An Integrated Communication System for a Special Needs Children Centre

by

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Abstract

Managing communication and tracking therapy sessions or data has been a challenging aspect for many SME (Small to Medium Enterprise) special needs centres. We believe there is a possibility for web technology to simplify this process. This research sought to discover how such digital technology could assist and improve interactions between parents and professionals within an institution involved in the improvement and development of special needs children. Through research interviews, the study investigated how engaging stakeholders digitally can enhance multidisciplinary evaluation, diagnosis, learning intervention, archiving data and tracking therapy sessions. It also addressed factors to enable an online platform to be used as an environment to communicate and hold digital data across different touch points. Through discovery interviews and feature consultation with participants, including clinicians, educators, and parents, our study suggests that using web based technologies as a mode of communication could enhance and assist in the upbringing of a special needs child and increase productivity among professionals.

Author Keywords

Special needs, children, child, therapist, treatment, healthcare, record keeping, educators, parents, time managing, assigning task, design requirements, user interface, interactive design, internet, web technology, web service.

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A special thanks to the therapists, special needs teachers and parents who have patiently contributed towards this project. Without them the project could not have moved forward. Out of respect for their privacy, I am withholding from publishing their names.

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Dedication

To all parents and family members with special needs children. To all professionals involved in a special needs institution.

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1. Introduction

Integrated and seamless communication is the key to achieving objectives and targets in any given environment or situation. Helping a special needs child or a child in a grey zone involves therapy, customized education and special care to be taken by parents. Using technologies such as digital platform or applications may significantly solve issues of connection and communication between parents, teachers and the health professionals in the development and upbringing of a special needs child or any child considered in the grey zone.

Special Needs Children & Children in Grey Zone

A special needs child is a term used to describe individuals who may be challenged physically or mentally or emotionally disabled (Merriam-Webster). While a child in grey zone is a term used to describe individuals who may have similar challenges but usually are ignored or have a certain challenges in overcoming certain aspect in life such as motor skills or depression (WebMD).

Society & Contemporary World Situation

Our changing world has disrupted social behaviors, cultures, traditions and family values. The home structure of a man working the whole day and the woman taking care of the family and the house is no longer the same as it was a couple of decades ago. It is now common in our society to have both parents in a household (Aryee, Fields & Luk, 1999) working for several reasons some of which are career, ethical, cultural and economical.

Parents of special needs child have to spend considerable amount of time with therapists and teachers organizing schedules, face-to-face interaction with professional guidance, following tasks and home works (Brazelton, Berry, & Greenspan, 2009). Unfortunately, often a parent may have to give up their working hours or sacrifice their career to look after the child or family (Schuster, Chung, Elliott, Garfield, Vestal & Klein, 2009). In the case of low-income families, this can create further financial stress (Loprest & Davidoff, 2004).

"Depending on the nature and severity of the disability, many parents of children with special needs find that the prospect of coordinating services, arranging for child care and providing an appropriate educational setting are overwhelming tasks."

– Areva D. Martin, Esq, Special Needs Network

There is an opportunity with digital technologies to remove the disconnection in communication or change the traditional methodology used in special needs centres. The research question was itself raised out of an observation from an active centre setup in the city of Dubai. It became more evident while having conversations with the healthcare professionals and educators dealing with special needs children and children in grey zones. These professionals have all worked in different countries and have several years of industry experience.

Often communicating at different levels within the institution is the challenge. In a family where both the parents are working especially high at their career course, it may become difficult to arrange face time meetings with the therapists or teachers as often as required. Digital platform should help to solve the problems in assigning objectives and tracking progress in the up bringing's of a child without the need to meet face time by different stakeholders. Involved members must be able to connect effectively using existing technology and devices that they already own.

Mode of Communication

Emails are still the primary mode of communication apart from meeting personally and telephone (Patel, 2013). However, email communication can get challenging with overflowing and busy inboxes. It also makes it difficult to follow trails of communication and take effective action towards achieving the objectives (Virji, Yarnall, et al., 2006).

Web based platforms that are cloud hosted could play a role in solving this challenge or at least ease through a platform or application that connects different stakeholders and patients or patient's guardians in an institutional level. The key is managing these tasks and communication to be able to perform as a team in achieving objectives. In this case of study, that would apply to the upbringing of a

special needs child. However, this principle can be applied in any context from the healthcare perspective.

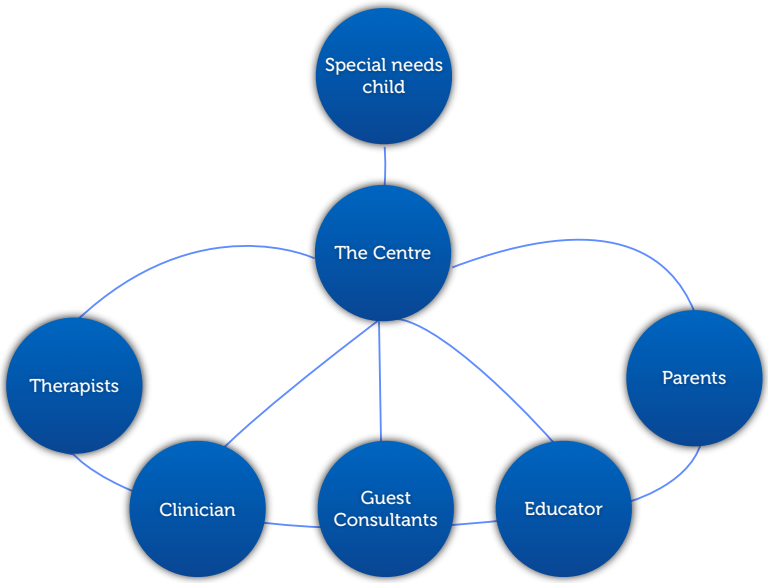

Figure 1. General structure of stakeholders

The study is intended to create design brief for a web based platform that will enable any special needs centre to be able to use as an environment that will activate tracking, communication, case management and other details that can be shared among different stakeholders and accessible across different touch points. The data collected and organized will be shareable, reachable and transferable easily within stakeholders or even between centres using the same system. This application or platform may eventually form a part of the centre's digital, communication and IT solution that may increase productivity and efficiency.

Institutions here are defined as schools for special needs, clinics, hospitals or other medical and health centres or a business that are involved in assisting the development of special needs children. However, this study will primarily be interested in looking at small medium (SME) sized institutions rather than larger or corporate level.

Apart from integrated communication, it should allow teachers or other institution staffs to access a child's essential data, which may include profile, dietary conditions, behavioral patterns, progress etc. The project shall also assess benefits of being able to assign tasks to other stakeholders, create a team of professionals and communicate effectively in achieving objectives set by either stakeholder. The concept is inspired from Basecamp, Jira and other related project management tools used often in software development industries for reporting and tracking bugs, assigning new scope, tasks et cetera. The question that guided this research, therefore, was: How can digital tools in the form of a web application improve communication within a support group to provide better care for individuals with special needs?

Through out this document we will refer to therapist and educator stakeholder participants as professionals. We will also refer to any data activity on the platform such as information or entry as transactions.

Digital Inclusion

This research investigates whether digital inclusion can make way for a team to be setup from different disciplines that may also have stakeholders outside of proximity, yet effectively create productive environment. Digital inclusion may also help bridge communication gap between stakeholders from overseas or visiting therapists and still be able to collaborate in different time zones. These are some of the aspects the project intends to explore and answer for the benefit of the child's development.

This paper begins by looking at a literature review (chapter 2) related to this study in the area of healthcare interface design, technology, emotional behaviors among stakeholders, best practice considerations, building relationships and managing records. Next, we introduce our methodology (chapter 3) used in this study to conduct research and recruiting participants. We then review results (chapter 4) and discuss outcomes from the research (chapter 5). Based on these learning, set of features and recommendations (chapter 6) were created to support development of a design brief. Some of these features were translated as a set of low fidelity wireframes. Some of the same participants then reviewed our design considerations for feedback. In the end, we close the paper with conclusions (chapter 7).

2. Literature Review

Existing digital services, application and literature were reviewed to explore how current digital technology and the Internet played a role in working with children with special needs from a therapy perspective and from the point of view of teaching . Distance learning was also briefly investigated due to certain possible similarities.

Alan, William and Jeffrey (2009) studied application of virtual reality in various fields such as business, science, art, medicine et cetera that has been tested to treat patients. A therapist's main priority is their patient; henceforth an interface with drop down menu system can be noxious. Feedback through sound and cues and ability to control the interface through one hand whether active or non-active is essential. The study also found that having a menu repeatedly occupy most of the real estate space of the screen hindered user's ability to quickly interact with elements. This is evident in how interfaces for smartphones have been advancing by hiding the menu behind the active layer and bringing it to forefront by user gesture.

Dietz, Nef & Rymer (2012) through their paper, discussed the importance of controlled interfaces in the medical industry. From a therapist's perspective, an interface that is fully controllable and adaptable during therapy is extremely

important. Likewise, the feedback through an intuitive GUI is essential for any digital piece. The authors professed that interfaces must restrict in elements that are available to them during each step. Interface element's size, spacing and flexibility enhanced their performance and efficiency. Study also explained the benefits of a touch interface over a mouse-controlled interface whereby less supervision is required. This can be related to the home environment whereby parents are required to operate for assisting their children complete tasks assigned by therapists whereby supervision is absolutely unavailable.

Upkar's (2009) research, emphasizes emerging technology within healthcare system is the evolution of wireless health monitoring system (WHMS) that includes several devices such as wearable hardware, smartphone and tablet. Upkar focuses on training healthcare professionals for mobile decision-making as a key requirement. As this comes with handling devices, several things needs to be considered such as the screen size, what information can be served, concerns to patient's privacy, determining patient's needs etc. The beneficial of these handhelds however are that interface can be served based on context, location and proximity. Thus saving the real estate space of the screen and allowing effective decision making while the professionals are mobile.

Teigland (2003) in his research states that sharing knowledge and information between two parties within an organization requires building trust and

commitment to each other (Nahapiet & Ghoshal 1998). This can be achieved by giving back to the other party in terms of positive and effective response. Implementing a technology within an institution whether healthcare or not isn't enough. Teigland stresses the need to make way for cultural change. Sharing knowledge and trading information should be at the core to make technology assist in collaborating and working on a common task in achieving a common goal.

Meyers (2013) through his article, provides a reality of parents with special needs children that are likely to be more depressed than parents with healthy children. They are more likely to be associated with stress, depression and sense of loneliness (American Psychological Association, 2010). In my opinion, this is where the relationship between therapists and parents become inevitable. Special needs children require guidance as much as any other child but sometimes much more in a planned manner. Parents need to feel that they have support at home to be able to guide their children (Kleiner, 2002).

Supporting that argument is Silverman (2011), with his theory that the therapist must build a social relationship with their client. This is build traditionally through face-to-face interaction that creates emotions and empathy. The exposure to technology is another crucial factor in maintaining an effective relationship. Silverman also states that building relationship through virtual

communication may take time to openness, but the resistance reduces over time, claims Silverman. The experiments described in this article help understand how digital can bring stakeholders together to build trust and resonate a community feeling. Client's exposure to culture and traditions also play an important role in building relationship and trust (Hanna, Karen, & Rodger, 2002).

Morgan and Zhao (1993) claim that for a successful health care delivery system, relationship between doctors and caregivers are vital. The caregivers form an integral part of the system in achieving health care goals. Often caregivers form part of the family relationship and are more aware of the patient situation. This also leads to being the person immediately answerable to family and close friends than professionals from health care centre. The observations caregivers make and the knowledge they have about the condition are critical information to the healthcare professionals. Morgan's and Zhao's researches find that goals and objectives are achieved with greater clarity when doctor-caregiver relationship are taken care between the realms of medicine and family.

Having the user well trained to use a system is one thing. But more or less it is also important for systems to understand the context and be location aware of its usage (Dey, Brown, et al, 1999). Delivering interactive elements based on the situation will enhance the user experience and delivery of interface. In another study, it is noted that being able to access captured record is something that has

been ignored often. This is an integral part of any system as it can improve day-to-day task management and communication among peers (Richter, Abowd, Poltrock & Daijavad, 2001). Some similar applications that are utilizing this theory and have made it vital are Jira and Basecamp.

In a study conducted by Mortley, Wade and Enderby (2004), it was discovered that transferring therapy data through Internet proved to have increased confidence in communication. Their study also had assigning therapy tasks and aligning them based on participant feedbacks. This allowed in giving control towards the patients and allowing them to be flexible in achieving objectives. The software facilitated therapists and participants to communicate better among each other using their respective Internet enabled devices. Authors claim that we are better positioned in terms of information and communications technology to be remotely located with limited face-to-face interaction.

However, therapy through Internet treatments cannot deliver the same empathy as the face-to-face sessions (Almov, Carlbring, Kallqvist, Paxling, Cuijpers, Andersson, 2011). This is the challenge for therapists between text and verbal therapy. The existing model of communication between the therapists and patients or caregivers often happens through email. The problem with this mode of communication is that it depends solely on writing skills.

A study on task technology fit perspective found that negotiating online tasks when used as text based had greater efficiency in meeting requirements as opposed to same task when trialed video-based (Doong, Wang & Hsieh, 2009). Results from the research revealed that participants with written tasks were able to easily scan, search and moderate when compared to rich media tasks.

Another recent study proves that Cognitive Behavior Therapy delivered through Internet via Email is as effective as the ones delivered in person (Paxling, Lundgren, Norman, Almlöv, Carlbring, Cuijpers, Andersson, 2012). But the means when mixed with regular sessions add immense value as it allows patients and caregivers access and contact to therapist support when needed which sometimes extends beyond email through chat as well. Having more frequent contact between patient and therapist also show positive effect on achieving treatments (Palmqvist, Carlbring and Andersson, 2007).

Kientz and team (2007) conducted a similar study to this research on using computing technology to improve parent and pediatrician interaction. In their research, doctors who participated in the research advised how important it is for children to have doctor visits. Technology can play a role in enhancing that relationship but it must not interfere as it could have adverse effects as it lacks the sentimental value face-to-face creates. Feeding information through technology can boost parent's confidence, as we humans are very curious by nature.

Originally designed as a task management tool, email quickly grew to become obsolete for this purpose as volume increased with its popularity. A research study on email as a task management shows that people with low cognitive abilities perform indifferently with interfaces (Gwizdka, 2002). The surrounding a user interacts with an interface was also found to be an intriguing element in user experience.

Another research showed that contact method based on email alone was not effective to satisfactory level for the treatment (Carlbring, 2006). But it did prove that Internet or email based therapy had helped clients to have flexibility since they can choose when to have the session, well fitting to their daily schedule. However, another study found that giving an extended time to achieve therapeutic tasks had a negative impact on the treatment (Carlbring, Ekselius, & Andersson, 2003).

Therapists are always willing to embrace new technologies to streamline their work process (Hoffman, Desha, Verall, 2011). However, technical challenges stands in between them and demotivates them from exploring the potentials. In the same study it was found that such fate might lead to less activity on the interfaces, which may lead to outdated information. Training at all ends are crucial for any implementation of technology within healthcare sector.

Through the work described above, we learn that building social relationships is critical in any digital piece of work, especially in the line of sharing data and knowledge. Although Email was invented as a task management tool, it is emerging to be ineffective in the new age era (Mathis, 2012). Businesses in several sectors are moving away from email into collaboration systems. Contextual and location awareness is important in serving user experience. This should be designed to guide and educate the user interaction. Technology is fast evolving; and future proofing for potential other devices with continuous but intuitive user coaching is an important aspect of any successful digital commodity.

3. Method

The goal of this research was to discover digital platform features that can integrate and synchronize communication between stakeholders within a SME institution focusing on achieving growth and success for a special needs child.. Success can be defined as including greater qualitative communication, sharing valuable data, archiving key information and giving access to data at relevant time on a relevant device by the concerned member in the most user-friendly and time saving manner.

Hypotheses

The research study began with the below hypotheses:

1. Email is the current primary digital communication between stakeholders. This mode of communication may also be a source of storing data and information. Relying on it is not a compelling experience. The dependence has huge risk of data loss as much email platforms are based on Microsoft Outlook, which stored emails on the computer hard drive. Hence, there is a need and demand for a new task-communication management system to streamline the environment for a greater efficiency.

2. Many stakeholders are familiar with modern devices but not very intuitive with sophisticated interface technology. Most software systems in the

healthcare sector fail to create a productive experience for the professionals and parents. It does not adhere to the working environment or the context where the technology maybe used and interacted with. Designing a system based on common web interface will facilitate quick learning and guide the users using an adaptable interface. This can be through familiar interactivity learned through commonly used web services.

3. Flexibility and customization will be critical for the success. Therapy and education plan for each child will be different and in some ways may depend on the parent and the structure. This extends to other features within the platform. Ability to talk to other systems or enabling third party development of plugins which may come in the form of games, API or functionalities are important to cater to cases, institutions and other unforeseen challenges or requirements. Making a uniform rule may not work in this area.

Recruitment and Settings

The research was conducted with participants from a special needs centre that is involved in educating and applying therapy based in Dubai, United Arab Emirates. The name of the centre has been withheld here to protect the privacy

given the sensitivity surrounding in the work environment and nature of the situation (Appendix B).

From the centre, a client relationship executive (hereby called as CRE) was recruited to assist in the research and to recruit other stakeholder participants. The CRE facilitated all interactions between the participants at the centre for the research including but not limited to recruitment, scheduling research interview, coordinating with parents to see if they would be interested in participating and required sample gathering along with required permissions (Appendix C).

This participant provided immense details on the process at the centre from parent's first interaction to case discussion to scheduling and other admin related activities at the centre that may have direct or indirect effect to the intended platform. The CRE also assisted on behalf of the Principal Student Investigator (PSI) or mediated between the PSI and the other participants. All CRE's activities including further recruitment, requirements assessment, action on forms et cetera was according to the directions by the PSI.

Participants were voluntarily recruited from the centre through the assistance of CRE following ethical and moral code agreed between the centre and the PSI. To accomplish this study, following list of participants were recruited with stated set of prerequisites and requirements (Appendix D).

1. Three educators were recruited with over five years of expertise in teaching special needs children either at a school or special needs centre. They all had work experiences with therapists in achieving goals for the child.

2. Three therapists were recruited from the same institution with over five years of expertise in training special needs children. They were unique in their specialty and had experiences working closely with teachers or educators on achieving goals for the child.

3. Two parent of a special needs child were also recruited. They have at least half time career or are self-employed.

This was achieved by placing a notice on the centre's notice board calling voluntary participants for interview and low-fidelity prototype testing. Once the participants were recruited, CRE assisted in getting schedules with each individual participant (Appendix E, F). All interviews were conducted either in person or over an Internet call such as Skype and Facetime.

There were no direct benefits to therapists, educator or parents. However, many participants informed how good they felt about being given a chance to contribute towards a research that may improve the environment or productivity in the future should the online platform be developed. All participants who agreed

to be a part of the research were requested to fill the Informed/Consent Form either electronically and sign –or– print, hand write and sign; giving their consent and agreeing to the terms (Appendix G).

The form was then handed back to the PSI directly or through the CRE at the centre. The information consent form gave all details about the research; informed their options, privacy, confidentiality and rights. PSI and CRE together made sure that the participants understood the research and ensured they obtained signature on the form, which was signed by the PSI. Two copies of the Informed/Consent Form were produced, one original copy kept with the PSI and the other copy with the participant.

Any audio recordings taken during sessions were shared with the respective participants upon request to maintain transparency. They were always given the right to withdraw from the research at any given point of time without being questioned (Appendix H). Participants were also made aware that if they were interested, access to the final paper would be shared. The cyber laws and privacy laws of Dubai, United Arab Emirates have been strictly followed as the PSI resides in and the research was conducted in the city of Dubai.

Procedure

Interested candidates were requested to share their full name, contact details such as email, and phone and residence district/city on the application via

email. A total of 13 applications were received. PSI selected the required participants by reviewing all emails that was in response to the notice inviting participants for the research. All communications were progressed either through email, phone or Internet call. The selection for qualified candidates where based on first come first serve basis. All of the selected candidates participated in the first research interview. Many of them also participated again in the second set of interview on feature consultation (Appendix J).

Personal details were collected from all participants to understand different archetypes of users and for the matter of retaining contact details during the course of the research. Data such as name, email and phone number was stored digitally. The data was treated with anonymity; that is during the course of research and after the research.

A unique participant code made up of alphanumeric characters was assigned to participants that were stored digitally in a password-protected spreadsheet. A code starting TH01 was assigned to therapists, code starting with ED01 for educators and code starting with PN01 for parents. All interviews were conducted by following the code of conduct in align with ethics board of OCAD University (REB approval number 2014-15, Appendix A). Participants were also read out their rights and all required permissions were obtained before any interviews.

First Interview: Research and Discovery

First session was about discovering and conducting research interview. Each session consisted of a semi-structured interview conducted with parents, educators and therapists as per protocol to facilitate free flow conversations (Appendix I). This was achieved with a set of questions used to start and establish conversation. None of the participants were made aware of any other participant. The questions were related to communication, task assignment and data exchange among stakeholders – challenges and issues faced and expectations from an ideal system.

First part of this protocol was about understanding the existing processes and workflow; second part was about how the stakeholders felt about existing system and what changes they wish to see from their current work process. Third and final part was about their opinions and experience on how digital can play a role to fill current gaps or streamline their work efficiently better. Participants were informed about their confidentiality and how the data that was collected would be maintained and how the data gathered from them will be used.

Every interview was audio recorded without mentioning the participant's name but the code. The audio file was saved with participant number and date on a secured laptop. On an average, each session lasted approximately 70 minutes.

Once the interviews were completed, the PSI played back the interview recordings several times to create notes and mind mapping of the results. Through the mapping, key indicators were derived and other suggestive features. This was then turned into affinity diagrams, which assisted in grouping multiple stakeholder thoughts and responses (UsabilityNet). This led to low-fidelity wireframes and participants were invited again for a second interview.

Second Interview: Feature Consultation

Second type of session was conducted after research results stage. A set of features was derived based on the research results (Appendix K). These features were translated to a low fidelity wireframe. All the participants were invited again to participate in feature consultation. Six participants out of the nine recruited from the first interview responded within the given time set for this interview. Participants were debriefed on the proposed application feature list. Then they were consulted with a visual reference of the list giving them a break down of the proposed idea of the application.

Users were asked to imagine working with the proposed interface. They were asked to express their thoughts on the features that could simplify their process and how much value they saw in using such an interface, should it be realized. All observation notes were taken on a laptop (PSI's) using multiple-choice questions and thus leading towards an open-end discussion. At the end of

this interview, participants were asked to share feedback and thoughts. The PSI then collate all the feedback as a point form and update the wireframes refining it further with annotations.

4. Results

The purpose of this study through research interview with stakeholders was to discover features and functionality for development of design brief for a platform. Aimed at small medium sized special needs centres, this platform is intended to integrate seamless communication, archival of data, accessibility to information and task management by stakeholders. In this chapter, we list out the results from the interviews. In the next chapter (Chapter 5) we discuss about these results in detail and share insights from the PSI and participant interviews.

There were a total of 9 users who participated in the interview comprising of 3 educators, 3 therapists, 2 parents and one relationship executive. Participants in this study appeared to have an average of over 2 years of tablet experience, over 4 years of smartphone experience and over 10 years of experience with computers (see figure 2). All the participants had access to the Internet on their computers and tablets via Wi-Fi networks. They also had access to Internet on their smartphones via data connection with 3G being the least.

We began the interview starting with questions to understand the current working process and communication methods, then followed by questions to understand existing usage of systems. This was followed by participant opinions

and thoughts on industry and role digital can play in the development of special needs children. This resulted in eleven main themes, which are described below.

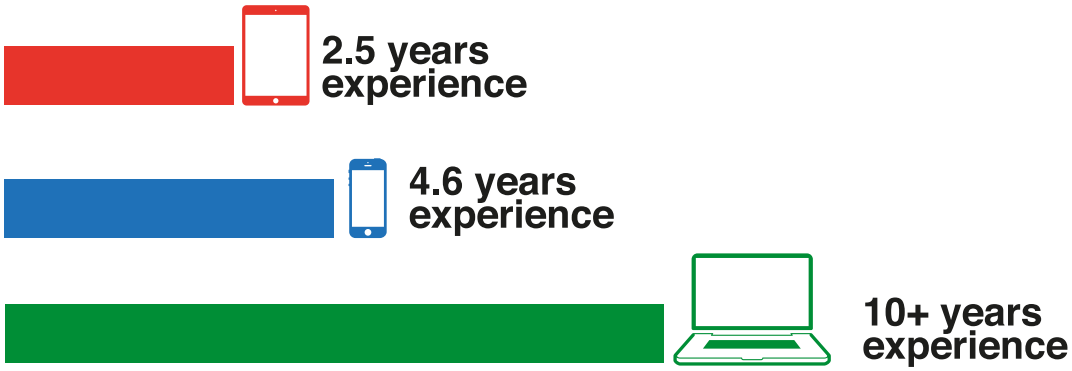

Figure 2. Experience with devices

Understanding Current Processes

Email is less reliable for the job at special needs children centre

Email as a communication mode was suggested to be inefficient among participants. Often communication was difficult to organize and collate as a piece of information on the development of a child. Linking notes, observations, progress reports and other relevant data to the case could not be linked and lacked seamless integration, suggested most participants. Colleagues share incidental logs, notes and soft copies of their reports via email or through file sharing applications. There is a considerable amount of time wasted in searching and collating these data using these applications.

Inability to manage group tasks

There were several similarities amongst the participants concerned with the regard to the usage of email for managing tasks between colleagues. However, they continued to use email in their best possible way due to lack of alternative options. Figure 3 describes participants rating email reliability with their experience on email. 7 out of 9 participants expressed having encountered several times wherein the other party misinterprets their intended message due to lack of context. The users further explained this with the main underlying cause being the coverage of several topics in one email and/or replying to messages that don't relate to the subject or topic. Making it difficult to find the same information when required. Eight out of nine participants also experienced email as a communication tool that lacks in its inability to manage tasks among groups.

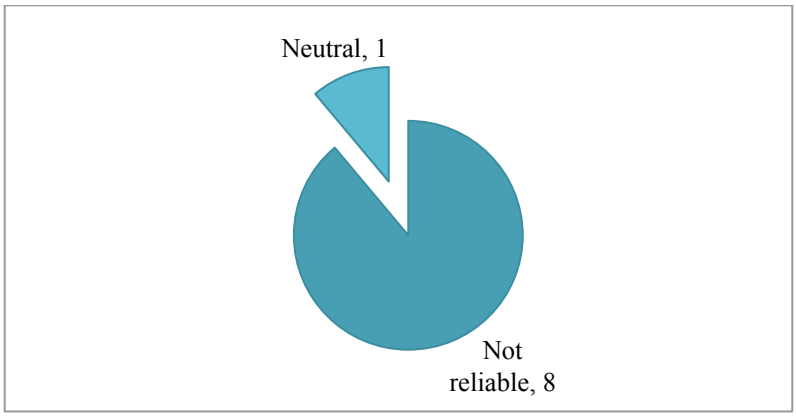

Figure 3. Email Reliability for Task Management

Parents sharing observation made at home on their child

Participants were asked to express their thoughts on allowing parents to share data of their child's unusual behavior with time and date through an application. Results showed consistency with all educator and therapist participants voting for utmost importance. It was rated as vital information to receive from parents. All participants also agreed that getting accurate time and date through parent's report would help identify patterns, which was aligned with our predicted needs. Similar analysis was performed with parents on how they felt sharing behavioral data digitally to therapists and teachers. Both the parent and participants agreed that they must actively contribute. However, there were some fluctuations on what kind of data must be shared. Currently, some parents use email as a way to send across any observation made. This email is then saved to a respective folder for the case within the email application.

Understanding Existing Systems

Sharing weekly progress via an interface may have adverse effects

Educator participants expressed discomfort in the idea of showing child's weekly development progress as a graphic representation to the parents through an application. Each child has individualized education plan. There are no set standard ways to show progress due to customization based on what is best for the child or the case. Currently, a progress report is communicated with parents every 12 weeks. Many educators expressed difficulty in sharing an ongoing progress

due to the nature of individualization. Therapists on the other hand had other suggestions in terms of showing progress. But all participants flagged a potential problem with this feature as parents could misread the data without any guidance on how to read these reports.

Parents lack time to watch recorded videos but useful for professionals

It was noted that if parents aren't able to make it to a therapy session, then it is very unlikely that they may have time to watch recorded videos unless otherwise advised by a professional. Participants preferred a summary highlight in textual format that parents can digest information easily and quickly. Meanwhile, professional participants agreed that this may add value especially to those colleagues joining the team during the later stages and it might assist in reviewing history. Currently, video recordings are only shared with parents for preview if necessary or if requested. On the other hand, educators believed that their sessions with the parents, every 12 weeks, must happen face-to-face. If they aren't able to make it, then a videoconference must be arranged. Sending a pre-recorded video or audio is not enough to debrief parents.

Security and privacy issues of a platform hosted by third party service provider

Figure 4 describes participant concerns raised on having data handled by a third party service provider serving the institution and clients (parent). The results

showed critically high concern with security and privacy issues. Major concerns for this issue were due to the nature of sensitive information that the service would hold. Participants were also worried about accidental information leak through software bugs or accidental grant of permission to view by unauthorized parties, which stood at 3.66 mean level. In regards to concerns on the service being hosted on a cloud and hackers utilizing the service to steal personal data barring credit card information stood at an average 3.44 level. The least concern was privacy issues at 2.77 level. High risk was stated dealing with a service provider less heard of as a brand. But when participants were asked what if a reputed brand publisher such as Microsoft or Apple or Google provided the service; they reported more confident with Microsoft and Apple. Many participants responded doubts using a service from Google due to known business model of data mining.

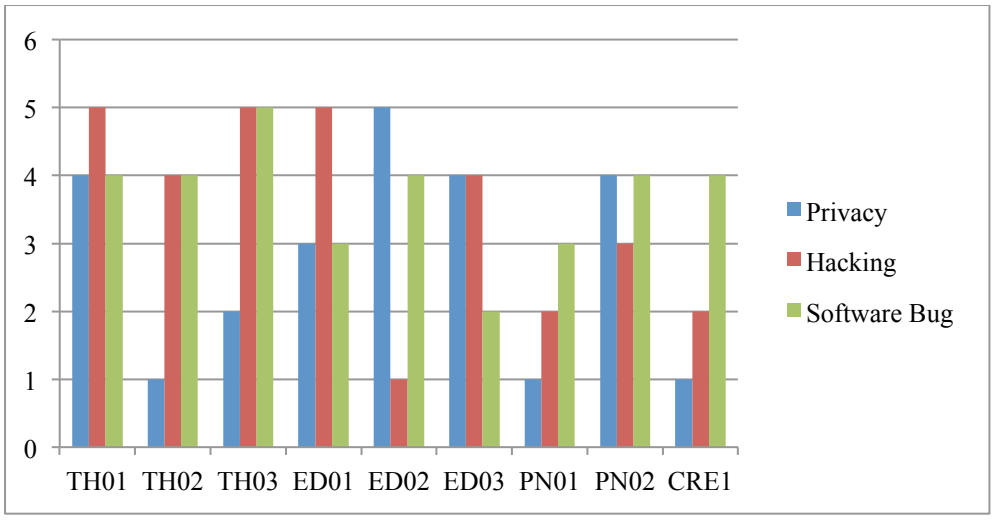

Figure 4. Security concerns

Participant Opinions and Thoughts

Information mobility is a need with adaptive interface per device screen size

Figure 5 describes participant's need to have data access during mobility through different modes of devices such as tablets and phones. Each participant was asked to express their opinion and rate on a scale of 5, which meant full-required access. The mean point stood at 3.78 for level of data access on smartphone. Meanwhile, tablets proved to be among the most popular to carry information mobile with 4.55 mean rate. Many participants also agreed that interface and content on these devices must be very contextual as their usage will differ based on time and environment.

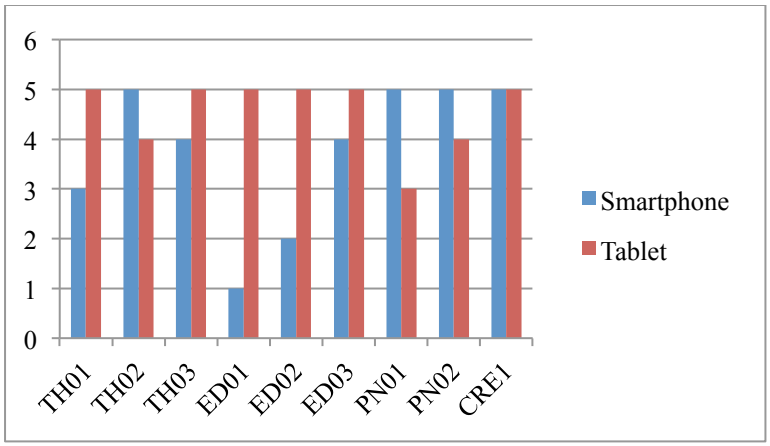

Figure 5. Required access to data while mobile

Activity notification in the platform

When professional participants where briefed on the potential platform and its capabilities, there were irregularities in the results for participants wanting to receive notifications via email about activities on the platform on a child's case. The same was reported in the case of device's lock screen notification. They believed email notification might create havoc in their inbox and the same was applied when questioned about preference to receive on device lock screen. Some therapists preferred to login to the system 10 minutes before any session while most educators agreed that they would make it a routine to follow up daily. Meanwhile, both parent participants expressed the idea of smartphone notification along with emails as an added advantage. The discrepancies were mainly due to the volume of email notification different parties might receive.

Lack of experience with digital task management applications

Most participants reported lack of experience working with advanced task management applications in the past other than simple To-Do apps. Only three participants expressed previous experience working on task apps outside of medical industry. However, when narrated the scope of the project, many participants expressed interest and value in such a platform. Some participants reiterated that friendliness and intuitiveness of the design with common web interface elements would make a lot of difference. Some participants also expressed that it must be as easy as using some of the renowned web interfaces such as Gmail, Facebook and MailChimp. Professional participants expressed that the benefits of such a platform would depend on the level of coaching they provide to the parents.

Performing more than just managing a child's case

Interview results from professional participants revealed that users want a platform to perform more than just managing a child's case. It was reported that the platform should also have an automated and systematic way with scheduling, administrative and even invoicing. Having to interact with multiple platforms was pointed as a discomfort and logistical issues with maintaining records at multiple systems.

Participants prefer common web interfaces against OS based software interface

All participants pointed to a moderate level of degree in having digital gaps in the daily work process and communication channel due to the current IT setup. Although they were equipped with latest technology handhelds; most participants agreed digital experience as average and that most applications were difficult to navigate. They were comfortable with common web interface elements and navigation structure than rigid software based on OS interface architecture and experience.

5. Discussion

In the last chapter, we looked at understanding current process, existing systems and collated participant's opinions and thoughts. After reviewing results from the participant interviews and then referencing it with our initial hypothesis, it leads us to three important categories for the feature direction for this platform. They are Communication and Task management, where we discuss about issues with email, managing day-to-day tasks between stakeholders and how to seamlessly allow parents to record observations. Then we discuss about Concerns and challenges related to sharing weekly progress with parents, recording session videos and overall concern with security and privacy issues. Finally, we discuss design considerations and new features enhancing user experience that emerged from participants through interview.

Communication and Task Management

Email, an ineffective and unreliable task manager

According to participants, email as a dominant mode of communication with another party is considerably easier as information can be exchanged without limitation of time. Information can be consumed at their convenience without waiting for a user within the group of people that are being communicated to and fro. However, tracking communication through email and relating them with the tasks is a challenge many participants face every day. The major issue with most

of the existing systems, like email, was that it lacked a methodology to archive their communication in a way that is easily traceable and track-able.

"The most advantageous feature of email is that it is easy to express the needs as putting in writing doesn't require any waiting of other members. I can instantly reach a group of people and get my message across which otherwise would require everyone in the group to be available for a meeting." – Therapist (TH02) participant

Some participants used email as a task management by keeping emails in unread status. However, that doesn't satisfy their requirement except as a temporary solution. Using email inbox or custom folders per case/child is not a compelling experience either and it fails in locating certain information when required. The fact is that the majority in the business world use Microsoft Outlook as an email application. Hence, a plugin that would instantly allow assigning email to a case or assigning a task to a colleague or stakeholder within Outlook or even growing popular Google Apps is a welcome feature. This will be a key functionality to keep all threads of information together. The platform's design should allow linking communication with other aspects of the work environment such as files and observation notes.

Therapists described that parents with careers often come regularly in the initial sessions. Then it is the nannies or the caregivers who bring the children for sessions or for classes. This is not an indication of parent negligence but rather time factor due to their work schedules. Parents have the urge to stay updated on their child's case. However, it is easy to miss out on the important messages from their child's concerned therapists or teachers, as the parents receive several emails a day and they often get flooded among the others, reported parents. They described that getting on top of it is a challenge. Sharing information between the parties is extremely crucial to any organization or group in building trust and commitment (Nahapiet & Ghoshal 1998).

"*Computing technology should be used to improve the parent/pediatrician interaction and make the precious time together even more resourceful.*"
– Kientz (2007)

A remote channel for parents to interact with professionals

Our study discovered the requirement for remote interaction between parents and the institution. In principle, all therapists agreed that receiving feedback from parents on unusual behavior is a necessity. But it was also cited that the kind of information that would be channeled through the platform might not be of great quality. Similar feedback was received from educators although they had raised less of it as a concern. Giving coaching to parents on what kind of

information they should be sharing is important to ensure the message is precise, clear and of worth. Professionals are not at the luxury of time to read everything and anything that parents may feel curious to send through the platform. Many participants suggested giving the control to the professionals to decide which of their clients could access a feature. The stakeholders at the institution might need to evaluate at a later stage whether this is practical with their client. Later, institution stakeholders might also re-evaluate and assess these rights periodically.

*The concern is not about giving parents the right to feedback through the system. In principle this is a great virtual feature. The concern is about the quality of those information and educating parents on what is to be shared and what is not. I almost worry about unnecessary time consumption with quantative feedback over qualitative."– Therapist (*TH03) participant.

When parents report approximate date and time of occurrence, it can be vital information in facilitating observation on child's behavioral pattern. The system would allow parents to communicate with therapists or educators about matters that are not otherwise to be discussed at the presence of the child. Some participants also shared past experiences where lack of such a feature had uncomforted the child. Parents expressed that such features would allow them to report necessary information at any time, anywhere.

Displaying activity feed or log

Our study discovered relying on email notification in regard to an activity on the platform was not very reliable. Due to the nature of the job by individual cases, getting on top of the activities is a discomforting user experience. With each therapist in a SME environment, handling an average of 10 children, it is important for the system to intuitively debrief the user. Participants expressed satisfactory user experience with social feed interface common in websites like Facebook, Twitter and Pintrest. Like many social media interface, the user should be able to see list of activities as a log or feed presented in a user-friendly manner.

"If I had an email for each activity on the system, then that would mean hundreds of notification hitting my inbox. Instead, what I like is an email digest that tells me from a high level, what has happened in the last 24 hours. This in my opinion, works better along with the activity feed." – Therapist (TH01) participant

The feed must be smart and flexible enough for the user to interact and complete some functionality within the feed interface. The feed should enable in giving an alternative view of the users tasks. It should allow the user to reply, reassign tasks, approve and other similar functionalities. The feed should be the central intersection of their job. Relying on email notification for each activity on the platform only benefits to complicate their already flooded inbox. It is

important to move away from the email reliance. However, receiving email notification and controlling what notification to receive must be entirely user customizable.

Data accessibility is required across multiple devices

It is apparent through our discovery phase that having access to data is critical in this business. The same data are required between educators and therapists and it should be accessible any time of the day or week to each other on all types of devices. According to the CRE, file-sharing services such as Dropbox has been a favorite utility in a start-up environment. A lot of paperwork are often scanned and saved under folders that are shared across Dropbox users within the institution. But many participants agreed it is not the best use case while being mobile. Data needs to be structured based on context, location and environment (device screen size).

"For me, in a perfect world, iPad should give me a visual representation of all my sessions. Within the timetable, I should be able to quickly pull up someone's records. Make a note. Share it with someone. Comment on someone's question. Quickly be able to tap into other colleague's knowledge and experience. I think supporting each other using technology is what I want to see more often happening. Our industry needs demanding healthcare experience based

innovation. And I think its because no one has thought how to organize these content in a smart way." – Therapist (TH03) participant

Concerns and Challenges

Showing child's progress ratings

Many professional participants expressed their disagreement towards showing daily or weekly progress with parents. Both therapists and educators believe this may have adverse effects on parents. This was due to misinterpretation of the results without enough guidance or understanding. Any progress reports would need explanation, reported professional participants. However, we question the hypothesis by professional stakeholders, as there isn't enough study available on showing user-friendly graphical progress. Some participants believed statistical information are time consuming and an unfriendly method to share. Another issue was the fact that each child has a customized and individual education plan. This makes it difficult to create a set standard way to report progress or goal achievements in graphical format. Many therapists also reported that it is a risk sharing progress with parents as they may take it too positively or too negatively, which may create incorrect reality or provide false hopes due to lack of explanation on what they are viewing. Participants believe textual information might not be enough as it lacks emotions and tonality. Some alternative methods by showing charts and rating scale for the parents were

discussed but did not have a concrete direction or agreement. Managing sensitivity is the challenge here. The solution would need to be flexible due to the complexity in existence between different therapeutic treatments. The current system therapists use such as Vinland adaptive skills are not user friendly for parents to understand the information (TH03). They are very technical and lack inclusivity in readability. Another layer of problem is when the child is seeing more than one therapist on a totally different matter. A therapist participant expressed against the idea of allowing parents to see therapist notes. The system should hence allow entry of a topic, which can be viewed by parents, but not the notes by therapist, which will be for staff only. A research on the topic of visual graphics is required on its own before such a feature can be developed for the platform. Like many other features, this may also require some parent coaching on how to read the results.

Third party data hosting and security

Security and privacy issues are a major concern due to the nature of the content that is shared in the system. Transactions (data) on this platform will be extremely sensitive information that is shared and posted by therapists, educators and parents. They are utmost important for a platform that transacts details about special needs child. Any involvement of a third party service provider means that the parents and institution must have confidence that the security is on a top of the

layer for the provider. They must be assured everything they feed is protected and safeguarded. Some participants had raised concerns about bugs or issues that may allow unauthorized access to data by users.

A number of hacking, software bugs and unauthorized access on the Internet have risen over the past few years making it mainstream news. Big brands such as Google, Microsoft, Amazon, Sony and Yahoo are not immune to Internet attacks; hence a service provider, which is less heard of, might create lack of confidence in users. Securing medical records is a rising challenge that industry has been facing lately with several incidents reported (Schultz, 2012). It was interesting to note that participants felt less confident to use a service from Google as opposed to Microsoft or Apple. This was due to the known fact that Google is poised on a data mining business. Although in reality all technology companies have data as a big factor to fuel their services. What this shows is that users need guarantee that any data shared on the platform shall not be used for any other purpose than what it is intended.

Other Design Considerations

Granting access rights and permissions

The system should allow data to be entered in a detailed manner that can be referred back in a user-friendly way. However, data sharing within the institution also comes with privacy concerns. Parents need to provide consent for

any new member to review the file unless otherwise clearance is in place. Having to wait for parents to provide written consent is a time consuming process. Permissions should be handled through the platform so it is quick and effective.

For example, if a therapist required another colleague to review a child's case file, they should be able to send a request to the parent through the platform for granting access to their colleague. This can be instant, tracked and recorded. Each request would have a description that reflects on the rationale and that it can be reviewed later as a log.

Video recording, hosting and commenting on therapy sessions

Therapists sometimes have requirement to video record their sessions for future review or by another member within the institution whether internally or to an external therapist or educator. Currently, sessions are recorded on a digital video recording device and then downloaded on to the computer to be shared as a video file. Ideally, this should be integrated to the platform. While video upload is viable, it should also be possible to upload seamlessly to the platform for view by authorized parties on the web with commenting feature and with basic ability to edit the video. Tagging and labeling a video with keywords may help organize data and make it searchable in the future. It is important to avoid any reliance on technology outside of the platform as this might disrupt their workflow. The video must be played within the platform as a web player. When interviewees shared

how they might use the video, file size and bandwidth did not seem to be a concern for the platform as the traffic will be below average and concurrent viewer of a video will be seldom. It seemed the major purpose of video maybe seen as storage more than a player.

Our discovery revealed that giving parents access to videos were not a necessity. Many professional participants experienced that parents might not be able to watch the session videos due to other daily commitments in life. The parents also testified this. On an average, each session last 35 minutes. However, the videos do not have to be restricted unless the professionals believe it may create adverse effects. It is up to parents whether they want to or when to watch.

Administrative tasks

Many participants agreed that administrative tasks, appointment management and financial activities should be integrated within the same platform. Having to run multiple platforms and multiple methodologies is something business is trying to eradicate. We propose that there are applications already in the market that does scheduling, financial management etc. The matter must be explored at integrating into the system through API.

Technology and common web interface elements

Tablets were more popular for work among the participants when compared to smartphones. The screen real estate space played a big role in the preference as participants felt they could perform more activities on an iPad with larger visibility when compared to smartphones with smaller screen. Latest gadgets in the category of tablets and smartphones were in hand by all participants followed by a laptop. But when it came to using these devices, they described themselves as an average user. Almost all participants preferred applications that aren't sophisticated but simple to use and focused. Many of them expressed that platforms or applications that are web based using common elements are comfortable when compared to software that needs to be installed. A web based solution they believed allowed them to access data from any front or device. The institution also benefitted from web services, as it required less technical support and was easy to setup and manage.

For SME institutions, cost of implementing IT solution is another challenge. CRE expressed that implementing sophisticated software and network is an expensive affair and comes with the requirement of onsite technical support and maintenance, which as a startup isn't economical. Hence, relying heavily on a mix of services online, which are either served free, or for a minimal cost.

"Whatever we do with technology lets not do to take the human contact away. As a tech professional, I think your industry has a huge responsibility to balance both worlds. Personally, emotions are very important. There is truly something about face to face interaction and I have never seen anything or any technology replace that." – Educator (ED02) Participant.

6. Feature Consultation: Design Ideas and Participant Feedback

In this chapter, we describe potential design directions and features for the platform that can support small medium sized special needs centre and its stakeholders in communicating and archiving information to help in the upbringing of a special needs child. The features were listed before the study, but have been iterated after due course of the discovery phase that meet many of the design suggestions made available through participants. Our findings have led us to four themes that categorize our features for the platform. They are Child's Case Tracking, Parent and Clinician or Educator Interaction, Data and Information Archival and lastly other technology trends. The design was later presented to the participants as a low-fidelity wireframe to conduct as paper prototype testing. The participants shared their thoughts and concerns, which we will describe in more detail below:

Child's Case Tracking

Activity feed

An activity feed will replace email's inbox by giving an overview of the data transactions sorted by date in which the user is considered as part of the team. As seen on Figure 6, this will reduce the reliance with email by tracking communication, history and making it possible to read case activities as a

summary. The user can choose to view transactions per case or choose to see all the cases. For the parents, they can view per child or all their children as an overview. Activity feed will also allow users to list transactions by tasks assigned to them, monitor progress on tasks assigned to the other team members and can easily interact on different topics. Each feed will have the name of the user, their profile image, date and time stamp.

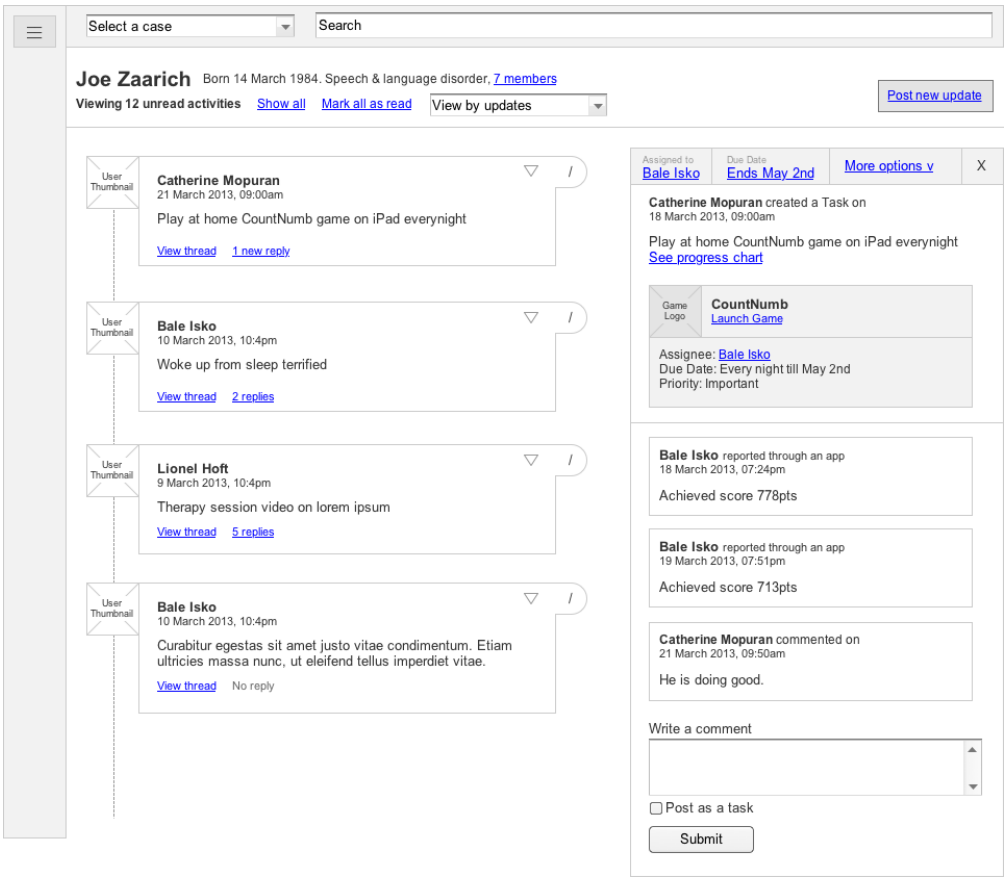

Figure 6. Activity feed

During the test, most of the professional participants reported that they would like to see activity updates of a single child at a time. The view for all children together does not help them and may add level of confusion due to mixing data of several children together. However, parent participants did not have any issue as they like the idea of viewing quick summary of all children, should more than one child of theirs attend the same institution. All professional participants preferred to replace the word 'Case' from the dropdown selector with 'child'. They also proposed to have a number of updates that has been posted as an indication next to the child's name. This they recommended would allow them to know which cases have updated transactions.

Posting an update on a case

We proposed the development of communication strategy for each case through the platform. Each message can carry forward allowing stakeholders to comment on the same matter or topic hence available for review at a later time (Figure 7). While posting, the system will utilize current date and time. However, the user will be given the flexibility to change the date and time should they wish to adjust based on the actual occurrence of time and date. This is not a mandatory interaction but an option. A case is considered as a child in an institution. Therapists, educators and caregivers will have access to the case if they are assigned as part of the team. However, the methodology of posting by parents and

professionals will vary based on their profile for the case. Parents have the flexibility to post and choose whether all members in the case have access to the message. Meanwhile, professionals would have the option to decide whether the information is visible to parents. However, by default all professionals can read other professionals posts.

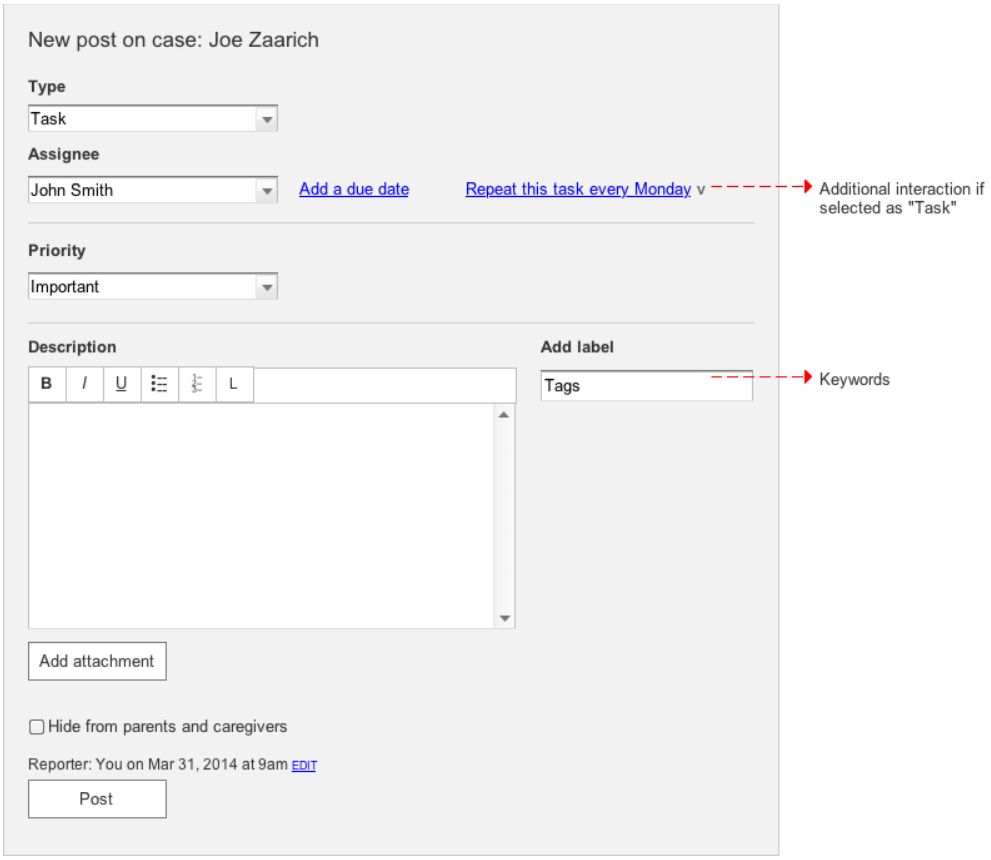

Figure 7. Security concerns

When this was tested with participants, professionals remarked that labels, severity level and assignee level that carry each message should be in the control of theirs to modify. This is to ensure organization of data. Research and

experience indicated that parents might have the tendency to post everything as severe while it isn't. Hence, there maybe cases where certain aspect of the data needs modification. Professional participants also advised that they should be able to create templates that allow them to quickly post tasks or case details. This means certain fields will be prefilled by default.

Assigning tasks with due date

Any message can be converted to a task by either of the stakeholders with an assigned due date. The intention of the feature is to allow stakeholders to track every activity and be able to monitor them collectively (Figure 8). Any user should have visibility to their pending tasks that require their attention. But can also see other team member's task related to that case. Tasks will visually indicate its urgency based on the due date and will show in chronological order with functionality to change sorting.

Figure 8. Assigning Task

Participants recommended that they should be able to quickly set a task for a week or set a period of time without having to interact with the calendar. Some of the tasks require reoccurrence as something that needs to be done every day or every week.

Parent and Clinician or Educator Interaction

Enabling parents to report on observation

Parents are always eager to share feedback on observations they notice about their child. Through our research, we had discovered that this information could be extremely vital for the educators and therapists. The platform can encourage parents to update the case but it also needs to ensure that the feedback is genuinely helpful for the development of the child. We proposed a controlled feedback interface whereby parents can opt from list of options and provide observations (Figure 9). First they are asked what type of feedback they want to

feed. Then they are asked to rate using the given scale, which can be a custom setup by a professional. Additionally they can opt to add further description that they think may help the professionals. If there were any photos or videos that the parent think might help, they would have the choice to upload it on to the system for review by therapists or educators. Lastly, the computer will also generate a graph based on the type of feedbacks they provide. For example, a parent maybe asked to generate daily report on the child's eating pattern. This can be done instantly through the parents smartphone or tablet before they go to bed, which in turn, the professionals can review the next day. A daily entry into the system would help generate a daily or weekly graph for professionals and parents. This would facilitate them to see the progress instantly in a visual manner without having to go over in detailed numbers or statistics.

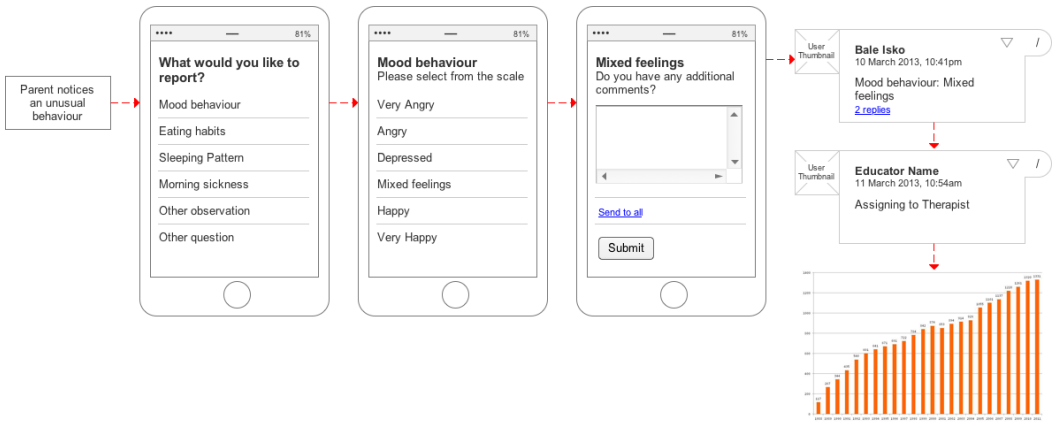

Figure 9. Parents reporting to professionals

Parent participants expressed their satisfaction with the feature and appreciated it as something convenient and usable through their smartphone. They had related that this would mean that they do not have to wait till the next morning or next session to report any matter. They preferred the methodology as it can be tracked and archived digitally. Professional participants also agreed with the process of parent interactions. However, they stressed that the institution or the professionals should reserve the right to decide about the access to this feature for the parent. The professionals proposed feature on creating custom category for parent reporting and its data creating a graphical chart for review. They believed this feature could be highly beneficial when they require data from home about their children for a period of time such as monitoring certain activity.

Requesting parents for permission to access child's case

The therapist or educator may need to involve a colleague from the same centre for suggestions or review of a case. Ethically, this requires permission from the parent. The proposed functionality allows any professional stakeholder to reach out to a parent, requesting permission for their colleague to review files. This can be delivered as a notification to their smartphone or tablet as well as email whereby they can quickly grant permission (Figure 10). A digital sign can be considered acceptable, as parent would need the passcode to grant permissions. Before giving grant, parent can review the description, which may explain why

this is required. Parents can also click on the name of the new member and see the profile of the person requiring access.

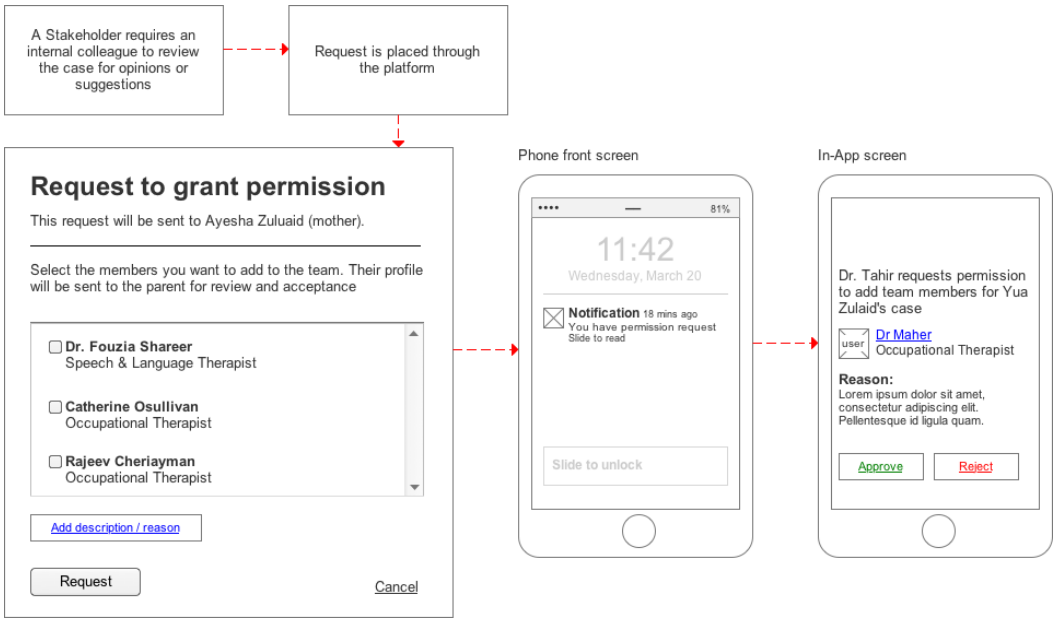

Figure 10. Requesting access from parents for case review

This cuts down a lot of red tape and time lost waiting for written and signed permission, suggested one of the professional participants. Parents also expressed their likeness on the feature but suggested that they would like to set an expiry date upon which access to their child's case would be blocked. Meanwhile, it was also suggested that a parent should be able to set permissions as open for any staff to access file if they wished within the institution. This however can divert permission grant to the therapist or educator on the case file if the parent has given consent for institutional wide access.

Data and Information Archival

Recording and hosting video of therapy sessions with notes and bookmarks

In our interviews with the therapists, it came to our notice that certain sessions are video recorded for future review. Sometimes, another colleague is required to look at the video as part of the treatment process. Archiving these footage means relying on hard drives or setting up internal storage server, which aren't very user friendly. Additionally, some educators also expressed that they are required to watch certain sessions as a part of planning their individual education plan (Figure 11). Parents also expressed interest in watching the footage at their convenient time but current process does enable this functionality.

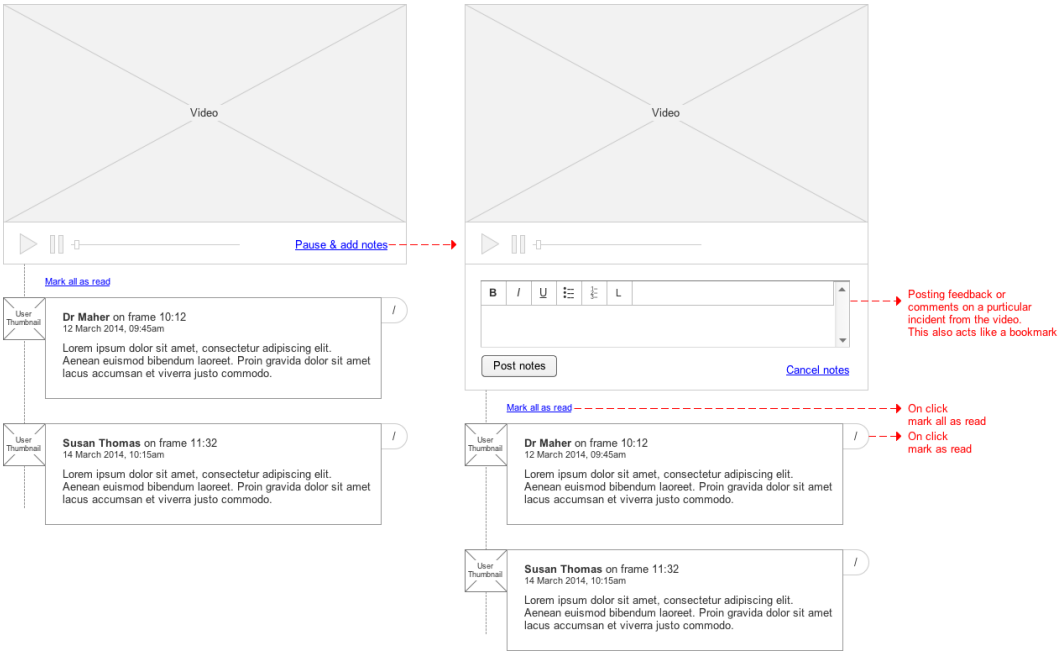

Figure 11. Accessing and comments on incidents within a video

We proposed that the platform should allow therapists to upload their session footage whereby the appropriate compressing and storage will be taken care of. The platform then will make way for the video availability when and required for the stakeholder through browse or search. This makes it easy should in future a new user is added as a stakeholder. It would enable them to quickly watch and review session videos. The user that uploads the video can add keyword, description and further details that would help them organize their storage for future search and review. Professional participants can also pause a video at a certain frame to add description.

Professional participants suggested that editing any recorded video is a challenge. Sometimes there are scenes they would like to cut out to save video time length. The platform should allow an easy way to remove certain parts of the video. It should also allow adding titles, chapters and frame bookmarks for future speedy access. Through search, user should be able to navigate to the right time within the video based on the keywords picked up from the comments or replies.

Robust and advanced search functionality is essential

The intention of this project is to build a platform that archives information and serves the content when requested that may appear in many types of user behaviors. Thus, search functionality is equally important as any other feature of this platform. It must be robust, quick and accurately smart to search

anything. It is predominant that the elements of search functionality are quickly accessible while users are browsing. It must also provide recommendations as users are typing and also provide suggestions should the user misspell keywords. This is equally important on mobile devices. While these are standard in today's technology, what is most important is the catering of simple and advanced search. Participants reckoned that there would be cases where the search would have several parameters such as dates, keywords, type of content, assignee or post creator et cetera. It was also important that search looks into attached documents in a post. Some participants also suggested possibility of creating tasks by entering a conversation in the search field. Example: "Create a task for John Smith assigning Kate Lucy". Upon entering this keyword, the search would suggest whether the user wants to create such a task and take them to the window to continue entering further details. This discussion also opened up ideas about integrating search functionality with voice capability especially for smartphones and tablets. Technologies such as Nuances allow this functionality on many mobile devices.

Child's active profile dashboard

A child might have interaction with multiple educators and therapists. An active profile hereby is defined as an interface feature that would show a child's details carrying his/her dietary conditions, allergic conditions, sleeping pattern,

emergency contact numbers, known behavioral patterns and other vital information. Such information may help stakeholders structure their day with the child or get data as and when required. Information such as sleeping patterns and mood behaviors could be created dynamically and live through the information's fed by either of the stakeholders. This page would act as a dashboard for the child and it can host graphical information based on any parental daily data entry on a specific task.

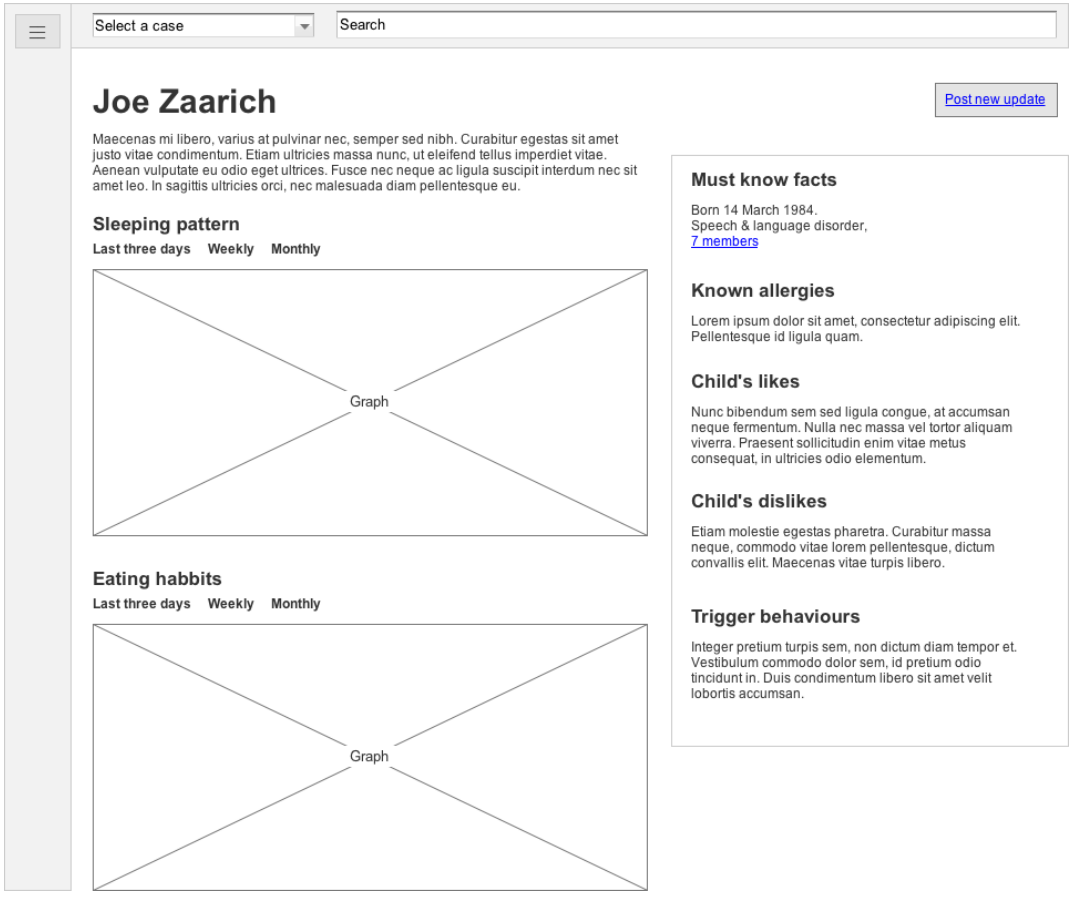

Figure 12. Active child profile

This proved to be an essential functionality. Any stakeholder would benefit from having a window to all the summaries of information. A new stakeholder on board would be able to review so as to understand the basic details of a child. Participants also suggested this should accommodate emergency contact numbers and direct messaging to parents.

Other Technology Trends

Shortcut keys on website & Accessibility

To improve their work efficiency, it is important that the platform support several tasks with shortcut keys on the website for desktops. Therapists and educators will be spending enormous amount of time on the platform doing their job. All participants agreed if the system supported shortcut keys, then they would extensively use it. Although web based, participants suggested a mechanism to show or guide through random tips that would educate the user on certain hidden features. The system must also adhere to users who may have color blindness. Hence, no visual language will be color only dependent. Icons or some design differentiation is required.

Application Programming Interface

There are going to be certain aspects of the platform that do not require redevelopment rather integration is going to be the key success. There are several services that does better at what they are focused. For example, Dropbox does an

incredible job in holding files in a central location that can be shared among coworkers. Google Apps' Google Calendar is a popular product among businesses for managing individual and group calendars. Quickbooks is known for accounting and invoicing. Most of these online solutions are open to API. We propose that this platform should also allow integration both ways with other apps and services.

The platform should allow third party developers to create plugins and apps that run on the platform. Each institution would have its own unique requirement. Platform must be flexible enough to adapt to any kind of requirement. This would mean keeping costs down for SME institutions. For example, a game developer can develop an inclusive game for children with autism. Therapists or educators must be able to assign that game to the parent to ensure the child plays it for a week and the results are updated everyday for therapist or educator review. To facilitate easiness for businesses in finding these solutions, a plug-in store or the likes of an app store is highly recommended as a central database to holding third party developer works.

7. Summary and Conclusions

Our study consisted of interviews with 3 therapists, 3 educators, 2 parents and a client relationship executive from an institution based in Dubai involved in the development of special needs children. Interviews with participants confirmed most of our assumptions and recommended several other design suggestions for the platform we have been investigating to run on the web. Based on the results from interviews, we developed a low fidelity wireframes that demonstrated the value and benefits of web based service for child's care management; multi-disciplinary team communication and archiving information in a special needs centre. Six of the participants returned to review these wireframes to provide their thoughts and opinions.

A child may be diagnosed with a learning or development difficulty that could hinder in reaching their best potentials. With the help of families and qualified professionals, most special needs children can overcome these differences. When needed support and care is given, they can make their way into the world to be independent and stand up for their own dreams or desires.

In the evolving society and metropolitan cities, a family consists of both parents leading a career for many reasons. The significance of the project was to create an environment or web platform digitally that would enable them to

continue their daily tasks but still be able to communicate with the professionals hired for the development of their child. Such a system that will enable two-way interaction without the need to meet face time between parents and therapists/educators, track, search and archive data proved through the research study as a necessity. A niche product such as the one in this study can assist when targeted at SME institutions as it allows them to implement economically.

Our interviews with participants proved that enabling a system that allows assigning tasks between colleagues and parents, allows better tracking of child's progress. Each child's case profile can create topics whereby stakeholders can post comments and update on information that can be easily reviewed among the team. When parents were shown the feature that would enable them to report observations of their child at home, they referred to it as a need that will simplify their contribution on child's development. Professionals also expressed how a system tracking such data could be critical especially in the future when a new colleague is brought in to the team and reviewing case history. Any system developed for such purpose must allow an open platform that will allow developers to build applications on top of the environment. These applications can be integrated by the stakeholders and assign it to a child's profile whereby parents can also get involved if certain tests or tasks are to be done at home. Having one central place with one-login credentials and archiving all data will make a better

user experience. The interface should reflect and adapt to current situations or user tasks hence removing clutter and confusion.

Showing weekly progress of the child's growth were not welcomed by professional participants due to the complexity of customized education and training. But, we believe this research has also helped in identifying future research directions and possible touch-points in developing weekly graphical progress report for this environement. Another area for potential expansion of this research is other technology real estates such as gaming consoles and television. A viable research can also be conducted on wearable technology such as watch and health monitors that can contribute to the development of a special needs child while integrating with the platform.

Allowing teachers and trainers to have a fluid and flawless conversation with everything tracked and recorded on profile for review at a future date or for review by another or new stakeholder, will create significant work efficiency. The system should also support the relocation of a child to another institution or city through data export. It must be easily exportable in different medians. The more the system remains open to integration, the better it may attract developers to enhance the system for good. But beyond all, the user experience must be designed in a way to guide the user to the interaction and support them to accomplish user task. Based on these findings, a possible next step would be to

follow user-centered design process accommodating feedback and commence on high fidelity wire-framing. There after it will be followed by visual interaction design and phased development with user-testing at various points in the process.

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Appendix Index

Research Ethics Board

February 25, 2014

Dear Mazhar Mohad,

RE: OCADU 160, "Integrated Communication Systems for Special Needs Centre."

The OCAD University Research Ethics Board has reviewed the above-named submission. The protocol and the consent form dated February 25, 2014 are approved for use for the next 12 months. If the study is expected to continue beyond the expiry date (February 24, 2015) you are responsible for ensuring the study receives re-approval. Your final approval number is **2014-15.**

Before proceeding with your project, compliance with other required University approvals/certifications, institutional requirements, or governmental authorizations may be required. It is your responsibility to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the OCAD U REB prior to the initiation of any research.

If, during the course of the research, there are any serious adverse events, changes in the approved protocol or consent form or any new information that must be considered with respect to the study, these should be brought to the immediate attention of the Board.

The REB must also be notified of the completion or termination of this study and a final report provided before you graduate. The template is attached.

Best wishes for the successful completion of your project.

Yours sincerely,

Tony Kerr, Chair, OCAD U Research Ethics Board

OCAD U Research Ethics Board: rm 7520c, 205 Richmond Street W, Toronto, ON M5V 1V3
416.977.6000 x474

Appendix B (Email)

Letter to the center

Date:

To, Managing Director, [Special Needs Center]
Subject: Request for support to conduct academic research for major research project

I am a student of the Master of Design program in Inclusive Design at OCAD University, Toronto, Canada (low residency program). As part of my course requirements, I am doing a research project on the topic of “Integrated Communication Systems for Special Needs Centre”. I have obtained the approval from the Research Ethics Board of OCAD University (Ref 2014-15) and the same is attached here for your review.

The primary area of investigation is to explore how digital technologies can assist and improve communication between parents, educational professionals and healthcare professionals at an institution involved in the improvement and development of a special needs child.

The primary focus of users and our stakeholders will be the educationists, therapists, health professionals, parents and special needs children. The project will look in-depth how to be able to connect special needs children’s parents and the stakeholders via digital tools to coordinate, collaborate, communicate and track with each other about the progress and objectives that therapists or teachers may assign in up bringing the child or assist in overcoming difficulties.

The intention of this research study is to create design brief for a web service platform that will allow institutions (or health centers) to be able to use as an environment to communicate and hold digital data across different touch points that is shareable, reachable and transferable easily. It will allow teachers or other institution staffs to access a child’s essential personal data which may include from profile, dietary conditions, behavioral patterns, progress etc. Project may also look into integrating these data with wearable devices or other electronic devices through API.

However, through research, I want to understand issues and challenges with existing working model, how time is spent by different stakeholders and issues with current communication system. The project will also research the benefit of being able to assign tasks to others, create a team of professionals and communicate effectively in achieving objectives set by either stakeholder. How can a web application assist patient’s support group such as parents with less facetime interaction with teachers and therapists.

Your support in conducting the study will help me understand the current working model in detail and challenges. It would be great if we could meet up in person/skype/phone to discuss this opportunity further. If you need more information, please email me at mm03mz@student.ocadu.ca or you can speak with me at +971-55-865-6422 or skype me at mazmohad.

I look forward to your confirmation and hope you will be able to help me with my research.

Regards,

Mazhar Mohad,
Student, Master of Design, Inclusive Design,
Canada: Faculty of Design, OCAD University, 205 Richmond St W, Toronto, ON, M5V 1V3
UAE: JVT 8T20, Barsha, Dubai, UAE
Email: mm03mz@student.ocadu.ca, Tel: +971-55-865-6422 [Dubai]

Appendix C (Email)

Welcome letter to CRE

Date:

To, [CRE name], Client Relationship Executive, [Special Needs Center'
Subject: Confirmation letter for volunteering in the research

Dear [CRE Name]

I would like to extend my appreciation and thank you for opting to volunteer and support me in my Masters degree research project. This letter is to confirm your participation as the mediator between me (Principal Student Investigator) and the research participants that shall be hired through the centre.

I would like to arrange a meeting with you sooner on our free schedule to discuss how we can work together and what support I am looking for. I would also like you to take me through the centre's rules and regulations if any that I should be aware of while using the premises for the research.

I look forward to working with you and support in completing my research for the Major Research Project.

Regards,

Mazhar Mohad,
Student, Master of Design, Inclusive Design,
Canada: Faculty of Design, OCAD University, 205 Richmond St W, Toronto, ON, M5V 1V3
UAE: JVT 8T20, Barsha, Dubai, UAE
Email: mm03mz@student.ocadu.ca, Tel: +971-55-865-6422 [Dubai]

Appendix D (Notice)

Invitation to participate in an academic research study

Would you like to take part in an academic research (thesis paper) about a web technology integrating communication and task management between teacher, therapist and parents in the development of a special needs child? I am looking for the below participants:

Therapists
- Must be employed as therapists.
- Must have at least five years of work experience in a special needs centre.
- Must be able to read and write English fluently.

Teachers
- Must be employed as a teacher in a special needs centre or school.
- Must have at least 5 years of work experience teaching special needs child.
- Must be able to read and write English fluently

Parent(s)
- Must have a special needs child being consulted at a centre or clinic.
- Must be able to read and write English fluently

If you think, you are one of the above and would like to participate and support me in my academic research (thesis paper) in the form of interview and observation, then please get in touch with your full name, email address and phone number to mm03mz@student.ocadu.ca by February 18th 2014.

Accepted participants will be notified by email. There are no monetary benefits to either the researcher or the participant as this is an academic research project.

Thank you,

Mazhar Mohad,
Student, Master of Design, Inclusive Design,
Canada: Faculty of Design, OCAD University, 205 Richmond St W, Toronto, ON, M5V 1V3
UAE: JVT 8T20, Barsha, Dubai, UAE
Email: mm03mz@student.ocadu.ca, Tel: +971-55-865-6422 [Dubai]

Appendix E (Email)

Acceptance of interest

Date:

Subject: Invitation to participate in the research

Dear [Participant name],

This email is to acknowledge receipt of your email indicating that you are interested to participate in the academic research study. I would like to extend my invitation and I believe you are the right candidate.

Please see the attached Informed/Consent form which you would need to print two copies, sign and hand over one copy to [CRE Name] at the centre. Thank you very much for your interest to participate in my study and I look forward to working with you.

Please note that this form must be handed over to [CRE name] by [Date] in order to be accepted.

Regards,

Mazhar Mohad,
Student, Master of Design, Inclusive Design,
Canada: Faculty of Design, OCAD University, 205 Richmond St W, Toronto, ON, M5V 1V3
UAE: JVT 8T20, Barsha, Dubai, UAE
Email: mm03mz@student.ocadu.ca, Tel: +971-55-865-6422 [Dubai]

Appendix F (Email)

Placed on wait list

Date:

Subject: Placed on wait list

Dear [Participant name],

Thank you very much for your interest in participating on my academic research study. This email is to acknowledge receipt of your email on the interest.

At this point, required number of participants has been recruited to complete my academic study. However, I am placing your name on a wait list. In the event of any recruited participant decides to withdraw during the study, I will be contacting people from the wait list, in the order which the names were entered into the list.

Once again, thank you very much for your interest.

Regards,

Mazhar Mohad,
Student, Master of Design, Inclusive Design,
Canada: Faculty of Design, OCAD University, 205 Richmond St W, Toronto, ON, M5V 1V3
UAE: JVT 8T20, Barsha, Dubai, UAE
Email: mm03mz@student.ocadu.ca, Tel: +971-55-865-6422 [Dubai]

Appendix G (Form)

Invitation / Consent Form

Date: [Date]

Project Title: An Integrated Communication Systems for a Special Needs Centre

Principal Student Investigator: Mazhar Mohad, Student, Master of Design in Inclusive Design, Faculty of Design, OCAD University, 205 Richmond St. W., Toronto (ON) M5V1V3.
Phone: +971-55-865-6422 [UAE] Email: mm03mz@student.ocadu.ca

Faculty Supervisor: Ronald Baecker, Professor, Computer Science, U of T, Toronto, ON, Canada
T: +1-416-978-6983, E: ron@taglab.ca

Invitation
Thank you for your interest for participating in Mazhar Mohad's (hereby known as PSI) academic research study. PSI strongly believes that digital inclusion and web technology can dramatically improve multi-disciplinary communication and task management in workspace shared between therapists, educators and parents. As part of PSI's Major Research Project (hereby known as MRP) and to complete degree requirements, PSI will be researching on this matter to develop a brief for web platform that will solve these challenges and make interaction much better.

Tasks & Involvement
Should you wish to continue, you would be interviewed to understand current workflow, workspace and how communication happens, what kind of communication, how much of multi-disciplinary interaction takes place, dependencies etc. PSI would ask you to share your opinion on existing communication tool such as email or any other application/platform that you might be using at this point. What works, what doesn't, challenges and issues.

Once the research and discovery phase is over, you maybe invited to review visual wireframes or blueprint of some interface screens of what would be the online platform to enable this experience. You maybe asked few questions in term of navigation, usability and how you feel if such online service were to exist.

Potential Benefits and Risks
There will not be any direct benefit to any participant whether educator, therapists or parents through participating in this academic research study. However, by participating in this research study, you will be contributing towards a future web technology that may improve the environment, productivity and dramatically make integrated communication and tasks management very intuitive and inclusive.

Confidentiality
The interviews and observation maybe audio tapped or video recorded using a digital device and stored on my computer as a data file very safely and securely. The participant will be notified well in advance and have full right to deny any sort of recording. In such events, the PSI will be taking written notes and these notes will also be safely secured and locked to respect privacy and confidentiality of the participant. PSI will be destroying all collected digital files and any notes four months from the date of project submission at the university. PSI wil not be using the data for any other research nor share it with any other researcher.

To further protect participant's privacy and confidentiality, PSI will code name each participant and this code name shall be tracked to actual details on a digital spreadsheet which shall be stored on

the PSI's computer that is password protected and physically stored in a locked compartment while not in use. Your name and details shall not be connected with any of the data or results for this research.

Voluntary Participation
Participation in this study is voluntary. If you wish, you may decline to answer one or more questions or refuse to participate in any component of the study. Further, if you wish to withdraw from this study at any time, you are free to do so by sending PSI an email about intend to withdraw. PSI will then confirm your withdrawal and trash all data collected from you till that point. By withdrawing you will not be putting any loss of benefits to which you are entitled and you may do so without any penalty.

Publication of results
An article about the research outcomes maybe published in a magazine, blog or journal. In such event, all participants shall be notified and a copy of the article will be shared via email. Only anonymised data will be presented. Quotations from interviews or surveys will not be attributed to you without your written permission. In such cases, you will be notified well in advance.

Contact Information and Ethics Clearance
If you have any questions about this study or require further information, please contact PSI, Mazhar Mohad or Faculty Supervisor, using the contact information provided above. The Research Ethics Board at OCAD University, Toronto, Canada, has reviewed this study and issued ethics clearance [file# 2014-15]. If you have any comments or concerns, you may contact the Research Ethics Office through at +1-416-977-6000 ext.474.

If, after reading and understanding the above, you decide to participate in the study, please fill in the Consent form below except for the signature and email a copy of this document back to me. When we meet, I will obtain your signature on a printed copy of your consent form and also give you a copy to retain with you.

Consent Form

I hereby agree to participate in the academic research study “An Integrated Communication Systems for a Special Needs Centre” described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

I agree to have a video recorded or audio tapped digitally of my sessions with the researcher to ensure accurate capture of data for further analysis. I am aware that this material will be treated as confidential.
 YES
 NO, I only agree to audio recording of the session
 NO, I do not want video or audio recording of the session

I agree to the use of clips from video or audio recordings featuring me in presentations made by the researcher:
 YES
 NO

I agree to receive a copy of the final outcome and report through my email.
 YES
 NO

I agree to feature my name in the credits, should this project realize commercially.
 YES
 NO

Name: _____

Signature: _____ Date: _____

Name of person who explained consent:
_____ (Please print)

Signature of person who explained consent: _____Date: _____

Thank you for your assistance in this study.

Appendix H (Email)

Withdrawal Confirmation

Date:

Subject: Withdrawal request approved

Dear [Name],

Thank you for your email. This is to acknowledge receipt of your email indicating your intention to withdraw from the academic research study “An Integrated Communication Systems for a Special Needs Centre”.

I would like to confirm that you would not be associated with the study effective from [date]. I would like to assure you that, because of withdrawing, you will not be put to any loss of benefits to which you are entitled and that information collected from your so far will be destroyed and not used in the research.

Thank you very much for participating, and I wish you the very best.

Regards,

Mazhar Mohad,
Student, Master of Design, Inclusive Design,
Canada: Faculty of Design, OCAD University, 205 Richmond St W, Toronto, ON, M5V 1V3
UAE: JVT 8T20, Barsha, Dubai, UAE
Email: mm03mz@student.ocadu.ca, Tel: +971-55-865-6422 [Dubai]

Appendix I

Interview Protocol

Before the session

• Print out the participant's consent form received from the participant signed through email.
• Fill in the participant number and session date on the form and in the spreadsheet.
• Check that the audio recording device is ready if the participant has granted rights to record.

Start of session

• Confirm with the participant that they have read and understood the Invitation/Consent form. Ask if they wish to be read it out one more time and if they have any questions before interview began.
• If the participant had granted rights to recording, show this to the participant and ensure they are ok to have them recorded. Explain again, how the recordings will be handled.
• Start the session by announcing and noting participant number, date and time.

Start a conversation with the participant by reading out:

Thank you for helping me in this academic research project. I want to assure you that your participation is voluntary. Should you feel uncomfortable with any part of the session or any question I may ask, please feel free to request to skip it. You are also free to withdraw from this study at any time. There will be no negative consequences should you wish to do so.

Let me explain you in detail about the academic research project I am under going.
[explain briefly about the project and platform]

End of Session Points and Questions:

• Ask: Do you have any other comments or questions?
• Ask: Should I have any further questions, would it be ok if I contact you later?
• Thank and appreciate the participant for their time.
• Turn off the recorder. Check recording. Note end time.
• Transfer data file to computer and delete from source. Ensure data files are appropriately named and numbered.

Questions for therapists

How do you communicate with parents and co-workers such as educationists or therapists?

How effective is email as a communication mode to help in progressing case forward?

Would you agree that email, as a communication tool is great to track and progress and archive data? If yes/not why?

What other modes do you use for this purpose?

How important is it for you as a professional that you have quick access to data (archived) in all devices including smartphones or tablets. Can you elaborate please and rate on a scale of 5.

If you had a parent share data every morning such as the child's behavior that morning or the activities child has achieved, would it have helped you plan your goals for that child effectively. Can you elaborate how would it help please.

How important is that parent share or record with educationists or therapists on any behavioral change or attitudes by their special needs child. Is the time and date of occurrence vital information?

Would you prefer for the parents to update you then and now when an observation is made through an application or would you prefer to wait till the next meeting to be briefed? Why?

In your opinion, ethically, are there any problems having these data sit on a third party cloud or should all these information be within the center's server.

If a transaction was made on the application by a parent, would you rather receive an email notification or would you rather access few minutes before the meeting and through the digital file.

For those parents who cannot make it to a certain session for their child, would you offer them to see the session video at a later time at their comfort? Or do you think that might encourage them to skip regular sessions and might add adverse effects on the growth of the child or meeting objectives?

What is your opinion about showing parents the progress of their child as a info graphic or chart or something visual. Any thoughts on how this can happen?

Where do you think digital, or more precisely inclusive design can play a big role in making a change in a way that would assist you or increase efficiency of your day to day work? From a multi disciplinary communication perspective and sharing data.

Brief on the idea for the platform.

I keep reading from research that children fifty years ago had more physical activity than today and situations were much better. What do you think digital age has done to the world?

Questions for educators

How do you communicate with parents and co-workers such as educationists or therapists?

How effective is email in progressing child's education and growth?

Would you agree that email, as a communication tool is great to track and progress and archive data? If yes/not why?

How important is it for educators to have quick data access (archived) in all devices including smartphones or tablets. Why and how does it help? Can you elaborate please and rate on a scale of 5.

What kind of data would you need to have on a software that you can access anywhere?

If you had a parent share data every morning such as the child's behavior that morning or the activities child has achieved, would it have helped you plan your goals for that child effectively. Can you elaborate how would it help please.

How important is for an educator to have parents share or record any behavioral change or attitudes by their special needs child. Is the time and date of occurrence vital information?

Would you prefer for the parents to update you then and now when an observation is made through an application or would you prefer to wait till the next meeting or open house to be briefed? Why?

Do you want those information passed on to therapist first and then they filter down or channel necessary information to you?

In your opinion, ethically, are there any problems having these data sit on a third party cloud or should all these information be within the center's server.

If a transaction was made on the application by a parent, would you rather receive an email notification or would you rather access few minutes before the meeting and through the digital file.

For those parents who cannot make it to a certain open house session for their child, would you offer them a videoconference? Or do you think that might encourage them to skip regular sessions and might add adverse effects on the child's education plant or meeting objectives?

What is your opinion about showing parents the progress of their child's education as an info graphic or chart or something visual? Any thoughts on how this can happen? Please explain current process.

Where do you think digital, or more precisely inclusive design can play a big role in making a change in a way that would assist you or increase efficiency of your day to day work? From a multi disciplinary communication perspective and sharing data.

Brief on the idea for the platform.

I keep reading from research that children fifty years ago had more physical activity than today and situations were much better. What do you think digital age has done to the world?

Questions for parents

How do you communicate with educationists or therapists?

How effective is email in progressing your child's education and growth?

Would you agree that email, as a communication tool is great to track and progress and archive data? If yes/not why?

How important is it for you to have your child's history (archived) in all devices including smartphones or tablets. Why and how does it help? Can you elaborate please and rate on a scale of 5.

How do you feel about actively sharing data every morning such as your child's behavior that morning or the activities child has achieved?

Are there any obstacles you feel might face in the long run. Can you elaborate please.

How do you think or when do you think you may in reality share these informations. What is an ideal environement. Preferred time of the day?

Have you experienced any obstacles in the past about informing emergencies to the therapist or educators.

Would you prefer to update then and now when an observation is made through an application or would you prefer to wait till the next meeting or open house? Why?

Who would be the first person you would report a matter? Therapist, teacher or both?

Do you prefer every transaction you make on child's observation shared with all members on the team or do you want to have the control who should see it?

In your opinion, ethically, are there any problems having these data sit on a third party cloud or should all these information be within the center's server.

If a transaction was made on the application by teacher or therapist, would you rather receive an email notification or would you rather access the platform in free time to keep yourself updated.

Brief on the idea for the platform.

Where do you think digital, or more precisely inclusive design can play a big role in making a change in a way that would assist you or increase efficiency of your day to day work? From a multi disciplinary communication perspective and sharing data.

Appendix J

Table of participant

Participant Code	First Interview Participation	Feature Consult Participation	Parent of Special Needs Child	Years as Therapist	Years as Educator
TH01	YES		N/A	10-15 YEARS	N/A
TH02	YES	YES	N/A	5-10 YEARS	N/A
TH03	YES	YES	YES	10-15 YEARS	N/A
ED01	YES	YES	N/A	N/A	5-10 YEARS
ED02	YES		N/A	N/A	5-10 YEARS
ED03	YES	YES	N/A	N/A	5-10 YEARS
PN01	YES		YES	N/A	N/A
PN02	YES	YES	YES	N/A	N/A
CRE1	YES	YES	N/A	N/A	N/A

Appendix K

Feature Consultation Questions

Activity Feed
Explain features and rationale for the functionality
Express thoughts on the activity feed and its intention to replace email notifications.
Do you believe this may enhance tracking and tracing past communications or history review?
Any thoughts on viewing an overall activity that is a summary of all cases? Or would you prefer to see per case?
What do you think about calling each child profile as a case?

Posting an update
What are your thoughts on the update posting form? Do you think you would need any dedicated fields that may help you organise data?
Do you envision a need to change the publish date or time? (Give a scenario).
Explain the methodology on assigning and giving access to visibility.

Assigning tasks with due date
Explain about converting a message to a task and creating a task with date and assignee.
Ask for a scenario they may seem helpful.

Parent report on observation
Explain a scenario with the feature. Show the flowchart.
What are your thoughts on such a feature?
What do you think about computer generated graphs on daily reports such as sleep pattern or eating habits.
Would you rather receive/send data as and when event happened or would you wait until next meeting to discuss the matter?

Video Conferencing
Ask to share thoughts on proposed methodology for hosting video footage.
What are your thoughts on watching a video at a later stage?
Do you think an ability to post comments directly to a frame (time) within a video as a bookmark may assist in future reviewing?
Do you wish to see any other features with the video?

Search
Explain about search. Have an informal discussion about finding information.
Would you prefer search to be in advanced mode or basic mode by default. Now that you know more about the system, what would be the advanced search in your opinion?
Would you create tasks through search field if you coud write a line? Give scenarios.

Requesting permissions
How do you feel about requesting or receving requests digitally through this methodology?
Do you feel this is a feature that can be digitized?

Other features
Explain and give scenarios.
Ask how they feel might add value to their work environment. Ask for suggestions.