will be an option to register at maximum two contacts per student. After the teacher has added the parents to the group, a short introduction email and text will be sent to the phone numbers. The introduction will contain a link to the web portal and instructions how to register on the portal.
3. *Parents registration:* Parents will receive email from the class teacher with link to create account. The student's ID number will be the verification code to register into the app.
4. *Send Message:* Parents and teacher shall be able to send instant message to each other. They will be notified when a message is successfully delivered to the recipient by displaying a tick sign next to the message sent.
5. *Send Attachments:* Teacher shall be able to send attachments with messages.
6. *Group Email:* Teacher shall be able to send messages to the class group.

6   Usability

PTP usability is the key factor ensuring early and widespread acceptance by both parents and teachers. For this reason, the most heavily used portions of this application are tested rigorously to ensure continuity throughout the application. Security is ensured by following best practices to ensure the privacy and security of all user information during transit and at rest. Code is written securely, data is encrypted during transit, and repeated tests to ensure security measures are in place. Figure 1 shows the link between various functionalities as data flow diagram.

7   User Interface

1. *Home Screen*: The three options available on this screen are Login, Customer Support, and FAQ. The Login button directs the stakeholders to the Login screen and function.
2. *Login Screen/Function*: For the demo, the login and registration are left open. The registration and login functions of the portal are operational.
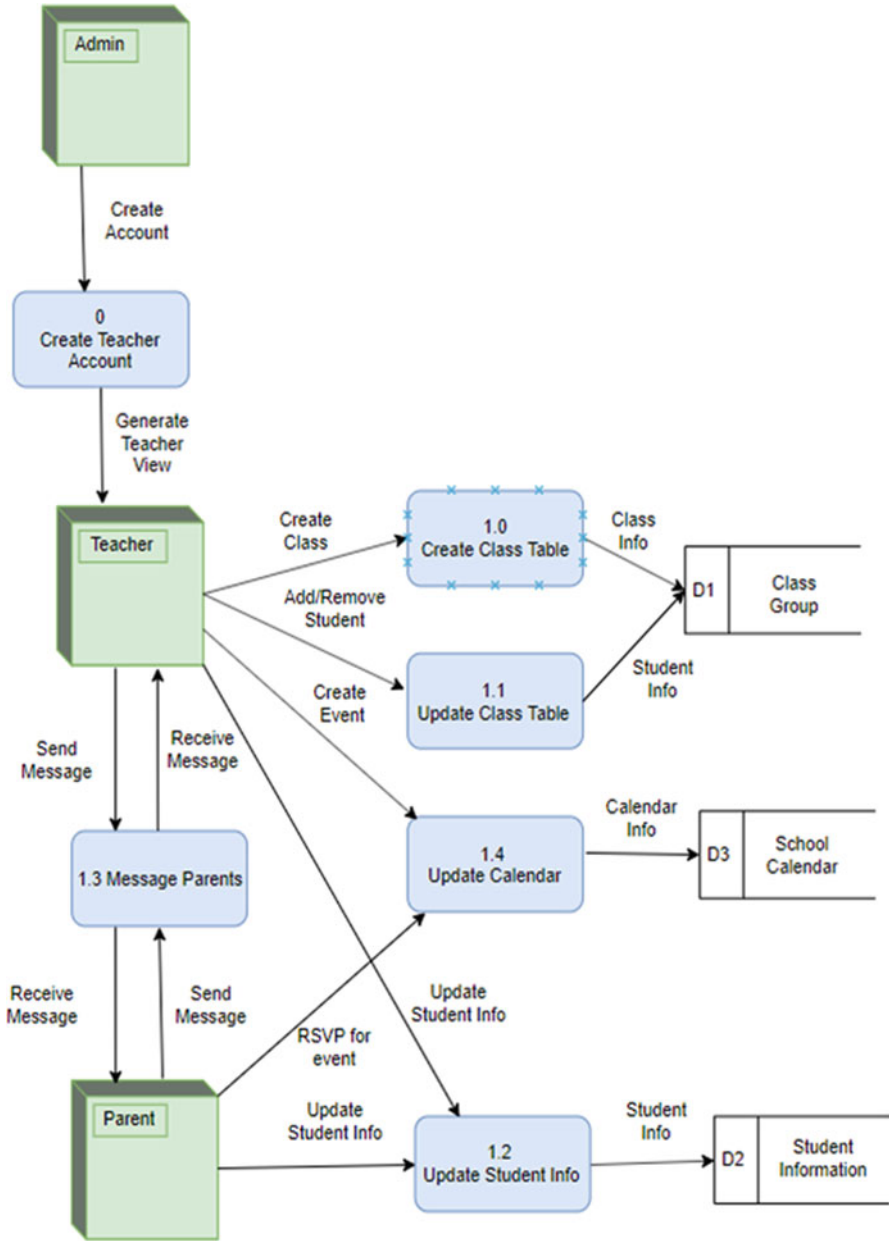
Fig. 1 Data flow diagram

3. *Teacher Home Screen*: The backdrop of the teacher homepage is flexible so that teachers can frequently change these real-world boards to reflect seasons and holidays.

4. *Class Group Screen/Function*: The title banner changed from "Class Groups Assigned" to "Classes Assigned." It Pprovides the ability to view student details and to see parent contact information.
5. *Email Screen/Function*: The emails shown in this area will be separated by the various classes a teacher is teaching and a collection of all parent emails. It is a filter option that would separate the emails into class groups.

8 Conclusion and Future Recommendation

The main goal of the PTP application was to streamline communication between elementary school teachers and the parents of their students. When interviewing several teachers, they stated that the hardest part of their job can be communicating with parents directly about how their child is doing. The PTP application allows teachers to create class groups with all the contact information of their student's parents in one location. With that information, they can send a mass class email about a reminder or directly communicate with a parent about a child's issues in school. Parents can also see the information of other students in their child's class allowing them to coordinate and work with other parents for school events or volunteering in class. The use of the PTP application should significantly help make communication easier between elementary school teachers and the parents of their students.

We have completed most of the functionality that we set out to create at the beginning. The biggest part that we pulled back on was including a translation service for our application. Along with communication being the hardest part for elementary school teachers, communicating with English language learners (ELLs) can be a barrier. This would be the first and highest priority for future release of our application. In addition, future functionalities are translation service, calendar, send text, class group collaboration for parents, chat feature, discussion board for parents, and graphic design customization.

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