

Investigating the Use of Technological Devices to Target Social Skills in Autism Spectrum Disorder Therapy in New Zealand



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BUSINESS TECHNOLOGY SUCCESS

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Abstract

This project assisted Callaghan Innovation in analyzing the potential need for a new technological communication application that improves social skills for children with Autism Spectrum Disorder (ASD). To determine the needs and opinions of consumers, the team conducted 19 stakeholder interviews with members of the ASD community in New Zealand. Our results indicate that a tablet application that focuses on developing communication skills and is customizable, collaborative, and culturally appropriate could potentially meet the needs of the community. Also, the stakeholders stressed that technology in ASD therapy cannot replace a teacher and must be implemented as a tool. This information gathered will hopefully aid Callaghan Innovation in designing new technology products in the future.

Executive Summary

Introduction and Background

Autism Spectrum Disorder (ASD) is a developmental disorder that affects 1 in 100 individuals in New Zealand (AutismNZ, 2015). Children with this developmental disorder tend to lack the social skills that most people develop at an early age. This includes difficulty with communicating, interacting, identifying emotions, engaging attention, and adapting to new environments (CDC, 2015c). There is no specific approach to treating autism because every child has individualized needs; therefore, treatments for autism include a number of therapy methods. As new methods arise, technology such as computers, tablets, virtual environments, and large touch screens, play a more significant role in therapy in the autism community.

Our sponsor is Callaghan Innovation, a government funded New Zealand agency whose main goal is to promote local technology-based businesses. Callaghan Innovation has developed a product designed to initiate conversation between autistic children through the use of a touchscreen device. This device allows students to learn how to communicate through the use of picture based icons to form sentences. Other than functioning as communication devices, tablets are tools that can develop the social skills of autistic and other special needs children. Online application stores that sell this software are helpful resources to learn about and purchase new applications and software for autism therapy.

Methodology

This project was intended to assist Callaghan Innovation in analyzing the potential need for their new technological communication application in the autistic community. We accomplished these goals for Callaghan Innovation through our three objectives as shown in Figure 0.1:

1. Determine which underdeveloped social skills in children with ASD therapy targets most
2. Explore the prevalence in the ASD community of technology devices, specifically, tablets and touchscreens in autism therapy
3. Identify end user needs and desired improvements in regards to technology in ASD therapy.

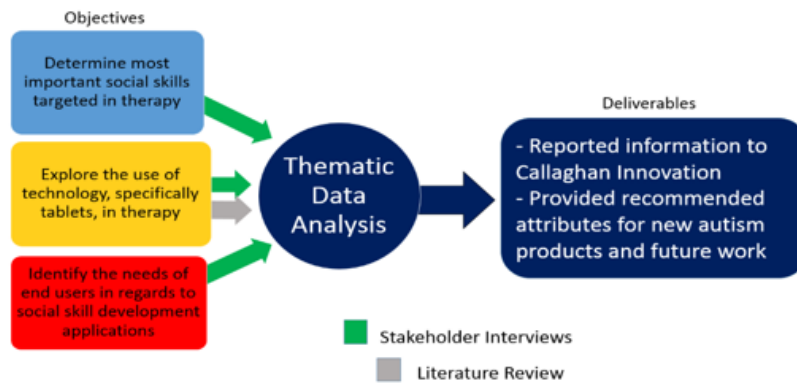


Figure 0.1. Methodology Diagram

Our main method of data collection for these objectives was to conduct 19 stakeholder interviews with members of the New Zealand autism community. These stakeholders did not include children because we focused on those that could evaluate the effectiveness of the products and were involved in the product selection process. We categorized these interviewees into four stakeholder categories based on their experiences: parents of children with autism, therapists who worked on developing skills with autistic children, teachers who had experience instructing children with autism in a school setting, and assistive technology specialists whose role is to design therapy around the use of assistive technology devices. Due to the varying levels of background knowledge of our interviewees, these interviews were unstructured but we had specific overarching themes that we inquired about in each interview. These main themes were targeted social skills, methods used, opinions on technology from adults and their perception of their children’s opinions, and finally the concerns and desired improvements for these methods. Our main topic was the social skills the stakeholders focus on developing most at home, school, and therapy and the methods they use to do so. We also asked about the stakeholders’ opinions regarding these technological methods and how they thought they could be improved. Finally, we inquired about the level of success that the ASD children have in utilizing these methods.

Results

After compiling the data collected in these interviews, the group organized and coded it thematically to identify trends to make conclusions about our stakeholder group. One result was all but two of the stakeholder responses fell into one of the following **five social skills categories: verbal communication, peer interaction, behaving appropriately, reading emotions, and**

coping with unexpected events. A major finding from our results was that more than half of our participants mentioned **communication as the most important social skill to develop in children with autism.** Since at least one person from each stakeholder group had this opinion, it shows that developing **communication skills is of importance to all stakeholders.**

Another finding of this project was related to the devices primarily utilized in the autism community. One of our major findings was that **tablets were the main technological tool that 11 out of our 19 stakeholders integrated into their social skill therapy.** However, we also observed that **the majority, namely five out of seven, of our parent interviewees mentioned that their children have not used a tablet or iPad to develop social skills.** The parents who had no experience with tablets in therapy attributed this to the fact that their children were out of therapy and the technology was not fully developed during their childhood. However, these parents mentioned that they would have been willing to try these tools with their children but did not have the opportunity.

The next findings are the result of our interview questions regarding interviewees' opinion on technology in ASD therapy. A number of stakeholders mentioned that **technology cannot replace a teacher** and that they believed **it can be a successful tool if it includes another person in the therapy process.** Four interviewees were very passionate about this opinion and another five also mentioned this idea. Additionally, some interviewees said that though technology can assist in this area, **developing relationships with other people is the most effective component to improving social skills.** In addition, a portion of these stakeholders believed that the **children were drawn to technology and enjoyed using it** saying that "it makes sense to them", it allows "simple cause and effect" support, and "errorless learning."

The next set of results dealt with concerns and challenges regarding technological devices in autism therapy. One difficulty that we observed during our data analysis was that some of the interviewees' children **were not able to delineate when it was time to work and time to play when using a tablet.** Because a tablet can be used as an educational tool as well as a toy for games and entertainment, a child sometimes has the tendency to be distracted from education by fun.

Another concern was getting the funding needed for the more expensive technology tools. Because the Ministry of Education reserves the Ongoing Resourcing Scheme (ORS) for autistic children with very high needs, three out of seven parents and four out of six therapists said that it

is very **difficult for families with lower needs children to afford the more technologically advanced products**. Additionally, several stakeholders were concerned that **technology was not reliable** because it has a tendency to have functional issues and when it needs repairs it takes too long to fix. This was a particular concern of the four therapists we interviewed at Kimi Ora Special Needs School because they mainly worked with children with a lack of motor control who had a tendency to be rough on these devices. The **need for individuality and customization** of the method used to help the autistic children was a common theme that interviewees brought up. At least one person from each group, with a total of eight, went out of their way at various points throughout the interviews to express their concern about ensuring that the child's specific needs were met by the therapy.

The stakeholders also provided suggestions for improvement on therapy products that they used based on their experience. One such improvement that three stakeholders mentioned was the need for a more culturally appropriate approach to the design of the applications. Given that New Zealand is a rather small country, we discovered that **applications with built-in voices were not specific to the country** and often spoke with an American or British accent. 83% of our interviewed therapists and 66% of the assistive technology specialists suggested an **increase in the functionality and extent of the vocabulary in assistive communication devices**. This is because the special needs individual needed to be given the opportunity to communicate in a manner that exceeds functional interaction and requests. Another suggestion was targeting the product's ease-of-use because a number of therapists mentioned that the **communication devices they worked with were often too complex to be effective** with the children. A final improvement that all the interviewed teachers and one therapist wanted to see was an increase in **research, data, and results to back up the claims** that the companies make involving the successes of their products.

An additional result was that some of the parents and therapists believed there was **insufficient training for public school teachers on how to teach children with autism**. Two out of seven parents and one therapist out of three had the opinion that teachers need to be trained better for this role.

Data Based Recommendations

We created a set of four recommendations based on the final results of our project for a product that could potentially fit the needs of this ASD community. First, because our interviewees believed that communication was the most important social skill to address in therapy, this product should **focus on developing communication skills**. Second, **a tablet should be the primary platform for the software application** because of the large percentage of stakeholders who have familiarity and positive outlook on tablets. Additionally, the product should have **customizable features** in order to individualize to the needs and cultural situations of the students using it. Finally, the product should be **collaborative and require use with more than one person** in the therapy process. In this way the product will support socialization with human to human interaction.

Opinion Based Recommendations

We also created a set of recommendations based on our team's opinions as well as the information we received from background research and general feelings from the interviews. Because software that includes many visuals tends to be more effective with autistic children, we recommend that a new product be **highly picture based** to apply to this type of learning. Moreover, **repetition and consistency** are product characteristics that should be taken into consideration and incorporated during development, because autistic children often desire routine while learning, as it makes the therapy procedure less stressful and more effective. Furthermore, a product should be **easy to use** and it should be **accompanied by an in depth tutorial** that the instructor can reference to ensure that the application is being implemented correctly.

Conclusion

With the results and recommendations that we generated from our research, we hope that Callaghan Innovation will be able to evaluate their current product and determine how well it will address the needs of the autism community. Due to our limited size and potential bias in representation, more research should be done to better understand and generalize the needs of this community. We concluded that a product that fits the needs of this community could have potential for success but due to the difficulty that consumers have navigating the marketplace additional

research in efficient commercialization techniques should be done to increase this possibility for success

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CHAPTER 1: Introduction

Autism Spectrum Disorder (ASD) is a developmental disorder that an average of 1 in 68 individuals are diagnosed with worldwide. (Autism Speaks, 2015). The disorders that fall within the spectrum are accompanied by a large range of symptoms and challenges that researchers are currently addressing. Some of these symptoms include an inability to concentrate, learn in a traditional school setting, control repetitive or compulsive behaviors, and respond correctly in social situations. In this project, we focus on the difficulties that children with ASD have regarding social skills and interactions. Because ASD does not have a specific cause, there are a variety of treatments and therapies to address the disorder. The newest forms of treatment for this disorder include various types of assistive learning technologies, such as games and software, which utilize traditional therapies for the disability. By implementing them on a digital device that offers mobility, compactness, and features like recorders and cameras, technological methods can be more effective and efficient in therapy.

The area of focus for this project is New Zealand, where autism is slightly less common, affecting 1 in 100 individuals (AutismNZ, 2015). However, ASD is still a definite concern and researchers are currently developing possible assistive technology devices and software for use in the ASD community. One such company is our project sponsor, Callaghan Innovation. A research team at Callaghan Innovation is in the process of creating and marketing an assistive technology device that addresses the needs of the end users in the New Zealand autism community. This product will be directed towards encouraging and improving underdeveloped social skills in children with ASD. Ideally, the stakeholders involved will utilize this product in school, therapy, and at home to improve the social interactions with the children. Children were not the stakeholders of focus in this project because they are not the stakeholders involved in selecting products. It was important that we interviewed the adults in this community to provide thorough and thoughtful evaluations pertaining to these children and the products they use. Also, parents and therapists can describe children's attitude towards these applications which we did take into consideration.

The major goal of this project was to assist Callaghan Innovation in identifying if their confidential product in development will fit the needs of the various members in the New Zealand autistic community. In order to achieve this goal, our group analyzed data collected through stakeholder interviews and literature review regarding the most addressed social skills in therapy,

consumer needs, and currently existing products. The team conducted interviews with parents of children with ASD, autism therapist who focused on child development, teachers with experience with children with autism who focused on education, and assistive technology specialists who incorporated various types of technology into the ASD therapy. Additionally, a literature review to determine the qualifications of a successful therapy tool was necessary to find the current technologies that researchers and other companies already developed. With this information on both the existing products and stakeholder needs regarding these products, we provided Callaghan Innovation with recommendations regarding the important features a product should have in order to meet the needs of the ASD community in this area of concern.

CHAPTER 2: Background

This chapter provides an overview of the use of technology in the development of social skills for children with Autism Spectrum Disorder and the need for technologies to help target the advancement of these social skills in therapy. The mission of Callaghan Innovation, the sponsor of this project, is to help New Zealand businesses succeed through technology (Callaghan Innovation, 2015). They are a New Zealand government funded agency that is based on the idea of “comprehensive and integrated solutions for New Zealand businesses” (Callaghan Innovation, 2015). Callaghan Innovation provides access to experts, technology and product development, innovation skills, business collaborations and grants for research purposes. Callaghan Innovation asked us to investigate the market potential and the level of consumer need for the use of Information and Communications Technologies (ICT) as a social skills training tool in special education, specifically in autism. Their current research involves the use of assistive tablet applications that focus on improving social skills in children with ASD. This chapter reviews autism in the New Zealand community and assistive technologies designed to encourage communication, collaboration, and other similar interactive skills for children with ASD.

2.1. Autism Spectrum Disorder (ASD)

This chapter discusses Autism Spectrum Disorder in further detail and how it affects a range of social skills as well as discussing the resources for the diagnosed children in New Zealand.

2.1.1. Symptoms and Key Facts about ASD

Medical professionals classify Autism Spectrum Disorder (ASD) as a developmental disorder accompanied by varying levels of disabilities that affects a great number of people, both children and adults, worldwide. Currently, statistics show that 1 in 68 children will be born with some level of ASD (Autism Speaks, 2015). Although ASD is more common in boys, showing statistics of about 1 in 42, it still affects girls with diagnosis rates of 1 in 189. This range of disabilities presents a great number of challenges that children with ASD face every day and researchers are continuing to search for better mechanisms to alleviate them. Common symptoms and effects of ASD are various kinds of behavioral and emotional problems. Autism is most often associated with social difficulties, including an inability to engage eye contact or hold a

conversation, as well as repetitive and sometimes obsessive behaviors. Children with ASD have trouble communicating, interacting, identifying emotions, engaging their attention, and adapting to new situations (CDC, 2015c).

Additionally, autistic children are often unable to respond correctly to social cues or other people's emotions (CDC, 2015c). Since these children are unable to recognize that body language portrays feelings and expressions, other people tend to feel that the children's responses are rude or inappropriate. Autism Spectrum Disorder is also known as the "Wrong Planet Syndrome" (Marwecki, 2013). Autistic children typically see themselves as normal and their surroundings unusual as if they are living on the "wrong planet" which makes engaging in social interaction difficult.

Symptoms usually appear early in life and children generally display these symptoms before two years old. This early onset leads to the need for early intervention in order to treat the effects of the disability so that the child is able to function as normally as possible. Given how much this range of symptoms can affect the child's life and development, taking initiative to get early treatment is vital in the therapy process (NIH, 2015).

Tailoring to the needs of each child is difficult, especially when there are so many different ways in which autistic children learn. According to Hirstwood Training, there are seven main learning styles that are most prevalent in autistic children (Hirstwood, 2014). If a child is a verbal or linguistic learner, they will learn best with the use of words, written and spoken. Some children are logically or mathematically driven and they pay attention to patterns and work well with numbers. Musical children use their auditory sense to process sound and spoken words. Visual learners benefit from images and color distinction. Kinesthetic learners improve learning through movement and mimicking actions. It is important to acknowledge that learning is dynamic and no child experiences one singular learning style.

2.1.2. Categorization of Problematic Social Skills

This project focuses on the different types of social skills that autism often compromises in the affected children. In general, we can categorize the various social skills into one or more of three main categories: conversation, body language, or situational awareness. All three of the categories of skills can help a child to read and respond to a given social cue. Our main reason for categorizing these social skills in this manner was to facilitate our data analysis when we coded the results of the interviews based on these categories. Social skills are difficult to separate because they often overlap, however these categories kept them as separated as possible.

The first category of social skills that are problematic in children with ASD is conversation and verbal communication. These children are often unable to correctly understand people's tone and volume of voice and consequently they cannot correlate these signs to people's emotions. Another difficulty is paying attention and being able to listen and respond when the conversation requires it. Often, autistic children will turn away from a conversation if they are no longer interested or will monologue without interruption when they are discussing a topic that interests them. This kind of behavior often appears as rude and uninterested to the people who do not have experience with autistic children (Planet Earth Primer, 2015).

The next category that often causes difficulties for these children is body language and unspoken communication. Autistic children, in general, have difficulty with keeping eye contact and staying still during conversations and other social interactions because of the urge to perform repetitive behaviors; additionally, they tend to be distracted by other things around them. They are also often unable to recognize and respond correctly to the unspoken communication that is portrayed by other people's body language. Therefore, they can be easily confused when the context of the conversation revolves around aspects that are not stated clearly. The more subtle nuances of conversation and human interaction often go unnoticed or ignored (Planet Earth Primer, 2015).

The third and final category that can be difficult for ASD children to fully grasp is situational awareness. This category encompasses the big picture in social interaction. It involves taking in all information in a given environment and responding to it appropriately. This area of social skills is more advanced than the previous two categories because it requires conditional

behavior and is not straightforward. Social awareness also includes cooperation skills, sympathy and empathy, and teamwork. Since ASD can cause difficulties in listening, attention span, and cognitive abilities, things like sharing and working together are often challenging for the children. Such troubles can cause problems in other areas as well, especially in school or work-related situations (Planet Earth Primer, 2015).

2.1.3. Rights and Resources of Special Education Students in NZ

The Education Act of 1989 legally holds the rights of all New Zealand students (Ministry of Education, 2015a). This document, administered by the Ministry of Education, provides the legal framework for the educational system of New Zealand. In regards to children with special needs, the Act states that they have equal rights to enroll in primary education, secondary education, and partnership schools along with all students without special needs (Ministry of Education, 2015a).

The New Zealand Disability Strategy created by the Office for Disability Issues also holds New Zealand schools to certain standards (MSD, 2009). This strategy provides a framework to help the government remove barriers between society and the disabled. It delineates five themes that will support disabled persons in the community: public awareness, resources, support services, incorporation, and individual understanding (MSD, 2009).

The Ministry has also pushed to increase the use of inclusive education strategies in schools; the Education Act of 1989 founded this idea (Ministry of Education, 2015c). Inclusive education focuses on engaging students through the use of flexible practices that adapt to the needs of the students (Ministry of Education, 2015b). The use of this method ensures that in daily school practices, all students and teachers recognize all identities, languages, cultures, abilities, and talents (Ministry of Education, 2015b). School systems in New Zealand are starting to implement inclusive education and this method is working its way into the special education branch creating more individualized approaches to learning.

The Ministry of Education is investigating and instigating assistive technology as a resource to assist special education children. Assistive technology is as any form of technology that helps a child with special needs to perform tasks that he/she would otherwise be unable to perform entirely on his/her own. However, since these more advanced technologies are often

expensive, the Ministry requires that children with a high level of need demonstrate eligibility for the use of this technology. The children must also be currently enrolled in school and there must be proof that the current technologies in the school are insufficient for the child's learning in order to receive this technology (Ministry of Education, 2015c).

The department also recommends that the parents initiate a learning assessment to discover more about the child's disability and the obstacles that stand in the way of learning. Given the costly nature of the assistive learning technologies, the Ministry requests that they should take less expensive steps first to determine if cheaper and more accessible tools and technology are available; these modifications should exist in both the child's curriculum and learning environment. If the less advanced technologies are not adequate to overcome the learning disability, the Ministry is then willing to begin supplying the more technologically advanced and costly assistive tools (Ministry of Education, 2015c). In order to determine how much Ministry involvement the law requires, the spectrum is separated into three levels of need: low, moderate, and high. The Ministry is generally more involved with moderate and high level need children and will bring specialists or therapists into the school environment to assist the teacher with the children if deemed necessary (Ministry of Education, 2015c).

Though the Ministry is reluctant to employ these more expensive technological tools, they provide additional resources that are very helpful in the educational advancements of autistic children. There are many sources of support for this type of assistive learning technology including important information about the technology and how it works as well as news about the release of newer technologies. The Ministry of Education also has a number of employees who facilitate the process of using this technology and adapting the child to this new learning environment. There are field staff members who work with the schools to integrate the technology, either one-on-one with the student or with a therapist to determine the best treatments and therapies. Additionally, there are district technology coordinators who are responsible for determining the need of the child and the type of technology best suited for their situation and need. Finally, the Center for Assistive Technology helps the parents of children with ASD in learning about the newest and most effective assistive technologies for both home and school situations (Ministry of Education, 2015c).

In the current New Zealand school system, there are many options and methods of support and treatment for families with children with ASD. The Ministry of Education stresses the

importance of early intervention and treatment. It also tries to ensure that caregivers monitor the disability so that failure to intervene does not severely inhibit the child's life and development. The level of Ministry involvement varies depending on the situation but it is still dedicated to supporting children and their families throughout the child's schooling (Ministry of Education, 2015c).

There is no additional cost to the families of the children with ASD because the government funds all fees and expenses only for these resources in school. Though it provides an extensive support network, the Ministry advises all families with affected children to build a support group of their own because of the difficulties that families often face during the education process. The support of friends and relatives can assist with difficult situations while also ensuring that the child's company is not limited to his/her therapist (Ministry of Education, 2015c).

2.1.4. Other Disabilities with Characteristics Similar to ASD

There are many other conditions and disabilities that have symptoms similar to Autism Spectrum Disorders (ASD). Since ASD is a spectrum, it covers many levels of severity in the autism disorders. Three main categories on the spectrum are low functioning autism (LFA), moderate functioning autism (MFA), and high functioning autism (HFA) (Marwecki, 2013). Asperger syndrome is a diagnosable disorder that exists on the spectrum which has characteristics similar to HFA (Marwecki, 2013). Other disorders that are not specifically defined on the spectrum can have symptoms similar to ASD. Medical professionals categorize Pervasive Developmental Disorders (PDD) by symptoms including impairments in areas of communication, language, and social interaction (Silva, 2014).

2.2. Treatments for Children with Autism

In this section, we discuss the various technological and non-technological methods that exist in autism therapy.

2.2.1. Standard Therapy Methods

There are a number of methods for the treatment of children with autism. Most of these therapies focus on identifying problem behaviors and using various techniques to address the problem. Some such therapies include Applied Behavioral Analysis, Pivotal Response Treatment, and Speech-Language Therapy. The newer assistive learning technologies that researchers are currently developing use these aforementioned methods to teach skills using more innovative approaches.

Applied Behavioral Analysis (ABA) is one of the most common treatments for children with ASD. This method is an in depth and lengthy process that requires ongoing assessment of the child's progress and constant alterations to the proposed teaching plan. The basis of ABA is analyzing the child's various behaviors, both normal and ASD influenced, and determining which behaviors should be encouraged or discouraged. This further involves teaching the correct behavior so that the child can learn to replace the poor behavior with better (Autism Speaks, 2015). The effectiveness of ABA depends on differential reinforcement. Differential reinforcement refers to positively reinforcing socially desirable behaviors and negatively reinforcing problematic behaviors. These reinforcement methods do not include physical punishment (Morris, 2015). A professionally trained behavior analyst or therapist is in charge of the child's therapy but works with the family to set reasonable goals for the child's progress and to teach the family techniques for responding to certain situations. The therapist designs and constantly modifies a personalized curriculum specific to the needs of an individual (Autism Speaks, 2015).

There are a number of teaching strategies involved with ABA that are meant to discourage bad behaviors and reward good behaviors. One of the first methods is a combination of task analysis and chaining. Task analysis is the breakdown of complicated tasks into smaller, more manageable action components. Chaining is the further separation of the smaller actions into their vital components so that the child is able to apply them one step at a time and slowly combine all the actions into one, to complete an entire task. For example, for a child to make a sandwich, the

therapist could break it down into retrieving the plate and knife, getting the bread and peanut butter, spreading the peanut butter on the bread, and finally putting the pieces together. The smaller steps are often easier to handle for the child to complete the task (Morris, 2015).

Task analysis and chaining are intertwined with another teaching strategy, prompting. The therapist uses various prompts to encourage the correct behavior or response. This prompting could be telling the child to pick up a block and put it away or suggesting a more detailed response to a question (Morris, 2015). Since children with ASD are often unwilling to respond to conversation or respond as succinctly as possible, this method requires them to expand their answers and thereby conduct a better conversation. It also facilitates directions to any task that the child is attempting to complete. However, the therapist should not use prompting all the time with the child because the end goal is to fade prompting. Fading refers to the process of slowly weaning the child off of task prompts. The goal is that the child will recognize a situation and know the proper response without assistance, but the fading process allows guidance where it is needed (Morris, 2015).

The last step in the process is generalization. This step is one of the most vital and the most difficult in which to succeed. Generalization is ensuring that the child can apply the lessons learned to more than one specific circumstance. It requires turning a skill learned in therapy into general knowledge that the child can apply to a similar but not identical situation outside of therapy (Morris, 2015).

One disadvantage of ABA is that the therapy takes 25-40 hours per week for 1-3 years. In other words, an individual with ASD using this method may need to exercise five hours every day for three years to complete the program. It also requires someone to work with the ASD individual for this amount of time every day. This is a starting point where learning software can help and reduce the cost of the treatment by using applications on technological devices at home without necessarily the continuous supervision of therapist or a parent.

There are also a number of treatments and therapies that directly aim to develop the problem areas in social skills. Examples of social skills that might be enhanced through these treatments include verbal and nonverbal communication and situational awareness. Parents and schools often utilize speech-language therapists in order to help improve these skills. The treatments that the therapists put into place are entirely personalized to the child's individual issues

and problem areas, so the first step in this technique is to evaluate the child's skills and difficulties and properly encourage or combat them in a one-on-one or group setting. After recognizing the abilities and difficulties of the child the therapist puts reasonable goals in place to gauge the progress of the child and works towards larger and more difficult accomplishments. Some examples of the treatments used are Pivotal Response Treatment (PRT), Discrete Trial Training (DTT), Functional Communication Training (FCT), along with many others. Pivotal Response Treatment is one of the most common therapies utilized by the speech-language therapists. PRT is a treatment that involves child-initiated interactions and situations. The motivation behind the therapy is to target a certain "pivotal" area of concern, such as knowing how and when to initiate a conversation. When this concern is addressed and fixed, it will also cause improvement in a number of other areas, such as conversation skills and interactions. PRT was developed from ABA and is based off of game play and fun tasks. It includes rewarding good behavior with a desired prize, such as candy or other treats, to complete the desired tasks (Autism Speaks, 2016).

2.2.2. Technology Tools in Autism Therapy

Individuals with ASD often find working with computers and electronics less intimidating for many reasons. They have an easier time visually focusing on material illustrated on a computer monitor (Ozonoff, 1995). In addition, many children like software programs because of their predictability, the repetition of the activity, and the engaging animation (Herskowitz, 2003). Educational software refers to computer programs that target certain skills. Such software can be more effective than traditional methods of learning and children with ASD find it more motivating and less stressful due to the attractive colors and the ease of use that technology provides (Daymut, 2002).

According to Marwecki, et al., technology offers a promising tool to provide assistance with addressing problematic social skills. Children with autism use various types of applications and games with computers or any digital interface (Marwecki, 2013).

Researchers have investigated the use of different forms of technology in this field. Computers, tablets, and other unique electronics are products in development to encourage collaboration. Computers use specialized software packages which can be simple games or versions of collaborative virtual environments (CVE's). CVEs are virtual environments which

typically involve a child playing through the use of an avatar in computer-generated situations (Parsons, 2011). The attribute that makes these tools collaborative is that they involve interaction with other avatars that another student or teacher/caregiver/therapist can play to initiate appropriate behaviors in a virtual setting that is comparable to real life (Parsons, 2011). Some of these environments, like Block Challenge, involve headsets and visual goggles that immerse the player into a three dimensional environment (Parsons, 2011). Similarly, another form of a CVE is through a “blue room”; a blue room is a room in which projections of environments establish a situation that allows the child to experience the program more naturally (Parsons, 2011).

These surfaces belong to the category of tangible user interfaces (TUIs) (Silva, 2014). Compared to graphical user interfaces (GUIs) which use Windows, Icons, Menus, and Pointers (WIMP), TUIs are more interactive in that they involve response to touch (Silva 2014). An example of a TUI is DiamondTouch, a multi-user touch technology, which is a common tool in collaborative research (Dietz, 2001).

2.2.3. Tablets in Autism Therapy

Since smart devices started to be part of everyday lives, some applications that assist learning procedures have invaded this market. Designers have now developed new applications that focus solely on individuals with learning disabilities. More specifically, these applications assist in learning procedures that focus on skills like problem solving and social interaction. In this project, our focus is on applications designed to improve social skills in children with autism. Additionally, we will concentrate on the applications designed for and used on tablet devices.

Nowadays, an individual can select from a wide variety of devices in order to find the one that fits their needs best. Tablets, smartphones, laptops, and desktops are the most common devices that an individual can find on the market. Our research on currently marketed applications showed that software vendors have developed many of them for different devices and for different operating systems, such as Android, Mac OS and Windows. Per our sponsor’s suggestion, we focused on tablet applications due to the ease of use of a touch screen for an individual with autism, as well as the large size of the screen that gives the opportunity for a more complex graphical user interface.

Additionally, tablets were the main technological device used at May Institute, a private autism school in West Springfield, MA that our group visited. Many of their nonverbal students used an iPad to help them speak, but they can also use them for reward and entertainment. The communication tool that students primarily utilized was Proloquo2Go (Assistiveware, 2016). This device allowed for the student to click on the words they wanted to say to form a sentence to communicate with someone else. This application is part of a grouping called Augmentative and Alternative Communication (AAC) applications which operate as an alternative method of communication, other than oral speech, that individuals with limited verbal ability use for their daily communication needs (ASHA, 2013).

It is important for every product to have an efficient path to reach the final consumer and many of these assistive learning applications use online application stores for distribution. It is a convenient way for the individuals interested in the applications to have access to them. Based on our research from appyAutism.com and the AppStore, the prices for these applications vary from free to about \$1000. Packages that include multiple applications can cost as much as \$1300. The prices for simple applications tend to be in the free to \$10 range and the Augmentative and Alternative Communication (AAC) applications range from \$100 to \$300.

Based on our observations of the market, applications to enhance social skills use either a innovative method or copy an already existing learning method and transform it to a digital, faster, and more user-friendly interface. AAC applications often optimize previously used teaching strategies for nonverbal individuals and combine them with innovative ideas and technologies, like touch screens and sounds. These combinations yield new and improved products that are good examples of computer technology assisting autism therapies.

2.3. Therapies Directed Towards Improving Conversation

Since children with autism often have trouble with initiating and holding a conversation, there are a number of methods whose purpose is to develop these skills. Some of these methods, both technological and non-technological, are discussed in the following section.

2.3.1. Non-Technological Approach to Conversation

Our research has found no specific treatment or therapy that addresses conversational social skills specifically. Most teaching plans are individualized for each child based on their needs. However, some methods work better than others to facilitate conversational social skills. One of the main strategies is peer-mediated treatment. This option requires the involvement of two children to communicate with one another to encourage interaction. This approach aims to teach children to talk to each other and play together. Helping children to hold and initiate conversation appropriately translates into valuable skills in real world social interactions. Learning Experiences and Alternative Program (LEAP) is a specific program that uses principles of ABA therapy and techniques like peer-mediated instruction to help facilitate interactions between two students (ASHA 2013). The Circle of Friends and Integrated Play Groups are also two models that reinforce positive behaviors in a more natural setting through the use of play and discussion and communication groups between children with disabilities.

2.3.2. Technological Applications for Conversation

QuickCues is a social script application that targets teens and young adults with ASD (Schechtman, 2011). The goal of this application is to help individuals communicate in new situations and learn new skills. The communication module comes pre-installed and provides help with conversations at school or work, listening, and talking on the telephone. Its operation is easy to navigate because it only involves two steps. First the user selects a social skill category, like communication, and then a specific subcategory with a more specific problem in this social skill and provides offline access to on-the-go guidance. The guidance gives tips and/or examples regarding how to react to different situations.

2.4. Therapies Directed Towards Improving Body Language

Enhancing ASD children's understanding of body language addresses a number of social skills that can be taught with direct methods. Practice and repetition are the main tactics that applications and therapy apply to improve the skills in this area.

2.4.1. Non-Technological Approach to Body Language

Therapists often use Cognitive Behavioral Therapy (CBT) to help children to regulate their own emotions while controlling impulses through cognitive reflection and awareness. This method targets the reaction aspect of body language and focuses on self-awareness, but in the process it teaches the children how to recognize nonverbal gestures conveyed to them from another person. Through patterns of thought, the children reflect on previous behaviors as well as the actions of others and evaluate the implication of these cues. This helps the child understand on a deeper level what is being said without the use of words so that in the future they can more easily identify these characteristics in social settings. This method changes the way the children think to ultimately change their analysis of their own behavior (ASHA, 2013).

Parent-mediated treatment, similar to peer-mediated treatment, can easily be applied to body language. Although parents can use this method to apply to a wide variety of social skills, it has strengths focusing on body language. A specific parent-mediated program is Talkability; developers designed this program to primarily teach nonverbal cues and how to react to them appropriately. Son-Rise is another program that uses imitation as the primary tool to help parents and therapists first understand how the children think. "Rather than trying to force our children to conform to a world that they don't yet understand, we join them in their world first." (The Option Institute & Fellowship, 2016). This theory allows children with autism to make connections between the behavior they observe and their own actions.

2.4.2. Technological Applications for Body Language

One technical application, *Touch and Learn – Emotions*, uses images that show other children expressing certain emotions. With the help of audio cues, the child using the application must identify which of the children is expressing the given emotion (Albers Hill, 2015).

Body Language (Mazuzu, 2011) is a very similar application that displays expressive faces of people of all ages and enables the autistic child to recognize and choose which emotion the face is expressing. It allows the user to study as well as test their knowledge of the material.

2.5. Therapies Directed Towards Improving Situational Awareness

Situational awareness is difficult to teach due to the fact that these situations are conditional and always changing. These therapies and applications must present a wide variety of situations and demonstrate the correct behavior required for each.

2.5.1. Non-Technological Approach to Situational Awareness

Social Communication Interventions is a treatment approach that improves social skills by encouraging acceptable responses in a group setting. The SCORE Skills Strategy focuses on five main social skills that relate to situational awareness, namely **S**hare ideas, **C**ompliment others, **O**ffer help or encouragement, **R**ecommend changes, and **E**xercise self-control. These five skills are important when working together with another person and encompass the main characteristics that a good team player would follow in the context of working together in a given situation. Social Skills Groups use role-play and feedback as a main approach to introduce the children to a new, but more structured and predictable environment that a therapist controls. Social stories is another intervention program that uses stories to introduce imaginary scenarios to provide an example of appropriate reactions to social situations (ASHA, 2013).

2.5.2. Technological Applications for Situational Awareness

In the market, there is a wide variety of applications that target social awareness. These teaching games tend to function using similar strategies. One application that applies this strategy is *Model Me Going Places* (Schectman, 2011). In this tablet application, the user follows another child through an interactive slideshow at a number of social locations like the grocery store or the playground. In these stories, the children speak about their actions and show proper behavior in those situations so that the user watches and can correct their own behaviors.

Another application that targets social awareness is *Stories2Learn*. To use this tool, the child's caregiver (therapist/parent) creates a story that depicts the social skill of interest (Schectman, 2011). Using a mixture of photos and audio, the therapist can make up a scenario that

the child listens to and watches. This application can teach social skills like turn taking and sharing because these events are simple to incorporate into day-to-day activities.

2.6. Summary

Autism Spectrum Disorder is a disorder that greatly affects the lives of individuals throughout the world and is a problem that researchers continue to try to address with a range of treatments and therapies. A large number of these therapies focus on helping develop social skills in the affected individual so that they may lead more normal and independent lives. These social skills that are often problematic for these children can be broken into three categories: conversation, body language, and situational awareness. Today's newest technologies, especially tablets applications, are the latest tools to assist in this area of treatment and our project looks further into this area of technology and its potential.

CHAPTER 3: Methodology

This project assisted Callaghan Innovation in analyzing the potential need for a new technological communication application in the autistic community that improves social skills for children with ASD by identifying end user needs and collecting feedback on currently existing products in New Zealand.

We accomplished these goals for Callaghan Innovation through our three objectives which were:

1. Determine which underdeveloped social skills in children with ASD therapy targets most
2. Explore the prevalence in the ASD community of technology devices, specifically, tablets and touchscreens in autism therapy
3. Identify end user needs and desired improvements in regards to technology in ASD therapy

A visual representation of our methodology can be seen in Figure 3.1 below:

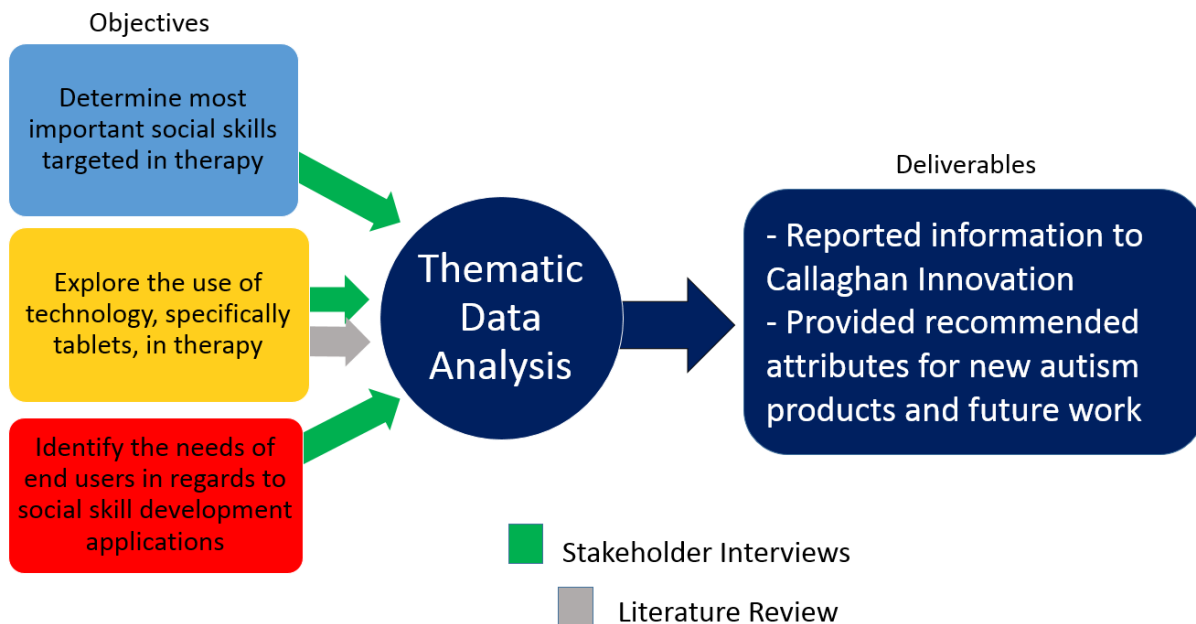


Figure 3.1. Methodology Diagram

3.1. Determine the Most Targeted Social Skills in ASD Therapy

It is necessary to understand what problems relating to social skills therapists and parents commonly target in ASD therapies in order to evaluate the type of product that can address the biggest need. We determined the social skills a small sample size of teachers, therapists, and parents focus on and consider to be most important to develop. Our team used stakeholder interviews to determine what social skills our interviewee groups most commonly treated in autism therapy.

The stakeholders we interviewed were a collection of parents of children with autism, teachers and therapists employed at both public and special needs schools, and assistive technology specialists. Before we conducted our final interviews, we designed two interview question guidelines, one for teachers/therapists and one for parents, which can be seen in Appendix A and B respectively. We believed that we could gather similar data across groups but adjusted the wording of questions to the experience of the groups to maintain the same theme given that their background differed. These questions were intended to provide a semi-structured guideline to our stakeholder interviews. We started with some “role-playing” interviews within our team and sponsors and then continued with two practice interviews with an early education teacher and a parent of a child with Down’s syndrome. We utilized these practice interviews in order to ensure that our questions and interview techniques were sufficient before beginning our data collecting interviews.

In our practice interviews, we learned that the conversations can take a number of routes. Consequently, our group believed that a less structured interview would yield more relevant data collection. Hence, the interviews that we conducted with the different stakeholder groups were unstructured because the question order, content, and wording was dependent on the interviewee’s background and experience.

Our sponsors originally mentioned a specific list of stakeholders for us to interview and contact. After an evaluation of the time frame of this project, we moved from this more structured idea to improvisation. Our sponsors then initiated contact through a company-wide email asking for interested persons with experience with autism to participate in our study. Our contact at Callaghan forwarded us the email responses so the group could initiate contact with the employees

that expressed interest in the project. In the end, 30 Callaghan employees reached out to help and about half of them were able to either be interviewed or connected us to another person to interview. Many of them took it upon themselves to reach out to other contacts that may have valuable information for us including their “son’s friend’s principal” and their friend who has a child with autism, and so on. It was hard to follow how some of these contacts related to Callaghan employees. An unintentional snowball effect began with a few Callaghan employees as these contacts continued to connect us with additional interviewees. There was no distinct method for controlling the numbers from each stakeholder group with this process due to our time restraints and urgent need for data. We continued to schedule interviews with new stakeholders as we started the data collection and concluded the process with 19 interviews, 5 of which were connected through Kimi Ora, a special needs school located in Naenae in the Wellington region of the Lower Hutt. The 14 volunteer interviews through Callaghan were all conducted via phone because traveling to the various locations across the country for face-to-face interviews was not viable.

Our group visited Kimi Ora School in Naenae, after being invited by Dave Speden, their head occupational therapist, with whom we had previously conducted a phone interview. We had to wait until the second week of February to visit this school because the students were just coming back from summer break. On location at Kimi Ora, we conducted two casual face-to-face interviews with their speech-language therapists. They referred us to a representative from a service called TalkLink. This service helps teachers and therapists identify the correct assistive technology tool based on their needs. We were then able to contact and schedule an interview with the autism specialist of this service in New Zealand.

In nearly all of the interviews, one team member conducted the interview and a second member took notes. To keep track of the main ideas that were important to touch upon in each interview, we had a checklist at the end of the question sheets that we referenced during the interviews (Appendix A and B). We recorded all but three interviews, due to technological limitations.

Our conversations varied from person to person, but followed a general trend in direction across the stakeholder group. Appendices A-F show the general outline and wording of the questions asked in each stakeholder group. Every interview began with a question (Question 1 in Appendix C, D, E, and F) inquiring about their experience with autism and autism therapy. With

this information relating to the interviewees background, the interviewer then could phrase the following questions more appropriately. The next question that the interviewer asked centered around what social skill the stakeholder most often targeted in therapy in order to collect data for our first objective. The remaining questions in these stakeholder interviews targeted information that helped us fulfill Objective 2 and 3.

3.2. Explore the Prevalence of Technological Devices in ASD Therapy

Callaghan Innovation is interested in using a tablet as the major platform for their product and therefore we investigated the usage of tablet applications to improve social skills by the ASD community. We employed two different methods in order to complete this objective: interviews and literature review. We were interested in understanding how much the selected stakeholders utilized technology in the special education area.

During the same interviews as mentioned above in Section 3.1, the group asked each stakeholder what methods they utilized primarily to teach these social skills that they identified as most important to develop. For those that did not mention a technological tool, we expanded the question to ask if they use technology in any form. This provided the information on how the stakeholders utilized technology and if tablets were the tool of choice in therapy. As seen in Appendix C-F, the questions for each stakeholder group were slightly different in wording and order. We also used this opportunity to ask what they liked about the methods, what the children liked, and what are the actual products employed and how do they work.

Additionally, our group completed a literature review regarding the various tablet applications that companies have already released on the market for the purpose of targeting social skills in children with autism. After doing Internet research regarding the most recommended autism applications along with the applications that the stakeholders mentioned in our interviews, our group created a document compiling a list of these applications.

3.3. Identify Needs and Improvements for Technology

One important objective of this project was identifying the needs of the various stakeholders involved in the ASD community who would be potential consumers for a new technological product. In order to gauge interest and identify what is important to these stakeholders, we had a set of interview questions that asked about their opinion on these technologies based on their past experiences and their recommendations for improvement. After understanding the teaching methods, technological devices, and applications that they used to target social skills, we asked about their feedback and observations about the method they utilized most. We then gave the interviewees an opportunity to expand upon their experience with technological devices and applications; what they liked about a tool, what they disliked, if they saw any need for improvement, and what they would change about the application. It was important that we understood how people feel about their current products to evaluate whether a new product can fill a gap in the market or surpass a current product. We also asked these stakeholders how they felt about integrating technology into therapy in general in order to gauge their interest in using a technological product and discover why they chose, or would choose, one method over another.

3.4. Thematic Data Analysis

The group collected the data through unstructured interviews and adapted the questions depending on the interviewee's background. This meant that each interview had a unique structure and flow. We recorded and transcribed all but three of our interviews, which we reported notes for instead. The group utilized the thematic analysis method to identify patterns and trends in the categorized data and draw conclusions about the opinions of the stakeholders regarding different topics. This method of analysis consists of four major steps: gathering data, organizing data, creating codes from the transcribed interviews, categorizing the codes, reviewing the categories as they developed, and finally stating the final results of the categorized data.

In order to analyze and draw conclusions about the data that we received and draw conclusions, the team had to organize the data since our interviews were unstructured. We separated the interview data into seven main sections that encompassed general concepts to address each objective. These categories included: the most important social skill to develop in autistic

children, the methods stakeholders use to improve these skills, improvements they suggested for these methods, information about autistic children's experience in schools, children's opinion on these methods based on their observations, stakeholders' opinion on technology in therapy and other information that did not fit under a certain category. To assign this information into one of the seven categories, we highlighted it with the corresponding color to the concept. We then compiled all of the colors into one document, separated by interviewee to identify trends within these groups. Based on the developing themes, we moved some data around to a more appropriate category.

The next step was to determine the codes that appeared in each category which also guided us to our final results. We identified themes that were common within the categories and pulled out the important quotes from each stakeholder and arranged the quotes by theme in an Excel spreadsheet. We used this information to provide a basis of the various trends that we saw within our data and present the data numerically and qualitatively to compare across and within different stakeholder groups.

To ensure that the data was not taken out of context, the quotes were located in the transcripts to identify the part of the conversation where they were mentioned. This enabled us to compare prompted against unprompted results.

CHAPTER 4: Data Analysis and Results

This chapter discusses the results of the data analysis that our group conducted from the information we received from the interviews with members of the autism community. It includes information about the demographics, experience, and backgrounds of our interviewees. We will also discuss the data and results that we received and how they fulfill our three objectives, namely, which social skills these stakeholders believe are most important to address in therapy, where tablets fit into therapy methods, and what are the needs and desired improvements of technology in ASD therapy.

4.1. Demographics

We interviewed a total of 19 different stakeholders (see Table 4.1). Our team categorized these stakeholders into four main groups based on similar experiences and interview questions, namely, parents, therapists, teachers, and assistive technology specialists. Table 4.1 shows each interviewee along with their gender, stakeholder group, and experience with autism.

Table 4.1: Interviewees and their experience

Stakeholder Group	Name	Gender	Experience with autism and special needs
Parents	Bernie Wastney	Female	19 year old son with severe autism at a preschool level intellectually
Parent	Diana Siew**	Female	23 year old daughter with high functioning Down syndrome
Parent	Jason Ryan	Male	8 year old son diagnosed on the autism spectrum
Parent	Julie Ellis	Female	17 year old son with high functioning autism and a 19 year old son with Asperger’s syndrome

Parent	Karlyn Sullivan-Jones	Female	8 year old son diagnosed with autism
Parent	Leahn Simeon	Female	Son with autism who is out of school and has experience as a teacher aide for a child with autism and a child with Asperger's
Parent	Marie Kiwara	Female	7 year old son with autism
Therapists	Brynlea Stone	Female	Speech Language Therapist at Kimi Ora, a special needs school that focuses on physical disabilities
Therapist	Claire-Ellen Roberts	Female	Speech Language Therapist at Kimi Ora for three and a half year and previously worked at a special needs hospital and volunteered for over five years
Therapist	Clodagh Counihan	Female	Speech Language Therapist for three years who provides advice and guidance for families
Therapist	Dave Speden	Male	Occupational Therapist at Kimi Ora
Therapist	John Feeney	Male	Occupational Therapist for students with complex special needs in Wellington who works for the Ministry of Education
Therapist	Sarah Spence	Female	Speech Language Therapist at Kimi Ora and worked in the U.K. and New Zealand in this role for over 12 years
Teachers	Irene Pow	Female	Primary school and early childhood education teacher for over 30 years who has encountered a number of autistic and special needs children

Teacher	Nerilee Shipman	Female	20 years of experience with special needs children who began as a teacher then transitioned into a SENCO at a special needs school
Teacher	Trish Tennant	Female	Full time SENCO of 15 children with autism for the past 11 years
Assistive Technology Specialists (ATS)	Coll O'Connor	Female	15 years working as the Assistive Technology Advisor at the Ministry of Education
ATS	Fern Jones	Female	Speech Language Therapist for Talk Link, an assistive technology service
ATS	Hilary Stock	Female	Computer Supported Learning Specialist at the Champion Centre, an early learning based early intervention service

Within the therapist group, we interviewed two occupational therapists and four speech-language therapists who worked in both school and private settings. Four out of the six therapists were from Kimi Ora, a special education school focused on physical disabilities. This is a concern in the data analysis because the majority of the therapists have the same background and therefore they are likely to have similar opinions and techniques, which can skew the results. Our teacher stakeholder group included one special education teacher and two SENCOs (Special Education Needs Coordinator) who work in both public and private schools. The seven parents interviewed had children with varying levels of Autism Spectrum Disorder or Asperger's Syndrome, ranging from 7-23 years old. Three of our interviewees had distinct professions where their purpose was to specifically incorporate technology into therapy and we identified them as assistive technology specialists. They all had a background in autism therapy but now specialize in assistive technology and provide parents, therapists, and schools with recommendations regarding introducing this technology into therapy depending on a child's needs.

4.2. Analysis of the Most Targeted Social Skills

The first data analyzed revolved around the social skills that stakeholders targeted most in autism therapy. Though our interviews were generally either semi-structured or unstructured, the first question was always the same which was “What do you think is the most important social skill to address in therapy or at home?” Some of our interviewees mentioned more than one skill and found it difficult to pick just one. Over our four stakeholder interview groups, they responded with one or more of the following five responses: verbal communication, coping with unexpected situations, peer interactions and making connections, reading people’s emotions, and behaving appropriately in social situations. Each of these themes encompasses a number of ideas that the stakeholders mentioned in our interviews and are briefly described in the next paragraph. Two outlier codes existed that did not fit well with any other skills mentioned, namely anxiety due to sensory stimulus and written communication.

The themes that the group used to categorize the responses to this question covered a range of social situations and issues. The first theme, verbal communication, includes expressing ideas verbally or visually, to another person. It also involves understanding how to use language in a meaningful way. Coping with unexpected situations refers to understanding and dealing with disappointment and understanding that daily situations are often unpredictable and difficult to anticipate. Peer interactions and making connections with others relates to all relationships built between two people, which includes the physical properties of a connection like touch, eye contact, and physical space. Recognizing people’s emotions covers a broader spectrum and involves reading facial expressions and understanding another’s point of view. Behaving appropriately in situations speaks to the social environment at the time and the necessary response to it, to ensure that the individual responds correctly.

We then separated the coded data by stakeholder group in order to compare both within and between the groups regarding the areas the interviewees mentioned as their main area of concern. Figure 4.1. contains five bars that represent the five different social skills that we detected as most important to be treated in children with autism after analyzing answers to our interview question about this topic. Each bar indicates the number of people from each stakeholder group that mentioned this social skill within the first question of the interview. If a bar does not include a color it means that the stakeholder who corresponds to this color did not mention this particular

skill. The total number of interviewees was 19 and some of them mentioned more than one social skill.

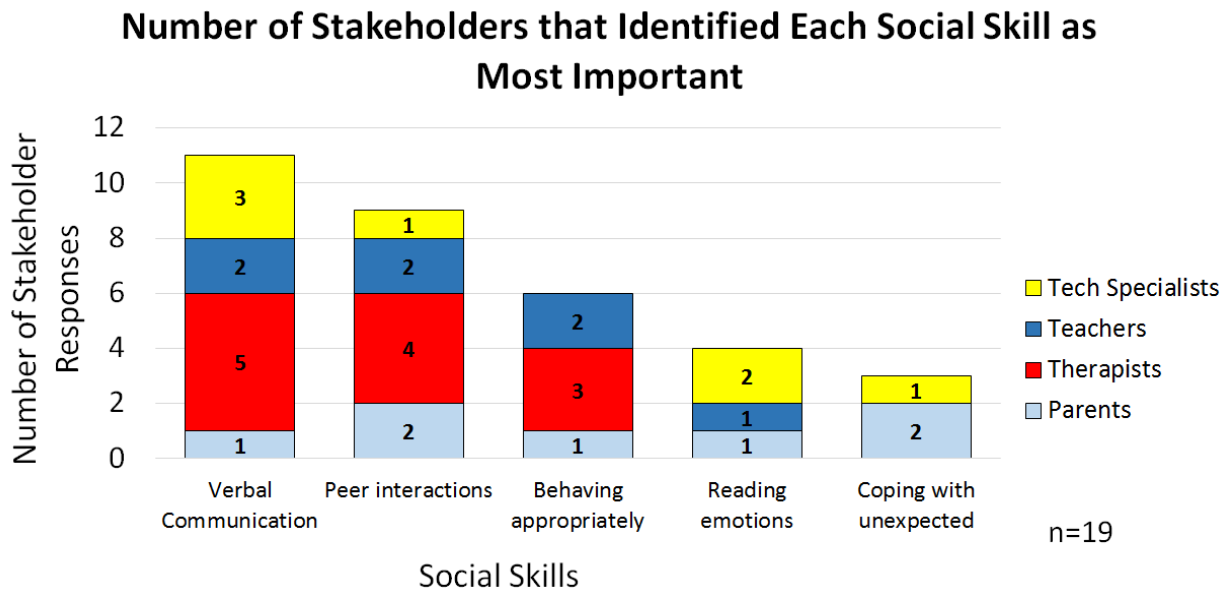


Figure 4.1. Number of stakeholders that identified each social skill as most important

When asked what they considered the most important social skill to target in therapy, ten of our interviewees mentioned that verbal communication, followed by increased peer interaction, was their main focus. In addition to being the most frequently mentioned, verbal communication and peer interactions were the only two skill sets that were of a concern to all stakeholder groups. Regarding this result, it makes sense that communication is a focus of these stakeholders in the autistic and special needs community because communication is the basis for making social interactions. As Dave Speden said, “Behavior issues come from communication problems and not being heard.” As such, the data from our limited sample population of 19 interviewees indicates that communication is the most important social skill to develop in autistic children.

4.3. Technological Methods Used to Address Social Skills

Our second objective focused on how stakeholders utilize tablets in autism therapy. This included the technological tools consumers used to treat social skills along with their concerns about this method's approach and their feedback about their experiences with it.

4.3.1. Devices Used by the Community

In our interviews, after inquiring about the targeted social skills, we asked the interviewees what methods they primarily utilized to target the important social skills they previously mentioned. The responses to this question fell under four main categories: encouraged interaction, social stories, modeling, and communication tools. In response to this question, 8 of our 19 interviewees mentioned that they had used technology as a primary tool in these approaches. Five out of the eight mentioned that they used a tablet or iPad in some manner to develop social skills and the other three used devices such as computers, TVs, and other video modeling systems. There are a wide range of methods our interviewed stakeholders tried in order to address the social skills they consider most important to develop. Sarah Spence, a speech-language therapist, claimed that “every low tech method has a high tech equivalent” in regards to therapy. Based on interviewee responses and previous online research, we saw that all methods that our stakeholders mentioned in our interviews, other than ‘encouraged interaction’, had a low and/or high tech equivalent. For example, social stories can be told through physical books or on an app like *Book Creator*. Modeling can be done in person but can also be shown and explained in videos on YouTube or apps like *Model Me Going Places*. Additionally, communication devices can be as low tech as a Core Board, as seen below in Figure 4.2, or as high tech as a program called *DynaVox*. A Core Board is a low tech AAC tool for nonverbal autistic children and include simple icons with specific meaning for basic communication. Although there are a number of technological alternatives to these approaches, less than half of our stakeholders mentioned them as a primary tool.



Figure 4.2: Core board used at Kimi Ora School

Our team compiled a list of the applications that target social skills that we found through Internet research, as seen in Appendix H; in this list, the applications that our interviewees specifically mentioned as a primary tool to improve social skills which are marked with an asterisk. We arranged the applications in categories of similar functions: AAC Devices, Social Connections, Social Cues, Emotions and Body Language, and Other Favorites that include other applications that did not seem to fit in one specific category. With Alternative and Augmentative Communication (AAC) applications non-verbal individuals communicate with others by using symbols and other visuals to construct sentences. In the social connections category we include the applications that help the children organize what they know about other people, keep photos of relatives in order to recognize them easier, and organize their daily schedule. Under the social cues category there are storytelling applications that describe some daily situations in society, explain the behavior of the individuals participating, and help the children with autism understand how to behave in their daily routine. As for the body language and emotions category, it includes applications that help the children understand non-verbal gestures and facial expressions during interaction with others. Finally, the category of “Other Favorites” includes applications that stakeholders mentioned during the interviews but could not fit in any other category. This includes applications that help with constructing sentences, recording words and aiding the academics aspect of these children.

This document displays the name of the software in alphabetical order and by category, an image of it in use, a brief description of the application's functionality, its price in U.S. dollars, and a link to the source website for further information. There were a total of 37 applications in this document.

We collected these applications mainly by two sources: the references from the interviewees and recommendation websites on the Internet. We utilized the autism applications for iPad list by Shannon Des Roches Rosa (Rosa, 2011) and kept the ones regarding social skills. We also included some applications from Tzvi Schectman's list with 11 social skills and life skills applications on iPads (Schectman, 2011). The rest of the applications were a result of our research from top user reviews on websites like *iTunes* and *Google Play*. The final list provided in Appendix H includes some effective and user recommended applications but we are sure that there are still many other applications in the market. Due to time restrictions and a large market we could not include all the applications possible.

For those interviewees who did not include technology in their primary therapy methods, the interviewer then asked if their child/students ever had experience using technology for therapy. After this question, an additional 6 interviewees said that the children they work with use iPads to develop some social skills. This totals to 58% of our stakeholders who have experience with tablets in autism therapy. More than half of the group who had experience with tablets indicated specifically that the tablet served primarily as a communication device. According to our data, for those who incorporate technology into autism therapy, the primary technological tool is a tablet and more specifically an AAC device. One thing to note is that a number of our stakeholders required prompting to acknowledge that they used tablet in therapy; this seems to show that although the majority of stakeholders use technology they may not see it as a primary method or tool to treat social skills. For the most part, our stakeholders demonstrated a tendency toward low-tech methods in therapy despite the existence of high tech alternatives.

Compared to only two out of the seven parents, all the interviewed therapists and assistive technology advisors used some form of tablet. Five parents who had children that did not use a tablet in therapy at all commented that researchers had not succeeded in fully developing this technology for their purposes at the time they needed it. All but two of these five parents had children over 17 years old, so this result is understandable given how quickly the technology has

progressed. Leahn Simeon, a parent of an older child with autism, stated, “The technology is different now to what it was then. It was only really beginning to be used.” These parents, along with the other teachers who did not use technology, showed some level of interest in using it primarily due to word of mouth recommendations and seeing an increased use of this type of tool in the special education setting.

All of the eight interviewees who had no experience with technology for autism therapy were interested in using it and supported the integration of technology in autism therapy. It was very clear that the interviewed stakeholders believed that the children were drawn to technology and enjoyed using it. Along with the visual and sensory stimulation, the adults say that “it makes sense to them,” it allows “simple cause and effect” support, and exemplifies “errorless learning.”

4.3.2. Opinions Regarding Technology in ASD Therapy

We offered all interviewees an opportunity to express their attitudes towards technology when asked a question about their opinions on technology as a therapy tool or when asked, “Do you have any comments regarding the use of technology in therapy?” Several interviewees expressed skepticism about incorporating high-tech tools in therapy. For example, Irene Pow, a teacher with experience in special education, has had no experience using technology with her special education students and is willing to try it. However she does not “feel a lot of socialization when the children are working with iPads and computers.” She articulated a serious concern for using technology appropriately and suggested that it should be used only as tool and not a replacement for a teacher. Additionally, all three of the assistive technology specialists shared similar opinions about this issue. Another comment made by one of these interviewees was that children can over focus on technology. One teacher claimed that people are the most important tool when developing social skills and therefore technology can be a successful tool if it involves more than one person. As Irene Pow said, “The resource is useless unless you have a teacher that is willing to use it and taught to teach.” One assistive technology specialist, Hilary Stock, always designs her therapy with technological support. Her approach is very specialized in that “it’s always with another person. It *has* to be.” Fern Jones, another assistive technology specialist, mentioned on the topic of communication devices, “You don’t communicate with a screen you communicate with a person... so to learn social skills you actually need to do them.” Additionally, her job focuses on providing the training to the supporting people who work with the student to

make the assistive technology as effective as possible. This was also a concern for an additional five interviewees.

4.3.3. Challenges with Technological Devices

Though the opinions that the interviewed stakeholders had regarding technology were generally positive, they brought up some reservations about the use of technological tools and tablets in therapy. One difficulty that a number of stakeholders brought up on their own was the child's inability to delineate when it was time to work or time to play when using a tablet. Because students can use a tablet as an educational tool as well as entertainment, the child can sometimes have a tendency to be distracted by the idea of the fun and want to stray away from the educational and functional aspects of a specific tablet application. One parent described her difficulties with this distraction saying her child would leave the educational application and go to play on other apps. One therapist, Dave Speden, said that "If it's someone's toy as well, it's really hard to use it as a communication device at times." Six of our stakeholders, at least one from each group, said that this was a concern and created difficulties in therapy. A few strategies that parents and therapists adopted to address this issue were the use of different color cases on an iPad to distinguish learning time and playtime as well as guided access functions on a tablet that would lock the student into one specific app so that they could not navigate to their favorite app or game

Getting the funding needed for the more expensive technology tools is one of the major challenges that the autism community in New Zealand faces. Because the Ministry of Education reserves the Ongoing Resourcing Scheme (ORS) for children with high to very high needs, the interviewed parents said that it is very difficult to afford the more technologically advanced products. One parent, Jason Ryan, said "...it was actually very hard to get ORS, he's just below that threshold." He believed his son's therapy would progress better if the family had access to the more expensive therapy products. Three out of the seven parents brought up, without prompting, funding issues. This statistic suggests that autistic children could not get the adequate treatment that they needed to advance further because of this problem. The schools also have the issue of the government not providing them with enough financial support to modernize to technological tools for the autistic children. Diana Siew, another parent who supported the use of technology, said "The special needs education here, in New Zealand, is very cash strapped" and continued to say that funding problems prevented schools from becoming modernized. This funding issue was also

brought up by four out of the six therapists interviewed who were concerned that the tools that they recommended to the families to use with their autistic children were too difficult to come by because of the cost and lack of financial assistance. John Feeney, an occupational therapist, said, “In New Zealand, the education does provide some funding and technology to kids with really high needs, but there’s such a huge range of kids with autism on the spectrum that don’t get much help and that’s sort of just how it is really.” This lack of funding could impede the advancement of the child’s education and therapy in New Zealand depending on how the child reacts and responds to the types of technology used.

The stakeholders’ challenges with funding and being able to acquire the more expensive devices relates to another concern that we heard, namely, the reliability of technology devices. According to our stakeholders, technology can be unreliable because it often fails when it breaks or the battery dies. We also learned that when the tools do break, it takes an inconvenient amount of time to send it back and get it fixed, which interferes with the child’s developmental progress. For example, one therapist at Kimi Ora mentioned that when a child’s communication device had a piece break, the school had to send back the whole unit and the child was without a voice for a number of days. This was a particular concern for the four therapists interviewed at Kimi Ora special needs school because they primarily worked with children with physical disabilities minimal motor control. A number of parents were reluctant to use the tablet because of the general wear and tear that would be put on it given special needs children’s tendencies to be rough on playthings and toys. Additionally, another therapist stated that “the technology becomes a very expensive paperweight... because people are too scared to use it and bring it because it’s so expensive.”

A major theme that our stakeholders brought up as a concern was the need for individuality and customization of whatever methods they used to help the autistic children. At least one person from each stakeholder group, a total of eight, went out of their way at various points throughout the interviews to express their concern about ensuring that therapy met the child’s specific needs. Since autism is a spectrum and the children can have many levels of needs and skills, each method needs to have certain characteristics that address the specific needs. One assistive technology specialist, Coll O’Connor, said, “I have to state really clearly that it depends on the student's diagnosis and student’s needs, you individualize what [the student’s] need is.” These stakeholders were concerned that technology methods were too generalized and consequently, they would not

be effective enough for the children. Additionally, there was concern about the large number of applications available for the treatment of autism and the lack of specificity and customizable features. The stakeholders seemed to recognize that there were many applications for autism available on the market and therefore it was difficult to find exactly what they wanted.

4.4. Suggested Improvements for Technology

In order to address our project's third objective, our team asked the interviewees about the technological devices and applications they had used in therapy and what improvements they would like to see in these products. The first trend that came from three interviewee responses was the need for a more culturally appropriate approach to the design of the applications. Given that New Zealand is a small country, we discovered that applications and teaching tools with built-in voices were not specific to the country and therefore these digital voices spoke with an American or British accent. Regarding this problem, one therapist said: "We're basically the size of a city... there's never been a New Zealand based accent or digitized speech... we borrow off Australia or we borrow off America or off England. So that speech or the speech quality is really important as well." Additionally, these learning tools borrow more than just accents from other countries and often have foreign phrases and idioms dispersed throughout the program.

This situation is an area of concern because of the autistic child's ability to mimic these tools. As the child progresses through the program and continues to experience these other cultural influences, he/she often picks up on the subtleties of the language used in the applications. One parent described her child as her "little British boy" although he had lived in New Zealand his entire life. He developed the accent from the technology that was helping him to learn to communicate. This interviewee also mentioned a friend whose autistic child had acquired an American accent while also incorporating American phrases into her speech because of the learning software. One of the main concerns behind this cultural difference is how much more the child would stand out from his/her peers. Only a small percentage of our stakeholders mentioned this concern: one out of the seven interviewed parents and two out of six therapists. However, this opinion seemed important because it was a unique unprompted theme that a few interviewees mentioned passionately.

Another improvement that the stakeholders suggested was increasing the functionality and extent of the vocabulary present in assistive communication devices. Coll O'Connor, an assistive

technology specialist, said, “Technology for the special needs person makes life accessible.” The interviewees who expressed this opinion believed that the special needs person should have the opportunity to communicate in a way that exceeds just functional interaction and requests. For example, assistive technology specialist Fern Jones said, “We try really hard to work on a range of language function and move ASD kids away from a totally request-based system.” Five out of the six therapists and two of the three assistive technology specialists we interviewed expressed concern over the limitations placed on children who had to use these communication devices because the range of words and language provided to the learner is entirely controlled by the parent or therapist. Therefore, the child was able to communicate his/her needs but could not really personalize or participate in any unstructured conversation setting. Because any other developing child would have the opportunity to hear, learn, and choose which words to speak, the autistic child should have the same chance to access a larger range of vocabulary. Instead of limiting the child by removing some categories of words, the stakeholders said that it would be more useful to just teach the child when it was or was not appropriate to use certain words or phrases. They believe that this freedom could contribute to the development of social skills by enabling the child to have more opportunities to interact on a more personal level. As one therapist said, “the technology supports the communication then we set up the environment to develop the social skills” showing these results demonstrated that the technology can only serve one role and it is the responsibility of the surrounding influences to develop social skills.

Another trend that we identified from the suggested improvements was that application designs need improvement on the product’s ease-of-use. Four of the therapists we spoke to mentioned that the communication devices they worked with were often too complex to be effective with the children. One of these interviewees, Dave Speden, stated “It was just too complicated the way it worked...the symbols don’t match to what you naturally think of.” This therapist was referring to the symbols and pictures that would represent words on Proloquo2Go, and AAC device. This therapist mentioned further that with software updates or changes to the program, there would be a new and different set of symbols than before. This change could present difficulties because the child would then have to relearn an entirely new set of symbols and images. Because consistency and repetition are key in an autistic child’s learning process, these interface changes can affect the student’s progress and cause setbacks. Additionally, for effective use of technology, the stakeholders mentioned that the interface should be easy to understand and

navigate from both the student's and caregiver's point of view. This is a main reason for Kimi Ora primarily using low tech methods that are more simple and straightforward. Because the overseeing adult plays such a vital role in ensuring that these applications are effective, 31% of the 19 stakeholders specifically stressed the need for adequate instructions and tutorials. One teacher, Irene Pow, said, "If you're going to present something, you probably need to actually come with the tutorial, with how to actually use it." This ease-of-use aspect was not brought up by the majority of our interviewees but still appeared to be a significant issue for those who expressed interest in fixing this problem.

A final improvement that these stakeholders wanted to see was an increase in research, data, and results to back up the claims that the companies make involving the successes of their products. All three of our teacher interviewees and one out of the six therapist interviewees mentioned this idea. This distribution appears to be logical because these stakeholder groups are often the ones who are deciding what tools would be best to use with the autistic children. In most interviews, we additionally asked the stakeholders what swayed their decisions when determining the devices to purchase if they had experience in doing so. These groups were interested in ensuring that the product had merit before attempting to use it in the therapy or school setting and one SENCO, Nerilee Shipman, said about a therapy application, "It needs to have some sort of research background so that you can see that there are results....It's no good just to trial something without having any sort of known benefit to the students."

4.5. Additional Results

Along with our results regarding our objectives, we collected some information that was beyond what we anticipated from the goal of our questions. Additionally because of the unstructured nature of the interviews, we had the flexibility to gather the extra information we did not anticipate.

4.5.1. Teacher Training

We observed a trend from the comments of parents and therapists identifying the teachers' limited training that results in an insufficient way of treating children with autism in public schools. More specifically, two out of seven parents and one therapist out of three made this observation without any question prompt.

A parent of an ASD child commented about her child's school, "A lot of the teachers didn't really know what to do with him so they just left him..." In addition, Clodagh Counihan, a speech-language therapist, said "A lot of our work is around training parents and teachers around where we can build those opportunities into their day and how to, first of all, complete whatever the goal is and then phase out the prompt so they become more and more independent." These comments lead us to infer that there is a problem regarding the training of teachers who deal with autistic children.

4.6. Project Challenges

Our team faced a number of group challenges that had a strong impact on our results. The biggest challenge we faced was communication. We had a remote sponsor based in Christchurch while we were housed in Wellington and the only way to get there was by plane. Because all forms of communication were electronic (Skype and email), there was a lot of room for misunderstanding. It was difficult to keep both sponsors and team members on the same page. As a result our project goals shifted a number of times which made it difficult to plan our methods prior to data collection. As mentioned earlier, we used unstructured interviews because we did not understand the backgrounds of all the interviewees and could not predict the conversation sufficiently. This made data analysis difficult because we did not get to ask every stakeholder every question and not all of them were necessarily given the opportunity to express their opinion on a topic. This meant that we had to be careful in stating that a certain number of people did not mention something because they may have not been given the opportunity. Similarly, since we did not always collect the data in the same manner with regards to the same wording and context of the questions, it was difficult to compare what each stakeholder said regarding a topic of question.

Another flaw in our methods was that through the initial contacts we had difficulty getting in contact with therapists in this field. Therefore, we had to reach out to other resources and we

did interview four therapists but they were from the same institution (Kimi Ora). Additionally, we had some stakeholders who did not have much experience directly with autism including these four therapists from Kimi Ora, one parent, and one teacher. Some of their remarks are not necessarily specifically for children with autism and are not representative of the entire population.

4.7. Summary of Results

Over the course of our stakeholder interviews and data collection process, the team was able to get the information necessary to fulfill all three of our objectives. Through these interviews, we saw that our stakeholders believe that communication is the most important social skill to develop. However, because each child is unique, it was hard for the stakeholders to identify the best method used for the development of social skills. More than half of them have had experience using a tablet primarily as a tool for developing communication. Additionally, we compiled a list of currently existing tablet applications to give to our sponsor further insight in regards to the products that are popular and what sort of features they have. These are listed in Appendix H. Many of the stakeholders, specifically therapists, expressed the opinion that the ultimate goal of communication devices is to develop conversation skills. Although, technology is quite widely used and supported in autism therapy, a number of interviewees were quite passionate about making sure that there were limitations put on the devices. These limitations include ensuring that the application requires another person to ensure that it does not lead to antisocial tendencies. Additionally, there were other concerns regarding the cultural specificity of the tool, difficulties in acquiring funding for the expensive devices, and the need for an accurate system for finding the most appropriate applications for a particular student or child. This information from our sample community has aided us in developing recommendations and conclusions about new technological devices to develop social skills for children with autism for our sponsor.

CHAPTER 5: Recommendations and Conclusion

Based on our stakeholder interviews and data analysis of the information that we received, our team compiled a list of recommendations for Callaghan Innovation for a new product that would fit the needs of this sample population. We provided data based recommendations that were strictly from popular trends in our data as well as opinion based recommendations that were based on our group assessment of comments made by interviewees and our background knowledge on the subject. This chapter suggests future work that should be done to evaluate the success of a product followed by a project conclusion.

5.1. Data Based Recommendations

The data and opinions that we collected from major trends in our interviews led us to a number of recommendations for a potential product in the autism therapy area.

Communication Tool: The first recommendation that our group has for a new product in this field is that the product should work to target the development of communication skills. Based on our collected data, our interviewed stakeholders considered verbal communication as the most important social skill to address in therapy. Therefore, we believe this demonstrates that this area of focus would present the biggest opportunity for success.

Tablet Application: Another recommendation that we have for this product is regarding the platform for the application itself. Since the majority of the stakeholders who were interviewed had at least some experience working with tablets, specifically iPads, in either an educational or recreational setting, it seems that this would be the best device for the application. Additionally, many of the families owned tablets for themselves, so a software with compatibility on these devices would require no additional hardware to be purchased. Using a device that the community is familiar with would allow for easier access and additional comfort to the application.

Collaborative: Another theme that was commonly mentioned by our stakeholder interviews was the need for the technological tool to be used in collaboration with another person in order to maintain the human interaction aspect that is lost through the use of technology. Because the device is a tool and not a replacement for a teacher or therapist, it should be employed with appropriate supervision and human interaction. Therefore, this potential application should

utilize this idea and require two person participation so the use of the application encourages verbal communication outside the application.

Customizable/Culturally Aware: Our final recommendation for this potential product is to ensure that the application is fully customizable and specific to the country of use. Because autism is a spectrum and there is a large range of needs and disabilities, our stakeholders stressed how vitally important it was for methods and products to be individualized to meet those needs that were specific to the student. Additionally, many applications are not specific to the New Zealand language and culture, which was another complaint from our interviewees that should be addressed in this application. However, this is most likely not a concern in larger countries.

5.2. Opinion Based Recommendations

In addition to our entirely data based recommendations, the team developed a number of recommendations based on both background knowledge acquired through previous research and general feelings gleaned from our consumer interviews. These recommendations are not necessarily in response to questions asked in the interviews but more often themes that were brought up casually in the flow of the conversation.

Picture-Based Program: In both literature and conversation, we often heard that most autistic students greatly benefited from visual learning and often succeeded much more while utilizing this technique. Additionally, a number of the more successful applications on the market already employ visual cues in their programs. Consequently, our group conjectures that it would benefit an application to be highly picture-based in order to apply this type of learning style. This type of layout could help the child progress through the lower levels of communication in order to eventually communicate at a higher and more personal level.

Repetition/Consistency: Another common theme that we noticed throughout our project was the prevalence of repetition and consistency in the methods used to address problems with autistic children. Because often these children desire routine, repetition is necessary to ensure that the children fully comprehend the lessons and ideas. Additionally, given that consistency is important in the learning environment, repetitiveness assists the student in becoming accustomed to the program, what it does, and how to use the tool. We believe that repetitive features in an application could greatly improve the overall effectiveness of the tool.

Ease-of-Use: Information from the interviewed stakeholders and some research into currently existing applications highlighted that many existing programs are overly complicated and difficult for both the caregiver and child to use effectively. A tutorial or in-depth instructions about how the application operates would be a beneficial addition to the product. This type of direction could assist the caregiver in ensuring that the child uses the application in the most effective manner. Additionally, as mentioned in the previous section, the teacher or therapist should be able to individualize the program for the child. For the ease of the caregiver, it would be helpful for the customization to be simple and straightforward to complete.

5.3. Future Work

There remains much more research to be done to understand completely the needs of the ASD community in New Zealand. Through this project, our team studied the needs of a small group of potential end users. Given our difficulty in acquiring interviews for this project, our sample size was not very representative of the general ASD community in New Zealand. The majority of the interviewed therapists were from Kimi Ora School which could have introduced bias into the responses. Moreover, a significant percentage of the interviewed parents had children over the age of 17, which probably skewed parts of our data. Therefore, to generalize this information on the community, there needs to be more research gathered that is more representative of this population. This project, however, provided a good basis for future work. With a better understanding of this information, Callaghan Innovation can design a new tool that fits these needs. The next steps include testing the product, receiving feedback on its use by the end users and then bringing it to the community.

In the future after their product is potentially released, it could also be helpful for Callaghan Innovation to have another WPI IQP team continue the work that our team has begun. Therefore, it would be helpful for Callaghan to receive feedback from early users of their product who have formed opinions about it. Another IQP could potentially involve contacting and interviewing stakeholders who have had the opportunity to use this product in order to form recommendations on product improvements.

After product development and trials, there is still work to be done to increase the chance that these products are marketable and successful once the company releases them. Though it is

outside the range of a WPI IQP, we believe the next step in ensuring the success of the product is to examine more closely the market and commercialization methods. A product can fill all the needs of the community and still not be successful if it cannot reach the consumers. From our interviews, we noticed a trend that implied that these end users found it difficult to find appropriate products on the market. Therefore, Callaghan Innovation should investigate potential approaches to inform the community about this application. For future products, it would be helpful for Callaghan Innovation to focus on this aspect of product development to gain confidence that their product is marketable while also filling stakeholder needs.

5.4. Conclusion

Autism Spectrum Disorder is a developmental disorder that especially affects the development of social skills. A multitude of therapies, devices, and products have attempted to address the difficulties that autistic individuals face associated with these problematic social skills. This project's goal was to assist Callaghan Innovation in identifying the New Zealand community's needs regarding these therapies as well as realizing the potential for a new technological product on the market. Through background research, stakeholder interviews with members of the autism community in New Zealand, and analysis of the results, our team provided Callaghan with information regarding this community and its needs in addition to recommendations on what characteristics would be useful for an improved product in this field. Our findings led us to recommend that a new product should be a tablet application focused on developing communication for individuals with autism. Additionally, this application should be highly customizable, culturally appropriate, and always used in collaboration with another person. Though not all needs can be met by one product, we hope that our research and findings will assist Callaghan Innovation in producing an effective product that will benefit the ASD community in New Zealand or even globally.

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Appendix A: Teacher/Therapist Interview

Introduction:

We are students from Worcester Polytechnic Institute, in Worcester MA in the USA participating in a project in collaboration with the research team of Marcus King from Callaghan Innovation. The project targets investigating the use of technology in the education and therapy of individuals with autism as well as determining the most important social skills to be improved. All the information gathered is for scientific cause only and all questions are entirely voluntary; any questions that make you uncomfortable feel free not to answer.

We would like to record this interview for evaluation and data collection purposes and would like to confirm that you are comfortable with being recorded. Our research and interviews are helping us write a final report: are you comfortable with being quoted (anonymously?) and/or referenced in our paper?

Demographics:

Name: _____ Date: _____ Interview Type: _____

Gender: _____ Role: _____

Experience/Qualifications: _____

Related disabilities: _____

Interview Questions:

1. What social skills do you put a particular focus on developing in your teaching?
(examples: conversation, recognizing social cues, attention, etc.)
[Why is that?-children weak, curriculum, easy]
[Any others?]

2. How do you develop or teach these social skills to children with ASD? What materials and tools do you use?

3. Are you satisfied with the method/tools that you use? Why? Rank to 10

4. Have you observed any improvement in your students' social skills in this area due to the use of this method?

5. Do your students enjoy these methods? Rank to 10

TECHNOLOGY:

1. Do you currently use or would you like to use any devices to assist you in the education process? (example: computer, tablet, phone for therapy purposes)

What devices do you use?

If tablet/touchscreen:

a. What model/device/size do you use?

b. In which environment, space, and setting do you use it?

2. What applications do you use?

a. How often do you use applications compared to other methods?

Multiple/Day	Daily	Twice/Week	Weekly	Monthly
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b. What do you like most about the application/tool as a software product?

c. What do you feel is the most useful quality or function of this application?

d. How does it help [whatever has been identified as the most important underdeveloped social skill in children]?

e. Are there any areas that could be improved or was there aspect that you were unhappy with in this application(s)?

[Ease of use of parent or child]

[Did this unhappiness affect how often it was used? Why?]

f. Is there any feature that you think is missing in this product?

[How do you think this could be resolved/fixed/incorporated?]

g. Why did you choose the application(s) you currently use over others?

NO TECHNOLOGY:

1. What methods do you use instead?

2. Why did you choose this method over others?

3. In the past, have you had any experience working with technology in therapy or in any other areas of focus? If so, what are your thoughts regarding this product?

Do you have any additional questions or comments in regard to this research project or field?

Closure:

Thank you _____, we appreciate all of your help.

Ask about additional references to contact to collect more data.

OUTLINE

- Important social skills
- Ways to improve them (tech - traditional)
- Recommenders-decision making process
- Current satisfaction
- Improvement on child
- Child satisfaction

IF TECHNOLOGY:

- Devices
 - If tablets: name & environment
- Applications

- Frequency
- Features
- How it works
- Feedback - recommendation on currently used products

NO TECHNOLOGY:

- Why not?
- What instead?

- Experience with technology

Appendix B: Interview Question Sheet for Parents

Introduction:

We are students from Worcester Polytechnic Institute, in Worcester MA in the USA participating in a project in collaboration with the research team of Marcus King from Callaghan Innovation. The project targets investigating the use of technology in the education and therapy of individuals with autism as well as determining the most important social skills to be improved. All the information gathered is for scientific cause only and all questions are entirely voluntary; any questions that make you uncomfortable feel free to let us know and we can skip that questions.

We would like to record this interview for evaluation and data collection purposes and would like to confirm that you are comfortable with being recorded. Our research and interviews are helping us write a final report: are you comfortable with being quoted (anonymously?) and/or referenced in our paper?

Demographics:

Name: _____ Date: _____ Interview Type: _____

Relationship to child: _____

Child disabilities: _____

Interview Questions:

1. What do you think is most important social skill to treat and/or address? (examples: conversation, recognizing social cues, attention, etc.)
[Why is that?]
[What social skills does your child have the most difficulty with?]
[Any others?]

2. How do you try to improve these social skills at home?
[What materials and tools do you use, if any?]
[If you have a therapist, do you use any method that was recommended to you?]
[If you have a therapist, is there a method you have continued to use in the home?]

3. Are you satisfied with the method/tools that you use? Why? Rank to 10

4. Have you observed any improvement in your child's social skills in this area due to the use of this method?

5. Does your child enjoy these methods? Rank to 10

TECHNOLOGY:

1. Do you currently use or would you like to use any devices to assist your child? (example: computer, tablet, phone for therapy purposes)

What devices do you use?

If tablet/touchscreen:

a. What model/device/size do you use?

b. In which environment, space, and setting do you use it?

2. What applications do you use?

a. How often do you use applications compared to other methods?

Multiple/Day	Daily	Twice/Week	Weekly	Monthly
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b. What do you like most about the application/tool as a software product?

c. What do you feel is the most useful quality or function of this application?

d. How does it help [whatever has been identified as the most important underdeveloped social skill in children]?

e. Are there any areas that could be improved or was there aspect that you were unhappy with in this application(s)?

[Ease of use of parent or child]

[Did this unhappiness affect how often it was used? Why?]

f. Is there any feature that you think is missing in this product?

[How do you think this could be resolved/fixed/incorporated?]

g. Why did you choose the application(s) you currently use over others?

NO TECHNOLOGY:

1. What methods do you use instead?

2. Why did you choose this method over others?

3. In the past, have you had any experience working with technology with your child or in any other areas of focus? If so, what are your thoughts regarding this product?

4. Would you like to (be willing to) try using technology to improve your child's social skills?

Closing Remarks

5. Do you have any additional questions or comments in regard to this research project or field?

6. Do you have any additional references or contacts that you think would be willing to participate in an interview?

Thank you, we appreciate all of your help.

OUTLINE

- Important social skills
- Ways to improve them (tech - traditional)
- Recommenders-decision making process
- Current satisfaction
- Improvement on child
- Child satisfaction

IF TECHNOLOGY:

- Devices
 - If tablets: name & environment
- Applications
- Frequency
- Features
- How it works
- Feedback - recommendation on currently used products

NO TECHNOLOGY:

- Why not?
- What instead?
- Experience with technology

Appendix C: Parent Interview Questions

- 1) What experience have you had with children with autism or special needs?
- 2) What do you think is the most important social skill to address in therapy for your child?
- 3) What methods do you use to try and improve those social skills at home?
 - a) Have you found these methods to be effective?
- 4) Does your child get external therapy from either a private therapist or school?
 - a) Are you aware of the methods they use for your child?
- 5) Have you used any technological devices or tablets that to help him with problem areas?
 - a) Has this been effective?
 - b) Has your child enjoyed using these?
 - c) Is there anything you would change in regards to the technology you use?

IF NO:
 - d) Would you be interested in using technology?
- 6) What would you look for in a product?
- 7) Do you have any comments or questions in general about technology used in autism therapy?

Appendix D: Teacher/SENCO Interview Questions

- 1) What experience have you had with children with autism or special needs?
- 2) What social skills have you seen and put a particular focus on helping develop in teaching with these children?
- 3) What methods do you use in your curriculum to develop and improve these skills?
 - a) Are you satisfied with the methods that you use?
 - b) Have these methods been effective?
 - c) Do your students enjoy participating in these activities?
- 4) So have you ever used any technological devices to help you with encouraging these social skills?
 - a) Are you satisfied with the methods that you use?
 - b) Have these methods been effective?
 - c) Do your students enjoy participating in these activities?
 - IF NO:
 - d) Would you be willing to try to use technology in the future?
- 5) Do you have any comments or concerns, just in general, about this field and how it could be improved for the future?

Appendix E: Therapist Interview Questions

- 1) What experience have you had working with autism or other special needs?
- 2) In your therapy do you have a particular social skill or number of social skills that you particularly try to focus on developing in these children?
- 3) What methods have you used to address and treat these problematic social skills?
 - a) What approach have you see that shows the most improvement in these skills?
- 4) Have you used any technological devices or methods to help them improve these skills in therapy?
- 5) Have you found these methods to be effective? Is there a noticeable difference between the use of low/non tech methods and high tech methods?
 - a) Do your children enjoy these methods?
- 6) In regards to technology in therapy, is there anything you would like to see improved?
- 7) How do you feel about technology being used in therapy for children with autism?

Appendix F: Assistive Technology Specialist Interview Questions

- 1) What kind of experience have you had with children with autism or special needs?
- 2) When you worked with the children did you have any particular social skill that you tried to help them improve with?
- 3) What kind of technological methods have you used to help them with these skills?
 - a) Have you seen improvement using this technology with the children you work with?
 - b) Do your students like interacting with this technology?
- 4) With the apps that you have used, have you seen anything really lacking in this technology? Is there anything that you'd want to see improved with them?
- 5) How do you decide what applications or technological tools you will recommend to others?
- 6) So do you have any comments just about technology in therapy as a whole?

Appendix G: Interview Transcripts

Bernie Wastney Interview Transcript

Description: Parent

Date: 2/2/2016

Interviewer: George Ardamerinos, Hope Shevchuk

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

G: Could you talk to us about your child's disabilities that have to do with social skills?

B: My son's social skills?

G: Yes.

B: My son's severely autistic. So socializing has always been one of his deficits. However, in saying that, we worked with ABA with him for many years. We've found ways around encouraging him to socialize on from that a very big family. They're probably the best asset that we have in supporting and socializing with him.

G: What do you think is the most important social skill to treat?

B: I actually think we need to work on the social skills of anyone who's working or surrounding kids with autism (laughing). However, that's not really possible. I think for a kid that lacks important social skills that they can learn, it's just having confidence knowing that everything's going to be ok. That they're, even if it's a little bit difficult, for them, whatever they're going through, that too will pass and everything's going to be fine. Does that make sense? Mainly because of the anxieties that they have from socializing and being around people.

H: So you had mentioned that you use ABA as one of the primary methods for improving the social skills. Could you explain a little bit more about some particular techniques that are used or games that are played, or anything like that specifically in ABA?

B: ABA didn't have a lot of, when we did it a while ago, the socializing aspect of it or the play aspect of it. But because we come from a very big family, for my son, it was just going-just encouraging him to be part of whatever we were doing. He's lucky he had a very supportive family that accepted whatever level he could participate in. With ABA, a lot of the principles that we used for all of life things. It was just telling him, very clearly, what we were going to do, for example, if we were to be going out somewhere, we would often prepare with a social story. We would have a photographic book to let him know where we were going and when that's going to be finished. Or we would know that it was going to be there and then all the way through the process, after we had done all the precreation, he just got some encouragement that he was doing well, and he's fine and when he felt comfortable, he was much more able to socialize.

H: So it seemed like you did a lot of things outside school or specific therapy within your family and on your own. Did you use any external services? Did he go to a public school or private school?

D: Yes he did. We did the therapy that was six hours a day. We also had lots of family gatherings and lots of family that visited. So that became part of his life. He did go to kindergarten but he had a teacher aid with him. Often, he went to Montessori, so things that they did at Montessori matched the things that we were doing at home, the ABA program. He did go to a public school where he had teacher aide support again. A lot of what we did there was-we were very lucky that the school worked closely with us as a family and they would-I actually went around to the school first of all to make sure that they were going to be open to Michael's way of learning. We had five schools in our area that we had visited and I chose the one that I thought would be the most supportive for Michael and how he learned.

H: So you said that they were very supported and connected with you. So did that mean you were aware of any of their specific treatments and methods that they used?

B: We don't have specific treatments in New Zealand (laughing). He was supported by the special needs unit here. So he did have the teacher aide, but they initially just tried to adapt the curriculum that they had. They purchased programs that were going to support him that we had talked about. I went to a lot of conferences and came back and said "I'd like the clicker program to be used with him," and they did try to mainstream him because we have inclusion that's pushed a lot in New Zealand and so he did meet up with the kids, or P.E. with the kids or art. The special needs unit is where they did the specialized learning with the trying to teach him to read and things like that.

H: So these programs that you said you purchased, are these technological programs?

B: Yes they were.

H: So you mentioned a clicker program... would you be able to describe what that is?

B: The clicker program was-we bought one of the first ones that came out before the iPad or had computers but we were lucky that we had had one and supported the school in getting-we actually helped to buy the program for them to use. He was able to participate and create stories so if they had been somewhere that we came up with options that he could click-it's called clicker-he would click and make the story using the clicker with the help of the teacher aide.

H: Have you found that he tends to like this program for the most part?

B: He did respond to it. When the next program came out, they bought the next updated versions so I think that the time he was in school there we got the clickers fixed. So it was successful for him.

H: Did you actually have any experience using this program or did he only use it in school?

B: No we had-I trialed it here. I purchased it and trialed it and we took it into school. When I would send notes to that school I would say "I would do it so it would be easy to use and the clicker program." So I was familiar with the program so that after the weekend, i could say the cousins came over and he had a haircut or something like that so that-yeah we did write a lot of our stories from home where he'd use the information that we gave because he's non verbal to use in the program.

H: From your perspective, is there anything that this program is lacking? Is there something else you'd like to see in it?

B: I think the program at the time, that particular program, was just ideal for what we wanted. It was very simple. And at my son's level, it was ideal. The other things that he used to communicate with which became part of his socializing I guess because the kids in his class would use it was the McCore. It was called the McCore the talker. And then he upgraded then to, I think it's called TalkPlus, which is a board that has a whole lot of different options on it so that he can communicate through the board. He would press like three or four and would say "let's go", "I'm hungry", "go room five, go now." He would press this and then the voices would come out. Sometimes it was his voice, if he was in a good space we could record him saying it and sometimes it would be me saying it "go home now" or "let's find mum." They had my voices down there, and it was to do anything social, usually his peers from his class would write "let's go outside" or "time for music" or something like that so that it would give them some variety. That was used a lot. The two communication boards were very good, he still uses it now.

H: What would you say were one of the most useful features? Is it the ability to record voices, it seemed like you showed a lot of interest in that.

B: I think it tied in with what we were doing because he was very autistic, he-we communicated a lot with pictures-I think because it had a voice in there, sometimes it could be his voice and his level of language was varied it depending on he also had inaudible so sometimes he was in a good space and sometimes he wasn't. But the pictures, regardless of where he was and how he varied, were always the same. He was often always able to relate to the pictures whereas people and what we say and what we do changes all the time. I think it was most successful because of that. I think it added in a social part of it where other kids could say "ah please can I do whatever?" if we had a new picture. So for them they felt like they were a part of Michael's program and part of Michael's circle.

H: You talked about the boards that were used to communicate, were those pretty much used all the time?

B: Yes they were. We always had games but we also had a business card holder. I saw on one of the programs that had Bruce Willis in it and an autistic boy, can't quite remember what it was... but anyway, I saw that the boy had two cards that were attached to his belt and he pulled that up and it had the-I think it was a photo of mum and a photo of someone else. And so I used that idea and made up a similar thing with all of the pictures he'd need because the board was on loan to us by one of the government departments that was quite expensive and we used to take it from home to school, but it's not something that you could just carry around the school. And it would get lost and stuff. So I made up this picture card book which he used instead of the board when it

wasn't available. But he could be out in the field, and even if he wanted to go back to the classroom, he could find the picture he wanted. Or if he was having a meltdown and we didn't know why we would say "show me" and he would flip through the picture that he wanted and use that picture. The boards are a lot smaller now but at the time that's what we used.

H: I'm sure it was very helpful for it to be specialized for what he needs.

B: *Inaudible*

B: Now they have a whole lot of apps that are autistic friendly, which are amazing on the iPads and the computers. He has never had very good fine motor skills so he would find it hard to use a mouse. That's why the teacher aide would hold his hand directed toward where he wanted to click. Being able to touch now is so much better. But unfortunately, even though he has an iPad that he uses for school, we have a touch screen computer that we bought for school and we have the same one at home. Because his favorite thing is Barney the Dinosaur it's hard to actually get him to use it for anything other than that now. But he has an iPad that he uses but he thinks the iPad is only for Barney the Dinosaur. To get him to do any other work on it, cause we've got some great programs, is hard. If I think he's in a very good space, like he doesn't sleep very well so we have to be awake in the middle of the night, and I think he's just starting to turn and get tired, I might pull up some of the things and then we can do some of the apps that are on there. There are some great apps. *Inaudible*. So the apps are very good but not necessarily as a constant educational tool. Why would you want to work when you can watch Barney the Dinosaur?

H: Can you mention a few of the apps you may have that you feel would stand out as being exceptional?

B: There's one that he likes that is purely for social stuff and it's the Wiggles. The Wiggles have an app-they're a singing group, a kids group...

H: Yeah I know the Wiggles (laughing)

B: When he was younger, we took him to see the Wiggles at the theatre in town and he wasn't interested in them as people because they were not the Wiggles that he only-I think he still finds it hard to differentiate between 2D and 3D. So he was more interested in the curtain. But they have an app that's out and you bring it up and it's "Sign with Me" or "Sing Now" or something like that and if you press it, there's an option of different songs, and he has three favorite ones, and it comes up with a big mirror with his face in the middle and they sing in the background and he can sing with it. It teaches a lot of this concept and learning in there as we just get through the space that we want and press record. And he likes watching himself again and again and again singing with the Wiggles. That's one of his favorite ones. Any of the other ones-I can't think off the top of my head-I think are just ABCTeach I think is an American based application or resource place that I was part of; they would have different apps or different templates that you could use for teaching. So then there were some basic puzzles, like there's pieces and you have to join them all together, so anything with puzzles or matching. I can't think of one that was a favorite. He's intelligent but low functioning if that makes any sense.

H: When you can get him to use some of these programs, do you see that they are effective or do they just seem to be presenting information that he's just not retaining?

B: I think whichever way we present it it would be hard for him to retain just because of the kind of activity that's going on. He might take two months of taking in lots information and then he could have two months of not recognizing and not being able to do anything. I think for him, to be brutally honest I think anything that we present to him is just a means to learn, just like (dramatic sigh) ok here we go. And then it's like OK I'll do that and then I'll get to watch Barney. I think when you chip it down his favorite form of communicating or anything is still with the old pictures that we use. The old choice board. THAT's what he tends to go back to. If he's in a good space he loves-the beauty of having the internet available and youtube, he now watches Barney in Spanish, Russian, Greek. So he finds a way around and he finds a way to entertain himself. But as far as us getting to a stage where keep teaching him, I think we've plateaued.

H: I think that was all we pretty much had on our end to touch upon. Do you have any more comments or even questions about this field or our project?

B: I think the internet, just as it is at the moment is-there's so much information available and that's fantastic. Parents now, opposed to when my son was younger, inaudible and now the accessibility to technology is just incredible now and most of it's free! When my son was younger, we paid for a lot of his stuff. I think that everyone's spoiled now.

H: There are a lot of resources out there.

B: Yes, a huge amount.

H: How old is your son now?

B: My son is now 19. However, I guess he's still at the preschool level when you're looking at the teaching resources. We don't get anything. If we are looking where he fits developmentally or intellectually, many of the resources that we buy are preschool resources.

Closing remarks and call ended.

Brynlea Stone Interview Notes

Description: Speech Language Therapist

Date: 10/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

- sharing space
- aware of world outside of immediate environment
- they can have control and impact other people
- depends on what families want
 - peer-peer social skills, lots of time with adults
- intensive intrusion
- Core Board-reproducible, wide variety, disposable
 - specific set of frequent words/vocab
 - functions: requests (get stuck on) but more function than requesting
 - point to picture-sentence structure subject, verb, adverb
 - language would be arranged differently for different languages (sentence structure)
 - gives chance to comment-really important, useful for bonding
 - P.O.D.-Pragmatic Overlap Device
 - Lot of vocab used in same context
 - eyes in the hole- use eye gaze for option, turn page in levels that you would talk about at once
 - switch scanning-activate cell and push switch at right one
- high tech-some prefer physical-can lead to iPads
 - looks cool to use iPad
 - easy to use and get and download a ton of apps
 - “technology can breakdown”
 - “keep something low tech going as you are looking at high tech”
- step by step-recording messages
 - more than one message
 - simple turn taking
 - even if they don’t process, they are getting two way conversation
- interaction-jokes with the button
- technology?
 - programs record on to button and it speaks
 - communication-she wanted to quit off it and play
- Accent
 - touch screen computer
 - based on language structure
 - good because specific language words turn up and pages come up and changes to proper grammar
 - previously recorded words, no grammar structure
 - good to have language put together matching normal speech “really cool”
 - his form of communication

- some hand gestures
- only one using it?
 - cognitively able-others aren't
 - voice output is useful for him
 - keep pressing for auditory stimulation (for those that don't actually know to use it)
 - "funding is really challenging" big process
 - levels of professionals
 - 12000\$ accent
 - "ministry more likely to use high tech"
- Dynavox
 - not enough to say and opens sup
 - vocab-imaginative, novel thought
 - limited range of movement making it difficult
 - specific communication system open programmed sheets with layers or communication
 - smaller, too small, only 12 buttons
 - scene based
 - Touch Chat
 - Talk Link talks to them about getting tech
 - 3 years here
 - didn't learn about it at all (what programs should be used-no research)
- work best?
 - spending time with people
 - modeling and show
 - everyone has to use them around them
 - takes a while to introduce it
 - showing different ways
 - challenging and complicated to use all different things
- feel about tech
 - good-"i hate it when it breaks"
 - "amazing when they can find a voice"
 - forget to help them with word needs when they reach a certain age

Claire-Ellen Roberts Transcript

Description: Speech Language Therapist

Date: 11/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: What experience have you had working with autism or other special needs?

C: Well I'm a speech language therapist. I've worked in this area for the last—I've worked at this school, Kimi Ora, which is a special needs school, for the last three and a half years, and before that for another year I worked with other children with special needs at a hospital for at least four and a half years and before that I did various volunteer-y type things.

J: Okay awesome. So for this project we're kind of putting a focus on social skills so during your time as a therapist have you come across any particular social skills that you always—generally put a focus on in your therapy?

C: Yeah so with—as a speech therapist I do lots of work on social communication so those skills are, I guess, talking to another person, looking—you have to look at the person, you have to gain their attention, you have to actually listen to their answer so you can't ask them a question and then run away [laughter]. And also social skills around just making sure that you're not talking to strangers and things and the safety aspect of it. Social skills and communication around going out into the community, so when you go to a café, what's actually appropriate and not appropriate. How do you get food when you go to a café? All the steps that are involved and then there's going to the supermarket, going to the pool, all those other places. I guess that's probably the ones that I focus on most.

J: Okay do you have one of those that's your biggest focus?

C: For kids with autism or those types of tendencies, probably my biggest focus is talking to someone not at them and making sure that when you're talking to them, you're listening and waiting for their response. So I find that that's something that they definitely struggle with.

J: So for that problematic skill, what kind of methods do you use to try to help them be better at it?

C: So for that, we focus on, I guess—I watch—we do a lot of video modelling and things so it might be from someone else so there's quite a few YouTube clips and YouTube cartoon characters or regular characters that talk about talking to each other and talking to people and having to wait and things like that. And also go through questions and what are questions and reading books, there are certain books that focus on that social skill as well that have—that explain a person who doesn't always listen and then maybe something that happens to them and how they feel and how they don't like it so we do a lot of that and then lots and lots of practice. In lots of different situations with lots of different people. Yeah so making sure that we practice practice practice since that tends to be somewhat difficult.

J: So we're also looking into a little bit on the technology side of it so have you used anything technological like on a tablet or an iPad or anything like that to help them with those skills?

C: I mean other than watching things on YouTube, I haven't used a tablet really for that skill specifically. Unless of course the child is using a piece of technology to talk, in the first place, so then we'd be using their piece of technology to do those things. But other than that probably not.

J: What kind of tools have you come across that children will use to communicate, through the technology?

C: So there's quite a wide range, iPads are quite common at the moment and you can get various apps for iPad that you can load vocab onto and pictures that they can talk through so I have used a lot of that. There's this thing called a springboard and that, I've seen that being used a lot and worked with that. Gotalks are slightly more low-tech but they're still a piece of technology. What else have I seen? Advantage, which is quite an old system, but I have used that before.

J: With the springboard thing that you were talking about, we've never actually come across that one can you tell us a little bit about it, just what it is?

C: I think it's a slightly older piece of technology but the basic idea behind it is it's an old style computer probably slightly bigger than—probably about the same size as an iPad but slightly thicker than an iPad, computerized. And it works in the same way so you'd have a set of pictures or words and you would push the ones that you wanted and it can flip through pages much like what the app ones can do, yeah but it's just on a different system. And it's specialized just for communication so it can connect to things like the television or the computer and act as a remote for various bits and pieces.

J: Have you personally been involved with using those sorts of tools?

C: Yup.

J: Okay when you've been involved with using them have you seen them be effective in helping the children communicate better and more?

C: Yes, yeah I have.

J: Okay for the most part do you think that they enjoy using them and like the freedom that they give?

C: I think—it definitely depends on the child, some kids just really don't like technology and if it talks back to you it just turns them off completely. There are some children who do that or some kids who—the technology is just too much and they can't think of communicating they just use it as a mode to stim on which is—stimming is fine but that's not so good when you want them to communicate so there is that. But then I have seen when a child has used it and really enjoyed it

and loved that it can be their voice for them, basically used it all the time to talk, make sentences. It varies on the situation. So yeah it has been quite good.

J: Okay so given your experience how do you feel just about technology in therapy in general? Good, bad, indifferent?

C: I think it definitely has its place so it is good. But there are obviously some situations in which it gets a bit overused, I think, when it shouldn't be. So there are some bad parts to it too. But if it's used correctly it's really good.

J: Okay what do you see that could be improved with the technologies that you've seen or is there anything like really missing from it?

C: I think it would be really good if there was some—because iPads are coming out and being used a lot now and they're being used a lot for communication and they can link to some things but not so much others. I think in the way of communication it's really handy to have a device that can do various different things so they can be used for communication but also if the child is able or the adult is able, that it can go on to be able to be connected to a computer so that they can type things and write stories into the computer or they could use it so it's adapted in a way—because they're obviously to use a touch screen so that it can work for like a remote for other pieces of technology in the home as well and that ability to link to things, which I could be wrong but I have yet to see that work so well at the moment. So yeah.

J: Okay so you mentioned that technology has its place but it also has some not so good aspects. What do you consider the bad outcomes of technology?

C: I think sometimes people jump on the bandwagon of, you know, "this thing is awesome" and they use it with everybody and I think that that's not a good approach to go with because obviously every child or every person is completely different so what they can use or react with or what works for them is different because everyone obviously doesn't relate to it in the same way so that can be hard with someone who's like "oh this thing is awesome!" and they try to use it with a child who has different abilities or different things that they like or dislike so actually it doesn't work for them at all and so I have seen that happen. Where a whole lot of kids have got the same thing but for most of them it doesn't actually work for them so that's probably what I think is the bad, I think.

J: So when you're deciding what products or tools to use with a child, how do you go about deciding what's best for them? Or do you have any resource to help you do that?

C: Yeah so I'll more think of rather what this technology can—like this is the piece of technology that I have how can I use it with this child, I more think of the child first and more think "what are all the things that this child can do, what are all the things that I want this child to be able to do, what are all the different technologies that can help me to get the child to do that, and then maybe trial a few and see which one's they take to and then, whichever one they kind of take to the most I'd go with that, so yeah instead of just grabbing the piece of technology first.

J: In general, do you prefer either low-tech or high-tech or do you try to use both?

C: I try to use both just because even if you have a high-tech system and that's what you prefer, they die, they run out of battery, and they don't work so well. And as everyone has experienced a computer or a printer for some reason or another be not working at this time and that's not really practical when you're using it for communication so you need to have a backup. I tend to use both even if they do have a more high-tech, I tend to try and make sure that there's a backup.

Closing remarks and call ended.

Coll O'Connor Interview Transcript

Description: Assistive Technology Advisor

Date: 10/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: What kind of experience have you had with children with autism or just the special needs community in general?

C: Okay I've had about 15 years' experience working with high needs children, predominantly with students with Autism Spectrum Disorders, from high functioning to severe. I first started working as a teacher aide: one-on-one support for our ORS students, which is Ministry of Education high needs funding with the Ongoing Resourcing Scheme and I have a qualification in autism and severe communication disorders from Canterbury University, Christchurch, as well I have a degree in education major in education psychology.

J: With what you do now do you work with children, I know you're in the assistive technology department..?

C: Yeah well what happens now is that about a year ago I started working with the Ministry of Education as the Assistive Technology Advisor but before that I was school based still working one on one with students with autism and involved in a lot of intensive almost applied behavior techniques—multi-disciplinary techniques and technology was just one tool that I used.

J: So we're kind of focusing this project on social skills and on what social skills people focus on in the therapy for the autistic children, when you worked with the children did you have any particular social skill that you tried to help them be better with?

C: I think what's important is to realize that each student is individual and each has a sort of spectrum of social skills so some might have none at all [laughter] and that might be because they have some communication deficits as well. They might be self-electing mutes, they might not have any speech capability, in which case your communication skills have to be taught like sign language or picture exchange systems, those sorts of things. For maybe high-functioning autistics it might be just the case of reading facial expressions, in which case we can use low tech which is mirrors and we can do person to person mirroring/modeling, we can use video modeling, we can use face to face on iPad, there's a myriad of ways to teach social skills, facial expressions, reading nuance, picking up on things like idioms, you know when people say like "my foot's killing me" and I'm kind of off-setting that autistic literalness where they're looking for your foot with a gun, you know, that sort of thing [laughter]. And also participating with their peers, we have a strong bend in Ministry of Education New Zealand for inclusionary practice which means that our children with autism need to be able to cooperate and enjoy their peers in an education setting. So we try as much as possible to make sure they can interact with their peers successfully and know how to deal with disappointment, you know, if somebody says "actually no I don't want to play with you today" that can be quite wounding to any child to be

excluded like that but particularly with autism it can be prevalent, they don't know how to handle it.

J: In addition to the methods that you mentioned that you use to teach these social skills, what kind of technological methods have you used to help them with that?

C: Okay so going back to technology, low-tech, we can do things like social stories. Now we can either just type them up on a desktop with some inserted photographs of the behavior that we want to see and make it into a customized little social story book for students to have at hand every time they might need some reinforcement with it. Common practice is actually that most students have a little box of stories, social stories you know, involving different sorts of scenarios like "I want to borrow somebody's pen, do I go and just take it? No I need to do this I need to ask. If I want my teacher's attention I put my hand up I wait. If I want to get into church and get my favorite seat I have to line up and this is how I line up." You know all those sorts of things, low-tech can be made on a desktop but also you can get an app on an iPad like Book Creator, Pictello, there's a whole rash of social story apps available through the iTunes store that you can customize and make for your student. You can have voice recording, you can video him sign language, you can put additional stories in from mum and dad, you can email mum and dad those social stories from school just so mum and dad have got the same copy and you're on the same page, all that sort of collaborative stuff. . Yeah there's loads of stuff you can do. It just depends on the needs of the student.

J: So using those iPad apps that you were talking about, have you seen them the students improve on the social skills that they're trying to focus on?

C: Yeah see the iPad's actually just a tool, you wouldn't just use it exclusively in part of your training or therapy. What you would do is plan first: what is the social skill deficit that you're trying to improve for the benefit of the student. Then you'd sort of plan out how that iPad would be useful, so maybe just reinforcing, and what I find most important about it is video modelling capabilities which means that you can do some cartoon drawing, you can do some social stories, you can actually model, you can, you know, have a hierarchy of reinforcers, like a star chart, to reinforce the behavior that you want and you can practice extinguishing the behaviors that you don't want. That's all part of the implementation plan and the iPad is just one component of it and you might just choose for a week that for five minutes you're going to do facetime, face-to-face, where the student puts the iPad up to record their face and they can talk to it and it can mimic their facial expressions and let them hear back, mirroring basically, what they just did. And then you can assist them by saying "well how do you think that went? What did that look like to you?" You know, so iPads are handy like that. But it's only just—I have to really really really really say clearly that technology has its place but it doesn't replace a teacher or explicit, implicit teaching. Okay?

J: So when you do use the technology, the iPads, that kind of thing, do your students like to use them or do they have other things that they prefer or does it depend on the student?

C: [laughter] Have you met a student with autism that didn't like technology?

J: Not really [laughter]

C: You'd be hard pressed to find one who just won't go near I would imagine and it would have to be for a severely sensory reason. Our kids with autism love technology. It's intuitive, it makes sense to them, it's got pathways, it's logical, it's all that lovely literal stuff and they can be kind of creative in their own techy little ways. So part of our use of technology needs to be monitored quite carefully, we actually need to put in some boundaries around technology with our students with autism because they can almost focus in a little bit too intensely on a particular piece of technology and you need to make sure that that's manageable otherwise your therapy, your implementation, you know, whatever it is that you're doing will probably fail if you don't have that in place. And there's—again it's ironic but you'll use technology to put the boundaries around technology. You'll put things in place like guided access, like a lock-out system on your iPad, when you only want to focus on one particular app you lock the student out of the rest of the functioning iPad until you finish doing what you need to do and you can use the iPad as reinforcers, like if we do our five minutes of face time and you think that it's great and you've been cooperative and whatnot then you can have five minutes of free time after which is pretty—it's like gold actually [laughter]. You can get them to do anything for a bit of free time on the iPad. But you have to be very careful, then again so you monitor that you actually load in a timer so when they finish their free time it goes back to the home page and they're locked out they can't just go and freeride through and create 1000 different files on trains or airplanes. They actually—you've managed it and that's really important to know, when you're using technology with these students it has to be managed and it has to be monitored.

J: With the apps that you have used, have you seen anything really lacking or is there anything that you'd want to improve with the ones that you've used?

C: Yeah oftentimes, you're dealing with a student that might have a smattering of needs in one section and needs a little bit of that in another and you wish you could actually just grab that bit from that app and this bit from that app-- other app and sort of combine it together to just make a customized successful app for that particular student but that never happens. Any app out there, particularly in the iTunes store is good for a student with autism because quite frankly, if you've got a maths deficit there's a maths app for them. You know, if they're developmentally delayed, they're six years old but they've got a developmental delay of three years then you've got an app there somewhere in the early childhood section that would be suitable for their maths so it's all about adaptation. Perhaps the student might not be able to do the classroom maths but it's maths time so that student should be doing maths as well but at their level so you make adaptations and materials and technology for them to participate in maths at that level, be achieving at their own rate, but also included in the classroom maths program.

J: So given the iTunes store and its size how do you decide which apps to use for the children?

C: [laughter] That's my job, Julia. Part of my job is to find out what's going on around the country, what the teacher's teaching, how they're teaching, and what sort of special needs students need what. So I actually do spend quite a bit of time scrolling through and finding really great apps and researching them and comparing them and I'll do that for iPad, I'll do that for Google, and I'll do that for Microsoft as well. And I'm sort of like the checkpoint or resource for technology coordinators around the country to ask me, "I've got a student that's got this, this,

and this, what would be a great reinforcing maths app at this particular stage, they have a short attention span, they stymie, they've only got like one finger that they prefer to use for everything, they throw pencils and pens across the room so can you suggest what can engage them? They have a high focus on ambulances can you find a maths program that has an ambulance in it?" Because it's engagement as well. You need to find all the tricks you can to engage the student if they have a strong focus. Actually I had a student with a strong focus on the Simpsons. So I used all the Simpsons characters to encourage writing; I got the student to draw the Simpsons characters so there were some fine motor skills going on, we collected Simpsons pictures, we drew cartoon bubbles to practice speech with the Simpsons, we put the Simpsons in a house and we make cups of tea and we make toast, you know what I mean? Life skills with the Simpsons. Just use the Simpsons to engage and learn and then bit by bit we fade out the Simpsons and actually got into some real stuff so those are just some of the techniques that you can use. Another one is Lego. And there are great Lego apps on the iPad to use.

J: So another one of the things that we've been hearing a lot about is communication devices, particularly AAC devices, are you familiar with that kind of situation? It's augmented and alternative communication devices.

C: Yes I am familiar with those. Again I have to state really clearly that it depends on the student's diagnosis and student's needs, you individualize what his need is. Oftentimes, in a school situation, augmented communication devices can be manipulated by others so you're not getting a true communication from the student so you have to be really really careful about that. Yeah I think it's best with children with severe autism it's best to keep to minimal speech and perhaps a picture exchange communication system which you can do on an iPad as well because it's portable and easy to use. But you can also use manual ones, you know, with the velcroed icons and those sorts of things. But be very very careful about adult communication expectations being foisted on the child, speaking for the child. Yeah it's an interpretive thing. You have to be really careful when you're practicing with that sort of stuff.

J: So do you have any comments just about technology in therapy as a whole? I know you said it's a use it when you need it kind of thing but do you have anything else about it, just in general?

C: I think when our students with special education needs have technology then they have access to their world. They have access to the curriculum, whereas before maybe a pen and a piece of paper was a barrier, so sometimes, you know, in life technology makes our lives easier but technology for the special needs person makes life accessible. So it's a tool, not a replacement for a teacher is about what I can say.

Closing remarks and call ended.

Dave Speden Interview Transcript

Description: Head occupational therapist at Kimi Ora Special Needs School

Date: 29/1/2016

Interviewer: Hope Shevchuk

Note Taker: Julia Smith

Recording/Quotes: Yes

Anonymous: No

H: So starting off what is your role at Kimi Ora?

D: I'm an occupational therapist

H: And could you elaborate more on what that entails in your experience, your day-to-day activities, and what disabilities you work with?

D: Oh yeah sure sorry. So we work in a transdisciplinary way-- I just want to say that my girlfriend is North American also and she finds that I mumble a lot so if you need me to put on a fake Southern accent let me know.

All: [laughter]

H: Alright sounds good so far.

D: Good. So we work in a transdisciplinary way here, which means that all the professions sort of blend a bit so that we-- you know if we're not here someone else can pick up the slack; so for example I do have some knowledge of *inaudible* practice, some knowledge of physiopractice, some knowledge of teaching... so the things that we do in a day here, mean even though I say my job here is to try and help the students we work with access as many core occupations as they can, whatever that is, that they choose and the student population here at Kimi Ora historically is a physical disabilities school so we've still got quite a few students with cerebral palsy for example, some with head injuries, most of our students have motor issues and then-but the New Zealand government, four years ago, well they had a bit of a change of policy and special schools are becoming more open registration which is cool and so we have a few more students coming in now with behavioral and autistic needs and less of the physical disabilities so my skill set is moving a bit from providing opportunities for students for non verbal to communicate, providing opportunities for students who have really severe motor needs to be able to independently engage in activities. A lot of our students operate on an expanded New Zealand curriculum, which means they're before level 1, and level 1 in New Zealand curriculum is being able to count to 10, and being able to do the alphabet, and however-whatever form that takes so a lot of our students are on, sort of what traditionally in a special needs education that's been called a sensory sort of curriculum but we're trying to get away from that term as well because everyone's a learner and it has a negative connotation put on it when you say that you're doing a sensory curriculum and sometimes students just get that constantly in that role rather than being *inaudible* that can move on to the New Zealand curriculum. So yeah a lot of my work has been around using assistive technology to do environmental control wheelchairs and such things, and I co-run the hydrotherapy program, done some hand therapy, work around splinting, and assisting teachers with behavioral programs and that sort of-- usually section with communication with

speech language therapists because a lot of behavior issues come from communication problems and not being heard. So that's sort of a loose outline of what I do.. can probably go more in depth if you want [laughter]

H: So one of the things we're looking at is more specifically, like the autism, communication, and social skills so that's kinda how we're gonna direct this conversation. So in your experience what have you found to be like the most important social skills for your students to develop?

D: So-- that's a bit-- not necessarily tricky like a lot of the social skills we work on are like functional communication to get you independent. So that can be through like using, for example, the picture exchange communication system where the students work up through sort of the initial bit of that is the picture exchange to get what you want. And then once that's mastered the people can do-- the learning to do sentence structure and things like that but a lot of our communication that way has been-for communication has been more function, getting what I want, ya know, and then behaviors stay low because they're not get frustrated that way and you can do more. As we move on from that to the more higher, higher level of it where you're working a lot on-- a lot of our students here that can communicate, prefer to communicate with the adult staff and so we're trying to foster friendships and peer interactions because there's things you can discuss with your peers that you shouldn't be discussing with us. For example, and so constantly trying to provide opportunities for that to happen. So we have a reporting group, for example, where peers work together to report on a new story from the week and what's been going on in their lives. we look at sports games coming up and get people to choose which teams they're going to go with to win so i guess, ya know, for a North American sport we'll probably be doing the Superbowl soon.

All: [laughter]

D: And just trying to get some common interest going between people. We do then try and take and generalize their skills out from in the classrooms to go out in the community and use-- some of our students use communication devices that are high tech, like Accent which is made by the people that used to make Passage(??? 7:41) I think they're called Prentke Romich(??? 7:46) anyway they-- that's our highest tech one down to BIG macks and Step by Step communicators which can playback a recording message or a sequence of messages and otherwise sign and gesture and vocalizations so-- yeah we try and put the skills we're mastering here out into the community. I think now the main social ones I guess we do generally looking at communication is all about the-- a lot of our parents request that their-one big goal for their students would be to be able to take them to a cafe and not have any meltdowns or issues so we do every lunch time, we call it communal dining, where everyone eats in the same room so it's quite a busy room so that the skills, you know, can be developed and the busy environment further so they're used to it so when they go to a cafe with their parents and sometimes students are-- struggle to master that skill in a busy environment so they're in a quiet room and as they master it they come into the busy room. So that's probably it. I only do-which again is just a social skill and that cleanliness and hygiene and that so we do a men's group and a girls group with like deodorant and perfume and toothbrushing and showering and things like that.

H: Oh wow. So we're taking a particular interest into those assistive technologies that you had previously mentioned. So we saw that... assist is that the name?

J: Accent

H: Accent I'm sorry.

D: Yup.

H: That was one of the tools you had used. Was that one of the picture technology applications?

D: Yeah it's on a tablet.

H: Okay

D: I should say that some of our students in the past have used apps like Touchchat and Proloquo2go. Yeah but-so the Accent is...yeah it's on a tablet but it's developed by Prentke Romich they used to do I think they've based around the language development and sentence structure and things like that are built in to it and sort of used as colorful semantics, I might be wrong with that but you know, and these pictures, are verbs and (??? 956) and things like that. But based around developing a practical language structure where as other ones like the DynaVox and that were based more around like a functional language and following like-- you know you'd have a picture of your bedroom and you'd have bed and options would come up for "that bed" and options for "make bed" would come up and things like that so... yeah.

H: So are these tablet applications, are they used outside your school as well? Like do these students rely on them throughout their life-kind of everyday life?

D: Yep... so in New Zealand, like our-the schools don't own the products or tool of life people assist for them, so there's an organization called Talk Link here who'd probably be interesting to talk to as well, but they assist for it and provide the student with their communication device tool of life. So when the person who uses the Accent leaves school, the Accent goes with them. If that's what they're using at that time.

H: Do you find that this is one of the more successful methods that you've used? Technology has been a recently building field, so to speak more traditional methods that can also touch upon these, but have you found that these tablets are more successful? Or easier?

D: That depends, I guess if it works for the student it's whatever works for the student; they're quite individual. But the boy who uses Accent also has a really reliable use of a notes *inaudible* that at times he prefers to use. So-but if you add in the public and people don't know that the movement opening his fingers mean yes, then I'd say like it's a good time to use that device. It's also a good time to use that device to have more complicated conversation. For him it depends how he's feeling at the time. His motivation for communication is probably a big thing. I'd say-yeah the tricky thing with using iPads for example, is that if that's someone's toy as well, it's

really hard to use it as a communication device at times. So we have to use the guided Access function to lock people into their communication device otherwise they'll close it and go to their favorite app. For-that's definitely not their favorite app for-watching movies, or their favorite app for, ya know, whatever.

H: That's definitely something to think about. Didn't really think about... but yeah that's typically used for the entertainment aspect and adding that functionality can be quite difficult I'm sure.

D: Yeah and if it's been introduced as some functions *inaudible* or arrive with an iPad that's their fun, yeah, and they try to use it as a communication device after that "woah that was a fun thing" and now it's a communication device. I have heard of a place that wasn't here that had different color covers, so when it was in the red cover it was for communication, when it was in the blue cover it was the play one.

H: So in your experience, is there something that you could see be improved in this kind of technology? Is there something that you don't particularly like?

D: Probably the biggest thing from my end/beach/speech? *inaudible*, was a few years ago I used to go to the teaching *inaudible* conference in L.A. but they-the massive one there was to try to get away from digital speech to more natural speech for people receiving the message because particularly in New Zealand, I'm sure you're discovering the way things are spelt sometimes and the way they're pronounced, so when you would push Tony for example, type Tony in, it would say like "pick one" where as you want-so you could have a human voice that would be really good, but I know that makes it really tricky because you need to, ya know record onto it. But... and again, in New Zealand I think the struggle is like, and Europe and in America where there's a large population base, the digitized voices have been created for those populations, where in New Zealand, we're basically the size of a city the cost of doing it means that there's never been a New Zealand based accent or digitized speech, I think we borrow off Australia or we borrow off America or off England. So that speech or the speech quality is really important as well. I used to really like when they're really old school technology there's one called Lite Writer that when people could type in and it would digitize it but on-also it would print out what it was saying like on a display screen so this person, if they couldn't hear, could at least read what it had said. Which was on the backside thing who you would be communicating with rather than the person typing in, whereas now on an iPad sometimes it says that but if it's facing towards you and they don't let the other person show the display for someone to read, I think that's quite a struggle and becomes quite frustrating and, ya know, if the student doesn't experience success, they at least know that they can do it. And then, yeah, I don't know, we constantly-we struggle a bit when we get to the point where you've got functional communication down and the person's getting their needs met, but they're not really using it to chat. It's hard to move from functional communication to chatting. I don't know whether that's just because as students... developmentally are at that early stage and struggling or whether it's that a lot of our students are nonverbal and when you're trying to use two devices to chat, they get quite tricky, ya know especially if one of them fails or the battery goes out or... yeah, so everything we do, we try to have a low tech backup as well so, I don't know, we use Core Boards and P.O.D.S. here and all light techs.

H: Could you briefly explain what those non tech methods are? The core boards and...

D: Ah yeah. So a core board is-they divide it up into different things like differently used colorful semantics, but they have like the thirty most commonly used words for actions such as a laminated piece of paper, and you point to what you want or won't point to what you want. And it just gives you a core vocabulary and then that sort of starts at like nine, or something like that and then goes up to over seventeen, depending on how good your fine motor skills are and then the pod is like, I've forgotten what POD stands for sorry, and I can't explain it. There's much detail in the speech language pathologist but it has pictures to things and when you look at picture you turn to that page and it's the words around that thing that you might look at like food goes to a food page and that. Sorry there is another piece of technology that we've been using... it's eye pointing and then try to develop a plot around that camera tracking on the computer, but anyway that's more for a physical disability then...

J: What do you use more commonly? Are the technological methods used more commonly than the non technological methods and why or why not do you do that?

D: Non technological here mainly. Probably that's just a matter of like what students need to understand to be able to use a high tech device. There's much so-like I said before as students are mainly on the expanded New Zealand curriculum to understand language structure and everything like that often needs a lot more so we provide the means that best suit what the students can do to get their needs met. So it'll be-that's usually sign or gesture and then to the pics??? and the picture stuff and then if the pics??? and the picture stuff is working 18:31 as we develop we go to the core board and the understanding how things work and when they're working consistently we go to higher tech devices and that sort of goes then to the assessment needed through the TalkLink to make sure that you're providing them with the best thing, which, I don't know if you guys know about ways assessment tends to be based loosely on the fit assessment which comes out of the states from Joey Debarlo/George(ia) Debarlum *inaudible*. Yeah, anyway, so that's sort of where we go from and to so it's a lot of consistent use nice to start with and moving up from there.

H: So one thing I think I was hearing was that some students just have an easier time with the non tech methods than the technological methods. Is that due to the complexity?

D: Yeah I think like-I don't know, like iPads are always are going flat or their accent-parents haven't put it on charge overnight so it takes until ten in the morning to have it charged to go out and use in public so like that's *inaudible* speak of it technology starts letting you down or it's inconsistent you need a backup method anyway. A lot of our students find it much quicker to just point to a yes or a no than to work through levels of a thing. I will say with the guy who uses Accent though, the coolest thing that I should have said early on was he knows how to get to his joke page and tell jokes and things like that.

All: (laughing)

H: That's awesome.

D: But he enjoys this and also we do-you do stories with him so we used to do a story where you got out the train set, and you put the trains together and we had people running around ya know and... so “did they get on the train?” and they’d be like “no” and then you’ll be like “oh well what is this guy saying?” and he’s like “get your ticket” ya know, but we programmed it all to say the things we want it to say.

J: Do you think that the kids that you work with enjoy doing the most? Like is there any method that they like doing or something that they don’t like doing?

D: Communication wise?

J: Yeah.

D: Yeah so probably the most thing our students like doing is taking some control back. And so... this example isn’t from one of our students, but I think it’s a really clear example of what the power of communication can be. So I know a guy, his name is Ben and he’s from the U.K. quite famous *inaudible* used to run a classroom and what did they do one day... he-they’d been trying to make this girl communicate for ages and she wouldn’t and then one day just like this pop on Bigmack which is just a single communication thing and he gave it to her and said “look anytime you do that there’s going to be like a balloon popping and all the staff are going to freak out for that so that next ten seconds going “ahh the balloon’s popped”” whatever and she just started hammering that switch he said ya know well had for the day knowing that every minute going “ahh the balloon’s popped what are we gonna do?” She then learned that she had some control and then over time administered feedback like and then using to do other things and then she developed the purpose of communication if that makes sense. So a lot of our students-just giving them the opportunity to just say “no” rather than constantly being told “oh do you want to do this? cool let’s just do it.” when they’ve got no consistent voice if they were in a hurry to say “no” It’d be tricky to tell jokes with another boy that we work with here who had a kicker switch to make it go and he really loved the little britain series but then, ya know, cause his functional movement of kicking had got so active and we were doing a skit with him where he would just kick the switch and it would say “computer says no” which was this thing and then he got to be the star of the show without it being wheelchair dancing or something like that. So I think that thinking about what students want,-not always thinking they just want to be able to say yes, sometimes they want to be able to ya know, they might want to be able to tell a joke, they might want to take an action over a room so sometimes I use a step by step communicator to say “hey guys, look at me. I’m going to be doing something exciting” and then have a third person with a switch activate a toy-a light, some fans, some bubbles or something like that, ya know? So just getting people like-actually what I think our whole role at this school is to give people control over their environment to see what they like to help and develop their personality to be who they’re going to be and to build on that so... and until you start doing that I feel like you don’t therapy and teach at someone, you start saying who they are; you’re working along side them to do that. That’s probably just a ramble, that’s not an answer. I think the answer is being able to take control over a situation.

H: I kind of have one more question that’s a little bit going back to the products you use... so when deciding which products to use what kind of influences your decision most? Like we know cost is a big factor, but there’s also other things that you have to take into account

like what it does, how it's going to affect the student, what research has been done on it and other things like that. Is there-what do you consider when looking into buying new things?

D: Cost is only a factor when it gets like quite high, so I think the good thing, with a lot of stuff being tablet based is that the cost of producing a lot of things spans, ya know, whatever, spread out over a lot more people. So Dynavoxes and Vantages *inaudible* and stuff that used to cost 13,000 dollars that were really difficult. Now you've got an app that does something similar that you can fit on an iPad or a tablet for probably around a grand ya know? So that cost has changed a bit in that way. And then there's sort of a set thing. So you look at the student-specifically what the means of accessing is going to be whether it's switching, whether it's direct access of the screen. I will say the tricky thing about iPads and tablets for us with people with real high physical needs is that if someone can't isolate their finger and use their finger, it's really hard to direct access to the screen where other devices in the past have relied more on pressure-someone could form a knuckle and punch or ya know, I don't know just integrate hands *inaudible* to hold people's fingers in the best position form could do it. If they can't hold a stylus and use it well like all that access can be tricky and then the switch access on iPads isn't quite where it should be I don't think, but that that'll probably come... Oh what was I-I just got lost. Yeah so we look at student access then we look at like what they want to do I guess so that's a little bit at whether they're wanting-whether they're like have any other things you need to consider like, if they drool a lot will the drool impact the function of the device. If they throw things when they get frustrated, then what kind of protection does the device need.

H: That's true.

D: All those things... so that sort of under the needs of the student we look at that we sort of- what they're physically doing, what their aspect of stuff is, what they're mood is, and what their cognition is so what level of-is it just a single nesses *inaudible* that their best going to be able to deliver, are they able to work through steps on a-ya know work through four pages to get to what they want to say, for example. And then we look at their environment that the student is interacting with and what needs to happen in those environments, so that tends to be at home and school-what things we want them to be able to do. And then the past-some of those environments that are here it might be talking to people running a computer. So it's a device that they would feel so they use to do like if someone *inaudible* into social media they can do that. If someone-if they're wanting to be able run a mouse on a computer to take control of the computer, we'll try and find those things. And then the last thing, so then you sort of have a checklist of what you want a device to have and then you look at the tools that are available and you check off the ones that do everything. So like that might be like a high tech device, a low tech device, sign language gesture, and then the one that gets the most tips is sort of Leapstart. So that's where we- obviously I've had Eyegaze-Eyegaze has come down a bit now as well. It's a bit more expensive and it takes a little bit more of a fight *inaudible* and more justification and they used to be sort of fillers I think with a neuroswitch and other various versions of that read literal impulses and muscles to fire-to activate things, that's for people that don't have any consistent things *inaudible* but that's more for people with Lou Gehrig's Syndrome.

H: So you're saying it's very dependent on what the child needs?

D: Yeah, yep. It does it definitely some things that you have to consider.

H: Right. Very good. Well I think that pretty much hit everything....

G: So I would like to ask about if you have any recommendations about-not actually recommendations, but what would you like to see additionally in the technology area? And if you have any like suggestions about a product that you could probably want to see in the market, but it doesn't exist up to now.

D: Yep. So my big recommendation, ya know, that voice output which I guess might be able to do with just like an app or something where you just record your own voice onto each of the tiles and then it's a natural voice that matches the area that you're in. All those kinds of things. And probably like simpler the better for our students is something that's really obvious, I think one of our students tried Proloquo2Go and it was just too complicated the way it worked. Around that some of the people have been using the Prentke Romich stuff, it's hard to work through the levels because the symbols don't match to what you naturally think of. It's, I don't know, just funny symbols that mean something when you process that but our students are at-we don't have many students that are at the intellectual level to process exactly what is there. And then the big thing here which may not be the same around the world, is follow up support and so there's a lot of provisional assessment and provision and then the piece of equipment arrives and then not many people are funded to do follow up so sometimes very expensive. Just the technology becomes a very expensive paperweight for a bookshelf item cause people are too scared to use it and bring it because it's so expensive and they haven't learned how to do it.

Closing remarks and call ended.

Diana Siew Interview Transcript

Description: Parent

Date: 28/1/2016

Interviewer: Julia Smith, Hope Shevchuk

Note Taker: Julia Smith, Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: What experience have you had with children with autism or special needs?

D: So we are going special needs at this point in time....My daughter is a young lady with Down Syndrome.

H: And how old is she?

D: She is 23 years old.

J: With your child, what do you think is the most important social skill that you've had to treat or address because of the Down's Syndrome?

D: That's a really interesting question actually, never thought of it. Possibly the fact that when—possibly appropriate behavior in terms of not pulling faces and... not pulling faces at people (laughing) and answering questions as opposed to—as opposed to just turning away when asked the question. OK?

J: OK

D: And possibly helping her filter what she can and cannot be saying (laughter).

J: Oh gotcha. Alright, so for those kinds of issues with the interaction with the faces and the filtering of what she's saying, do you have any particular ways you use to try to improve those and make sure she responds correctly?

D: Possible, well... you currently just have to try to explain it to her and then failing that you just get really frustrated (laughing).

H: Yeah, it can be tough.

D: Yeah that's possibly it really... or maybe just showing her, ya know just showing her sometimes just telling her "hey look at it" when you're watching a movie or when you're out and you see somebody else doing something like that, it's like pointing out "do you think this is good behavior?" "No" "Why?" "Well that's exactly what you do? So ya know, you need to improve."

J: Does that help? Using the people as examples... does that help her to understand what she is doing wrong and how to fix it?

D: Not necessarily, at times... sometimes it sinks in and sometimes it doesn't. I must admit that sometimes it's a threat, "if you don't behave properly than ya know, you don't get to go (laughing)."

H: So do you have any experience or understanding of—well I don't really know her background, so maybe you could speak to this too, about therapists or schooling that she had—has experience and do you know if they use any particular methods?

D: No, I think that in terms of her teachers it's again just trying to explain to her what is appropriate and what is not appropriate. She functions a very high level, so it's not that she doesn't understand, it's a measure of if she wants to take the info in and action it. You get my drift?

H: Right... no absolutely.

D: So I would think that if you have a child that was not functioning at high level, then it would be even harder.

H: Yes, right, we would anticipate that as well.

D: Maybe it's about learning herself, ya know? I'm sure interactive technologies—I mean, yeah that might be another way of doing it.

J: Have you ever—has she ever used kind of like interactive technologies to help her with these kinds of things?

D: No actually, I haven't. It's a thing ??? (at 5:11) (laughing)

J: Have you ever thought about using anything or have you heard about any kinds that you would be interested in trying?

D: No, that's possibly it. I mean, again, if she was a child that was *inaudible* not who she is, yeah we'd probably be looking for many more things to support her. But half the time she doesn't really need that.

H: So you feel that she doesn't necessarily need any of these technologies. Is—for something that might be useful—like what do you think might be an ideal tool, so to speak, to maybe help with this? That's kind of putting you on the spot, I understand that, but we're just trying to get a feel if you have any thoughts about what... what might be helpful and what you might be interested in.

D: Well... I... OK. It's not that she has no need for technology, or I have no need for technology, it's just that specific things are very difficult to come by. So in this case, and the behavior issue, is not—is not only... does not only manifest itself in her, ya know? So if you look at other kids with disabilities, they do that as well. And I think that—I think that a lot of them are also pretty—or favor technology, or the ones that we know anyway. And if you actually, coming to think about it, if you had a little video, or maybe even a video of them when

they're doing things like this—or but if you had a little video that you showed them and then you had questions about what did you think of this person's behavior, or what did you like about the question or should a ????? (7:30) answer that. Should they answer that, is that the right thing to do? Why do you think that's the right or wrong thing to do? So that actually pulls up or draws up some conversation points as well, maybe for them. And it possibly isn't something done with—I mean sometimes you can—a parent could do it, but sometimes it's not a parent. You see what I mean? It's because sometimes it's a third party is a—that can't give a—that doesn't say “you're not going out with me if you're doing that” (laughing). That helps as well.

J: Yeah definitely. Let's see, what else did we have?... In regards to just like the special needs community in general, is there anything you'd like to see improved, or do you see any rooms for changes just in regards to how... how your child has interacted with everyone so far, in regards to therapies and stuff?

D: I think that—I think that certainly there's some—ok, the special needs education here, in New Zealand, is very cash strapped, and I kind of think that if there were technologies or if there was some method—or I don't know what it is at this point in time—but if there was something that could bring some of this—some of their work that they're doing to a more modern setting, that would help. OK? And not—this is even maybe teaching fine motor skills, ya know, like doing up laces or doing up buttons or things like that and you get a child to get and do laces, since they're doing laces all the time that's not—that doesn't really work very well, but there are other ways of improving fine motor skills and they need to be able to tie laces.

J: So in general, do you have any like comments or opinions on the use of technology for this kind of education? Do you think you would—other than you said it might be helpful, do you think it would be something you'd be interested or other people you have interacted with would be interested in?

D: I think people with younger children would probably be interested in that. Ya know, if she can tie her laces herself, we don't need that, but she can do her buttons although it takes a long time (laughing). But you get my drift?

H: Yeah

D: When she was younger, this was something she struggled with.

H: So based on your experience and how, kind of you've been introduced to different techniques and methods, how would you say is the main kind of route that you've found out about these different techniques—was it through a therapist, was it through your own research, was it just kind of trial and error?

D: OK, most of the therapy that she needed to like, ya know, improving fine motor skills, learning how to crawl, things like that—the learning how to crawl we did it ourselves, but the learning other skills—she was supported with a physiotherapist right from probably the year that she was born and so ya know, the therapist that actually introduced them *inaudible* some techniques that helped her along and... that's kind of what you pick up, OK? But you certainly—

no, I never did, thinking about it now—I never did any research about how she should behave or whatever because she, like I said, was quite a special kid in her own right.

H: Absolutely, very interesting.

D: But if you've got the technology that'll make her go faster, that would be great. Yeah 'cause she's very slow. (laughing) (pause) If you're looking at other modules, I am probably not a very good test case for you guys...

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D: I told you I was a guinea pig and I'm probably not helping that much but if you—let's forget this behavior thing, let's kind of think about what other things that people with disabilities tend to not be able to do. They cannot count money; their math skills are very poor. Not being able to count money is a real disadvantage as you grow older. Telling time, time is not... time is not a concept that they grasp. OK? So you could teach them how time—the concept of time. Now I think that would be one of the most valuable tools you could get them. OK? So that really—that's not Izzy, that is talking to her friend's parents, etc. all of them struggle with time and... money. It is something apparent in these kids.

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J: Ok, I think that's pretty much all the questions we had for you, and thank you so much, you're definitely super helpful. This is definitely helping us a lot. Thank you. We really do appreciate it.

D: That's alright, no worries.

J: One last question, do you have any additional people you know or contacts that you think would be willing to help us out in regards to this research that may be interviewed?

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H: Our view on that is we would like to focus on autism, but we also realize there is some value in special needs as a whole because I feel the information about the community can also provide value on incorporating all of the special needs children with a new technology which is what we are kind of investigating.

D: Children with special needs are all very different, and each special need meet different behavioral problems; they are quite different. But if you're talking to Izzy's friend's parents, then always ask them about the time issue and money issue. And if you were talking to any parent, ask them about that.

Closing remarks and call ended

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Description: Parent

Date: 28/1/2016

Interviewer: Julia Smith, Hope Shevchuk

Note Taker: Julia Smith, Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

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Closing remarks and call ended

Hilary Stock Interview Notes

Description: Computer Supported Learning Specialist

Date: 3/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

Personally quotes-not Champion Center-look at website

Experience-end of 89 or beginning of 90,

Her role- engage with child-6 person team, she does speech language and early intervention teacher needs to know

Interaction with them, going for relationship and interaction

Social skills-relating and communicating-relationship with mother->relationships with other people, mother is always present

Switch programs and response is they laugh and look at you, taking turns, building tower and knocking down,

Built between mother and then them

They have non verbal programs-communicate by choice, receptive language, putting words around it, virtual experience

Helpful?-I think so, sometimes sensory overload, use pictures and stories of them in their own world, emotional buy in, experience and putting language around it, pictures and words associated

Get children to match-if pictures are of themselves-use pictures of themselves doing things and sticks them in their own reality, giving them the words

Children like tablets-they enjoy it-we don't need- meaningless, if it calms them down and that works, do it, don't use that, do interactive things, when they understand, then its worth it, really like technology need to use it for something useful, if you're obsessed with it and use it for entertainment vs learning/education, doesn't think it's necessary for other kids

Desk-stuck in their seat, Usually with her breathing heavily down he neck, "it's always with another person it has to be!" (applications)

Anything missing/improvement-lot of stuff-rely on places like networks that recommend apps, few core ones, having found anything, find bits of it somewhere, rely on powerpoint and made a program on their own, won't be as clever, less, doesn't need cute stuff all the time, not one thing that encompasses everything they are looking for

Only using technology-don't do it any other way, discussions about doing a special story, something you want to happen, made it so he wasn't scared, it certainly makes a difference

All I'veever done-boss in London, saw it could be useful in 90s and none of the others wanted to try it

Favorite application or had made-iPad special stories, special words (special numbers)
MathHD3-5 sentence maker, sentence builder, done everything in powerpoint and keynote if she needs it, Making Sequences

Decide what to use, based on child needs-Governed by speech language therapist and teacher-
what they want-about relationship-joining child where he is-mental level

“My children” fast, good, 20 minutes once a week, if it’s fun and what needs to get done, it’s ok,
only come here for 3 hours once a week

Learn to focus and concentrate-sit still and look-transferrable

Sitting down with the child-very present, trust

Irene Pow Interview Transcript

Description: Teacher

Date: 27/1/2016

Interviewers: Julia Smith, George Ardamerinos

Note Taker: Hope Shevchuk

Quotes/Recording: Yes

Anonymous: No

J: What kind of role have you played with children with autism in the past?

I: I've encountered autistic children in my primary school teaching and in my early childhood school teaching. Which has spanned over 30 years.

J: So in your time as a teacher, what social skills have you seen and put a particular focus on helping develop in teaching with these children?

I: Well first of all, make a connection, like actually make some kind of relationship with them so that involves touch, eye contact, being around the same physical space and area, and allowing other children to come into their environment as well so that they are seen as part of the whole group rather than isolated. And verbal of course, talking. I mean, obviously the verbal interaction even if it's a one way process I'm doing the verbalizing and I'm interpreting the nonverbal skills *inaudible* from the autistic child.

J: How do you try to help and teach these social skills that you find are most important? Do you have any materials or tools that you help to encourage these social skills?

I: Well we're often working with OT's and physiotherapists and nutritionists and teacher aides, so obviously I gather and listen to their advice and work with them. The other thing I do is use, like objects, like books, like visual stimulation if I can, and and sensory stimulations and also sportcast which is when—if I'm doing an action or I'm doing something social I'll actually be verbally saying what I'm doing so the actions mirror the words. So the words mirror the actions as I'm doing them. So if I'm saying hello and shaking your hand I'll say "I'm holding my hand I'm going to shake your hand, hello" that sort of thing. Labelling my gestures.

G: So are you satisfied with the methods that you use?

I: Well I'm always—well no—well you're always looking for other avenues or other pathways that will open up some kind of dialog or interaction.

G: So if you had to rank the methods that you use from 1 to 10 how would you rank them?

I: [thoughtful sigh] I never really thought about ranking them [slight laughter] Well, well that's the only tools I have so I rank them quite highly cause that's'—as a teacher that's all I can hang off really. So yeah they're valuable you know using all those stimulation—using materials and objects and other children as resources and adults and peers as resources are all valuable. So ranking? Probably 8. Because what alternative do I have?

J: So using these various methods have you seen your student's social skills improved in these areas, have they helped?

I: Um they have helped. I mean I have built relationships and I have seen responses and the hard one though is they don't come easy and they don't come instantly and I'm not sure how far they will go from where—from where I—I mean I'm working, primarily now, I'm working with four—three and four year olds, so I don't know how—I don't know if the school will... enable them or empower them to actually be sufficient to survive in the primary sector. If they stay mainstream

G: And how about your students, yeah not students, children: do they enjoy these methods?

I: Well they certainly they are interested in wanting to socialize with other children with autism or any kind of disability because my practice is based on being inclusive so I will invite children into that arena all the time so yeah they are interested and they do want to make connections.

J: So have you ever used any technological devices to help you with encouraging these social skills?

I: With autistic children, no.

J: Have you used it for any other children, like any other type of disability, not necessarily just autism?

I: Well I'm a bit of a dinosaur when it comes to IT. I believe that the current generation of children will be teaching my generation how to use it. So I see IT as just another tool to be used like a book like video like any type of sports equipment, so just another tool that the children—but I don't feel a lot of socialization when the children are working with iPads and computers it's very much "me and my computer" – yeah I don't see a lot of socializing-- socialization happening. With neurotypical children. That's my personal opinion. That's my personal opinion.

J: Given what you've worked with and your opinion, would you be willing to try to use something with technology in the future in order to help develop these skills or have you heard anything about them helping with this?

I: Well yes I would but I'd like to see it—I'd like to see—first of all I'd like to see an action and I'd like to see it backed up by some kind of research cause the research that I've read around IT is sort of debatable sort of sitting on the fence and such. And I think it would need to offer something that I couldn't currently do without, without technology. But yes I would be open. But I—but I probably would be skeptical until I saw it in action.

J: What do you think is like the most successful method that you've used to help the child interact?

I: Are you talking a child with autism?

J: Uh yeah. Sure.

I: Being around them. Well actually me. I'm the most useful tool cause I—regardless of any equipment you've got, if you don't have a teacher that—yeah I'm the most valuable tool. Cause I need to be interested in them, I need to be around them, I need to include them in all parts of the curriculum, so actually, at the end of the day, the resource is useless unless you have a teacher that is willing to use it and taught to teach. Does that make sense?

J: Yeah definitely. That is definitely a good point.

I: So if you've got something coming with IT, you also need the backup, you also need the expertise on how to use it . If you're going to present something, you probably need to actually come with the tutorial, with how to actually use it.

J: Any other questions or comments that you have in regards to what we're looking at?

I: Well no cause I know quite a bit about what you're doing [laughter]

J: That's true that's true [laughter]

I: But um yeah I—I can see with autistic children that possibly IT *may* be an avenue that they can use because of the.. present inability—or they are unable to make connections—well they can make connections with adults and their peers but it's quite a physical connection where as a computer is sort of more remote. So I'm just wondering if that distance will enable children with autism to make that leap because it's not a physical—its tangible does that make sense?

J: Yeah definitely yup

I: Yeah I think maybe maybe that would suit the child with autism better. I don't know. I'm not sure.

Closing remarks and call ended.

Jason Ryan Interview Transcript

Description: Parent

Date: 4/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: What is your experience with children with autism or special needs?

J. Ryan: My son who's eight, just turned eight, has been diagnosed on the autism spectrum disorder. I guess... range. So I say I've had a bit of experience with him. And I've... I've also sort of helped the early intervention because there's a couple of groups around, so there's an early intervention... I guess NGO I guess you want to call it for a better word. So I assisted them in some of their, I guess-the management side in helping them run the board, the trust.

J: So with your experience with your son, have you had a specific social skill that has been problematic that you consider most important to address with him?

J. Ryan: Yeah, anxiety.

J: Do you have any specific tools or methods that you try to use to improve this?

J. Ryan: It's been a moving field, as you can imagine. So... early days it was... it was understanding the triggers for anxiety, understand what... what was the main-it sort of ramped up so understanding when it was hitting a point where the anxiety would kick in and he would lock down, so he would no longer interact. Or he would cry, scream, hit out, lash out so it was understanding those triggers. They-as he grew up, those triggers changed. So it might have been-he was outside and he saw a bird flying over. And then all of a sudden, that would no longer be a trigger, or he would see a spider and then all of a sudden that would no longer be a trigger. And it would be he heard a siren so it was a constant change as to what those triggers were. And mainly audio-visual. So mainly issues involving outside stimulus. And depending on his mood, it could be just a quick flip that-and he would lock down and be extremely agitated-cry, scream, early days. Later days it was more non cooperative and, not quite violent, but quite physical. And hitting school those things became harder for us to understand because he would come home some days very wound up because of those triggers at school which we were unable to intervene into. So with... the child ????? (5:39) services, access that we've had here is part of the diagnosis, where he was then-we've actually moved on to some anti-anxiety medication to help decrease that level of anxiety, ya know, to function within the school setting.

J: OK. Is he in a public school?

J. Ryan: Yep

J: Is there anything different or special that they do with him because of that, or is it just a normal school setting?

J. Ryan: He-I'm not sure if you know the system in New Zealand, but there's a thing called ORS.

J: Yes

J. Ryan: Yeah. He was-because it was actually very hard to get ORS, he's just below that threshold, so he's been-school has additional special needs funding and services that they can access. So he's been able to access I think two or three hours a week mainly focused on the academic side rather than the social side. The social side has been pretty much ignored to a large degree by the school. As they've been focusing on the academic side. And a lot of the issues with the academic was because of the anxiety. So-one fit to the other but ya know, they weren't really addressing the root cause of why he was unable to focus in the classroom, why he was being uncooperative. So there was a breakdown within the school system as to how to handle that aspect.

J: Right, has that gotten any better or is that still a problem?

J. Ryan: It's still a problem. We've-with the medication it has significantly decreased to levels that no longer hinder his interaction in the classroom.

J: So have you ever used some sort of technological device to help your child with any of the problem areas that he has?

J. Ryan: Yeah... it's a tricky one the old tech or not tech *inaudible*. He loves technology. I guess most kids do. And... we've *inaudible* to go down using technology to assist him with, I guess the interaction. So we-he was nonverbal until, let's say four and a half. Maybe early fours. And so we used a picture system that was paper based or, ya know, a physical system, so pics and those sorts of things. I guess that was four years ago and devices weren't that common back then. So since then we've-I do know that in the classroom setting he does his tablet for writing. He finds writing with a pen very difficult-dexterity required to hold a pen. So they are using a device in the classroom setting and I think this year we are going to move more towards that in the classroom. And either getting a device ourselves or through the school, whatever. Yeah tablet to help with the writing. Had a lot of problems thinking and taking his thoughts and putting them on paper is sort of a problem with coordination required to do some of the writing. So it is something we are looking at.

J: So you are interested in technology in general then?

J. Ryan: Yeah, I guess it would be a case by case basis. But, yeah I think we're moving towards it a lot more these days.

J: OK. So in your experiences, is there anything that you've found that's really, I guess lacking in regards to what therapies and methods that are available to you?

J. Ryan: Very open question.

J: Sorry.

J. Ryan: About technology or just in general?

J: In regards to technology I guess?

J. Ryan: I guess a lot of the apps are very generalized that they're not-there's no, well in our experience anyway-it's been very hard to identify what the best app is for our child in particular because, ya know, I'm not sure if this is new to you- any kid on the spectrum is completely different in their needs and requirements. So... we've found it very hard to... to pinpoint, ya know, what sort of technological devices could help with anxiety. What-what could we use in that setting? We use some simple math and spelling apps that are available and that-their fine. They always encourage him to-to the academic side. But in regards to his autism, it's been very hard to... to look at a specific device or technology and say "well that's exactly what we need for this issue." So I guess a general understanding of what's out there and how it can help. There's nothing that we've been able to find easily. Without talking to a therapist. And they have access to different types of tools which are more specialized rather than generalized.

J: Does your child work with a therapist or it is mostly at home?

J. Ryan: Yeah, he had many years of early intervention therapy, both speech and language, and OT, and early intervention teacher, so sort of... going early sort of academic-and so there was a lot of work done on the speech and language mainly cause he was nonverbal. And then some of the coordination with the OT. So he was actually quite lucky to get into that system that was half a day once a week from when he was probably almost three til he was five.

J: Are you happy with what you've used so far in regards to how it's helped him improve in general?

J. Ryan: (Pause) Yeah? That's rather a tough question. We've-we live and use all types of technology, from laptops to tablets to phones. We've found, for instance when we... were going on a plane over to Australia, and he has-because of-in airports, there's this constant announcement system going over and over and over, and whatever announcement heard, he thinks it's for him and his plane flight and he gets very agitated. So we used-there's this some youtube videos that specifically done for kids on the spectrum to explain how airports work, like there's the announcements in different airports, and what you need to do when you go through immigration, through security and all those sorts of things. We found that those quite helpful in-not just him believing what we say but he thinks to believe a lot more what he reads and sees on the... on the net and those sorts of things, so those physical and verbal confirmation they were quite useful. And especially for all those different types of settings that are not everyday, but-that we need to sort of get through. Ya know, I think he finds it quite therapeutic to look at-if he has an interest in something... if he had a strong interest in coins, he always would go google images to look for the oldest coins and what the coins are around *inaudible*. So those sorts of-just that information quick to hand that was able to address a concern. That's been quite useful as well. So those sorts of things that-they're just generally available and it's just tuning/turning it for what he needs.

Closing remarks and call ended.

John Feeney Interview Transcript

Date: 4/2/2016

Description: Occupational therapist

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Quotes/Recording: Yes

Anonymous: No

J: What is your experience with children with autism or special needs?

J. Feeney: I supposed I've been working in this area now for about ten years and for I work here in Wellington with special education so I'm like the visiting therapist for the students with higher levels of special needs. So you have this thing in Wellington like the top 1% that get the most, ya know sort of monetary support which allows the service like myself and the occupational therapist to have some contact with them but it's kind of prejudice once or twice to *inaudible* to most of the kids. And with autism, that's a pretty big part of their caseload here probably about half because there really is *somebody else* to speak to.

J: So we're focusing our project kind of on the social skills aspect of the disorders, so in your experience, have you recognized any specific social skills that you always try to put a focus on developing in your therapies?

J. Feeney: Yeah... I suppose for me I tend to focus more on other functional skills like handwriting and eating and ya know the sensory issues. Are you talking to any speech therapists? Are you wanting to make contact with some of those people?

J: Yeah we have.

J. Feeney: So did you want to get in contact with another therapist on our team?

J: Yeah that would be awesome.

J. Feeney: OK. I think probably for me, as an OT, the social part-it's a little bit more-it's a focus but not sort of a big problem for us. With technology, I think the social part of that is that it's such a universal medium that it does draw in other kids and that's obviously something that we do notice is that providing a kid with an iPad or a laptop it does draw in other kids and obviously helps them into looking similar to the other students.

J: So with your focus, given that you focus on more of the other parts of it...

J. Feeney: The functional.

J: Yeah the functional-what kind of methods do you help to teach those?

J. Feeney: To help teachers?

J: To help teach those to the children.

J. Feeney: I suppose the first thing really is that most of it is responding to referrals. So do you mean just thinking about social skills or looking at sensory things for a kid with autism, for example.

J: Given that you don't have a ton of experience with the social skills, whatever you focus on is fine.

J. Feeney: OK. So with autism probably the main thing I'd be focusing on there would be the sensory issues-the sensory needs of the child. So responding to a request something like a child might be having difficulty resetting *inaudible* to a task, or they might be small behaviors that are a bit more disruptive. So I'd say my normal routine would be to look at the referral and to do observations and an assessment and then to work with the school and the classroom particularly with the teacher aide because just about all their kids have teacher aides and their classroom teacher and just again to make a little program of strategies to help with these sort of sensory issues. So very often it's just pretty little things like adaption to the environment and that can involve providing sensory activities and calming strategies, ya know the quiet area in the classrooms. The routine of having the students go out weekly for sensory breaks. Yeah pretty much things like that really. But our role here is more around advice and guidance too because the therapy *inaudible* and there's 180 kids in Wellington and there's just one OT. So our contact is sort of quite minimal but it's pretty much around advice and guidance and the support that we can get. We don't get much one-to-one.

J: So in your experience, have you used or advised using any technological applications or tools to help with this therapy?

J. Feeney: Yep. OK. Just thinking about it, a little part of my role is full of the sensory issues is of course the communication in the written communication and so yes we do. The device we've primarily used is iPads and computers, but the main thing is iPads just because it's inaudible that the wide range of cheap programs and the high visual aspect of them which obviously draws kids in with sensory needs. So yeah iPads would be the main thing-it would be a common thing for us to work with with kids and so the whole process is around doing an assessment and doing an application then getting the stuff provided to the students. And I just thought of this, cause kids with autism have a inaudible the ability iPad allows you to have a very simple cause and effect stuff that can support their student to do a little bit of writing and their abilities. And so with technology, we possibly need a little more coaching with the teacher or the teacher aide around; how to introduce it, how to get use it with the student. And of course we do, we possible would want to use computers with kids too with autism and so there's a little delay going on but possibly more just iPads now with keyboards that seems to be working quite well. There are program like Book Creator, for example, is an app you can put the visuals in so easily and the text to go with it. Cause many of our kids with autism wouldn't do a huge amount of writing. The technology is wonderful cause allowing kids to be able to write better by using predictive text and getting whole words to make sentences using the keyboard really possible. But compared to handwriting, there's so many kids with autism that are just very very inaudible handwriting, they don't connect to the meaning of it.

J: Do you have any specific apps that you use on these tablets that are your favorite or have found most successful?

J. Feeney: I'd have to say that Book Creator is one of the most common ones. I'm trying to think offhand of the other ones. The Book Creator is a common one for kids who can do a little bit of writing. The clicker series too of course is very good because you put in the clicker sentences and the predictive text ones. The whole writing process is better for it; they're very good because you can kind of *inaudible* and through from kids that can use whole words to kids who can progress to a bit of predictive text with the right timing. And the other ones, I can't remember their names right now, but also very simple prewriting apps that involve the kids just getting used to making lines in different directions and then leading the simple formation ones. I mean there's a lot of those read to write ones; I can't remember their names, but those ones that involve the initial information are really very useful. You can't really compare can you? The level of engagement and motivation to engage in writing on technology is huge compared to standard handwriting.

J: So do they enjoy using the tablets and the apps?

J. Feeney: It's massive, absolutely compared to writing by hand. So much more engagement really. And at the end of it, there's normally more of a tangible result. Kids with writing with autism will very often just do a few letters and then they'll give up. Because it's such a complex skill isn't it? Using whole words and using letters sort-just to type the letter "t" rather than form the t is easier for them. So yeah, the motivation and engagement is just huge compared to by hand. Kids can really move on and use some of their skills and then they've got something to show their family; they've got a record of their work and there's sort of like better progression. And it's interesting, especially with higher level kids, you can get some pretty good work out of them.

J: So you've seen it to be more effective as well as more engaging?

J. Feeney: Oh absolutely. It's almost like the way those kids' brains are wired for the visual learning really. That's the difference. So I think it just makes more sense too to be able to help kids. And there's so many different apps you can get to tap into some quirky behaviors or interests they might have too to help engagement and their learning. And then of course you can also use the iPad, it's not specifically we're talking iPads in New Zealand it's tablets, you can also use it as a reward really. So they have their little break too, once they've done the other and a bit of writing, if you do writing and that's the thing you're really focusing on highly. And of course you know the whole literacy reading stuff would be really important too. I think anywhere, there's always a caution about over using it. Kids can really overfocus on using technology. So it's having it so that the next real boundaries are around the users or the technology, whatever it is.

J: Do the kids ever have a hard time distinguishing between when it's time on the apps for education and for entertainment?

J. Feeney: That's a really good point actually. Because kids can also go on the technology and try to go to other stuff as well. We possible have really strong routines, ya know, using the timer

and if you can block out other sites that they can't go to they would use it nine-it's very common to go to stuff that isn't educational. But once the routine is set up, the majority of kids seem to be able to follow that and quite often an iPad or a laptop is stored away somewhere else outside as well. It can be a big thing. Sometimes kids just have their home iPad that they have more of games and the school one is just purely for schoolwork.

J: So when you're looking at these applications, is there anything that you could think of improving on them? Or are you generally happy with how they work?

J. Feeney: Generally there's such a good range of them now I mean there's just thousands out there. I think for our purposes-cause another important part I think with using particularly the iPads is that just to stick to three or four apps as well. *Inaudible* because it just gets confusing and sort of unnecessary. I think having apps that sort of work well for the kid, like a narrow range, I've found has better than a big range for them. So pretty much there's a really good selection around. There are some where you can put your own pictures in as well and make up a story and make up whatever it is that you're doing. That can be pretty engaging and very relevant to the level of needs of the child. There's not many kids-very few kids-that might really engage with an iPad and that could be the primary that they'll engage with the compared to that other stuff. And they're learning, the really delayed ones.

J: You said that there are a lot of apps out on the market. Does that make it hard for you to find the ones that were actually effective for the children?

J. Feeney: No, I think it's got better too. The system for looking up things, just put a note into the search bar-on the whole pretty good. *Inaudible* said from earlier, technology area who is really good at compiling it, looking around and getting things. That's another person I could probably get you in touch with if you want to. She would be a good person to talk to as well.

J: Yeah that would be awesome. Do you have just any general comments about technology and autism combined in therapy in general?

J. Feeney: One of the comments is that the technology over the last few years has made a huge difference to engaging those kids with complex needs and learning. But I think it still needs to be seen as just another tool. There's nothing of the sort about literacy, it's kind of really funny when you work for them, but you still need if possible to engage them with other students and of course technology can be a very isolating thing. I think everyone would say that. I think that that's important. But it's definitely got a really significant place in kids learning and it's sort of where the world is going. I think we need to encourage the use of it but just being aware that it's just one thing and it can be isolating but the good thing about it is that it does allow kids with these high needs to work and to be like their peers and if you come back to the social thing that is a chance, in some way to look similar to their peers.

J: Alright. Well I think that was all I had to touch upon. That was super informative so thank you very much.

J. Feeney: I guess another thing really is the cost of all the stuff isn't it? It's definitely cheaper than it was but it is another issue really. In New Zealand, the education does provide some

funding and technology to kids with really high needs, but there's such a huge range of kids with autism on the spectrum that don't get much help and that's sort of just how it is really. The lower level ones and kids with Asperger's too, they don't tend to get much help. I think the other general comment about iPads and computers and things as you probably know, that's the predictability thing isn't it? Because each time you turn that computer on, it's going to give you the same thing and then we know that the kids need the routine, the predictability, the certainty to deal with anxiety.

Closing remarks and call ended.

Julie Ellis Interview Transcript

Description: Parent

Date: 1/2/16

Interviewers: Julia Smith

Note Taker: Hope Shevchuk

Quotes/Recording: Yes

Anonymous: No

J: So in your experience with your son's and your friends, have you recognized like a most important social skill that has been problematic that you find is most important to treat and address in therapy or anything?

J.Ellis: The most important skill is communication. So that's the key one, if you could get some kind of communication going that's-that's things like holding a simple well when they're little it's things like greetings and teaching them key phrases and then as they progress from holding a simple conversation and then further along the track that's being able to explain their own stresses and issues. So first you just want the most simple communication, even... even asking a simple question like "juice or milk?" and then getting into greetings and conversations. So I think communication is the key skill. Without it you can't really have any social development. And then... as they learn being able to cope with unexpected things and cope with change is a very big social skill so for example if they're in a race and they don't win being taught how to cope with not winning, or if they are playing a board game and they want, like using the black token and one, they don't get the black token, being able to cope with those subtle changes.. in a socially appropriate way-so that's quite important. And then something all the way through, having appropriate peer interactions so when they are preschoolers, just being able to parallel play... maybe hand somebody something or get that back even if it's that nonverbal interaction. Just really basic social skills-not slamming the door in someone's face, just subtle little things like that and then as they grow, their peer interactions become more complex but what you're aiming for is appropriate interactions at each age and stage and then the last thing I would identify as an important skill is understanding others point of view. So "how does that person feel when you do that?" or "why did that person do that?" So that's quite a complex thing that I don't-a lot of the kids don't get quite that far-is understanding another person's point of view, but that would be a good aim. So that's what I think are the most important social skills.

J: So for a basic conversation what do you think-what have you seen specifically being the issue? Is it an attention, a lack of interest, verbal skills... anything in particular?

J.Ellis: To start with it's a-when Josh was little, he didn't understand... for example, he didn't understand the question "how are you?" He didn't know what it meant. But we taught him. He wrote-he had to learn to say "I am fine." So if anybody said "oh hi Josh, how are you?" he knew to say "I am fine." But the other question that-the other basic direction we taught him if someone said "how old are you?" he had to say "I am five." So it was very confusing for him because "how are you?" and "how old are you?" sounded very similar. So sometimes when somebody said "how are you?" he would say "I am five." And if they said "how old are you?" he would say "I am fine." And that indicated to us that he couldn't actually hear the difference and he didn't cognitively understand what the question was asking him. But he just (WROTE??? 6:50) learned answers just to start that whole process of social interaction so those are two of the key things we

taught him when he was five but it was sort of funny because we realized how similar the two questions sounded and how confused he was. (laughing) So to start with, he was just understanding what the person was asking was beyond him. But now-we just... we just... work with him and he's matured and he can understand that now. So, but when we started it was a total lack of understanding. Now he's seventeen and it is more of a lack of interest. He just doesn't want to talk to people. He's just not interested in answering questions. He won't say hello unless you prompt him, he's also slightly-has teenage embarrassment, so he doesn't like any attention put on him. So although he can cognitively understand it now, he has sort of a teenage issues of embarrassment and disinterest I suppose.

J: What kind of methods do you use to try to combat those issues with communication at home?

J.Ellis: When he was little, we did a lot of role playing. For example, a birthday party was totally stressful for him. And he occasionally got invited to birthday parties, so at home we would practice playing pass the parcel and so that he learned when the music stopped, you take off a layer and then you keep going and pin the tail on the donkey. That was really stressful for him because you have to wear a blindfold and get turned around. So all those sort of things that your typical kids just accept, and sort of learn quite easily were very difficult and lots of role play... knocking at the door, someone's knocking at the door "what do you do?" "You answer the door, you say hello and-or you give a high five" and we taught him different ways to greet people so we taught him to say "hi", he could say "hello", he could say "how are you?" he could give a high five or he could show them something just having a car in his hand or something. So lots of role play... lot's of repetition. So as I said before, even though he didn't understand the question and the answer, he knew what answer to give to a specific question. So if anyone said "what's your name?" he knew to say "my name is Joshua." And we just repeated and repeated and repeated and every time he got it right we gave him a tiny little m&m lolli. Just so he linked it with-he was more motivated to give the right answer. We did a lot of modeling using either his siblings or dolls. Ya know, nasty doll hits Teddy, "how does Teddy feel?" *inaudible*"Why did doll hit Teddy?" So lots of that sort of role play. Role play with just his brother and sister. And ahh Sam lost the race "how does Sam feel?" "What does same do?" Is it ok for Sam to hit Jesse because he lost the race, so lots of that sort of modeling. Books. Books are very important... so I made a lot of books for Josh that were totally based on him. "So my name is Joshua, I am four, I live at... my brother is, my sister is" and I had a photo to match each sentence. And then we read them and reread them and reread them and he learned, through that repetition of that reading, of just listening to me, "my name is Joshua, I am four"-of course there was an issue when he turned five, he thought then that he was four. Ya know we-we got over that. We did sort of look at Carol Grey's social stories but they're very Americanized and in New Zealand... some of the American things don't apply so that's why I made my own books. So that's why anytime there was an incident, I would make a little book about it. So if he hit someone at kindy we'd make a little book based on the Carol Grey social stories, but personalized to Josh in his situation. So we didn't blame him, but we went through the situation and sort of ex-well making it into a book made a little story explaining what some of the other options were to be instead of hitting or biting or whatever he did. And we read a lot of functional social stories-Anne Marie Johnson has done a whole series. She's done one called Ted Too Close *inaudible* which is about a boy who stands too close. It's about personal space. Isaac interrupt, Gary Greets, Connie Comments, so all those little functional social skill stories, where he could look at somebody else's behavior and

understand that Ted was standing too close or Isaac was interrupting too much. That helped. We used picture sequences from Jet Baker's social skills picture book?????. They were really good because the pictures were quite clear and we could talk about what was happening in each picture. Rather than constantly talking to Josh about his own behavior, sometimes we would look at the other books and pictures and he could see other people's behavior of what was appropriate or inappropriate. He's done quite a few courses, we did one through the Methodist Social Services which is just called Managing Everyday Challenges and then-he did that twice and I still felt he didn't understand basic social skills so I then set up a social skills course myself. I hired a tutor, I hired a *inaudible* I got other students involved and they-we ran this sort of social skills course, but it was a group of autistic kids. So it was a little bit tricky because they didn't have your typical role models but they had some quite good experiences. We did a weekend camp and they played games, *inaudible* they did cooking outside... so that sort of real life social interaction, but each child had to be well supported by an adult. So it's not like if you sent a kid to camp and you've got ten kids and one adult, this was one adult per child. So that's also a nontechnical-technological ways we help them. When Josh was little, there wasn't like the iPads and things like that, so we didn't use technological methods so much but we used board games. There's one called Social Skills Board Game, and there's another called Socially Speaking Board Game. They were quite good once he understood all the rules surrounding the board game. He quite liked those because they're quite fun and they involved other people. We also taught him Tony Attwood's Toolbox tools for coping with his emotions and coping with his reactions in social situations. We watched very short T.V. programs, there's one called Caillou and another called Pingu. Both of them are five minute segments, which was about his level of concentration. So we'd watch a Pingu and then we'd have a list of questions... "why did Pingu do that?" "how does Pingu feel?" "how does Pingu's dad feel?" So he learned... sort of to interpret other creature's behaviors I suppose. And then as-when he got a bit older, he got hooked into Mr. Bean. Because Mr. Bean is very expressive and he does really outrageously stupid things.

All: (Laughing)

J.Ellis: So Mr. Bean was actually quite a good learning tool for Josh, and also he'd watch them over and over again so repetition is really important. He would watch the stupid things that Mr. Bean did and would talk about them, and what was good about that, how did people react, ya know? So that-he really loved that sort of-really watching someone else do something wrong *inaudible*... expressive. So that, yeah-technology-we really just did board games and Tony Attwood's Toolbox and the T.V. programs because it was in the days before iPads and youtube clips and things. So yeah, that's the method mainly that we used.

J: Did you have one in particular of those that you see-that you saw being most effective in helping him communicate better?

J.Ellis: I think the books were quite good because he, with the repetition, he picked up the messages and it sort of became hard wired. Also the board game involved other children, so they were-he was learning about social skills but he was also practicing social skills by playing the board game and again it was non-threatening because it was not focused on him. Everybody was having a turn, and also with the board games they're sort of quite open ended, so "what (beaches????16:49) do you like?" There is not a right or a wrong answer, so again, that sort of kept it easy for him because he didn't feel that he had to choose the right answer. So it allowed

for his individual choice a bit. The role plays were... a bit stressful for him. He didn't like those, so really the books and the board games and the T.V. because it was funny. So those would be the three that he liked.

J: So is there anything that you found-there anything that you wish that you had for when he was younger? Was there something, like a product that you wish you had to help him kind of advance quicker or something like that? Was there anything really lacking in the methods that you used?

J.Ellis: I think the technology was lacking, but I bet the technology might be a bit better now because I just had to make like homemade books all the time and print out pictures and things. Really what you need is... a willing group of peers-that to me, if you've got a little pool of children who, as he's growing from five years, to eight years, to twelve years... if you can get a small group of children who are willing to practice with him. So to me, the best step is to have real people to practice with. And then back with little skits and little examples of appropriate and inappropriate social behavior. But the thing that really bugged me, and you're probably not aware of this, is that most of the content is American and because the autistic kids are such good mimics, they all end up with American accents which makes them actually stand out in the New Zealand school. So my son actually ended up with a British accent because most of the programs he watched were British. But my friend's daughter had an American accent because she watched, I'm not sure what program it was, but it was some American program. So what is really important is that the programs are localized and so they're more specific to the culture and the country and they're more relevant to each individual child because all the kids are different and you really need to personalize-things need to be able to be personalized, like the board games. The board games were great because you could give any answer you like but, yeah, otherwise, we did get a bit of American content and the kids would-I can't think off the top of my head- but they'd say phrases that New Zealand kids wouldn't say. I can't think of anything, but it was quite noticeable. It's like "oh that's an American phrase, oh, that's an English phrase..."

J: That's really interesting, we never really thought about that.

J.Ellis: Yeah and it is quite-it does make them stand out and ya know, my little British boy and my friend's little American daughter, yeah they're not, they're New Zealand kids, but they just pick up the accents and they pick up the words, the vernacular of the-whatever their-so you have to make sure that it links in with the country that the child lives in and the culture and that is sort of personalized to that child. Like we don't talk about grades school, just lots of little words that... we don't use that came through in some of the resources, like *inaudible*, picture sequences and things like that and even Henry Johnson's social stories, just some of the terms and not like what we would use in New Zealand. So that's just a minor point, but that was quite noticeable to us. We've got an American child and a British child (laughing) yeah... so that's about it.

J: Just in general, I know you said you didn't use it yourself, but how do you feel technology could be integrated into this kind of therapy if you think it would be good or bad or how do you feel about it?

J.Ellis: I think it has to-I think it's great! I think we should use technology. The autistic children respond quite well to some-to errorless learning. So that if they make a mistake, that it doesn't

negate all the correct answers they've given so if they make a mistake, they get another turn at it or they get another clue or-so using, like I said doing some question and answer thing, if they get the wrong answer there's not a negative consequence, they just get another clue to help them so that it's always positive... I think that's really important. My boy loves robotics. So we're talking about getting a dog and he wants to get a robotic dog (laughing), you don't clean up after it, you don't need to take it for a walk. He'd really like that and I'm like "No Josh, you'd look really obvious if you were going through a walk with a robotic dog."

All: (Laughter)

J.Ellis: He likes-they have sort of like a natural affinity to... robots and things that are non-threatening but interesting and they're something-apparently, there are some quite good robotic toys being made now that could help with social interaction but, I mean saying that, your peer group is really the most important group that you need to establish around the child, so they learn-what's the point of learning social interaction with a robotic toy if you don't practice it in the real world. So I think technology is a very important tool and I think you can start quite early with the kids, like preschool with technology and sort of get them hooked into things, like I know there's reading facial expressions, I know there's a lot of software that you can use with little kids to help them in facial expressions and that's sort of a basic social skill actually. If you can't tell if someone knows you're angry??? (23:45) then you're gonna be-there's a loss in not being able to predict what that person's reactions are gonna be. So, yeah, I think-I think technology is great. It doesn't replace real life interactions.

J: Do you have any additional comments or questions in general about this field?

J.Ellis: Perhaps, things that could be easily used at school because we've done so much work with him at home, but at school he floundered??? (24:36) we've had to pay for teacher aids, he's only been at school part time and schooling has been really stressful. He's not aggressive, he just sort of shuts down when he gets stressed. So I think the schools need more tools... and a kit that would help in schools with different... different little ideas and five minute activities would be great because like a lot of the teachers didn't really know what to do with him so they just left him and yeah, his schooling has been very varied. And I think it could have been better if the teachers had sort of more resources and more understanding or-and school is weird, they learn or they need their social skills because that's where they spend most of the time and that's when they're with their peers. At home, we understand him and we make allowances for him, but at school-school is really the main place where social skills are key.

J: Did he go to public school or did he go to a private school?

J.Ellis: He started at a school in town, quite a big school that has a special needs unit, but... He was getting bullied, quite badly bullied. And ya know, I had to get the police involved so it was quite serious and he had been very unhappy locking himself in the toilet. So, he was aged eight, at that stage, so we had a meeting with the school and we said who, ya know, the child was bullying. It was agreed "yes this child is bullying him, yes this is unacceptable" but the school couldn't guarantee Josh safe and this boy was going to be in Josh's class for the next three years. So then I shifted him out to a small country school and that worked much better, but again with an older boy-it was varied age groups because it was a small school and all the boys would just-

kept picking on him. And again Josh got quite unhappy and when we got to the bottom of it, because he's non verbal, he doesn't tell you things, so when we got to the bottom of it, he was able to explain what this boy was doing and how it made him feel. And so we wrote a letter using Josh's words and then the principal understood it from Josh's point of view, and she was very good. She supported him, she talked to the other boy, she managed to sort of keep a lid on it until the other boy left cause he was older. So that was better but he was-because he's autistic and because he looks at the ground and his body language isn't very good, he can't tell that he shuffles when we walks. He's sort of a magnet to be bullied because he has that... sort of posture that indicates that he's not the same, not your typical. So now he's at high school. He only goes to the mainstream for two classes a day for chemistry and physics-no calculus and physics he goes to the mainstream. And then he has two subjects of bio and chemistry that he does in learning support with a teacher aid that we pay for. So we had to-he count' handle being in class all day every day, so we've actually had to pay for teacher aids to work with him so it's been a juggle all the way through trying to keep him in school and keep him happy and keep him progressing. And we're just lucky that we can afford to pay for teacher aids because if we couldn't I'm not really sure what the other options are. So he's sort of part time in the mainstream, part time in the learning support room. But yeah, his schooling has been difficult and has all of my friend's children. They all have slightly different issues. But it all comes down to not enough resources, not enough training, too many kids in the class just all those-those general issues that everyone with a special needs child faces. So their needs are not really being met, but you just muddle on and do the best you can. So it would be really good if we had some tools for teachers to use to help them teach social interaction with their autistic kids.

J: So given that you think they need more tools, do they have any tools at this school that help him with these kind of communication issues or was it completely like-did they not have any methods to help him?

J.Ellis: No they didn't have methods and so I made visual charts. I went in and talked, when he went to the country school- I went and talked to the kids and I said "who likes chocolate? Josh like chocolate, you've got something in common with Josh." "Who likes watching cricket? Josh doesn't like watching cricket so that's a difference." And we went through and we talked about some things are the same with Josh, somethings are different from Josh. "Who likes playing chess? Josh does too, you've got something in the same. So I went through and tried to get the kids aware that although he's different, there are some similarities. So that was the first thing I did and then I set up a program where each day he would choose, or the teacher would choose-he would choose an activity like what he was-break time is really hard so morning tea and lunch time is unsupervised and that's really difficult because that's chaos for autistic children. So we set up a visual chart and on Monday Josh was going to play ball with Paul and on Tuesday he was going to read a book Mary. So a list of activities and the whole class and he-everyday Josh chose and activity and then the teacher chose the child from that, so every day at play time a child would go and do an activity with Josh. And that was just to get him used to them and them used to him. I made picture books with a picture of every child in the class each year and one or two interesting things about each child so that Josh could try and learn their names, even if he know Zach and Zach likes playing cricket. So at least he could link one-the name, the face, and one personality trait about that kid. But it was all generated from me, none of it was really suggested by the teachers, so just simple things like that. Just simple five minute ideas for teachers to help them teach social skills with autistic kids. They have to be simple, they have to

be quick, so that was quite a good one. And it didn't have to be the whole play time, it was just like five minutes. He might go and play ball for five minutes with somebody or do a construction or something. So I think the schools are quite key.

Closing remarks and call ended.

Karlyn Sullivan-Jones Interview Transcript

Description: Parent

Date: 2/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: So what experience have you had with children with autism or special needs?

K: I am the parent of an eight year old boy with autism.

J: So with your son, what have you found is the most important social skill that he has trouble with that you want to treat in therapy or at home?

K: Probably interacting with his peers at school and with his brothers. Being a little bit more social.

J: Do you have any particular methods or ways that you try to help and improve on this interaction?

K: We try to help him by reminding him by saying things like “take a look at who’s here, grandma’s here, say ‘hi grandma’”. We constantly remind him.

J: Have you found that that’s helpful in allowing him to interact more? Does he respond to that kind of commenting?

K: Yeah he responds, but he always needs a prompt. So it’d be nice for him to do it without prompting.

J: Have you used any therapists or anything like that with your child or is it just a home based learning for you?

K: We have used ABA therapy in the past.

J: Has that been effective for you?

K: It was when he was learning to talk when he was about four. Yeah it was very effective.

J: In your therapy or at home, have you used any technological devices or tablets or anything like that to help him with problem areas?

K: Yeah. We used an iPad. I can’t recall the programs that we’ve used.

J: Do you have a basic outline of what they do or what they help with and target?

K: Not really (light laugh)

J: That's alright. So with the tablet and everything that you've used, have you seen it help at all or has it been effective?

K: Yes, we used his computer now and we've used a lot of different devices in the past but he has a Mac computer now which is definitely effective now because he loves technology and basically he's learned how to communicate with this technology. Yeah we embrace that.

J: When your son uses all these technologies, have you seen any significant room for improvement in them or have you been relatively satisfied with how they work and how effective they are?

K: Yeah relatively satisfied.

J: Is there anything in particular that you would change if you could? Or just keep it the same as it is?

K: In what way, what do you mean?

J: I guess in regards to the applications he used if you recall.

K: (long pause) I'm not really sure what you mean.

J: That's fine, I'm sorry if I'm not being clear. If there was any big problem that you had with them that you would change to make it better?

K: Not really.

J: OK. With these various forms of technology, what kind of communication skills did they help learn? What did they help him do better?

K: They helped him with his reading. And they helped him with all sorts of things really. They use a lot of different programs at school to help with his math and solving math problems using the iPads. Just overall communication.

J: Do you have any comments or questions in general about the technology in therapy? Are you happy with using it? Has it been good or bad for you?

K: I do feel really good.

Closing remarks and call ended

Leahn Simeon Interview Transcript

Description: Parent

Date: 4/4/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: What experience have you had with children with autism or special needs?

L: I have a son who has autism and I have worked as a teacher's aide with one other child with autism... oh two. One was autism, one was Asperger's.

J: So we're focusing this project around social skills. In your experience, what do you think is the most important social skill, in either your son, or the other children you've worked with-what social skill do you think is most important to treat and address in therapy?

L: Do you mean a social skill like making friends? That's the one I would like schools to focus on. Schools teaching children how to include other kids.

J: Trying to help your son make friends like that, do you have any approaches or methods that you use to try to have him interact more or have children talk to him more?

L: I used to try and invite kids around for him to play with after school. He would have a different- they could see him in like a different setting. I used to coach any sports teams that he played in so that he could get a game and make sure that he was given a few go in the sports teams and things. I don't know...

J: Does your son go to a public school or a special education school?

L: He finished school now, but it was a public school.

J: When your son was in school do you know of anything that they used there to help with him? Was it a normal school setting?

L: It was just a normal school setting, but he did, when he was very young, when he first started school and when he was at kindy he had a teacher aide assigned to him so that he had help in the classroom. And so then the teacher aide would work with him or a group of kids, not just him.

J: So another part of this project that we're doing is looking at... what kind of experience, if any have you had with using technology as a tool to help your son advance or in the past?

L: He's 21 now, so when he was at school- the technology is different now to what it was then. It was only really beginning to be used in schools. It wasn't really something we could happen???
4:15 through that we could now. I couldn't really comment on that. Are you talking about digital technology?

J: Yeah, tablets, videos, anything.

L: They didn't really have tablets or TV but they did have a special grip for him on his pencil to grip it properly. He had a special chair that he was supposed to sit in. We took him to a course to teach him to desensitise because he was quite sensitive to touch and textures and stuff.

J: Given the technology that exists today, if you redid it, would you be interested in using that kind of technology to help him in therapy?

L: Yeah, I'd be interested in using the digital technology: iPads or tablets or anything like that. I don't teacher aide anymore so I haven't seen it for myself; how good technology is in the classroom, but I hear other people talking about how good it is.

J: Theoretically, if you did use it, what would you look for in that kind of device? Do you have any particular things you always wanted to exist that didn't exist for your son?

L: I don't know because you don't know what you didn't have. I guess I'd look for instructional things that had really good pictures with simple instructions. Whether it be routine or learning something new, even something as simple as forming your letters properly.

J: Was there anything that your son particularly liked to interact with growing up?

L: When he was very small, he really like Teletubbies on TV and then he really liked Barney the Dinosaur. Now that he's older, he's really obsessed with Marvel and D.C. super heroes. He liked cricket when he was younger; he liked watching cricket. He had his own cricket gear and he would get dressed up and watch the New Zealand team on TV.

J: Seeing that you experienced it from both ends, as a parent and a teacher aide, what kind of differences have you seen between treatments at home and treatments in the school for the other children? Did you approach differently in how you helped your son versus how you helped the other children in school?

L: The children I worked with at school had special needs and I wouldn't say I approached it differently, I used the same approach because I was still working with my child at home.

Closing remarks and call ended

Marie Kiwara Interview Transcript

Description: Parent

Date: 3/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: So what experience do you have with autism in your situation?

M: What experience? The only experience that I have—I never really knew what it actually was and I'm kind of still learning, my only experience is through my son.

J: Have you recognized a problematic social skill that he has that you feel is necessary to address and treat?

M: Sorry what?

J: Is there any social skill that your son has a problem with that you want to treat with him?

M: Oh. Well he doesn't—well he was always kind of a loner. He's been to—do you know what Kohanga Reo is?

J: I do not.

M: Well he started at Kohanga Reo and it's—our indigenous people of New Zealand, Maori, and so we take our kids to learn Maori, to speak the Maori language. So he's been there from practically birth—from birth to school. He never spoke once at Kohanga and I never knew what was wrong and I just—I used to worry about that. Now that he's seven, he's speaking a bit more... all I can really say is my experience so if I just tell you what I go through—what he goes through so from the start to the end—well not to the end but till now...

J: Yeah that's fine. We're just looking for your experience so anything you can tell us is perfectly fine.

M: So I pretty much knew something was wrong. I mean boys will be boys and they're late developers but it just would've—you know when he was turning four and I was thinking he would start doing the same thing and we didn't find out—we went to see the pediatrician two weeks before he turned five and he sent me to a psychiatrist in [town]—but our pediatrician said “Your son has signs of being autistic.” So yeah I didn't know even what that meant then and then going to see the social psychiatrist and he explained more and more to us what it was and everything he was asking my son was like checking off all the boxes like what the psychiatrist was saying I was like “oh my gosh yes yes!” so that's when we were told. So two weeks before school and my boy didn't have any—even though he went to a school—call it a kindergarten, even though he went there constantly everyday he still had no—he didn't really have any social skills, you know, he didn't want to play with anybody didn't know how to kick a ball he would

just roll it. He preferred to sit there with all his trains—he loves trains—one thing he knew, he couldn't talk but he could name every single train in Thomas the Tank Engine, you know there's a lot? And he knew they're numbers as well, of each train. So that, you know, used to impress a lot of people, they were like "how does he know that?" And he's excellent with the computer. We had to take—his dad is a computer technician and we had to—he was so bad about getting up to go to the computer each night that—he'd wait until we were asleep and he'd go and sit on the computer and do anything he could. Anyway, his dad took it apart and we got up the next morning—not like all apart just pulled some parts out of it but to switch it back you'd have to really be on to it and he's three years old and he—we got up in the morning and it was all put back together.

J: Wow.

M: Yup he just loves computers, he's like really—he likes designing train tracks but on the computer or he can draw it. So the only things that really interest him are yeah, computers, and trains, and tracks, engineering kind of things, checking things out and drawing.

J: Have you ever used his interest in technology help you with anything therapy-wise? Like have you used a computer to help him in therapy?

M: Yeah I've put a lot of apps on there for him to—you know like shapes and sounds and alphabet stuff and he'll go through it but he'll get bored with it, he'll get very bored with it yeah. Another thing is with his—when we used to go home, we used to go-- we live close to Kuranga *inaudible* every day I'd turn left I'd turn right and right again and we're home. Well sometimes if I go right to go another way home he'd use to scream. He hated—because every day pretty much this is how I used to go home and drop him off and go and do what I was going to do and he would just really scream and play up in his younger days like five and under.

J: Are any of the apps that you put on the computer for helping him with social interactions or are they all educational?

M: He plays Roadblocks and Minecraft. So those are the other things he plays.

J: Have you seen them help him advance more using these applications?

M: Not really I don't know. Like he's always on YouTube. There's a whole lot of applications on the computer, his dad keeps deleting a whole lot of stuff that he puts on he's like "What is this?" and he'll delete it and it's a thing to build firetrucks and stuff. I don't know where the site's he got it from but it was pretty cool. But yeah it took up a lot of storage so his dad kept deleting it so he kind of gave up on that after a while. And his tablet—well his sister broke it last—at the end of last year so we haven't gotten another one just yet but we will. He's been kind of out and about—down and out about that but we've just been limiting his time on the computer now and he knows the deal now, it's like after school half an hour off and that's it—same with his sister. But you know sometimes for good behavior it might be a bit longer. SO we've been able to put those into him now, like "you can get longer turns for doing something good, tidying up your room." Yeah.

J: Okay is there anything that you want your technology to be able to help him with in regards to education or advancing socially that it doesn't do?

M: Yeah everything. He's still in his—this year is a new school year and he's still in his same class and he's telling me—like the first school I enrolled him in, which was total immersion Maori, each report told that he was the lowest of the whole school and that he should be up here but even knowing the situation I just hate hearing that because he's so awesome and otherwise way advanced in—you know, in other ways, in other areas he wasn't, like he can't read. I'm worried that he's not going to be able to get these skills in time, you know? I can't really explain myself properly.

J: Is there anything just in general that you feel about technology in therapy for children with autism, just any general comments about it?

M: Yeah I think technology is great for kids like my son. Yeah I think it should be all over, to be honest.

Closing remarks and call ended.

Nerilee Shipman Interview Transcript

Description: SENCO

Date: 2/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Quotes/Recording: Yes

Anonymous: No

J: So in your time as a teacher and principal have you seen any particular social skills that are underdeveloped in the children that you feel you need to specifically focus on developing?

N: The social skills that a lot of them lack are reading people's emotions and how to behave appropriately in social situations. I mean some of the students will walk straight up to someone, invade their personal space, and then start yelling because they just don't know.

J: So with these social skills, how do you help them in your curriculum to develop them and improve on them?

N: We have various programs and the health curriculum, of course, deals with making friends and, you know, those types of things but it's really—there's nothing in particular unless the student is working under an RTLB, which is a Resource Teacher for Learning and Behavior, and they're allocated to schools and so they'll often come in and they will observe, for a start, in all settings and then they will take what they know and they'll design, you know, a particular strategy for the students. It-- it could be support at lunch time with interactions or it could be in the classroom and what the teacher needs to do in particular circumstances.

J: Do you know any of the specific tools they use for that or are there not any specific tools or is it just an assisting situation?

N: They probably have a tool kit there, I mean they do run programs—these programs called "Circle of Friends" which an autistic student would attend with, you know, a couple of other students that need little support in that area and they're good role models and then, you know, the learning and resource teacher would be in to facilitate interactions and use what comes up as opportunity for teaching. They probably—I mean they rely heavily on—probably research and there's a textbook I know that they have that has got a lot of different ways of dealing with autistic or Asperger type students and they will look at that and work out which parts of that textbook are appropriate for the student and then, you know, pass that information on to the teacher and it would've been the teacher and myself. So possibly then I'm not the right person to talk to about that because I, you know, I do my job they do theirs and we sort of interact on what we've decided together.

J: What role do you play in the education process?

N: A SENCO facilitates individual planning meetings with students. I facilitate the links between the home and the school; I—a support staff member is involved in whatever has been designed then you ensure that that support staff member has the training that's available to, to assist and

you check on that person as part of your appraisal process so then you have to access the support services I think that's quite important because often that's tricky because the support people have a certain quota and often your quota of students need that's supported more than, you know, they are capable of (6.40-6.50) working with. It's always a numbers and a hunting (??) sort of game.

J: When, in general not even necessarily focusing on social skills, when you decide to bring a new tool or a new product into your school, are you one of the people who helps to decide how you do that or what tool you decide to purchase?

N: Yes, I mean that is usually a senior management—what you're dealing with there is usually anything like that goes to senior management so principals of different schools or that sort of thing. Usually, nowadays, it needs to have some sort of research background so that you can see that there are results that could be, you know, used in your setting. It's no good just to trial something without having any sort of known benefit to the students.

J: When you look into these new things, have you considered or purchased any technology tools in the past?

N: Our focus recently has been building up the technological capacity of our workplace. Providing equipment so that students have access to that. There—in the past there have been programs which some of the students have used and there's very minor technology has been in our setting for reading support with talking pens and that type of thing. This year the focus is going onto some sort of work through a brain app that will be purchased.

J: Sorry what was that last one?

N: It's—it's like a neuro brain type app that is there so that the students—I can't really tell you too much about that because that's not my field of expertise but I know that it is being investigated.

J: When you're deciding about these things is there anything that the teachers themselves communicate to you what they want for these products?

N: I think the teachers, when it comes to, you know, supporting their students are fairly overwhelmed, they don't necessarily know what is out there and is available and they don't have the time to but they want the help so they say "well look, you know, I would like something that's going to help with these students" so occasionally you'll get a teacher that's—would've done a little bit of research or will say something a little bit further and I don't think they're actually aware of what's out there as, as a senior management I mean there's a lot out there nowadays but we're not necessarily aware of what it is and of course what it's costing.

J: Do you have any comments or concerns, just in general, about this field and how it could be improved for the future?

N: For autistic students with technology—technology appears to work quite well with the students, I can think of examples, that in the past where we have used it to calm a student that had an outburst, that often supports them with the writing process which a lot of the children that

I've worked with who have autism seem to really find writing difficult and there's some good structure programs and then they give good feedback to the students with things like rockets and things which they color as the student get answers right or does something correctly and then it blasts off into space and that type of thing and a lot of the students—they have been boy heavy in our schools so those sorts of things have appeal to the boys I suppose. Anything that can also be used alongside practical activities would be good. And I think, you know, what works best for some of these students is the relationships and that's key. You've got to have a teacher that believes in the students that wants, you know, -- and forms a good relationship with them so that some of the other things are overlooked.

Closing remarks and call ended.

Sarah Spence Interview Notes

Description: Speech Language Therapist at Kimi Ora

Date: 10/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording: N/A. Quotes: Yes

Anonymous: No

- Accent
 - access to it-limited hand function
 - specifically made for their kids
 - come with grid-keep finger on button
 - had it for 1.5 years
 - useful-things that are easy to edit
 - Mytap
 - parents/users themselves that can custom make-able to drag some in from this selection of words
 - not have too many steps
 - not too specific to be successful on market
- language teenagers might use “hi” “piss off”
 - language with friends and not with parents
 - i’m angrey vs i’m having a dreadful day
 - don’t choose other vocabulary, give them the options, cognition skills where and where not to use that language
 - communication apps could be physical
 - not limited by
 - used for people who had all these skills and are losing them
 - degenerative illnesses
 - record yourself saying stuff and have it on an ipad
 - easy to edit, intuitive to use, something that offers variety, templates you can adjust
- Worked in U.K. and here for 12 years
 - iPads have been quite a shock to communication
 - low tech has high tech equivalent as app
 - brilliant idea
 - technology fails-dropped, food, breaks, dies
 - robust transit
 - app with PODS
 - goes with PECS
 - picture exchange communication symbols
 - exchange picture for return of something else
 - build up to using sentences
 - large number of people with autism with PECS
 - Proloquo2go-higher functioning good access, good cognitive skills, difficult to understand
 - best for ages 12-13
 - iPod touch size

- Accent is not fashionable, don't use it because it's not cool
- fits needs in relation to what's available
 - colorful semantics app
 - objects green, verbs red
 - person-> action-> object
 - different symbols systems
 - symbols can be confusing with change
- Dynavox
 - start with grid
 - type first three letters of word, predictive text, top 10 used first, more quickly
 - accent can connect to comp to bluetooth and put in on a word doc
 - core for whole messages
 - qwerty keyboard for small words
 - control mouse with left/right/up/down buttons
 - image to find what he needs
 - can input stuff into search bar
- like tech?
 - none of them do exactly what you need and want
 - "fan of low tech"
 - voice away for 3 days, really limits him-when it broke
 - favors something with low tech option
- improvements?
 - put all options of words on there, "they have little control of what's on there anyway"
 - something you can print off
 - liked what she used
 - tech needs to be easy to navigate (took her 20 to add a word once)
- liked?
 - Dynavox, number of apps, private therapy
 - GoTalk-record onto 5 levels
 - paper overlay-just add in on
 - so much out there, all is useful for some people
 - need something that meet everyone's needs-diverse
- before market suggestions(getting products)
 - anything that you design actually needs to go out and be tested
 - observe practicality, see first hand how it'll be used, observe it being trialed in natural habitat to catch early fixes
 - needs to be designed by IT staff in collaboration with therapists and knowledgeable people

Trish Tennant Interview Transcript

Description: SENCO

Date: 3/2/2016

Interviewer: Julia Smith

Note Taker: Hope Shevchuk

Recording/Quotes: Yes

Anonymous: No

J: In your time working with children with autism and special needs have you seen any particular social skills that they have difficulties with that you'd like to focus on in your therapy and improve on?

T: Probably getting—I was going to say getting along but probably working alongside or playing alongside other children is one of the issues. For our high functioning children, appropriate conversations around breaking into a group is one that I've been working on and requesting play and also appropriate comments to children. The general give-and-take in a conversation is not always there and, at best, with some our classic autism children we provide them with a script so the other children—the neurotypical children understand that it's a script for them.

J: What kind of methods or tools do you use to try to address these social skills and make them better?

T: A lot of work with peers. I get a little group and that has been our general way, I haven't used technology as such though I have used technology as a tool if that's something that the child is interested in that so the give-and-take and taking turns, requesting, saying "thank you", "my turn", "your turn". And that would be anything that the autistic child the child with autism has as his major focus, you know, something that motivates the child. So really the small group work has worked best.

J: So you have seen improvement in your students by using that kind of approach?

T: Yes, they've met goals, and some of them have been very small goals, for one or two children it's been as much as the child—the group of neurotypical children coping the child with autism's behavior so the child with autism would spin the wheels on a scooter and the neurotypical children would copy and then that reciprocal thing and they would scoot around on it later on and eventually the child started to use the scooter appropriately, doing it that way. And then we had big ones where children have either learned to script quite well and have sufficient skills to be able to interact in a playground situation without our assistance.

J: So you said that you haven't used any technology but you said you used it if the children wanted to, could you expand a little bit on that?

T: Yes we've got several children who are fascinated—whose motivator are iPads so we'll play games on iPads and we'll have one iPad and two or three children and they've got to take turns. So it's really—the iPad is the motivator not the—it's not a social program as much—we haven't used any social programs other than Schroeder's games called *Socially Speaking*. I've given that

to children and that's worked well with some of our high functioning children with autism or special needs.

J: In general, how do you feel about integrating technology into your therapies; do you think that's good, bad, indifferent?

T: I think it's good when it's appropriate or if it's appropriate. We've got some children who are not in the slightest bit interested in using technology and we try with them just a little bit now and then and we keep on trying but to some they've taken an interest and it means we can use some of our reading, writing, and math programs that we have on computers on technology we've been able to use that but for some children they're just so adamant that they won't play with it and so we don't use it or we use very low tech things such as Social Stories and visuals, yeah not the technology as we know it, iPads and iPods and computers.

J: So in regards to the kinds of methods, the tools, the visual aids that you use currently, is there anything that you kind of wish existed that doesn't exist or something you would improve or like to see improved in these methods that you use?

T: Well it would be nice to see some tried and true or tested iPad apps that we could use either as instructional—well with instructions for us that children could use but generally I think we've made what we've got work with the children so I'm not sure that there are out there—well maybe they are and I don't know about them, but there doesn't seem to be a great deal and we haven't been researching it so I really don't know what's out there and available but that's what I would like to see. Perhaps more importantly is if it was available in a really obvious way. We get drips and drabs of emails saying try this app or try this particular program and there's no real go-to place to find these things. So a go-to place.

J: If you had the opportunity to try this technology you would be willing to at least try it?

T: Oh yes absolutely.

J: So with the methods that you do use to help them with the communication and interaction, does it differ depending on if the child is low or high functioning or is it about the same approach that you use?

T: It's more about the individual child. We'd look at the child's abilities and I suppose they do differ, the programs do differ for some children, we can just explain to them what we're doing and what we want but for some classic autism children, they don't—we don't always know what they understand or what they—whether they get the point of what we're doing and so it often takes a lot more scaffolding for the children with classic autism for them to understand what we're doing but having said that, for our high functioning children, they don't always see the point in having a lot of friends or—so we have to scaffold them—everyone really very individual we treat them very individually and look at their needs and scaffold accordingly.

J: So overall do you think that you're satisfied with everything that you've used and do you think that the children enjoy utilizing these methods in general?

T: Yes they do enjoy it we make sure it's enjoyable for them. One or two of them can only sustain a short time and then they want to stop and we respect that. They make it quite clear they've had enough of playing with other children or being with other children. For others who are happy to carry on with extended or take it to outside games or other social situations—because we're on State Highway 1—are you in New Zealand or are you in the States?

J: We're in Wellington right now.

T: Oh I see. We're on—our school is placed on State Highway 1 and we have a Mobil station across the road from our school and we've asked them to be part of our social group and our children go over to buy milk for the staff room and they'll go over and have conversations and we've asked them as part of it to, you know, -- given them scripts to make sure the children ask for things and you know that sort of normal give-and-take that they will meet in everyday sort of situations. Yeah—so yeah we're happy with what we've got but we're never satisfied. We always want more or we're happy to try other things.

J: Definitely. So in your therapy do you generally utilize one-on-one teaching or is it a group session or does it depend?

T: For the children, we sort of break things up into several situations according to their need. It's usually one-on-one or two-on-one maybe me with one of the teacher aides so that they can carry it on working with the child and a buddy or a couple of buddies. And sometimes, like right now in the afternoon, for a short time, 10-15 minutes, the teacher aides work on social programs and communication and sensory and these things are written in so they'll be working with the actual children-- as we speak they've got several neurotypical children over with them and they group the children together and they have—they have games and things and the reciprocal social thing is in the foreground, you know, paramount at this time. So they're—it's differing all the time, though we do have this period.

J: I think that's just about all that we wanted to cover, do you have any additional questions or comments just in general regarding this field?

T: No not really.

Closing remarks and call ended.