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**The Communication Choices of Students
with Autism Spectrum Disorder who are Nonverbal**

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who provided me with the educational

opportunities they never had.

The Communication Choices of Students with Autism Spectrum Disorder Who are Nonverbal

Abstract

The development of technology has seen the arrival of powerful tools that can enhance communication for individuals with Autism Spectrum Disorder (ASD). Smartphone and tablet technologies are readily available, portable, and changing the way we all work, learn, socialise and play. These devices also have the capability to function as Speech Generating Devices (SGDs) to support children and adults who experience significant communication challenges (McNaughton & Light, 2013). There is considerable debate about which of the three relatively common Augmentative Alternative Communication (AAC) options; manual signs (MS), picture exchange (PE) or iPad®, iPod® speech generating device (SGD), are best suited to the needs of students with ASD and who are nonverbal (van der Meer, Sigafoos, O'Reilly, & Lancioni, 2011). Finding a cost and time effective intervention is important as learning, mastering, maintaining and generalising AAC often requires an intensive teaching process (Achmadi et al., 2014).

This thesis describes two studies involving the use of AAC modes with students with ASD who were nonverbal. The AAC study investigated how quickly nine students with ASD learned to effectively use three AAC systems (MS, PE and SGD) and identify preference for a communication system. This extended previous AAC research by considering the relationship between device preference and acquisition skills. A second study (The Playground study) investigated how three students utilised AAC to interact or engage in playful activities to support the development of peer relationships during break-times in their school playgrounds (Bauminger & Kasari, 2000). Links between observed playground

activities and the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007) required a significant shift in thinking of teachers and their peer groups.

The thesis links research theory with teaching practice with the potential to influence policies, procedures and practice for managing the successful inclusion of students with ASD in their local schools. The expectation from the studies is not only to improve understandings of how to teach new communication skills to students with ASD who are nonverbal, but also to ensure that AAC skills enable access to learning in the whole school environment.

The AAC study utilised a single case experimental design with multiple-baselines and alternating treatments. Each participant's performance was compared across baseline, interventions and follow-up phases. The Playground study used an observational and narrative approach which included documentation of the participants' behaviours over time.

Key findings from the AAC study reported that five of the nine students learnt all three AAC systems with four students requiring fewer sessions to learn to use their preferred AAC mode. Evidence from The Playground study demonstrated that using a preferred AAC to select play actions prior to the student's entry into the playground resulted in increased spontaneous engagement with peers. Two of three students made substantial gains and one a more modest gain in reducing ritualistic behaviours and increasing play activities for a small part of each break-time.

Limitations to the studies included the diversity of the participants in ages, their prior experience with AAC and the variable support provided in their primary schools, preschools and 'home schools'. Both studies involved a small number of participants for a relatively short duration. Some procedural modifications occurred through oversights or decisions made on site during interventions. Research that includes a larger cohort and longer duration would provide valuable evidence on which to base future communication interventions. The

influence of AAC on spoken language should be specifically measured as well as the long term maintenance and generalisation of skills that provide opportunities for communication with peer partners. The value of break-times as a naturalistic instructional context for play needs investigation with links to the curriculum so that students with ASD participate as learners in their mainstream playgrounds. Both studies have helped develop an understanding of students with ASD and how they can learn to participate in the same world as their peers.

Overview of the Thesis

Chapter One

Literature Review: Introduction, synthesis of international research associated with the study.

Chapter Two

The AAC Study examined the following research questions;

Can students with ASD who are nonverbal learn to use three AAC systems?

Can students with ASD who are nonverbal demonstrate a preference for one AAC system and if so is the SGD the preferred AAC system?

Can the use of a preferred AAC system influence the rate of acquisition of an AAC system?

Chapter Three

The Playground Study investigated the playground experiences of 3 boys to address the research question;

Can AAC increase the participation in mainstream playgrounds for three students with ASD?

Chapter Four

Discussion: Interpretation of findings, limitations, future research.

Glossary

| | |
|-------------------|---------------------------------------|
| Kai | Eat; food; meal |
| Kaiawhina | Helper |
| Kapa Haka | Māori performing art |
| Mana | Authority; power; prestige; influence |
| Māoritanga | Māori culture |
| Marae | Traditional Māori gathering place |
| Pākehā | New Zealander of European descent |
| Te reo | Māori language |
| Whānau | Family |
| Wairua | Spirit; soul |

Source:

Calman,R.,& Sinclair,M. (2001). Reed Essential Māori Dictionary.
Auckland: Reed Publishing (NZ) Ltd.



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Chapter 1 Literature Review

Introduction

For many years researchers have been seeking to discover the causes of and treatments to manage the condition known as Autism Spectrum Disorder (ASD). The disorder first described by Kanner (1943) is generally characterised by impairment in three areas: unusual patterns of behaviour, difficulties with social interactions and delayed or unusual functioning in verbal and nonverbal communication (Mirenda, 2009). Severely delayed language development, which includes non-verbal behaviour, is a hallmark characteristic of the students in this study.

Thirty years after the work of Kanner, a report was presented to the Society for Research in Child Development entitled, *Language development in non-verbal autistic children using a simultaneous communication system* (Creedon, 1973). It is generally thought that this was the first public presentation on the successful use of a formal, simultaneous communication system i.e. speech plus manual signs with nonverbal students who were identified at the time as 'autistic'.

During the last years there have been many interventions and trends tried and tested for students with ASD (Mirenda, 2009). Even making a diagnosis of ASD is challenging as the three core impairments of social behaviour, rituals and communication can overlap with communication disorders.

During this period, the movement from special facilities to inclusion in mainstream schools for students with ASD has been a world-wide trend, requiring different interventions

based on individual students' abilities and learning capabilities (Friend & Bursuck, 2002; Sigafoos et al., 2010; Turnbull & Turnbull, 2006). All students in a mainstream school spend their break times in the school playground where there will be opportunities for play and the development of social competence. Playful interactions are strengthened by communication between play partners and for students with ASD who are nonverbal this can occur with the use of a communication system. While there is the potential to dichotomise clinical interventions and those undertaken in natural environments, a deliberate focus of the current study has been to bring together these potentially polarising positions to support choice making for children with ASD who are non-verbal. The study seeks to make explicit links between the need for communication and the need for inclusion as evidenced by the order and flow of themes within the literature review and across the wider thesis.

The framework for the Literature Review has five key themes. The first theme presents an introduction to (ASD) Autism Spectrum Disorder; the characteristics, prevalence and the impact that seeking student preference can have on choice-making skills for students who are nonverbal. As many individuals with ASD have severe speech impairments they can benefit from augmentative and alternative communication (AAC) intervention.

The second theme explores how students can acquire the skills to indicate their preference from three main AAC options and the influence this may have on the success of the intervention and the long term benefits of an effective communication system.

The third theme is concerned with assessment and intervention; an accurate diagnosis is important for the future communication and learning outcomes of students with ASD. The range of assessment models and interventions will be outlined with a focus on context and cultural appropriateness of both assessment tools and interventions. An accurate diagnosis of students with ASD can increase the likelihood of effective interventions. Because they are a

diverse group with different behaviours and learning capabilities they require different interventions (Matson & Neal, 2010).

The fourth theme focuses on inclusion as the trend towards mainstreaming students is an increasingly common choice for the parents of children with ASD. This theme describes the challenges of defining inclusion and the role of parents and educators in achieving a learning environment that is inclusive for students with ASD.

The final theme focuses on mainstream school playgrounds where students with ASD can potentially learn new skills, form friendships and interact with their peers. This section will explore the experiences of students who are often successfully supported within their classrooms but for whom the playground experience includes isolation, loneliness and/or vulnerability. The importance of the school playground will be identified as a context that may contribute to inclusion and also providing opportunities for physical exercise and the provision of leisure activities. The school playground experience of students with ASD has had little attention from researchers despite the hope that this context will provide opportunities for social interactions and play (Couper, Sutherland, & van Bysterveldt, 2013; Ingram, Dickerson Mayes, Troxell, & Calhoun, 2007).

Autism

Autism is a neuro-developmental disorder characterised by the early onset of impairments in reciprocal social interaction and communication, and restricted repetitive behaviours or interests (Lord & McGee, 2001; Lord, Risi, & Pickles, 2004). The most recent change in the *Diagnostic and Statistical Manuals (DSM) Fifth Edition*, (American Psychiatric Association, (2013) being that the three separate diagnoses, Autistic disorder, Asperger syndrome and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) have

been merged into a single diagnosis, known as Autism Spectrum Disorder (American Psychiatric Association, 2013).

This has resulted in the diagnosis of ASD being expanded to include students who were previously identified as having an intellectual disability. Although ASD is identified as a low incidence disability it is now one of the most common disabilities affecting the developmental trajectories of children (Boyd, Odom, Humphreys, & Sam, 2010; Coolican, Smith, & Bryson, 2010; National Research Council, 2001). All disorders on the spectrum are characterised by communication impairments of some type with more than half of the individuals identified with ASD lacking verbal and non-verbal skills necessary to access their basic needs (Cafiero, 2001).

ASD is a condition that is not easily understood but it is a disorder that has generated a wealth of research, as will be suggested throughout this chapter. While reported rates have increased there are some possible explanations for this which will be explored in the next section.

ASD and Prevalence

Over the last three decades, the number of children identified with ASD has increased all over the world. The increase has been estimated to range from 0.04% of European children in the late 1960s and early 1970s to 1-2% of all children by the late 2000s (Lai, Lombardo, & Baron-Cohen, 2013). In the 1990s ASD was considered rare, affecting 0.4-0.5 per 1000 students (Fombonne, 1996; Gillberg, Steffenburg, & Schaumann, 1991; Rutter, 2005). Ten years later, Fombonne (2009) suggested that the best estimates based on recent surveys for ASD was 60-70 per 10,000, with 20 per 10,000 a conservative rate.

In 2014, the overall prevalence of ASD among children aged eight years who lived in 11 sites within the Autism and Developmental Disabilities Monitoring Network in the United States was 14.7 per 1000 (one in 68 children) (Baio, 2014). A recent study in England reported a prevalence of students with ASD as 116.1 per 10,000 (Baird et al., 2006.) and in 2011 to be one in 100 (Ravet, 2011). In New Zealand, it has recently been estimated that one in a hundred children are diagnosed with ASD (Ministry of Health, 2013).

There is limited knowledge about the prevalence of ASD in less developed countries although a study in China for all students under 15 years reported an excess of 25 per 10,000 (Wong & Hui, 2008). In Iran 1.32 million five-year old children participated in a screening programme for ASD in three academic years from 2006 to 2009; the number suspected as having ASD was 24.09 per 10,000. The children were subsequently given a diagnosis of 'autistic disorder' by means of The Autistic Diagnostic Interview-Revised (ADI-R) and the number reduced to 6.26 per 10,000 (Samadi, Mahmoodizadeh, & McConkey, 2011).

Generally, it has been estimated that ASD occurs four times more commonly in boys than in girls (Sturmeay & Fitzer, 2007). Figures from the study in Iran for students identified with ASD between 2006-2009 showed 9.86 per 10,000 boys and 2.44 per 10,000 girls (Samadi et al., 2011).

There is no unequivocal understanding of the causation of autism or why the global prevalence rates appear to be rising (Ravet, 2011). Some evidence suggests that there is a genetic component to ASD with support for this thinking being provided by sibling studies (Bailey, Phillips, & Rutter, 1996). Attempts to link environmental factors to ASD, including prenatal exposure to viruses, are made by Bauman and Kemper (2005).

Variation in ASD identification is suggested as one reason for the range of estimates (Avchen et al., 2011). In the city of Shiraz (Iran) in 2008, a rate of 190 per 10,000 was found

from parent responses for 1,680 students aged 7-12 years (Ghanizadeh, 2008). The high rate is considered to have resulted from parents reporting unusual behaviours that overlap with features of ASD (Samadi et al., 2011). Screening tools in Iran rely on parent reporting with little time for experienced assessors to observe or interact with the students (Baird et al., 2006).

Different child rearing practices, tolerance and expectations around children's behaviours can be reasons for difference in prevalence figures, as can parental concerns and requests for assessment. In developing countries, parental literacy may be a factor; assessors may need opportunities to observe and interact with the children as part of the diagnostic process and reduce reliance on parent reports (Samadi et al., 2011). Screening of children for ASD in Iran uses an Iranian translation of the Social Communication Questionnaire (SCQ) (Rutter, LeCouter, & Lord, 2003; Sasanfar & Ghadami, 2006).

Iranian families may be more tolerant of some behaviours their children exhibit compared to families in Western Societies. In New Zealand, Māori or Pasifika families may not consider some social behaviours (such as lack of eye contact) a concern (Ministries of Health and Education, 2008). Different cultures may be troubled by different deficit social and communication behaviours. It is for this reason that cultural influences on parental perceptions of children's difficulties should influence the choice and adaptation of screening and assessment tools (Samadi et al., 2011).

The increase in the reported prevalence of ASD is still surrounded with controversy, whether or not this is due to an increase in awareness, changes in diagnostic practices or because of a true increase in ASD (Fombonne, 2005). Regardless of the reason for increased reported prevalence, there is an increasing demand on services, which include schools, preschools and other agencies, for students with ASD. Because early detection and

intervention are top priorities there is requirement for an increase in resources for the diagnosis of ASD. Early detection has resulted in more students being identified and an increased need for interventions/treatments, and accommodations for longer duration (Matson, 2007; Matson, Dixon, & Matson, 2005; Volkmar, Lord, & Bailey, 2004).

Communication

Generally, students diagnosed with ASD experience difficulties with social communication, social interaction and flexibility of thought. The students in the current study have Autism Spectrum Disorder and at the beginning of the study were considered non-verbal. The focus in the next section is on their need for communication, with a description of the process which provided a communication option that was each student's preferred choice.

ASD affects nearly all aspects of development but students who have ASD and who are non-verbal are at greater risk for delays in social, cognitive, language and literacy development than students with ASD who have some language. The introduction of AAC together with appropriate interventions may enable social interactions and communication for a variety of purposes. AAC technologies may be the means for building social interactions with young students because "without access to communication students with ASD are at continued risk for impairments in language, cognitive and social development" (Drager, Light, & Finke, 2009, p. 249).

AAC systems and interventions can be the tools for ensuring effective communication but only if they are appropriate. Some AAC technologies do not appeal to young children as they are drab and unattractive (Light, Drager, & Nemser, 2004). The AAC technologies need to be easy to learn with appropriate visual symbols, signs and gestures because these are attributes on which to capitalise. The organisation of the information, as

well as how the student is expected to navigate his/her way through the system, should be considered with the student's needs or capabilities in mind. Students need to be able to easily select their choice and rapidly produce some form of output such as a printed or auditory product. Most AAC systems are created by adults without disabilities. There is a need for AAC systems to be redesigned to maximise and support the individual needs of the student with ASD (Drager et al., 2009).

Because it is unlikely that many individuals with ASD will be able to verbalise their preference, other ways have to be found to enable them to indicate which of the AAC options they prefer to use. The selection of an AAC device should only be decided after a systematic analysis of learner characteristics and environmental demands (Schlosser, Blischak, & Koul, 2003). This will establish how the learner currently communicates, what vocabulary is required and which communicative mode should be taught. A decision can then be made as to whether an aided or unaided AAC system will suit the learner best.

Individual student characteristics and the context in which the student participates strongly influence the outcomes. Factors identified by Sigafoos and Iacono (1993) can support the decision to use photographs or line-drawings, displaying the message or using synthesised or recorded speech. The portability of the device is often very relevant as is the ability of the tool to attract a listener to receive the communication.

Three commonly used AAC options for improving communication are MS,PE and SGD and considerable research has explored the merits of each (Achmadi et al., 2014; Myles, Grossman, Aspy, & Coffin, 2007; Rogers, Charman, & Stone, 2006; Sigafoos et al., 2010; van der Meer, Didden, et al., 2012; van der Meer & Rispoli, 2010). The current study addresses just three of a range of AAC options and has a restricted communication focus, one

vocabulary word, one communication function and one context and utilise just three of a range of AAC options namely visual, aural and physical modes.

The reason for selecting these AAC systems was to utilise three relatively common systems that employed a somewhat different mode of access and output. It is acknowledged that these are only a very small sub-set of a much greater pool of AAC systems (e.g., alphabet boards, high tech communication systems). However within the constraints of the study it was viewed that the three selected were to a degree representative of the variety. Similarly the Proloquo-2-go application was one of many available applications marketed towards supporting communication for students with ASD and complex needs. Further studies could look at a wider range of options for example to consider student preference including the use of more than one option per child.

Manual Sign Language

Manual signs that included gestures were introduced in the 1970s and taught to individuals without functional language (Churchill, 1972). However, by the 1980s manual signs were often taught with speech, an intervention known as ‘total communication’ (Mirenda, 2009). Early research findings show that children with ASD can learn to use manual signs (Seal & Bonvillian, 1997). These studies described the implementation of total communication (speech and sign) but not sign alone.

The greatest disadvantage with manual signs is that they are not always understood by the community in which the student operates (Wendt, 2009). In New Zealand, manual signs from the Makaton Sign Language system (Makaton, 1998-1999) are sometimes taught alongside a laminated photo or drawing of the sign for a specific request. However, a student with poor hand-motor coordination may not easily use manual sign language and may prefer

another communication mode (Tincani, 2004). Students with ASD are thought to have difficulty with language symbols that are transient in nature, such as spoken or signed words (Schlosser, Sigafoos, & Koul, 2009). Manual signs may actually be easier to acquire than the use of graphic symbols such as those based on Makaton Sign Language because the student only has to use a physical sign rather than sift through an array of graphic symbols for a specific choice.

The Picture Exchange Communication System

The Picture Exchange Communication System (PECS) begins by teaching children to request preferred items or activities as positive reinforcement (Bondy & Frost, 2009). This is unlike other approaches to speech language training which begin with children naming objects or activities. Many children with ASD regularly use visual supports as they are fairly un-intrusive and can be individualised. Adults frequently use visual supports, such as calendars and lists, so similar visual supports for students can be seen as a usual occurrence. This helps lessen feelings of difference (Meadan, Ostrosky, Triplett, Michna, & Fettig, 2011).

Although research has shown that PECS may improve the spontaneous communication of students with ASD (Bondy & Frost, 2001) there are some limitations. Implementers of PECs need to be trained to follow correct protocol and the perspectives of parents considered. One solution is thought to be training parents as primary PEC's trainers (Park, Alber-Morgan, & Cannelle-Malone, 2011).

Speech Generating Devices

Speech Generating Devices (SGDs) have many advantages over other AAC modes of communication. They are easily used by the student and understood by others so provide a

functional mode of communication (van der Meer & Rispoli, 2010). There are a large variety of SGDs which can be selected and customised for individual interventions, although it is thought that the voice output feature in future models should include sounds and voices that appeal to young students (Light et al., 2004). SGDs have been used by many individuals with ASD since the 1980s and 1990s and significant recent research has been concerned with teaching students to request access to desirable items, like toys (Couper et al., 2014; Lancioni et al., 2007; van der Meer, Didden, et al., 2012; van der Meer, Kagohara, et al., 2012).

Speech Acquisition

While it is unclear if students who do not demonstrate speech at a young age will remain at a pre-linguistic level, it is also difficult to identify a viable predictor of non-verbal communication (Ronski et al., 2009). Bopp and Mirenda (2009) reported that social games and routines emerged as the sole predictor of the development of language comprehension and production in their study of 44 students with ASD. The lack of ability to communicate and engage in games and routines were important deficit play skills which are a documented feature of ASD.

It is noticeable that most research is concerned with young children as early as the 2nd year of life. Until recently, children with ASD were rarely diagnosed before the age of three - four years (Chakrabarti & Fombonne, 2001; Charman & Baird, 2002; Filipek, Accardo, Baranek, Cook, & Dawson, 1999; Fombonne, 2005). Early intervention has been widely researched to show its effectiveness (Rogers et al., 2006; Stahmer & Ingersoll, 2004). Typically developing infants learn to communicate non-verbally through behaviours such as eye gaze, vocalisations and pre-linguistic gestures (Trevarthen & Hubley, 1978). In a study of 14 individuals with ASD aged two and three years, it was reported that they exhibited atypical patterns of non-verbal communicative behaviour for requesting that included

pointing or showing objects, with limited eye contact (Stone, Ousley, Yoder, Hogan, & Hepburn, 1997).

The purpose of the communication needs to be emphasised and valued rather than focussing on the form of the message, such as learning to say words (Lord & McGee, 2001; Volkmar et al., 2004). Speech is only one form of communication so approaches to interventions should consider that some students may never choose to use words but will learn to communicate, in some way, with others (Prizant & Wetherby, 1998; Volkmar et al., 2004).

The decision to introduce AAC to young children is often made reluctantly when parents are concerned that the use of AAC will substitute or delay the development of speech. However, the benefits of AAC as a means of improving both receptive and expressive language were well supported in a comprehensive search of literature by Millar, Light, and Schlosser (2006). It was suggested that the behavioural theory of automatic reinforcement may indirectly result in speech development (Mirenda, 2003). The impact of AAC on speech development has rarely been specifically researched, and enhanced speech production as a result of AAC implementation “is usually viewed as a ‘bonus’ side effect of AAC use rather than a primary goal” (Millar, 2009, p. 173).

When evaluating the success of communication interventions there are four areas of expected increase (Ministries of Health and Education, 2008) “increased spontaneous communication, greater participation in functional activities, generalisation of communication skills across environments, and conventional communicative means understood by a wider range of partners”. Children with ASD need to learn within the social context of the communication task so they can generalise their learning to other settings and partners.

Student Preference

There has been considerable interest in which AAC options work best for students with ASD, and if students who are non-verbal can indicate preference after learning how to use each option. This is one of the most significant developments in the interventions for students with ASD as it enables non-verbal students to have a voice. When beginning an AAC intervention, it is recommended that the selection of the AAC device should be based on what is suitable for the individual and by allowing the student to indicate a preferred choice (Sigafoos, Drasgow, & Schlosser, 2003). Strategies for encouraging the modality preferences of individuals with ASD by providing opportunities for the students to actively participate in the decision-making process have been reported by several researchers (Sigafoos, O'Reilly, Ganz, Lancioni, & Schlosser, 2005; Son, Sigafoos, O'Reilly, & Lancioni, 2006).

Several comparison studies have used student preference as a critical variable. Comparisons between preference for PECS and SGDs have shown a slight preference for SGDs over other modes of AAC (Sigafoos, et al., 2009; Sigafoos, O'Reilly, Ganz, Lancioni, & Schlosser, 2005; Son, Sigafoos, O'Reilly, & Lancioni, 2006; Soto, Belafore, Schlosser, & Haynes, 1993).

Research by van der Meer (2011) which reviewed seven studies assessing preference for various communication options found that while individuals can be taught to use the three AAC options (SGD, PE and MS) for requesting and were able to demonstrate a preference, the evidence base was limited. In another study that compared just two AAC options (SGD and MS) for children with developmental disabilities, three of the four children indicated a preference for SGD with acquisition and maintenance better for the preferred option (van der Meer, Kagohara, et al., 2012).

Pace of Learning

It is possible that a student's preference for using one AAC option over another is the variable in explaining the individual differences in acquisition of an AAC option (van der Meer et al., 2011). The pace for learning an available option is of interest to researchers, with results showing few differences between PECS and Sign Language (Adkins & Axelrod, 2001; Anderson, 2002; Gregory, DeLeon, & Richman, 2009; Rotholz, Berkowitz, & Burberry, 1989; Tincani, 2004).

The relative importance of student preference versus speed of acquisition was investigated by van der Meer et al. (2011). The subsequent study of four students' preferences for all three AAC options (MS, PE and SGD) showed individual preferences for one mode of AAC resulted in faster speed of acquisition of AAC-based requesting and better maintenance of their preferred mode (van der Meer, Sutherland, O'Reilly, Lancioni, & Sigafoos, 2012). From that study, it was recommended that a student's preference should be considered when AAC interventions were designed and interventions implemented.

Links with Context and Communication

In order to make explicit links between context and communication Bronfenbrenner's ecological system was used as a framework to discuss both of these factors (Bronfenbrenner, 1994). Bronfenbrenner proposed an ecological systems view of an individual embedded within a series of complex and interrelating systems. This framework that can be visualised as a series of circles provides a useful way of demonstrating the links between the various contexts and communities that surround the inner circle (microsystem) that in this study includes a student with autism.

The environment in the ecological system (Bronfenbrenner, 1994) is divided into five components: the microsystem, the mesosystem, the exosystem, the macrosystem and the chronosystem.

The microsystem includes the objects and individuals that immediately surround and communicate with a person. For students in the study this included parents, siblings, teachers and whanau. Some students have multiple microsystems that include neighbours, caregivers and peers. The mesosystem which is between the microsystem and the exosystem represents the interaction between an individual's different microsystems and how they influence one another. The third circle is the exosystem and refers to the social settings that influence the student's development and in the current study this includes support agencies, funding and legal services that are managed by the school and Ministry of Education. Also situated within the exosystem are decisions about funding for teacher aide support within the classroom or increased levels of communication technology.

The widest context is the macrosystem that sits outside the micro-, meso- and exosystems and encompasses the attitudes and beliefs influencing the inner circles. In the current study this includes attitudes to inclusion and the social acceptance of diversity and disability by the whole school community.

Bronfenbrenner (1994) conceptualised children's development within this ecosystemic model proposing that a child's development is contingent on and impacted by this series of interconnected social systems (micro, exo, meso, macro) and can change over time (chrono) (Bronfenbrenner, 1994). The chronosystem interlaces all the systems and demonstrates that all of the systems are fluid and changeable. Particularly important is the context in which each student operates, which in the current study includes participating during break-time in a mainstream playground. The quality of the interactions and resultant interdependence

between individuals, as well as the teachers and peers will play an important role and will be influenced by this research model.

Some researchers report that context and communication strategies interact (Sowden, Perkins, & Clegg, 2010) so that programmes need to provide support whilst leaving room for self-expression from the student. The balance between allowing the student freedom of expression and providing support without interacting is a challenge, given that motivation, mood or enjoyment of any activity may fluctuate from day to day. There are numerous variables that might influence AAC preferences and their use that require future research, for example generalisation across settings, using AAC options for communication functions other than requesting and a stronger emphasis on maintenance (Achmadi et al., 2014).

Relationships with adults may also vary for many reasons but students with ASD are entitled to a level of control over these factors (Sowden et al., 2010). Highly directive functional tasks force interactions to follow pre-determined lines often with limited opportunities for interactions. For this reason, it is suggested that student choice and preference for using different AAC options enable individuals with ASD to display some degree of self-determination in different contexts when using their preferred device (Sigafoos, 2006).

In another area of research that compared picture and video prompts to teach daily living skills to individuals with ASD, researchers examined certain student and task variables on the effectiveness of interventions (van Laarhoven, Kraus, Karpman, Nizzi, & Valentino, 2010). These researchers reported that the student's preference rather than the educator's preference should determine which instructional method or material should be used. The preferences suggested and implemented by most educators are those that they know and with which they feel comfortable (Cihak, Alberto, Taber-Doughty, & Gama, 2006). The choice

may be based on time constraints to source or create new resources or lack of skills with new technology or other intervention strategies.

For many educators who have traditionally acted in the best interests of the student and made decisions without consulting the student, this is a significant professional shift. Put simply, when educators listen to the voices of the students in their care, provision will be more effective because it relates to the individual student's experiences which hold greater promise of successful outcomes. While this may present complex challenges for schools and support agencies, it does, however, present both a "challenge and an opportunity" (Russell, 1996, p. 118). Really listening to students often requires a role reversal with the student informing the teacher or the parent in the decision-making process.

It is nearly 20 years since it was recommended that students were key players in any assessment, planning of interventions or provision of support services, and that their views needed to be heard despite the challenges that existed (Russell, 1996). Many positive messages for listening to and learning from pupils with disabilities had been reported by Wade and Moore (1993) who investigated the views of students with special educational needs. Interviews revealed that the students valued positive feedback on their progress, classroom organisation that encouraged learning and development of peer relationships, opportunities for leisure and social activities, and being considered for positions of responsibility within the school. The promotion of pupil participation and engagement in decisions that affect their lives, such as health and wellbeing, is still a very important development (Vickerman, 2012). Surprisingly, opportunities to engage in chosen sports and physical exercise may make a significant contribution to the move towards inclusion and self-determination simply by being an occasion when student choice is questioned and considered.

The understanding that professional services can seldom be wholly effective without parental support and empowerment has been well recognised, but relatively recent research reported that the involvement of individuals with ASD, even in the assessment and intervention process, extends the notion of a family-centred approach which strengthens family functioning and collaboration with professionals (Iacono & Caithness, 2009).

Assessment and Interventions

Assessment is a necessary tool for diagnosis and can also be used for celebrating the progress of each student as a learner. Diagnosis enables everyone, including the individual with ASD, to identify and start to make sense of, cope with, and adapt to the strengths and challenges of the condition (Jones et al., 2008). ASD can be confusing and distressing and have a big impact on the quality of life and learning of the student. A diagnosis may enable access to specific agencies and the establishment of a partnership between parents and support services. An accurate diagnosis may also trigger legal protection and, in some countries, including New Zealand, access to some entitlements under disability legislation.

One of the challenges in accurate diagnosis is being able to reliably differentiate ASD from similar presentations, such as impairments in social behaviour, rituals and communication disorders (Ingram et al., 2007). This is particularly difficult when assessing young children who, as toddlers with ASD, display speech-like sounds that are linked to a language level similar to typically developing children of that age. The main difference found by Schoen, Paul, and Chawarska (2011) is that toddlers with ASD do not tune into the language model of their environment. They also use non-speech vocalisations more than a typically developing age-matched group.

While the bulk of research has focused on conventional forms of communication and has provided a great deal of information about the communication deficits of children with ASD, it presents very little information about how communication occurs with unconventional behaviours. Pre-symbolic communication refers to gestures such as pointing, tugging or whining that are often used by children who are non-verbal and have ASD. It is a form of communication which is generally quite effective and understood (Rowland, 2009).

Studies of Young Children

Studies of very young children emphasise non-verbal behaviours such as eye gaze, vocalisations and pre-linguistic gestures. Children with ASD are typically unable to demonstrate the same non-verbal behaviours to communicate (Stone et al., 1997). Young children with ASD who are aged two to three years tend to point at or show objects rather than using any other form of communication such as reaching or giving objects. Different behaviours can be used for different reasons; sometimes children with ASD even produce high-pitched squeals (which listeners consider unpleasant) to deter others from interacting with them or imposing on their activity (Schoen et al., 2011).

A number of studies describe the specific communicative characteristics of children with ASD aged two to three years (Paul & Chawarska, 2008; Wetherby et al., 2004). These were summarised by Chawarska and Volkmar (2005) to include abnormal gaze patterns, limited social referencing and sharing of affect, low frequency of joint attention, showing or commenting, and low levels of non-verbal communication. In addition, students showed inconsistent responses to their name, conventional gestures or interactive games. Pretend play was also limited as was interest in people, and sometimes there were unusual vocalisations.

Researchers agree that children with ASD are delayed in the acquisition of spoken language (Tager-Flusberg, Paul, & Lord, 2005); Wetherby et al., 2004) but they also show deficits in the use of early gestures to coordinate attention between objects or events and another person, to share experiences or follow another person's gaze, or to shift another person's attention using gaze (Iacono & Caithness, 2009). These deficits create fundamental impairments in social cognition and communication (Mundy & Sigman, 1990). Language includes socially agreed words and sentences to convey meaning, already an area of need for children with ASD. With children with ASD who are nonverbal however, it presents with a whole host of difficulties (Matson, Mahan, Kozlowski, & Shoemaker, 2010). As noted in reports by Lord and Paul (1997), 50% of children with ASD do not develop spoken communication after the age of five.

The overlap between the characteristics of ASD and communication disorders has been a concern for a number of years (Churchill, 1972; Mayes, Volkmar, Hooks, & Cicchetti, 1993; Rojahn, Matson, Naglieri, & Mayville, 2004). In an effort to improve differential diagnosis between ASD and other communication disorders many measures have been created ruling out other disorders and determining that ASD is present (Fenson & Dale, 1993; Matson et al., 2010). It is suggested by Matson et al. (2010) that as researchers and clinicians who are primarily involved in ASD are not always experts in language disorders, assistance may be needed to identify communication disorders that are ASD specific.

Assessment

Researchers agree that early diagnosis of ASD is a priority (Rogers et al., 2006; Stahmer & Ingersoll, 2004). Early identification, diagnosis and treatment can improve the long-term functioning of children with ASD by improving social and communication skills, adaptive behaviours and even IQ (Manning-Courtney, Brown, Molloy, Reinhold, & et.al.,

2003; Martinez-Pedraza & Carter, 2009; Wainer & Ingersoll, 2011). Many researchers suggest that the clinical diagnosis of ASD can be reliably assigned in the 2nd year of life (Chawarska, Klin, Paul, & Volkmar, 2007; Chawarska, Paul, et al., 2007; Cox, Klein, Charman, Baird, & Baron-Cohen, 1999; Klin, Chawarska, Paul, Rubin, & Morgan, 2004).

Relatively recent research by Hattier and Matson (2012) continues to support the need for the development of measures to identify early symptoms and diagnose children with ASD at an earlier age. An accurate diagnosis and assessment is believed to increase the chance that an effective treatment will be put in place. The U.S. National Research Council Committee on Educational Interventions for Children with Autism (2001) recommended that entry into intervention programmes should not even wait for a confirmed diagnosis. The diagnosis will be more stable, however, if it is made by a multidisciplinary team of experienced clinicians.

Assessment and Inclusion

There are an increasing number of assessment models that use more person-centred approaches that involve both the individual, his/her family in the process. This approach is represented by Bronfenbrenner (1994) as the microsystem that includes teachers, parents and whānau and encourages input from those who are consistently supporting and present in the daily life of the individual.

Assessment is described as the starting point for an education system that is more inclusive and more responsive to diversity; inclusion is considered to be supporting students with ASD to not just attend but also to access the curriculum (Ainscow, 2007). In New Zealand the importance of assessment has been well documented, suggesting that effective teaching and learning relies on collecting, analysing and using robust, valid, reliable assessment information in order to identify an effective learning pathway especially for students with ASD (Ministry of Education, 2009). Assessment raises several questions about

the reason for the assessment, the selection of an appropriate model for assessment and who will be involved, and why.

Assessments that Use Play

Two assessment models that no longer focus on a clinical diagnosis but involve observations made by parents or those closest to the student in the student's environments, are those that use play and narrative assessments.

Because many assessment models are concerned with receptive and expressive language production, it is often difficult to gain information from students who are non-verbal or use limited oral language and gestures. Researchers Bopp and Miranda (2009) found that social games and play-based assessments revealed effective pre-linguistic predictors of language development with children with ASD aged four - five years. They found that the specific skills required for engaging in games and routines like turn-taking, chasing, singing or dancing are important predictors of later language development. The skills involved with playing 'peek-a-boo', for example, requires a child to take turns, be aware that people and things exist even when they are not visible (i.e., object permanence), imitate actions with objects (e.g., remove the blanket) and respond to social bids by a partner. Playing 'patty cake' requires turn-taking and skills in imitation, joint attention and social engagement. Chase games require joint attention and, like singing and dancing games, depend on modelling and imitation of conventional actions (Bopp & Miranda, 2009).

A study by Stone et al. (1997) used the Pre-linguistic Communication Assessment (PCA) to assess the requesting or commenting behaviour of 14 non-verbal two and three year old children with ASD. The situations used play and were designed so that the child could

direct an adult's attention to an unusual event. Opportunities for comment included letting a balloon fly across the room, a remote car rolling across the floor, or pretending to spill a glass of juice. Opportunities for requesting included offering a clear jar of crackers with a tight lid or suddenly stopping a game of swing.

The Ingram-Troxell Playground Behaviour Checklist (2007) provides a different approach to identifying students with ASD by listing behaviours that are common to students without ASD. The checklist uses the context of play and requires observations that take place in a playground. This takes the assessment task out of a clinic or classroom, providing instead observations taken during opportunities for play with peers, which have “fewer constraints and confounding variables” (Ingram et al., 2007, p. 318). Children with ASD are easily distinguished by four common social behaviours: social isolation, absence of social play with peers, invasion of personal space, and socially inappropriate behaviour (Ingram et al., 2007). The behaviours are listed with indicators and scored according to the behaviour being present. (Appendix 1 lists the Ingram-Troxell Playground Behaviour Checklist with The Key Competencies of the New Zealand Curriculum)

Narrative Assessment

The current focus on standardised assessment in New Zealand schools is centred on the premise that learning is predictable, sequential and measurable (Williamson, Cullen, & Lepper, 2006). This approach risks labelling some students as failures forever as the students never achieve the standard that is expected for their age group and cannot demonstrate their learning (McIlroy & Guerin, 2014).

Narrative assessments use approaches that help everyone interacting with the student to notice, recognise, respond to, and revisit student learning in ways that are meaningful for

students, teachers, families, whānau and educators (Carr et al., 2005). Input is sought from everyone involved with the student's learning. The provision of links between assessment and the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007) raises the profile of students with ASD who are seen as learners alongside their peers.

Needs-based Assessment

As greater numbers of students throughout the world are being identified with ASD (Avchen et al., 2011; Fombonne, 2005; Samadi et al., 2011), the identification of priorities and services requires a needs-based assessment that follows on from the diagnosis (Brown, Ouellette-Kuntz, Hunter, & Kelley, 2010). Students with ASD are receiving medical attention, physical, occupational, speech/language therapy, and therapies for emotional, behavioural and developmental problems more often than are children without ASD (Gurney & McPheeters, 2006). Students with ASD need intensive professional support from a range of services that are already overloaded with some researchers suggesting that an examination of the unmet needs of children and their families is required (Krauss, Gulley, Sciegaj, & Wells, 2003; Siklos & Kerns, 2006).

Un-met Needs Assessment

Needs-based assessments involve assessing a family's unmet needs and are predicated on the understanding that every family has different strengths and requirements; not all families need the same levels of support. It is believed that this type of assessment has the potential to help policy-makers and service providers rethink eligibility criteria and the process of accessing care (Brown et al., 2010). Unmet needs, including difficulties in gaining access to appropriate services by families in both high and lower resource settings, have been reported (Divan, Vajaratkar, Desai, Strik-Lievers, & Patel, 2012).

Families cope in different ways; the impact on a family after a child has been diagnosed with ASD may be more or less than what was expected (Brown et al., 2010). The restrictions on socialisation, such as taking the child shopping, visiting other families, or even being able to use a babysitter, are described by some parents as an overwhelming burden, whereas others do not experience any problems with these activities (Cassidy, McConkey, Truesdale-Kennedy, & Slevin, 2008). Factors contributing to a parent's perception of need are the child's age and gender, the presence of comorbid conditions, and the time of diagnosis. The parent's income, education, marital status, place of residence (urban or rural), and changes made in employment, together with the child's level of functioning, the impact that the child's disability is having on the family unit, and the quality of accessed support and its use are additional factors influencing perceptions of unmet needs (Brown et al., 2010).

Researchers are only just beginning to identify the factors associated with unmet needs among families who have a child with ASD (Brown et al., 2010). Service providers need to rethink the eligibility criteria and the process of accessing care so that the development of resources and services are responsive to the specific needs of families (Krauss et al., 2003). Funding and the role of services have influence at the exosystem level (Bronfenbrenner, 1994), with links between the family and the legal and social welfare services available to each family. The uniqueness of each student with ASD and the changing needs of the family are considered in order to provide the most productive and effective match between the student and programmes or services (Delmolino & Harris, 2012).

Interventions

Choosing interventions is not easy for either educators or parents. There are very few clear answers for parents seeking guidelines for choosing treatments, including knowing what to expect, how to find practitioners or how to access help for funding (Mackintosh, Goin-

Kochel, & Myers, 2012; Schlosser & Raghavendra, 2003). A relatively recent emphasis on evidence-based programme approaches to decision making for choosing interventions requires decisions to be based on the evidence of current research, as well as constant questioning and evaluation of the decision (Schlosser & Raghavendra, 2003).

Decisions that are related to the increased uptake of AAC solutions for individuals with ASD who are non-verbal reflect the greater affordability, availability and social acceptance of the I-Pad® and other mobile technologies. Mobile speech generating devices such as I-Pads® are also generally easy for many parents, educators and siblings familiar with such technologies to use (McNaughton & Light, 2013).

AAC interventions, however, need to be appropriate for specific learners, in specific contexts, to meet specific needs (Mirenda, 2009). Failures in the use of AAC often reflect limitations in the training procedures and instructional methods rather than problems with the AAC. Selection of AAC tools requires practitioners to consider a combination of factors that include the quality of instruction, the learning environment and the student's preference.

ASD and Cultural Perspectives

While it is difficult to obtain comparative identification of children with ASD from around the world, researchers are becoming aware of the different services, assessment strategies and cultural influences that do exist. Obtaining information on the identification of children with ASD internationally is important as procedures for assessment and treatments may not be adequate or appropriate in all settings. For example, there is the potential for cultural mismatch between assessments and treatments for a child with ASD (Matson et al., 2010). Researchers have identified the need for cultural awareness with regard to the construction of assessment tools, the manner in which assessments are administered and,

especially, the method used to share the diagnosis with family and caregivers (Bevan-Brown, 2004; Chiang, Soong, Lin, & Rogers, 2008; Samadi et al., 2011).

Responding to cultural diversity, particularly in the field of special education, involves special educators to reflect on their practice, and not just at the assessment stage (Samadi et al., 2011). As stated earlier, the macrosystem of Bronfenbrenner's ecological system represents the attitudes and ideologies of the culture in which the individual is situated and influences all of the other systems around the individual. Culturally responsive practice includes ensuring that families understand what is being discussed at meetings so that interventions and instructional goals will be both effective and appropriate. Such content also needs to be part of teacher training programmes in order to ensure that teachers are able to be open to culturally diverse students. The training model from the University of Texas at Austin, for example, organises teacher preparation programmes that provide experience and pedagogy in cultural diversity which has not been part of the traditional agenda for preparing teachers to work with students with ASD (Garcia et al., 2010).

Perspectives of Parents who are Māori

The perspectives of parents and whānau of 19 students with ASD from 17 families were investigated by Bevan-Brown (2004). To gain information from Māori parents about their experiences of raising their children with ASD in New Zealand, user-friendly procedures were established that enabled parents to share stories of raising their children. This approach, aligned with recommendations by an advisory group (Bevan-Brown, 2004) was regarded as being more culturally appropriate than an interview format with set questions. Research in Māori contexts in New Zealand have found that when methodologies leave participants out of the conversations or interactions, participants feel they are

experiencing, “something done *to* them rather than *with* them” (Bishop & Glynn, 1999, p. 198).

In order to gather comments about what had been helpful or unhelpful over the years, the study by Bevan-Brown (2004) allowed participants to tell their stories and share experiences and opinions that were meaningful to them. Unlike the Iranian screening tools that relied heavily on parent reporting (Sasanfar & Ghadami, 2006) and linked directly with school entry to either a mainstream or a special school, there was no agenda. The parents’ experiences during the original assessment varied but there was strong support for having a visit from someone who would sit down over a cup of tea and explain the diagnosis, the services available and the eligibility to entitlements. This represents a culturally appropriate process rather than a visit to a clinic or formal letter because as one parent suggested, “we love our kai and we love to talk” (Bevan-Brown, 2004, p. 6). All but two parents favoured the inclusion of some degree of cultural input because they felt that ASD was hindering their children from involvement in cultural activities valued by their parents, such as kapa haka, learning te reo, and staying on the marae.

Participants in the study by Bevan-Brown (2004) identified a number of suggestions for service providers, doctors and educators of students with ASD to help overcome barriers in the provision of culturally appropriate practice, effective assessment, teaching and ASD related services. One parent described how her child acted differently in his natural environment compared to the hospital setting which she felt resulted in an inappropriate diagnosis. “His only way of dealing with his fears and anxieties is that he acts out and his behaviour just becomes appalling and he cries and he screams and he hits and he drops” (Bevan-Brown, 2004, p. 61).

This research reported many issues common to all families with children with ASD, regardless of their cultural background. Problems relating to assessment included inappropriate assessment tools, inexperienced assessors, inadequate time to assess properly, subjectivity of assessments and time-wasting assessments. Some recommendations included an increase of personnel, and provision for parents of ongoing assessment, information, assistance and support together with increased related financial support. Friendlier approaches should be adopted for access to resources, entitlements and transitions. Teachers and other professionals' knowledge of ASD together with Māoritanga needed to be increased with the up-skilling and expansion of existing Māori personnel. (Abbreviated from (Bevan-Brown, 2004, p. xiii).

There were reported advantages and disadvantages of service provision for children with ASD from Māori-medium education and Māori services. The cultural content, wairua and inclusive supportive attitude of staff to children in educational facilities and the friendly style of Māori service providers was seen as beneficial but the lack of expertise concerned some parents (Bevan-Brown, 2004).

ASD and Service Provision

Specialist Service Standards were developed in New Zealand in 2006 to ensure consistent quality specialist provision for all students with special education needs with compliance that relied heavily on parent reporting (Ministry of Education, 2006). The development process included consultation with parents, specialists, young people and educators, and ongoing monitoring and review. While the aim was to ensure that standards were met and difficulties identified, the perspectives of assessments, treatments and AAC options were important because parents are frequently not only the first communication

trainers and partners for students with ASD, but usually become their best advocates throughout their lives.

Parents are often first to notice differences in their child. The most common early concerns from parents all over the world and from all cultures appear to be in relation to speech delays, language development, signs of socio-emotional behaviour and medical problems or delays in reaching milestones (DeGiacomo & Fombonne, 1998). In a small scale New Zealand study by Le Grice and McMenamain (2001), four of the five parents suspected a problem with their child's development between two and two-and-a-half years while the fifth parent was aware of a problem when her child was just six months old. The majority of the parents in the Bevan-Brown (2004) study also reported that they became aware their children had difficulties prior to two years of age but diagnosis of ASD did not happen until much later. This gap was attributed to a range of factors including long waiting lists, rural location, caution of the medical profession to label and excessive documentation.

In some countries all children are screened for ASD at school entry to determine school placement. An example of this practice is Iran where a compulsory national screening programme began in 1993 for all children aged five-six years. Parents of these children wanted to enrol their children in the first grade elementary school (Samadi et al., 2011) and completed a survey as part of the screening procedure. It is suggested that the results were influenced by the parents' motivations as they wanted their children to attend a mainstream school rather than a special school. A diagnosis of disability was seen as stigmatising.

While it is acknowledged that the early diagnosis of ASD and early intervention can result in fewer challenging behaviours and better outcomes for families and whānau in New Zealand (Ministries of Health and Education, 2008), the decision to consult a general practitioner is a parent's choice. Difficulties accessing an early accurate diagnosis and

choosing therapies have been identified as parental concerns by Le Grice and McMenamin (2001). Recommendations for therapies were reportedly by word of mouth, or from information from parent support groups and professionals but this small study found that information provided at the time of diagnosis was variable.

Early research reported that parents may not even be participants in the assessment and intervention process that follows the diagnosis of ASD (Dunst, Johanson, Trivette, & Hamby, 1991). Family involvement in both the assessment and intervention processes helps to keep the student with ASD viewed as part of the family unit and a valued member of society. This model offers a means of obtaining information, preserving ownership of the intervention by the student and the family and including the whole family as part of the team (Beukelman & Mirenda, 2005).

Assess Then What?

When a student has been given a reliable diagnosis of ASD, the two main areas of deficit will be socialisation and communication. Deficits in the area of socialisation can result in isolation from others and poor social relationships. Over thirty years ago Rutter (1978) identified the most specific social impairments as uncooperativeness while playing with other children, inability to form friendships and failure to recognise the feelings of others. Communication deficits can lead to negative consequences including problem behaviours (Sigafoos, 2000). However, later data suggests that the extent or the severity of problem behaviours in students may be influenced by the level of the communication disorder (Sigafoos, O'Reilly, & Lancioni, 2009).

Many problem behaviours may serve a communicative function (Carr & Durand, 1985; Durand, 1986). Functional Communication Training (Carr & Durand, 1985) teaches

more appropriate forms of communication, such as requesting, while choice-making interventions can now provide an individual with ways to exert control, express preferences and indicate wants and needs (Sigafoos et al., 2009).

The tools for communication, including AAC technologies, will not be sufficient alone to meet the communication needs of students with ASD (Drager et al., 2009). Students with ASD, despite interventions and AAC supports, often find great difficulty initiating communication for social interaction. Communication is a reciprocal process and depends on interactions between a student and a communicative partner. Socialisation skills and social competence in turn impact on communicative competence.

Interventions need to be provided that build social interaction skills because communication occurs when there is a need for new information or a desire to interact with others to share thoughts and ideas. There is an argument that interventions should have a focus on the individual needs of each student with ASD and provide alternative strategies for self-expression (Howlin, 1997; Ospina et al., 2008). Numerous interventions designed specifically for students with ASD are without substantiated empirical evidence but still often claim to have a big impact on the condition. Nutritional, pharmacological, behavioural and educational approaches are examples of these (Sowden et al., 2010).

Even traditional behaviour-based interventions such as ABA (Applied Behaviour Analysis) have been found to lack generalisation and the spontaneous use of the targeted behaviours (Schreibman & Ingersoll, 2005). This lack is attributed to the highly structured environment in which the interventions are taught, with targeted behaviours often divorced from communication (Ingersoll, Lewis, & Kroman, 2007). Behaviour-based interventions like ABA are still a common form of intervention (Lovaas, 1977).

Naturalistic Interventions

The response to criticisms of ABA has been the development of naturalistic behavioural interventions, attention to non-verbal cues and regulation of behaviours (Terpstra, Higgins, & Pierce, 2002). Some researchers see little long-term value in individual therapies unless the techniques are taught to and used regularly by the child with ASD in natural contexts (Volkmar et al., 2004).

Naturalistic approaches to assessment and teaching strategies have increased for children with ASD providing opportunities where both context and communication strategies can interact. A programme with eight pre-school children with ASD that used naturalistic behaviour-based interventions enabled adults to have considerable influence in promoting communication in and with the children. It was found that the relationship between the student and the practitioner was able to be flexible across levels of directness and adapted to the changing needs of the children (Sowden et al., 2010). The importance of the teacher-learner relationship in achieving high-quality outcomes for students with diverse learning needs is also emphasised in *Ka Hikitia - Managing for Success*, the New Zealand Government's strategy for Māori achieving success as Māori (Ministry of Education, 2008).

Context is an important consideration both for teaching and assessment. For example, one study reported that students observed during snack time using PE demonstrated a six fold increase in their rate of spontaneous initiated communication (Gordon et al., 2011). Training led to some generalisation as communication for social purposes occurred for more than just requesting, and it is important to note that this happened in the company of other students. In New Zealand, best practice for students with ASD includes interactions with typically developing children rather than through teaching in isolated settings (Ministries of Health and Education, 2008).

Daily Living with a Child with ASD

A family's experience of living with a child with ASD may be an ongoing challenge. Research shows that it is associated with maternal, psychological distress, reduced marital happiness and reduced family adaptability and cohesion (Bromley, Hare, Davison, & Emerson, 2004). Furthermore, the stress experienced by the parents of a child with ASD exhibiting difficult behaviours and deficits, coupled with a lack of community support, is far greater than that caused by any other disability or special need (Schieve, Blumberg, Rice, Visser, & Boyle, 2007).

There is considerable emotional stress for some families trying to support all of their family members or whānau. Siblings, grandparents and extended whānau can be supportive and protective, but sometimes siblings are embarrassed and annoyed by having a brother or sister with ASD and feel 'left out' (Bevan-Brown, 2004, p. 2).

Family members play a critical role in the social interactions and language learning of children with ASD. Because they have a vested interest in the development and well-being of the child they are motivated to support and assist in a variety of ways (Kaiser, Hancock, & Nietfeld, 2000). Unlike professional support and external agencies, family members are always present in the child's environment. It is important that families are involved and informed about all aspects of the intervention process so that they can "provide continuity and consistency" (Drager et al., 2009, p. 261).

Interventions and evaluations need to consider both student and family variables when prioritising goals, expectations and intervention plans. When a family believes the goals are important and appropriate support and training is provided, the student's skills are more likely to be generalised in daily routines (Lord & McGee, 2001). Interventions which occur

throughout the day in natural family routines achieve significant gains while at the same time reducing family stress (Drager et al., 2009). When students make the transition from home to school parents will partner professional support to establish the successful inclusion of their son or daughter in their chosen school.

Financial Pressures

Financial pressure can be significant when families pay for therapies, medication or additional interventions. In many situations earnings are diminished through one or both parents being involved with child care rather than in full-time employment. In New Zealand some government financial assistance is provided to families as 'ASD is acknowledged to be a costly disorder' (Ministries of Health and Education, 2008, p. 64). Assistance includes the Child Disability Allowance, travel allowances, and some funding for structures such as fences. However, families have identified significant other costs in raising a child with ASD. Parents found that damage to clothes, toys, furniture and furnishings were the main cause of extra expense, but transport and health care were also a significant financial drain (Bevan-Brown, 2004).

North American research identified that compared with students with other special health care needs students with ASD were more likely to live in families that experienced financial problems as they were frequently required to pay for additional services and therapies (Kogan et al., 2008; Siklos & Kerns, 2006). Stories of coping with destructive, unsafe, demanding, self-injurious and frustrating behaviours were reported by parents in the study by Bevan-Brown (2004). In addition, parents described how they had to manage case workers with different priorities from theirs, insurance claims that were challenged, negative attitudes of other parents, exclusion from schools or kindergartens, shopping tantrums, and having to 'fight' for everything, even appropriate treatment at the dentist.

A study in India that researched the needs of ten families that included a child with ASD reported similar findings (Divan et al., 2012). The families experienced a tremendous strain on their personal and emotional resources and required additional assistance from their extended family network to manage their financial burden. The study suggested two major strategies to address the issue of the needs of the families: greater awareness of ASD and its impact on families; and the empowerment of parents and families through the development of parent support networks. Sometimes respite care was available only by “sending a child to school” (Divan et al., 2012, p. 198).

The cost of therapies, medication, interventions, support services and lost earnings has a significant economic impact on the families of children with ASD and sometimes for a long period of time. Considering Brofenbrenner’s ecological system perspectives the impact on families could be considered to occur at the chronosystem level as some families continue to provide financial and caring support well beyond childhood.

Inclusion

The movement of students from education in a special facility to inclusion in their local mainstream school has been a world-wide trend now for more than three decades. In the United Kingdom, after the publication of Excellence for All, Green paper in 1997 (Department for Education and Employment, 1997) there was a 16% increase of children with ASD attending mainstream schools (Keen & Ward, 2004) and by 2010 the majority, (70%), of students with ASD or Asperger syndrome attended mainstream rather than specialist schools in England (Department for Education, 2010).

While there is an expectation that all students, including those with ASD, will take a full and active part in the life of their local school, it is acknowledged that some students with

ASD can have major deficits and excessive behaviours which provide significant challenges for schools (Sigafoos et al., 2010). There can be conflict between the acknowledgement of students with ASD as a distinct group of learners requiring a special pedagogical approach, and the argument that most teaching strategies are relevant and effective for all students.

There are implications for those supporting students with ASD in mainstream schools as 'being there' is not enough and does not automatically result in inclusion (Norwich & Lewis, 2005).

A Brief History of Inclusion in New Zealand

Inclusion can be described as a journey that often begins with parents who notice difference and ends with a student attending, participating and contributing in a mainstream school. In New Zealand, the 1989 Education Act provided legislation that enabled the journey towards educational inclusion (Education Act 1989). It embedded parent choice in law and enabled parents to enrol their child at their local school regardless of their child's needs. This meant that students with special education needs had the same rights to receive an education and access to the New Zealand Curriculum (Ministry of Education, 2007) at state schools as students without those needs (Education Act, 1989). Thus, school communities in New Zealand were required by legislation to shift from thinking and believing they were unable to teach students with identified special needs, including students with ASD, to welcoming all students and effectively managing their learning and behavioural needs. A few years later, the Human Rights Act (1993) provided further reinforcement by prohibiting discrimination on any grounds, including race, religion, age, sexual orientation or disability.

In New Zealand, the principles of the New Zealand Curriculum underpin all school decision making and should be consistent with the following eight statements:

High Expectations The curriculum supports and empowers all students to learn and achieve personal excellence regardless of their individual circumstance.

Treaty of Waitangi The curriculum acknowledges the principles of the Treaty of Waitangi, and the bicultural foundations of Aotearoa New Zealand. All students have the opportunity to acquire knowledge of te reo Māori me ōna tikanga.

Cultural Diversity The curriculum reflects New Zealand's cultural diversity and values the histories and traditions of all people.

Inclusion The curriculum is non-sexist, non-racist, and non-discriminatory; it ensures that students' identities, languages, abilities, and talents are recognised and affirmed and that their learning needs are addressed.

Learning to Learn The curriculum encourages all students to reflect on their own learning processes and to learn how to learn.

Community engagement The curriculum has meaning for students, connects with their wider lives, and engages the support of their families, whānau, and communities.

Coherence The curriculum offers all students a broad education that makes links within and across learning areas, provides for coherent transitions, and opens up pathways to further learning.

Future focus The curriculum encourages students to look to the future by exploring such significant future-focused issues as sustainability, citizenship, enterprise, and globalisation (Ministry of Education, 2007, p. 9).

These eight principles are embedded in the way principals, teachers and their Boards of Trustees are expected to design, teach and review the curriculum. All students including those with special educational needs like ASD are entitled to experience a curriculum that engages, challenges, is forward-looking and inclusive (Ministry of Education, 2007). The New Zealand curriculum links strongly with the three principles of the Treaty of Waitangi. Because this study is situated in school environments which follow the Treaty principles to guide the development of policies and procedures for students and teaching practice within the schools, the principles were included by deliberate choice by the researcher as a way of examining and reflecting on the methodology.

Internationally, many policy makers have been wrestling with the issue of the place of children with disabilities in educational settings. The Salamanca Statement and Framework for Action (United Nations General Assembly, 1994) stated that, 'regular schools with inclusive orientation are the most effective means of combating discriminatory attitudes...building inclusive society and achieving education for all' (p.ix). There is no single coherent inclusion discourse dominating the evolution of inclusion in schools (Allen, 2008) which may explain how inclusion can mean different things in different places, and between different schools in the same community and in the same country.

New Zealand was one of 300 participants in the Salamanca Conference. The vision to create a world class inclusive education system soon revealed the need for a paradigm shift if that vision was to become a reality within the next ten years. The direction of policy and practice in New Zealand schools underwent further change with the release of the Ministry of Education's Special Education 2000 (SE2000) policy (Ministry of Education, 1997). This was a funding policy (rather than a professional practice policy) which required schools to become familiar with changes to funding for students with special education needs. It

subsequently required identification, assessment, teaching and learning plans to be implemented for students, which had previously not been a school's responsibility.

Since then, school-specific Boards of Trustees, principals, teachers, and teacher aides have endeavoured to create inclusive schools with inclusive school communities while also managing issues of eligibility, funding allocations, assessment, resources, access to professional agencies and external support, and professional development. School communities have been required to shift their view of disability from an exclusionary to an inclusionary paradigm (Kearney & Kane, 2006). Following inclusive policy and practice has enabled some school communities to make this shift, with inclusion embedded in the reasons why and the way in which they do things. A tool used by some schools to guide their practice is the Index for Inclusion (Booth & Ainscow, 2011) which is consistent with the Teacher Professional Learning and Development Best Evidence Synthesis Iteration for sustaining professional learning and development in New Zealand schools (Timperley, Wilson, Barrar, & Fung, 2007).

The movement towards inclusion in New Zealand grew out of the mainstreaming or integration movements that were occurring world-wide (Ballard, 1999; Kearney & Kane, 2006). Inclusion has now become a common term in New Zealand used to describe how school communities are required by legislation to operate (Education Review Office, 2013). The recent Education Review Office report on inclusive practices in New Zealand schools used a self-review questionnaire completed by reviewers and schools together to evaluate inclusive practices in 152 schools in 2014. The report found that '78% of the nation's schools were demonstrating mostly inclusive practice, an increase from 50% reported in 2010' (Education Review Office, 2015, p. 9). However, the increase is not strictly comparable as the rating changed from students with high needs to students with special education needs.

Defining Inclusion

The terms 'inclusion' and 'inclusive education' have led to a number of interpretations within both public forums and research contexts (Higgins, MacArthur, & Morton, 2008). It is important to explore and define inclusion as many students in the current study attend their local mainstream schools within inclusive communities.

Inclusion has been recently described as a way of viewing education and society and a deliberate move away "from a narrow view of inclusion as concerned only with disabled students or those categorized as having special educational needs" (Ainscow, Booth, & Dyson, 2015, p. 297). Inclusion is a deliberate approach that requires that all students are accepted and take a full and active part in school life as valued members of ordinary classrooms in regular schools (Ballard, 2004; Slee, 2001). MacArthur claims that, "inclusive education stands in contrast to 'special' education, where disabled students are educated in separate schools or classes or treated very differently in the classroom to regular students" (MacArthur, 2009, p. 6) .

A common misconception is that inclusive education requires the student to adjust to fit the setting and co-existing in the mainstream. The use of teacher aides to work with students in 'pull out' or work in 'withdrawal spaces' are practices often used by mainstream teachers to manage the learning of students with special needs. The term 'micro exclusion' is used by Cologon (2013) and D'Alessio (2011) to describe this practice which is perceived to be inclusive education while actually perpetuating exclusion.

While defining and delivering inclusion is still a challenge, all students in New Zealand are entitled to attend their local school and be taught by a registered teacher using the New Zealand curriculum (Ministry of Education, 2007). Recently, the Education Review Office clarified its expectations of schools in New Zealand by reporting that schools that

were mostly inclusive had an inclusive culture, a positive attitude to including students with special education needs and good relationships with parents and whānau (Education Review Office, 2015). According to Jorgensen, McSheehan, and Sonnenmeier (2007), when educators presume competence they are more likely to promote inclusion, with the full membership of the student in a general education classroom, and with supports and plans for learning that use the general school curriculum.

Membership in a general classroom includes the student's physical presence in the classroom and participation in all class activities. However, proximity alone is insufficient to benefit students with ASD so schools must provide meaningful opportunities for the inclusion of students in the school community (Delmolino & Harris, 2012). Additionally, there are symbols of belonging such as having a desk, doing class jobs, having your name called at roll call, and going on trips or camps with peers. Appropriate instruction, supports and accommodations for students with ASD, together with a shared vision of inclusive education by all teaching personnel in a school community, can help students with ASD go far beyond just 'being there' (McSheehan, Sonnenmeier, & Jorgensen, 2009).

Students with ASD and Inclusion

The focus on inclusion is an important feature of the current study because the parents of the participants have an expectation of inclusive practice from the schools where their children with ASD are enrolled. Historically, students with ASD have been seen as "too cognitively impaired" or "not ready for instruction" (Mirenda, 2003, p. 271). Students with ASD are thought to be less able than their peers to meet academic, social and language demands of schools (McSheehan et al., 2009).

Some research supports the idea that students with significant cognitive disabilities, including ASD, can learn academic content that includes reading, mathematics and science (Browder, Spooner, Ahlgrim-Delzell, Wakeman, & Harris, 2008; Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Courtade, Spooner, & Browder, 2007). Such findings support the premise that all students can learn, and that despite their abilities or disabilities everyone should have the opportunity to learn (Finke, McNaughton, & Drager, 2009).

Despite the move towards inclusion in New Zealand, it is usually necessary to secure a diagnosis of ASD in order to receive funding and to access appropriate needs-based support. From one perspective this practice is exclusionary because it emphasises difference and can be a step towards marginalisation for the rest of the individual's life. Yet it is also inclusionary, because it enables identification of individual needs and provision of teaching by an experienced teacher. The label is relevant if it enables families and educators to work together in collaboration. The argument for and against a diagnosis that labels, and the resulting two perspectives of medical labelling and special pedagogies is summarised thus; "The real work of enacting inclusion in schools belongs to teachers, parents, children and young people on the autism spectrum and support agencies working together in participation and dialogue" (Ravet, 2011, p. 679).

As has already been reported, not only have the number of students identified with ASD increased in the last ten years (Blaxill, 2004), so too, have the numbers of these students enrolled in their local school rather than a special unit or special school (Ofsted, 2004; Sigafoos et al., 2010). Parent choice for school placement for their child with ASD can often be based on geographic location; in many situations it is simply more convenient and desirable for all children in the family to attend their local school. The decision may also be based on a parent's values and beliefs about what constitutes an inclusive society (Delmolino

& Harris, 2012). Sometimes the reputation of the local school and the teachers is considered to be the most important factor in making the placement decision. In New Zealand, students with ASD who are non-verbal can be found in their local schools learning alongside their siblings and peers.

Research into teachers' attitudes towards inclusion reported that positive teacher attitudes were an important predictor of the successful education of students with disabilities, including those with ASD (Rodriguez, Saldana, & Moreno, 2012). The complexity or severity of ASD can lead even experienced teachers to believe that while they are able to manage the education of students with special needs, they are unable to manage those with ASD. In this study of 1430 teachers with experience in inclusive settings, three resources were considered necessary: training, expert support and the presence and collaboration of support staff (Rodriguez et al., 2012). Schools that have shifted to a whole school inclusive culture ensure all staff have a clear and shared understanding of the aims and expectations of inclusion within their school for all students, including those with ASD (Eldara, Talmora, & Wolf-Zukerman, 2010; Huang & Wheeler, 2007). It is seen as critical that an understanding of diversity is promoted within the classroom as this means the teacher has support for inclusion from the peer group (Finke et al., 2009).

Challenges for Students and Teachers

Mainstream education can present challenges for students with ASD and their teachers. The typical cognitive profile and learning style of students with ASD can challenge professional assumptions about teaching practice and learning (Jordan, 2005). The inclusion of students with ASD in mainstream schools is complex, and there is the risk of some negative outcomes compared with other learners. For example, the preference for routine, predictability and low sensory stimulation which is common to individuals with ASD is often

hard to achieve in a noisy, colourful, and changeable mainstream classroom (Carrington & Graham, 2001; Morewood, Humphrey, & Symes, 2011).

Many students with ASD who are non-verbal have both learning and behavioural characteristics which make them difficult to manage both at home and school. Some use excessive behaviours, such as self-injury, extreme tantrums and repetitive movements, which make teaching extremely difficult. In addition, these students often have difficulty with attending for any length of time, they lack control or the expression of emotion, and they need to be taught skills in social competence and self-care (Sigafoos et al., 2010).

When they have significant deficits in speech, language and communication development, students who are non-verbal have few choices for communicating with others. Pre-linguistic behaviours become frustrating for everyone as they are often difficult to interpret (van der Meer & Rispoli, 2010). It is for this reason that improving communication using AAC is an essential step towards enabling students with ASD who are non-verbal to access the curriculum, manage their behaviour and interact socially with their teachers, their whānau and peers.

The complexity of catering for the educational needs of children with ASD has required educators to identify new possibilities and alternative ways of teaching, especially in enabling participation in social learning activities (Peters, Forlin, McInerney, & Maclean, 2013). Several research studies reviewed by Vismara and Rogers (2010) identified the effectiveness of behavioural interventions for increasing language, communication, social and academic skills, and modifying challenging behaviours for students with ASD. Furthermore, this trend in education is presenting some teachers with considerable challenges as they manage the learning needs of an increasing number of students with complex needs, including those with ASD (Batten & Daly, 2006; Hart & Malian, 2013). An ever expanding

number of teaching and learning strategies that include typically developing peers are described in the ASD Guidelines (Ministries of Health and Education, 2008).

There will be teachers of students with ASD who need to prepare and adapt different versions of lessons, and it takes time to develop relationships with students, their parents and other service providers which is challenging for even the most skilled classroom teacher. Sometimes there is a discrepancy between the perceived academic strengths of the students and their social difficulties (Moore, 2007).

ASD and Interaction with Peers

Research carried out in the UK in a mainstream secondary school by Morewood et al. (2011) confirmed that students with ASD are at a greater risk from peer group difficulties than any other identified cohort. They are bullied more often, receive less social support, and experience greater rejection and reduced acceptance compared to other students in mainstream settings. In New Zealand it is reported that they are also more likely to be excluded due to a physical assault against another pupil or adult than are other students (Department for Education, 2010).

Students with poor relationships with their peers are more likely to develop behavioural and emotional problems. In addition, those with language and communication difficulties appear to be more vulnerable to peer rejection (Conti-Ramsden & Botting, 2004; Gertner, Rice, & Hadley, 1994) and they are more likely to experience victimisation or bullying (Conti-Ramsden & Botting, 2004; Luciano & Savage, 2007). Therapeutic interventions that tackled depression, low self-esteem and particularly anxiety have helped students with ASD to understand what autism means and how they can manage themselves to

avoid feeling a social outcast or that they do not fit in anywhere (Bauminger & Kasari, 2000; Morewood et al., 2011).

Without any explanations concerning the nature of ASD, other students in a classroom may behave defensively when they see students with ASD behaving differently, being treated differently, looking different, speaking differently, and being supported by different staff (Ochs, Kremer-Sadlik, Solomon, & Gainer Sirota, 2001). Classmates of students with ASD frequently avoid contact with them and resort to age-old negative behaviours like teasing and bullying. This isolating behaviour can be fuelled by a ‘them-and-us’ mentality which is sometimes generated when students are frequently withdrawn from the class by specialist teachers and teacher aides for reasons unknown to their mainstream peers. When peers have an understanding of ASD, their negative behaviours such as rejection, teasing and bullying are often replaced with friendly, supportive and accepting behaviours (Doll & Brehm, 2010).

It is true that peers may struggle to cope with a student with ASD in their mainstream class (Finke et al., 2009). They may see their teacher changing the way he/she teaches, which may include spending less time with them and more time with the student with ASD (Delmolino & Harris, 2012). They may become aware of extra stress in the classroom, and feel uncomfortable and even distressed themselves by the behaviours of the student with ASD (Finke et al., 2009). In some cases they may be frightened of physical contact or afraid of physical abuse.

Target Behaviours in the Playground

A recent systematic review of 15 studies of recess time (Lang et al., 2011) confirmed that the context in which to teach target behaviours such as social communication for students

with ASD is when they are in the playground. While students with ASD can make progress towards their goals in the playground, they need to actually be in the playground, and break-times need to be used efficiently and effectively rather than be reduced or eliminated (Lang et al., 2011).

Earlier research reported that seven students with ASD functioned in isolation during the total recess periods over three days (Schoen & Bullard, 2002) but after a simple intervention (that involved teachers asking the students with ASD to observe what their peers were doing) the students began to notice and copy the social interaction skills of their peers. All students were taught group games, and later a more structured buddy system provided increased opportunities for role playing that improved interaction skills. A deliberate focus on teaching students with ASD and their same age peers how to interact is essential to develop and foster social interactions in the mainstream (Schoen & Bullard, 2002).

Team Communication and Collaboration

There is general agreement from studies that students with ASD can be successfully included in their local mainstream school when there is a commitment to do so, and also with inclusion saturated in all areas of school life, practice and support (Morewood et al., 2011; Ravet, 2011; Rodriguez et al., 2012). Participating teachers in a study by Finke et al. (2009) identified team communication and collaboration as critical elements in the inclusion process. It was important for students to maintain contact with their peers and teachers during the whole school day. When the needs of the student were met by service providers they worked within the classroom, a 'push in' not a 'pull out' model (Finke et al., 2009). A teacher in the study described her perception of successful inclusion for students with ASD:

Our students with special needs are never pulled out of the classroom. They are able to spend all day with their peers and do not miss out on any lessons. The service provider meets the student's needs within the lesson that is taking place and teaches skills in context (Finke et al., 2009, p. 118).

Rodriguez et al. (2012), in common with Finke et al. (2009), reported findings that teachers need more information about how to teach children with ASD, even when they are supported by ASD networks. The inclusion of students with ASD is a challenge, because inclusion is such a complex process. A much earlier study reported more positive attitudes in teachers when they were reassured that they would receive training, support from a team of experts and support in the classroom (Werts, Wolery, Snyder, & Caldwell, 1996).

ASD and Support Agencies

The overall result of increasing numbers of students identified with ASD is that more students are in need of services and accommodations. The life-long nature of the disorder requires a long term and intensive resource allocation for many with ASD (Howlin, Goode, Hutton, & Rutter, 2004; Jarbrink, Fombonne, & Knapp, 2003; Matson, 2007; Matson et al., 2005; Volkmar & Pauls, 2003). There is a strain on current services in terms of cost, provision and organisation of health, social and educational support for students with ASD (Kogan et al., 2008). Inclusion is also a new challenge facing support agencies, particularly speech language therapists and educators who provide additional academic, speech and language support for students with ASD. Effective approaches for their services need to be developed to ensure students have every opportunity to gain friendly peer relationships and maintain self-esteem. For both students and their parents, greater social acceptance and self-esteem may be of equal importance to progress and language development (Laws, Bates, Feuerstein, Mason-Apps, & White, 2012).

Diagnosis and Interventions

Research that explored the experiences of Māori parents found their experiences of the diagnosis procedures and interventions included delays that were not all caused by a lack of capacity of the agencies involved (Bevan-Brown, 2004). One mother explained that the high turnover rate of various professionals made it difficult to build rapport. For a number of reasons, such as organisational rules and regulations, gate-keeping, geographic location and the health of the child, some parents were not able to access appropriate services. Several other researchers also identified access to care as a significant concern (Cassidy et al., 2008; Kogan et al., 2008; Kohler, 1999).

Restriction of activities, unless they were physiotherapy or occupational therapy, is described as *health capture* by Bevan-Brown (2004) and occurred when activities agreed to be effective (such as piano or classical ballet) were not funded. Access to support groups, play groups and parent organisations, as well as to speech language therapists, was limited in rural locations. Parents also felt some medical personnel were overly cautious with labelling and adopted a “wait and see approach” (Bevan-Brown, 2004, p. 53). Examples of helpful people and services valued by participants included Special Education and support service personnel and the parents of other students with ASD (Bevan-Brown, 2004). Other research identifies lack of family support, including respite care, as a concern of many parents (Cassidy et al., 2008; Divan et al., 2012; Kogan et al., 2008; Kohler, 1999). Lack of information about services and entitlements was frequently problematic (Le Grice & McMenamain, 2001).

Studies frequently focus on the student with ASD yet parents, siblings, whānau, partners and carers are key people in the lives of those students. They have practical and emotional needs that require support to ensure that they, too, can enjoy social inclusion as

members of their communities (Ministries of Health and Education, 2008). While it is understood that some parents of children with ASD have multiple roles, the degree to which they are involved will differ. While some parents may prefer to be ‘Mum’ and ‘Dad’ and not become involved with teaching, “roles may change over time reflecting the needs of the child” and their families (Ministries of Health and Education, 2008, p. 65).

Effective Classroom Strategies

The study by Finke et al. (2009) identified effective strategies used by five teachers of students with ASD who required AAC in general classrooms in the United Kingdom. The teachers felt they needed to practice a positive attitude; this was a personal, conscious choice to carry through into their teaching practice. They looked for opportunities to promote understanding of diversity within the classroom, used programmes that adapted the curriculum, and used different levels of support and learning styles to promote student independence. One teacher commented positively that “working with autistic (sic) children made me realise that everyone needs a chance to succeed” (Finke et al., 2009, p. 115).

Positive reflections from five teachers in the study by Finke et al. (2009) can be summarised into four key themes:

- (1) Successful inclusion resulted in an increased understanding of difference and diversity by all students in the classroom.
- (2) Collaborative teaming is a critical element for the successful inclusion of children with autism in general classrooms. Team members need well defined roles and responsibilities.

- (3) All teachers advocated for a push-in model of service delivery. They required specialised services such as speech-language therapy or occupational therapy to be provided in the classroom rather than removing the student from his/her classroom.
- (4) Most teachers suggested that additional AAC training should be provided for teachers and all professionals to ensure team members coordinated their services and understood the roles they played in the inclusion process.

Some negative themes also emerged. Participating teachers said there was stress for all students from the irregular routines, increased noise and activity. In some cases it was the student with ASD who used headphones to block out class noise. Other students in class often became frustrated by the noisy behavioural outbursts of the students with ASD, and in some cases felt fearful. Some teachers described being stressed by frequent interruptions to the class environment by service providers, such as psychologists completing observations which often required the teacher to stop and then refocus the class programme. Teachers found that the time required for lesson planning and preparation increased but their greatest concerns were about managing pressure from the parents of other students who believed their children were receiving less attention (Finke et al., 2009).

Teacher Training and In-Service Support for Teachers

Despite their inclusion in mainstream schools, there is relatively little known about how to effectively teach students with ASD who are non-verbal (Hart & Malian, 2013). Teacher training can help reduce the skills and knowledge gap that undermines teacher confidence and student success, and address the conflict between acknowledging a special pedagogical approach and the belief that pedagogic strategies are relevant or effective for all pupils (Norwich & Lewis, 2005). When teachers do not understand the diagnosis of ASD

they may struggle to anticipate, recognise, understand and address the difference in a student with ASD from other learners (Ravet, 2011). An effective teacher may be able to address the obvious aspects of the learning needs but be unaware that they are seeing “the tip of the iceberg” (Ravet, 2011, p. 676).

With an increase in the number of students diagnosed with ASD, the field of education and teacher training is at a critical juncture. The choices are to focus on student deficits and remediation, expect students to demonstrate specific skills before allowing them to be educated in an inclusive school, or to “develop approaches that foster skill development and engagement with typical peers in natural settings” (McSheehan et al., 2009, p. 434).

For many years, researchers have been reminding educators of the need to understand the complex interplay between disability, language and culture (Cloud, 1993; Garcia & Malkin, 1993a; Garcia & Malkin, 1993b). Students with ASD are culturally and linguistically diverse; teacher trainers are professionally and ethically responsible for ensuring teachers are adequately trained to successfully teach students with ASD in inclusive settings (Hart & Malian, 2013). Some interventions for children with ASD are complex and require specialised training for teachers, low teacher-student ratio and many hours of intervention (Machalicek, O'Reilly, Beretvas, Sigafos, & Lancioni, 2007; Machalicek et al., 2008; Scheurmann, Webber, Boutot, & Goodwin, 2003).

Teachers cannot make inclusion work all on their own. A variety of people enact inclusion in a school: those concerned with securing a diagnosis, those wanting a special pedagogy, those seeking specific ASD provision, and those wanting to deliver mainstream inclusive practice. In New Zealand, the Specialist Teaching provision includes Resource Teachers of Learning and Behaviour (RTLb) who are required to support classroom teachers, and, through them, support students with special educational needs. This is considered best

practice as it enables the classroom teacher to provide ongoing support for the student throughout the school day.

Teacher Aide Support for Students with ASD

Many students with ASD are provided with funding for teacher aide hours for some of their time in the school week. The teacher aide's main role is to support the classroom teacher to manage the learning or behaviour needs of a student. There is a wider issue to address when this partnership is not working effectively. Even a well-trained and experienced teacher aide may struggle to support a student if the teacher and teacher aide do not share the same vision for inclusion (Symes & Humphrey, 2011). This can be evident in teaching practice, the language used, and the placement of the student within or outside of the classroom.

The employment of teacher aides has continued to escalate along with the number of students with special needs (including ASD) attending mainstream schools. In 2004, an evaluation of the Professional Development Programme for Teacher Aides estimated that there were 8000 teacher aides employed in New Zealand schools. Of that number, 2565 (about one third of the total number of teacher aides/kaiawhina employed in New Zealand schools at that time) took part in workshops (New Zealand Council for Educational Research, 2004, p. xv). In 2014, there were 15,000 teacher aides in New Zealand schools with the number of hours to be increased by 800,000 additional hours over the next four years (New Zealand National Party, 2014, p.2). The number of teacher aides will increase accordingly after this Government funding announcement made in September 2014.

Teachers everywhere will argue that teacher aide support is critical to the successful inclusion of pupils with ASD, but research presents a mixed picture. For students who like routine and predictability, teacher aides can provide a secure feeling at times when they have

to move from teacher to teacher. However, some studies show that the more support that a student receives from a teacher aide, the less progress they make. Blatchford and Bassett (2009) reported that students who were supported by teacher aides received less teacher attention, and there was little impact on the overall attainment of the students (Howes, 2003). In addition, the practice of using teacher aides may reduce student independence by limiting opportunities for teacher or peer interactions (Alston & Kilham, 2004; McVittie, 2005). The most important contributor to effective teacher/ teacher aide partnership will be the clarification and understanding of the roles and responsibilities of both the teacher and teacher aide. Communication should include the planning and evaluation of programmes as well as opportunities for feedback and reflection (Ministry of Education, 2014).

Past research has tended to focus on the practice of teacher aides to effectively support students with ASD and not on the issues of inclusion within the school environment in which they work (Symes & Humphrey, 2011). It is important that this inclusive culture is backed with inclusive policies and practices led by senior management, with the aims and expectations of inclusion and student independence supported by the whole school community (Dybvik, 2004; Eldara et al., 2010; Horrocks, White, & Roberts, 2008; Huang & Wheeler, 2007; Ministry of Education, 2014).

The Mainstream School Playground

Parents who enrol their children with ASD in mainstream schools are hopeful that this setting will provide opportunities for social interaction, friendships and play between their children and other typically developing peers (Anderson, Moore, Godfrey, & Fletcher-Flinn, 2004; Woolley, Armitage, Bishop, Curtis, & Ginsborg, 2006). This is not always achieved; students with ASD are not always included in the social networks of their classrooms and, in fact, are often on the periphery (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011).

In spite of increased numbers of students with ASD attending mainstream schools (Ravet, 2011; Symes & Humphrey, 2011) very little research has investigated their experiences in their school playgrounds (Ingram et al., 2007; Kretzmann, Shih, & Kasari, 2014). Researchers have given little attention to the physical design of playgrounds and equipment as contributors to increasing playful social interactions between students (Yuill, Strieth, Roake, Aspden, & Todd, 2007). Sometimes full participation in the playground is constrained by the organisation of space, design of equipment, the landscape and the many barriers such as wooden borders found in playgrounds (Yantzi, Young, & Mckeever, 2010).

Students with ASD may experience feelings of anxiety, isolation and vulnerability in the playground because they often lack sufficient communication skills to engage easily with their peers. They may also have impairments in play skills, such as symbolic, socio-dramatic play, and imaginative or pretend play (Brewster & Coleyshaw, 2010; Lydon, Healy, & Leader, 2011). This results in feelings of anxiety and fear when even the simplest game may require interaction with a peer.

Most students, including those with ASD, do want to have friends and belong to a group of friends (Brewster & Coleyshaw, 2010). Break-time may be the one time in the school day, and for some, the only time in their whole day, when there are opportunities for interactions with peers of all ages and the development of friendships (Pellegrini & Blatchford, 2002). For this reason, as an environment in which to develop these skills the school playground is considered just as significant as the classroom (Woolley et al., 2006).

Limited Opportunities for Play

Limited play opportunities and time outside are a concern for some researchers who reported trends towards schools shortening break-times for all students, including those with disabilities such as ASD (Pellegrini, 2008; Woolley et al., 2006). Time in the playground is

important for all children yet it is becoming marginalised and devalued by adults making decisions on behalf of students (Pellegrini, 2005). Break-times are usually reduced based on an assumption that negative behaviour will decrease and, as the curriculum expands, that time in the classroom is necessary for *real* teaching (Pellegrini, 2005). This decision often excludes from the playground the very students who need opportunities for social interaction. Students with difficulties with social competence which are “interpreted as belonging to the student rather than the wider social environment of the school” are removed from the playground for their ‘*protection*’ (MacArthur & Gaffney, 2001, p.73). When students with ASD are isolated from their peers, they are more likely to develop rigid play routines that lack pretence or social interaction because they require peers to serve as models in the playground (Hess, 2006).

In the United Kingdom, only one in six schools have kept the afternoon break (Woolley et al., 2006). Yet it is during break-times in the school playground where friendships can develop naturally (Bauminger & Kasari, 2000). According to Doll and Brehm (2010) moving isolated students into the everyday play of their classmates is one of the signs of an effective inclusive school. When students are engaged in any form of game or play activity there are more spontaneous initiations and responses between them and their peers (Kasari et al., 2011). The potential for not only moving students into belonging to a social network but also for more socialising outside of school hours occurs when students are experiencing any level of positive peer friendship or interaction in the school playground.

The New Zealand Curriculum in the School Playground

Children with ASD experience difficulties in all forms of communication and social behaviours that are required for successful playful interactions. For students with limited

social competence, lack of play skills and few friends, the playground prompts the development of socially competent interactions (Doll & Brehm, 2010).

Learning in the school playground can be linked to the Key Competencies of the New Zealand Curriculum, confirming the playground as an important curriculum resource. The key competencies are used by people to live, learn, work and contribute as active members of their communities (Ministry of Education, 2007). This includes everyone, including students with ASD, with competencies developed in social contexts and shaped by interactions with people, places, ideas and things.

The playground is a natural context for the social development of all students. It provides a comparatively unstructured environment where students can interact with limited adult involvement. It is where the key competencies are learnt, practised and modelled, and provides what may be an important opportunity for students with ASD to see their peers modelling acceptable skills in relating to others, managing self, participating and contributing, using language, symbols and texts, and thinking. These are the skills that occur in a positive playground.

The mainstream playground has been identified as the setting where students with ASD are frequently bullied (Doll & Brehm, 2010; MacArthur & Gaffney, 2001; Rowley et al., 2012) with those in full-inclusion settings at greater risk of victimisation compared with those in special settings (Zablotsky, Bradshaw, Anderson, & Laws, 2013). Although studies remind us that children with ASD can be victims of bullying, with the playground providing the setting for this unacceptable behaviour (MacArthur & Gaffney, 2001; Zablotsky et al., 2013), a positive playground experience has an enormous impact on the development of skills in social competence, feelings of belonging, self-esteem and well-being (Doll & Brehm, 2010). Behavioural indicators of play and their alignment to the Key Competencies can help educators

identify the skills a student is displaying as well as the skills they need to develop to achieve a degree of social competence.

Interventions that focus on improving the skills of the student with ASD may not be sufficient to influence skills in the ability to make friends, play games or respond to the variety of demands of a school playground. A review of the roles that teachers, parents and peers play in facilitating friendship formation and supporting on-going peer relationships is also required (Rowley et al., 2012). In addition, a few simple strategies can easily be put in place to help time in the playground become more positive (Couper et al., 2013, p. 28):

1. The skills to play simple games need to be taught prior to time in the playground.
2. Individual Educational Plans need to include specific skills required to play popular games that allow interaction with peers.
3. Teachers can seek opportunities to prepare peers to include the child with ASD in their playground activities.
4. Forward planning needs to include some quiet time activities for the child with ASD who may need solitude as well as social contact.
5. Teacher aides and teachers should have shared goals around student independence so teacher aides do not get in the way of friendship /interaction opportunities with peers.

Play and Students with ASD

Play for typically developing five to seven-year old students usually involves some form of interaction with a friend, as well as the ability to initiate activities, share objects and to follow simple agreed rules. Students with ASD, however, rarely engage in creative, spontaneous play, lining up toys by shape or colour, for example, rather than playing as

expected of a typically developing child (Paterson & Arco, 2007). The behaviours of students with ASD are described by Ingram (2005, p. 10) as “rarely initiating or seeking interactions from others and even attempting to escape or avoid some situations”. Once students with ASD reach adolescence these behaviours are challenging, and often result in social withdrawal, atypical behaviours or one-sided conversations (Marks & Schrader, 1999).

Instruction in play skill is considered important for children with ASD (Bates, 1979; Dauphin & Kinney, 2004; Sigman & Ungerer, 1984.). Research by Stahmer and Ingersoll (2003) reported that higher levels of play, such as symbolic play, can be learned using a variety of behavioural techniques. However, the developmental readiness of the student needs to be considered when choosing age-appropriate play activities (Lifter & Sulzer-Azaroff, 1993).

Two methods to teach play skills prominent in research literature are Pivotal Response training and Video Modelling (Stahmer & Ingersoll, 2003). Pretend play skills, whereby students were presented with toys selected after a preference assessment, used both these methods (Lydon et al., 2011). Data were gathered on the number of play actions and verbalisations during baseline, training and generalisation. The results showed both methods increased actions using pretend play.

Changes in play during free time can be attributed to improvements in spontaneous communication as was reported in a study within a primary school setting after only 15 hours of PECS training (Carr & Felce, 2007). Pre-emptive communications by teachers decreased while opportunities for students to initiate communication increased as students became more responsive to their teacher’s communicative efforts. In another study, play with toys and joint attention improved during free play sessions involving increased social interactions with peers (Kravits, Kamps, & Kemmerer, 2002). The value of play and playing games with others

extends beyond the school playground and presents an important context for language development (Bopp & Mirenda, 2009).

Physical Exercise and Students with ASD

Compared with other individuals without disabilities, students with ASD are more likely to have motor development difficulties. Specifically, they are more likely to have difficulty with balance, postural stability, gait, joint flexibility, and speed of movement (Lang et al., 2010). In a study by Green (2008) which sampled 101 students with ASD across a range of intellectual functioning, 79% had definite movement impairment as determined by The Movement Assessment Battery for Children (Henderson & Sugden, 1992). Findings showed that some of the deficits may be exacerbated by lack of opportunities to participate in physical activities. Researchers also report that students with ASD are actually a special risk group with their sedentary life style increasing the risk of heart disease, diabetes and obesity (World Health Organisation, 2002).

A study of 133 individuals with ASD reported the benefits of physical exercise that included gains in motor performance and social skills (Sowa & Meulenbroek, 2012). The overall picture is that physical exercise not only improves the physical condition of individuals with ASD but also reduces their maladaptive behaviours (Lancioni & O'Reilly, 1998). Physical exercise interventions are reported to decrease stereotypy, aggression, off-task behaviour and elopement, while increasing on-task behaviour, academic responding and appropriate motor behaviour (Lang et al., 2010).

As stated earlier, recent government policies in many countries have resulted in increasing numbers of students with ASD being educated in mainstream schools with access to and fully included in all curriculum areas. In the United Kingdom one of the challenges

has been to improve access and entitlement to physical education programmes (Vickerman, 2012). Reports found students with special needs, including those with ASD, attending mainstream schools were restricted from participating in physical education and sporting activities. Some teachers felt inadequately prepared to adapt and modify activities and unable to cater for these students without teacher aide support (Vickerman, 2002).

Positive Experiences

Students who were fully included in physical education lessons have self-reported significant positive experiences (Fitzgerald, Jobling, & Kirk, 2003a; Goodwin and Watkinson (2000); Kristen, Partiksson, & Fridund, 2002). Students identified benefits in their ability to socialise with their peers, an increase in confidence and a greater sense of belonging, and subsequently they wanted to take part in more school sporting activities with their peers (Kristen et al., 2002).

According to MacConville (2007) consultation regarding a student's feelings when participating in a physical education programme can also provide important information about their overall experience of inclusion. A fundamental tension about including students with disabilities in physical education sessions arises when students who are unable to succeed may find that participating in physical education actually reinforces disadvantage and increases feelings of failure (Gordon, 2010). In order to create an inclusive environment for all students, the physical education culture needs to change (Tripp, Rizzo, & Webbert, 2007). Adaptations need to be carefully considered so that the rest of the class is not missing out on its share or choice of activity or the content of the lesson is not 'dumbed down' or limited in some way to cater for students with disabilities. There are unlimited ways in which adaptations can be made; "the only real limitations are in the creativity of the teacher and/or students and the commitment to the process" (Gordon, 2010, p. 136).

Leisure Activities and Student Choice

The United Nations Convention on the Rights of the Child Article 13 (Convention of the Rights of the Child, Sept. 7, 1990) emphasises the rights of children to express opinions about issues that affect them and the right to equal opportunities for education, leisure, recreation and cultural activities. Leisure activities need to become a focus because “inclusion in leisure activities parallels the situation in education; inclusion means more than simply placing a disabled person in a mainstream school and providing extra support. Inclusion demands major changes within society itself and should not be viewed in a vacuum” (French & Swain, 2004, p. 169).

Although consultation with students is placed at the centre of policy and practice in an inclusive environment, there are many reasons why students with ASD are often excluded from the consultation process. They may have multiple disabilities or may not acknowledge the label of being disabled or having special needs. They may have communication difficulties that result in them being overlooked or others having the perception that it will be too difficult for them to reflect their feelings or preferences (Brewster & Coleyshaw, 2010).

Despite these challenges, students with ASD were consulted on participation choices in leisure activities. In the study by Brewster and Coleyshaw (2010), findings in response to three questions were gathered using telephone surveys, group discussions with students with ASD, and group and individual interviews with parents and caregivers. The three questions posed by Brewster and Coleyshaw (2010) asked what the students currently did in their leisure time, what they would like to do in the future and what difficulties they encountered in accessing leisure activities. The most commonly reported activities were those confined to the home - television, playing in the garden, computer games and Play Stations. Many students played alone yet most said they wanted a friend and to play with friends outside

school hours. Safety issues arose when activities required students to be away from their parents.

Summary

This chapter has examined research that reports how students with ASD who are non-verbal can acquire the skills and indicate a preference for using manual signs, picture exchange or speech generating devices as their chosen communication mode. It has reported strategies that enabled students to participate in the decision-making processes that affect them (Sigafoos et al., 2005; Sowden et al., 2010; Wade & Moore, 1992). Although previous studies have compared how quickly students can learn to use three modes of communication and then indicate preference for one of the options, the effects of preference needs further examination (Achmadi et al., 2014; van der Meer, Didden, et al., 2012; van der Meer et al., 2011; van der Meer, Sutherland, et al., 2012).

Bronfenbrenner's (1994) ecological systems theory has been used as theoretical framework to examine the proximal and distal influences on students with ASD and their families. Explicit links have been made between understanding strategies to enable students to communicate and using this understanding to facilitate inclusion in natural mainstream settings. Educators can use practices that respect the views of their students, listen to their opinions and involve them in decision-making, even when participating in physical activities. This is possible because, through the use of their preferred AAC, some students now have a voice, often for the first time in their lives (Sigafoos et al., 2005). Preference assessments can monitor the maintenance of the preferred communication modes, as demonstrated by three of the nine students who used AAC in the context of their mainstream playgrounds in the current investigation. Previous research reported that students often abandon a newly

acquired skill, so the factors that influence maintenance continue to be an area of interest (Schlosser & Lee, 2000).

An appropriate choice of assessment for learning is at the centre of any school-based intervention; this chapter has included a focus not only on finding assessment tools that can deliver a diagnosis but also on those that celebrate success for students with ASD who are non-verbal. Recent developments in new technologies, and their rapid dissemination and inclusion in classroom practice, has resulted in significant changes to the teaching and learning of all students, including those who are non-verbal. It has also challenged stakeholders to ensure that evidence-based practices are implemented. There are an increasing variety of speech-generating tools to solve the most complex problems to transform the lives of individuals who face significant challenges such as ASD. However, there are still questions around the acquisition and generalisation of these tools (Diamandis & Kotler, 2012).

Inclusion in the whole school community has been an important focus in this chapter as the world-wide trend to mainstreaming generates significant implications for educators, support agencies and parents (Morewood et al., 2011). Teachers' attitudes towards inclusion are influenced by their experience, training and perceptions of available resources and support (Rodriguez et al., 2012). Lack of response to these demands can foster a negative attitude towards the education of students with ASD in mainstream settings.

The typical profile and learning style of students with ASD who are non-verbal can challenge a teacher's professional assumptions about his/her ability as an educator. One of the biggest concerns for both parents and schools is how to support and strengthen inclusive behaviour, not only in the classroom but also in the mainstream playground (Doll & Brehm,

2010; MacArthur & Gaffney, 2001; Vickerman, 2012; Woolley et al., 2006; Zablotsky et al., 2013).

Time in the playground is often an anxious and stressful environment for many students with ASD (MacArthur & Gaffney, 2001) but it carries high expectations for teachers, parents and whānau. The hope is that friendships, play and fun may happen for all students while developing and improving their skills in social competence (Doll & Brehm, 2010). Achieving some of the goals of the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2012) can demonstrate that the playground is a context for learning these skills and that all students are capable of being learners.

The AAC study aims to address these needs by first comparing the acquisition and preference for manual signs, picture exchange and speech generation devices for nine students with ASD who are non-verbal. The playground study, which involved three of the nine students, expanded to investigate whether or not using the preferred AAC mode could increase participation in mainstream playgrounds.

Research Questions

The investigation described in this thesis explored four questions:

- 1 Can students with ASD who are non-verbal learn to use three AAC systems?
- 2 Can students with ASD who are non-verbal demonstrate a preference for one AAC system and if so, is the SGD the preferred AAC system?
- 3 Can the use of a preferred AAC system influence the rate of acquisition of an AAC system?
- 4 Can AAC increase the participation in their mainstream playgrounds of three students with ASD who are nonverbal?

Chapter 2

The Acquisition and Preference of Augmentative and Alternative Communication for Nine Students with Autism Spectrum Disorder

The AAC Study

Introduction

Communication impairment is a core and defining characteristic of Autism Spectrum Disorder (ASD). Depending on the source of information it is estimated that 14%-20% of children with ASD will not develop sufficient speech and language skills for their daily communication needs (Lord, Risi, & Pickles, 2004). This chapter presents the background, rationale and methods for investigating interventions that could benefit these students by providing a practice that supplements (i.e., augment) or replaces (i.e., alternative) natural speech, known as Augmentative Alternative Communication (AAC) (Beukelman & Mirenda, 2005).

The key research questions for this study are:

1. Can students with ASD who are non-verbal learn to use three AAC systems?
2. Can students demonstrate preference for one AAC system and if so, is the SGD the preferred AAC system?
3. Can the use of a preferred AAC system influence the rate of acquisition of an AAC system?

This chapter is divided into five sections.

The first section sets out the reasons for the study, the research questions and the overall methodology.

The second section describes the implementation of the research design, the interventions and data collection methods.

The third section reports the results from the nine participants in the study and includes a discussion of the findings.

The fourth section provides case studies of three of the nine students who participated in the interventions to investigate acquisition and preference for AAC. Detailed descriptions of individual student's performance for each the phases and results are outlined.

Finally, the fifth section includes a summary that identifies some of the issues, limitations and suggestions for future research.

Section One

Aims of the Study

The current study has important implications for students with ASD who are non-verbal, as well as for their teachers and parents, as access to technology is expected to provide the means for shared communication and an opportunity for students with ASD to express themselves, to participate and to learn with their peers. Research evidence supports the use of one or more of the three different AAC systems for students with severe delays or limited speech (Bondy & Frost, 2009; Lancioni et al., 2007). However, the decision about which system is best suited to the communication needs of each student is sometimes a difficult one to make (van der Meer & Rispoli, 2010).

Relatively recent research found that some students with ASD and other developmental disabilities are not only able to demonstrate a preference for AAC but also acquire the skills to use some systems more rapidly than others (van der Meer, Didden, et al., 2012; van der Meer, Sigafoos, O'Reilly, & Lancioni, 2011). It was reported by van der Meer, Didden, et al. (2012) that when students were given an opportunity to select their preferred choice of AAC, as had been suggested earlier by Schlosser, Sigafoos, and Koul (2009), this influenced the speed of acquisition of communication skills. Choice-making interventions that include opportunities for student preference may also prevent the emergence of problem behaviours (Sigafoos, O'Reilly, & Lancioni, 2009).

In the first of two studies that compared two AAC systems, by Boesch, Wendt, Subramanian, and Hsu (2013), three children with ASD were taught to use both PE and a SGD (i.e., a Logan Talker™) to request food. Visual inspection of performance data suggested that two children performed better with PE compared to SGD. In their second

study, the researchers investigated the effectiveness of PE and SGD in supporting the development of social communication (i.e., making eye contact and the child's physical position relative to the instructor). No statistical differences were observed between the use of either PE or the Logan Talker™ in either of the two studies.

With the rapid advances in technology, McNaughton and Light (2013) suggest a need for research and development to integrate AAC across increasingly diverse and complex functions so that their benefits can be maximised, particularly for students with ASD who are non-verbal. Devices such as touch screen technologies with SGD capabilities are available and readily marketed.

A significant feature of the current study was to provide students who are non-verbal with a voice by providing them with an opportunity to indicate their preferred choice of communication mode. Despite the acknowledged importance of seeking and listening to student voices, there is a disregard for attending to the voices of students with special education needs who can become marginalised within the system (Fielding, 2010). Points of view range from tokenism to condescension, and “even where there is an attempt to redress these states of affairs the motivational thrust of the reparation often has its roots in the same ideological soil that nurtured the dismissal of certain students as less worthy of attention and respect than the majority of their peers” (Fielding, 2010, p. 7).

Researchers are examining ways for students to actively participate in the decision-making process not only because using a preferred choice may increase the rate of acquisition, but also because it may increase choice-making skills in other contexts (Sigafoos, O'Reilly, Ganz, Lancioni, & Schlosser, 2005; Son, Sigafoos, O'Reilly, & Lancioni, 2006; van der Meer et al., 2011). Listening to the *voice* of students who are non-verbal and who are now

able to make choices has redefined their position from being passive to active participants in their learning.

The current study elevated the notion that not only did the students have the capacity to indicate a preference but that their choice of AAC was recognised regardless of an educator's preferred choice for them. This was not an exercise in impressing external authorities or following trends but rather a conscious effort to provide students with an opportunity to express their preference for a communication tool.

Research Design and Methodology

This chapter will present a description of the rationale for the study, the aims, the development of the conceptual framework, and the protocols of the larger Marsden study with which this research is linked, followed by the methodology and the overall experiment, the participants, data collection and data analysis. Ethical considerations, participation agreements, validity and reliability issues are critically examined.

A single case design with multiple-baselines and alternating treatments was used because it enabled the researcher to compare each of the nine participants' performances during baseline to their performances during the intervention and follow-up phases. This was important because some researchers believe that one participant is "not sufficient to demonstrate the efficacy of an intervention, even using a single-case design" (Matson, Turygin, Beighley, & Matson, 2012, p. 932). The participants received different lengths of baseline which started in a staggered fashion due to their recruitment into the study being at different times. The first participant (Henry) received three baseline sessions and each subsequent participant received an additional baseline session. The AAC system available (i.e., SGD, PE or MS) was counterbalanced across sessions to control order effects. The

researcher gathered data after numbers of interventions, which produced trends and indicators for moving through the planned phases of the study.

Rationale

The overarching rationale for the study was to expand on existing research that investigated if students with ASD who are non-verbal can not only show a preference for an AAC mode but also increase the speed of acquisition and maintenance in a clinic or classroom (van der Meer, Didden, et al., 2012; van der Meer et al., 2011). The long-term maintenance of a preferred communication mode had also been questioned by Couper et al. (2014) with an exploration of generalisation to more naturalistic contexts. This research also evaluated the feasibility and effects of self-determination theory into communication interventions for children with ASD.

Self-determination theory predicts that enabling children to express a preference for different communication systems will increase the success of the teaching programme. Two studies that compared the speed of acquisition of AAC reported that both acquisition and maintenance were better when students used their preferred AAC mode. First, the study by van der Meer, Sutherland, O'Reilly, Lancioni, and Sigafoos (2012) reported that four participants made specific requests that were learnt faster with better maintenance when students used their preferred AAC mode. The second study, which compared speed of acquisition and preference for using only two AAC options (SGD and MS) with students with developmental disabilities, reported the same results for the preferred option (van der Meer, Kagohara, et al., 2012).

A non-experimental study compared the use of an iPad-based[®] SGD with a PE system for five students with either intellectual disability or multiple disabilities who had previous

exposure to picture-based communication systems. Although no preference assessments were made, Light and McNaughton (2013) reported anecdotal evidence that suggested two students demonstrated a preference for the iPad[®]-based SGD.

Lorah et al. (2013) examined the preferences of five boys with ASD when they were taught to request preferred items using both an iPad-based[®] SGD and PE. At the conclusion of the teaching phase several AAC system preference assessments were conducted. The two systems were placed within reach and the boys were asked to select one. Four boys selected the iPad[®] more often than the PE. Research by Achmadi et al. (2014) reported that three of four participants with developmental disabilities learnt to use each of the three AAC options with maintenance best for PE and SGD. This study also found that assessing a student's preference for different AAC options needs to be part of the post-intervention follow-up process because, although SGD was the most chosen option, the choice was only consistent during the follow-up phase.

From research findings, it is apparent that there may be value in examining the effects of preference assessments on acquisition and maintenance of AAC skills for children with ASD and limited expressive language skills. The current study aimed to replicate and expand on several previous studies (van der Meer, Didden, et al., 2012; van der Meer, Kagohara, et al., 2012; van der Meer, Sutherland, et al., 2012). Based on previous findings, it was hypothesised that the nine students in the current study would learn to use all three AAC options (PE, MS and SGD) to request access to preferred stimuli (i.e., toys), and also demonstrate idiosyncratic preferences for one AAC system, with most students demonstrating preference for the SGD.

Method

This study replicates a study by the University of Victoria which began a year ahead of the University of Canterbury study. The research design and interventions were consistent so that the external validity of the findings was increased.

In Canterbury nine students with ASD and limited communication skills received interventions to teach them to request their time to play with toys using MS, PE and SGD. In order to assess relative preferences, students had many opportunities to choose from the three options. Intervention was evaluated in a non-concurrent multiple-baseline across participants and alternating treatments design, which enabled determination of the comparisons between the least and most preferred AAC option (Kennedy, 2005).

Single-case experimental designs provided a sound basis for assessing the efficacy of interventions in AAC and for comparing the effects of three AAC options on individual performance. The participant's behaviour was measured over time during a base-line period. The frequencies of the target behaviours were measured before the intervention which allowed the researcher to identify changes in behaviours. Preference probes were conducted in baseline, intervention, post-teaching and follow-up phases.

The origins of this design can be found in the work of Skinner (1953) and the work of Kennedy (2005) with Applied Behaviour Analysis with research that investigated basic behavioural processes such as positive reinforcement.

Research methodology that uses multiple-baseline design (MBD) is often chosen when studies involve people with intellectual disabilities and/or pervasive developmental disorders (Matson et al., 2012). It is often selected "because it is based on an interest in the effectiveness of an intervention for a single particular individual" (Mertens, 2010, p. 207). Multiple-baseline design and alternating-treatments design were first introduced by Baer,

Wolf, and Risley (1968). The MBD provides strong evidence that changes in the dependent variable (frequency of correct response) are due to the introduction of the independent variable (intervention, training procedure) because the intervention procedure is sequentially introduced to participants. Presentation of the independent variable to the other participants was staggered across time. Any effects on the dependent variable replicated across participants when the intervention was introduced provided evidence to support the effectiveness of the instructional procedures. The design used systematic methods to isolate treatments with the aim of screening out variables (Kennedy, 2005). The experimental design involved five sequential phases and preference assessments which are described later in the chapter.

Participants

Participants were recruited to the study by advertising with local Autism support groups and schools. Some parents heard about the study from their speech language therapists or through the principals of the schools their children attended. Participants were invited to take part in the study after their parents contacted the School of Health Sciences at the University of Canterbury.

Parents, classroom teachers and principals were provided with information about using AAC systems and the long-term aim of enabling their students to communicate with them and with their peers. It was important that everyone involved was given sufficient information so they could offer input and support for the study. An information pack explaining the study and a consent form were sent to the parents of possible participants, and to the principals, teachers and teacher aides in the schools in which the children were enrolled.

There were two parts to the sampling process for the study. First, a parent interview using a Background Information Survey was completed during a visit to the each student's home. The aims of the study, clarification of the procedures and consents for possible inclusion in the study were explained. A second visit ensured there was a sample of students that fulfilled the inclusion criteria by gaining additional descriptive data on autism symptoms and adaptive behaviour functioning using the Autism Diagnostic Interview-Revised (Rutter, LeCouter, & Lord, 2003) and the Vineland Adaptive Behaviour Scales, Second Edition (Sparrow, Cicchetti, & Balla, 2005).

Inclusion Criteria

Nine students fulfilled the following criteria: (a) A diagnosis of ASD or related developmental disability, (b) School-aged children of less than 13 years, (c) Communication skills at an age level 2.5 years or less as determined by the Communication Domain on the Vineland Adaptive Behaviour Scales, second edition (Vineland-11, Sparrow, Cicchetti & Balla, 2005), (d) No auditory or visual impairment, and (e) Sufficient motor skills to operate the AAC communication system.

Communication criteria were determined by the Vineland-11 Adaptive Scales (Sparrow, Cicchetti, & Balla, 2005). Additional information on the communication abilities of the nine participants is presented in Table 2.1, including existing communication abilities as observed by the researcher and described by the parents during the background information interview. It identifies their prior experience with AAC, which was specifically explored during the interview.

Four of the nine participating families were located within the city while the others were in outer suburbs or rural settings. It was intended to recruit participants who could participate in familiar contexts, either in their classrooms during class or break-times or in their home at convenient times for the family and researcher. The real life context was considered important as it would capture the essence of how participants who are non-verbal can use preferred communication modes to influence their learning, behaviour and social competence in their own unique environments.

Table 2.1: Communication Abilities and AAC Experience from Parent Interviews

| Participant Pseudonym | Communication abilities | AAC experience |
|-----------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Henry | Echolalia Few single words Physical guidance of others | Visual strategies iPad® for entertainment only No MS,PE or SGD |
| Cameron | Few single words. Some signs. Physical guidance of others. Pointing | Limited MS and PE. No SGD. |
| Andy | Few single words Physical guidance of others. | Visual Schedules Limited MS(gesture) |
| Simon | Non-verbal Vocalisations Real objects for requesting | Communication book Limited PE |
| Nico | Echolalia Vocalisations | Visual strategies Limited PE |
| Andrew | Non-verbal Vocalisations | Visual schedules iPad® for entertainment |
| Jimmy | Non-verbal Vocalisations | Communication book Spelling single words on request using letter tiles e.g. <i>cat</i> |
| Shane | Few single words Physical guidance of others. | Limited PE |
| Edward | Unintelligible single words Physical guidance of others. | Limited PE and MS. Visual strategies |

Consents

Consent forms were provided for parents, principals, SENCOs, teachers and teacher aides. The principal of each school was contacted for consents before any approaches to other participants were made. Signatures were obtained after face-to-face visits with each participant and following their reading of the Information Sheets. All interviews and observations were conducted in the participant's usual location, such as their home or school. The usual location helped to reduce any stress or anxiety while the researcher became familiar with the participants.

Consents for participants in the research stressed anonymity; this included signed consents for all adults involved in the study. Although participating students did not give written consent, they were able to indicate their choice to participate. Each participant dictated the pace of the sessions and progressions. In one case, lack of response was considered to indicate that the participant wanted to leave the study.

Ethical Approvals

The study was assessed and approved by Victoria University of Wellington, Faculty of Education Ethics Committee (Reference Number SEPP/2010/92 RM 18095). All advice and guidelines for the research, which was approved by both Victoria University of Wellington and the University of Canterbury, were followed throughout the research study. This included requirements for the secure storage of field notes, participant files and data which were stored in locked filing cabinets or on computer.

Section Two

Implementation of the Design

The design enabled the comparison of each participant's performance during baseline to their subsequent performance during the intervention and follow-up phases. The comparison determined if there had been an increase in the participant's use of AAC as a function of the intervention. The collection of base-line data was the single feature of single-subject design that distinguished it from case studies and designs where treatments immediately follow assessment (Portney & Watkins, 2009). The alternating-treatments design enabled a comparison between AAC option preferences, and was embedded within the intervention phases of the multiple-baselines. This enabled identification of the differences in speed of use between the least and most preferred options. In this design, each student served as his own control. This individualised level of analysis was necessary because it was thought that the participants would show idiosyncratic preferences and variation of responses to the interventions.

Through these designs, relations between independent variables (intervention procedures and preference ranking) and the dependent variables (use of AAC) were noted. The single-case experimental design provided a high degree of control for threats to internal validity while external validity was established through repeated measurements across all phases of the experiment, across all students (Mertens, 2010).

The study incorporated vigorous procedures to address potential validity issues which will be described later in this section. All facilitators used a training manual, *Enhancing Communication Intervention for Children with Autism*, with identified steps for each phase

of the study. (The Training Manual is available on request). Training was provided before visits to participants, with graphed results and procedural integrity reported after visits.

Assessments

The Vineland Adaptive Behaviour Scales, Second Edition (Sparrow et al., 2005), is a 30-page booklet in which multiple interview questions are organised to record responses. The questions are organised under four Domains: Communication, Daily Living Skills, Socialization and Motor Skills. In addition, there is a Maladaptive Behaviour Index.

Within each of the four Domains there are Sub-Domains. Communication describes: (a) Receptive language (b) Expressive language and (c) Written language. Daily Living Skills describes: (a) Personal Skills (b) Domestic Skills and (c) Community Skills. Socialisation Skills describe: (a) Interpersonal relationships (b) Play and leisure and (c) Coping. Motor Skills describes: (a) Gross motor and (b) Fine motor skills.

The Vineland-II Survey Forms Manual (Sparrow et al., 2005) was used to calculate the Domain and Sub-Domain scores profile, and to identify the strengths and weaknesses for each Domain and Sub-Domain. Detailed instructions were given for identifying the percentile ranks that showed the percentage of people in the norm group below each participant. The norm group was based on a same-aged group from different regions in the United States of America, and were from various racial/ethnic and economic backgrounds (Sparrow et al., 2005, pp. 2-3).

AAC Systems Materials and Measurement

Speech Generating Devices (SGD) The SGDs used were an Apple iPod Touch® or an Apple iPad®. Both devices were loaded with the Proloquo2Go® application (Sennott & Bowker, 2009). The four symbol spaces on each page measured 2.5 cm x 2.5cm for the iPod Touch®, and 9.5 cm x 6 cm for the iPad®. It was soon found that the size of the symbol spaces on the iPad® were preferable for most of the participants. A graphic symbol for 'more' was inserted into one space; this symbol was programmed to produce the synthetically generated phrase '*I want more*'. Three symbol spaces were left blank; when these were touched no spoken or visual responses occurred. A correct response was recorded when the participant touched the 'more' symbol without prompting or cueing. (Apple iPod Touch® and Apple iPad® are registered trademarks of the Apple Corporation Cupertino, California, www.apple.com.)

A prompt hierarchy was used by all researchers and aligned with the study already begun by University of Victoria, Wellington. Prompting and fading prompts was checked between the researcher and research assistants and moved from least to most intrusive. It began with wait time, eye contact, moving or pointing to the card or SGD and last if the student was comfortable using a hand over. The researcher preferred to let the teacher or teacher aide use this last prompt as some students were sensitive to an unknown person's touch and were likely to react physically.

Picture Exchange (PE) The PE system was a laminated card (22cm x 25cm) with four equal squares, each with a Velcro dot. Four separate laminated squares (7cm x 7cm), each with a Velcro dot, had to be placed randomly on each of the squares on the card. One square contained the same graphic symbol for 'more' which was used with the SGD. The

other three squares were blank. Whenever the participant independently (without prompting or cueing) removed the card with the symbol for *'more'* and passed it to the instructor during the requesting opportunity, it was recorded as a correct response.

Manual Signs (MS) Participants were taught to use the correct New Zealand Sign Language (NZSL., 2013) for *'more'* to access repeated play with toys. This involved placing the right hand on the chest area with fingers spread and then moving the hand away from the body. Like the PE system, a card (22cm x 22cm) was designed with four squares, with one square showing a hand moving away from the body as well as an arrow to indicate the hand's direction. The three other squares on the card were blank. A correct response was recorded when the participant independently (without prompting or cueing) used the manual sign for *'more'* during a requesting opportunity.

Proloquo2Go® Proloquo2Go® is a communication software system that provides a range of solutions for people who have difficulty speaking or who are non-verbal. It can be purchased as an Application to be used with an iPad®, iPhone® or iPod® and can be adapted to suit a wide range of users with a varying degree of literacy. It is easy to use with a picture touched to activate a natural sounding voice. (Proloquo2Go® is a registered trademark of Assistive Ware B.V., Amsterdam, the Netherlands, www.assistiveware.com.)

The Toys and the Toy Box The preferred stimuli, which participants were taught to request, were a variety of toys intended to be age appropriate which could be used within the time-frame of 1 minute of play before each interruption. Examples of objects in the toy box which was a clear plastic box with removable lid included picture books, colouring books, crayons, pens, toy cars, wooden puzzles, bubbles, toy trains, shakers, noise makers, soft toys and puppets.

Time Keeping The easiest option for monitoring the one-minute play interruptions was a stopwatch that could be easily clicked to conclude each play interruption within each five-minute intervention.

Table 2.2: Timekeeping for Play Interruptions

| 1 minute of play | 2 nd minute of play | 3 rd minute of play | 4 th minute of play | 5 th minute of play |
|-------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Lid off at start of play. | Lid off at start of play. | Lid off at start of play. | Lid off at start of play. | Lid off at start of play. |
| Lid on at end of play | Lid on at end of play | Lid on at end of play | Lid on at end of play | Lid on at end of play |
| Wait ten seconds for response | Wait ten seconds for response | Wait ten seconds for response | Wait ten seconds for response | Wait ten seconds for response |

Instructors

Instructors for the study were a speech language therapist, a child psychologist and a special education teacher, each with extensive experience with children with ASD. In addition, one participant was taught by a family member who had a positive relationship with the student. Specific training was provided to each instructor before the study commenced. The aims, procedures and detailed written instructions for each step were included in the training. Participants generally remained with the same instructor for the study, which in some cases was two years. Each participant received the same intervention protocols. Some phases were staggered, in line with requirements of a multiple-base across subjects design (Kennedy, 2005). The experiments were conducted in the child's home or educational setting, based on family, whānau or teacher's choice and time of choice. Students in the study progressed through the phases according to the Enhancing Communication Manual.

Data Collection Methods

The complexity of the research environments and questions required that the data collection methods fulfilled a variety of purposes. Table 2.3 shows the data collection methods, how they were administered and an explanation of each method. Data from parents, educators and research added value to the study by providing opportunities for shared input from a variety of environments and perspectives.

Table 2.3: Data Collection Methods and Procedures

| Data Collection Procedure | Administer of assessment | Explanation of Collection Method | |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Background Interview using template with agreed protocols | Researcher, research assistants note-taking with principal/ parent input | Visits to each participant's home. Six questions to gather input about the background and perceptions of the parent or parents. Handwritten summary notes written onto a template. Questions included: social, behavioural, communicative and physical and sensory characteristics. The previous history with AAC was also recorded. (30 minutes duration) | Phase One |
| Adaptive Behaviour Assessment using Vineland Adaptive Behaviour Scales, second edition (Sparrow, Ciccheli & Balla, 2005) | Researcher, research assistants with parents | A one hour interview that resulted in an assessment that enabled a written objective description of the participant. The results were shared with parents and teachers providing a detailed record of the participant's existing strengths and areas of educational need. Parents given the original assessment form for their records. | Phase One |
| Free Play Assessment as planned in Protocol and Training Manual. | Researcher, research assistants and participants | The aim was to develop rapport and determine if toy play was a preferred activity. A box of toys and timer was used for each of three, 5 minute sessions. Each participant to average 4 minutes of play to confirm toys adequate stimuli for the study. | Phase One |
| Baseline as planned in the Protocol and Training Manual. Participants began simultaneously in staggered manner | Researcher, research assistants and participants | The purpose was to determine the participant's existing proficiency with each of the three communication systems. | Phase Two |

| | | | |
|--------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| (Kennedy,2005) | e.g, teacher aides and teachers | (PE, MS,SGD). Each session was of 5 minutes duration with an interruption after 1 minute when the toys were removed. After 10 seconds one AAC may have been used to request ‘more’. It was expected that 3 to 7 sessions would show stable data (less than 20% correct use of AAC) | |
| Device Preference Assessment Probes as planned in Protocol and Training Manual | Researcher, research assistants and participants. | After each Baseline session: Three AAC systems were placed in front of the participant and asked which one he would like to use with a 10 seconds wait for a response | Phase Two <i>Baseline Device Preference Assessment</i> |
| Teaching / Intervention as planned in Protocol and Training Manual. | Researcher, research assistants and participants | Each participant was taught to use each of the AAC systems. Three to six sessions of 5 minutes duration occurred until the participant reached criteria of 80% correct for 3 sessions in a row. | Phase Three |
| Device Preference Assessment Probes as planned in Protocol and Training Manual | Researcher, research assistants and participants | After each Teaching/ Intervention session Three AAC systems in front of the participant who is asked which one he would like to use with 10 seconds wait for a response | Phase Three <i>Teaching Device Preference Assessment</i> |
| Post Teaching as planned in Protocol and Training Manual | Researcher, research assistant and participants | To determine if one AAC system is preferred and to assess maintenance of learning. Seven to ten sessions of 5 minutes duration. Resulting graphed data will show preference. | Phase Four |
| Follow Up | Researcher, research assistant and participants | After a gap of about three weeks sessions identical to Intervention Phase without prompting or reinforcement contingent on a correct response. | Phase Five |
| Field and journal notes of visits. Supervision meetings and emails. | Researcher | A journal recoded dates of visits, phone, email contacts and meetings with parents and professionals. Field notes were recorded for each session with each participating students. | Phase One to Five. |

Five Sequential Phases

Five sequential phases in the intervention addressed the three research questions. Each of these phases will be described in detail.

Phase One: Background Interview and Free Play Assessment

Parents were invited to talk about their child's diagnosis, characteristics and development. It was considered necessary to access background information that described the participants in the study before assessing each child's adaptive behaviour using the Vineland Adaptive Behaviour Scales (Sparrow et al., 2005). The results of the assessment enabled the researcher to develop an objective description of each student's existing strengths and areas of educational need. This was shared with parents.

A summary of the results from the Vineland assessment is provided below. It can be seen that there are variations in ability in the cohort and within each individual participant's scores. Both Cameron and Jimmy scored above their chronological age for Written Communication but, like most of the participants, displayed significant receptive and expressive communication needs. Table 2.4 below shows the results from Phase One for each of the nine participating students.

Table 2.4: Participant demographics and age equivalence for sub-domains of the Vineland-II

| Participant | Age at Assessment | Diagnosis | Receptive | Expressive | Written | Fine Motor |
|-------------|-------------------|-------------------|-----------|------------|---------|------------|
| Henry | 5;3 | ASD | 0;8 | 0;4 | 4;3 | 0;7 |
| Cameron | 4;2 | ASD | 1; 0 | 0;1 | 5;2 | 0;7 |
| Andy | 7;1 | ASD | 1; 0 | 0;9 | 2;1 | 1;6 |
| Simon | 12;3 | ASD | 0;3 | 0;2 | 1;1 | 2;5 |
| Nico | 8;11 | ASD | 0;8 | 2;3 | 5;6 | 4;1 |
| Andrew | 6;6 | ASD | 1;6 | 1;0 | 1;1 | 0;7 |
| Jimmy | 5;1 | ASD | 2;5 | 0;6 | 5;6 | 1;1 |
| Shane | 5;2 | ASD | 1;3 | 0;9 | 1;1 | 2;1 |
| Edward | 7;11 | ASD/Down Syndrome | 1;3 | 0;2 | 0;1 | 0;8 |

Note: All ages and Vineland-II age equivalences are reported as years; months. All names are pseudonyms.

Free Play Assessment. Once it was established that the participant met the criteria for the study, a Free Play Assessment was completed. The aim of the free play sessions was to develop rapport, and also to determine if playing with the selected toys was an appropriate motivating activity. During each session the instructor presented the toy box, with toys inside visible through the plastic sides, while saying, ‘*Here are some toys for you to play with*’. To continue the study, each participant needed to play (touch, hold or manipulate) at least one toy for an average of 4 minutes across three free play sessions (see Figure 2.1). No interaction, prompting or any form of initiating occurred from the instructor during these sessions.

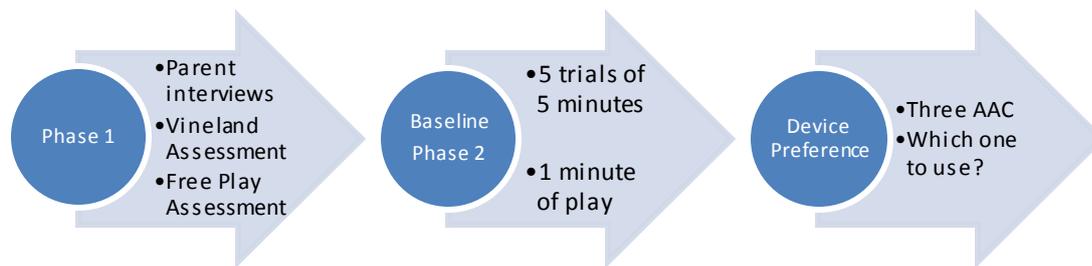


Figure 2.1: Phase 1 and Phase 2 Procedures

Phase Two: Baseline

Baseline determined the student's existing level of proficiency with each of the three communication systems. The nine students began the next phase after three, four, five, six, seven, eight, and nine baseline sessions respectively, whereby the first participant (Henry) received three baseline sessions (see Figure 2.1) and each subsequent participant received one additional baseline session. Baselines started at different times because the children were recruited into the study at different times. This meant that the participants did not begin simultaneously in a staggered manner, as usually required in a single-case multiple-baseline across participants design (Kennedy, 2005).

For each of the nine participants, all sessions consisted of five opportunities to request access to a box of toys or a preferred toy. Each participant was taught to use each of the AAC systems and a correct request or an incorrect request was recorded by the instructor. The percentage of correct requests was calculated for each session and revisited to confirm the preferred choice of AAC.

During baseline, the participating student sat on the floor or at a table with the lidded box of toys in an opaque plastic container placed out of reach, with the three AAC systems placed within easy reach.

A correct request was defined as follows:

Picture exchange: The symbol for *more* was retrieved and passed to the instructor.

Manual Signing: The manual sign for *more* was produced.

Speech Generating Device: The correct symbol was touched, resulting in voice output for *more* from the iPad®.

After each baseline session of five trials, a device preference session was conducted. When the participant selected or attempted to use one of the AAC during both the baseline sessions and preference assessments, this was recorded. After a 10 second delay it was assessed if the student had made a request. If a correct request was made it was not reinforced, just recorded. The toys were accessed after a 10 second delay whether or not the participant made a request.

Phase Three: Intervention and Teaching

The aim of this phase was to teach the student to request play with toys using each of the three AAC systems (see Figure 2.2). The order of teaching was alternated across sessions and counterbalanced across students. This was to conform to an alternating treatments design. Three to six sessions were provided for each participant until criteria of 80% or better were reached for three consecutive sessions using each AAC system. Each 5 minute session included an interruption after 1 minute of play, similar to the procedure for Baseline. In this phase, if a request was *not* made for *more* within 10 seconds the instructor would prompt and

guide the participant to use an AAC to request access to the toys. If there was the need for prompting this was recorded as *No* in the results. Instructors used the least amount of physical guidance or verbal prompts as possible.

Sessions of 1 to 5 minutes were conducted each day for each participant for one to three days per week. One AAC option at a time was used during each session. Each session involved the instructor and the student being positioned either next to or opposite each other at a table or on the floor. During some sessions, additional observers were present to collect reliability and procedural integrity data. The three participating students who attended mainstream schools were usually accompanied by their teacher aides. Eventually nine participants fulfilled the criteria and completed the study.

Device Preference Assessment

Preference assessment occurred prior to, during and after all intervention phases. The procedure determined if participants continued to indicate a preference for one AAC when compared to the other two systems.

Preference assessments involved the random placement of the three AAC systems (SGD, PE and MS cards) within reach of each student who was asked, '*Which communication system would you like to use?*' After a ten-second pause, a selection was recorded whenever a student touched or held an AAC system. Once a device was selected students were told, '*Let me know if you want more*' followed by a further 10 second pause. If a correct request was made using the selected AAC system, the toys were presented for play. If a correct response did not occur, the session ended.

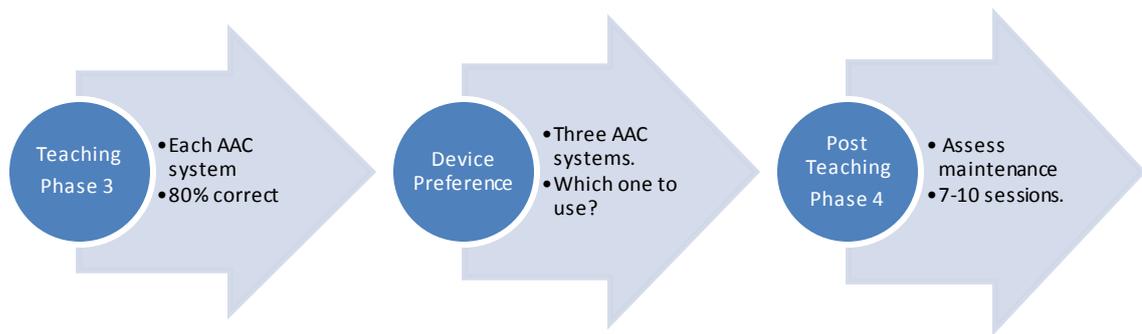


Figure 2.2: Teaching Phase 3 and Phase 4

The preference assessment determined if the choice of preferred AAC device changed over time, and if preference influenced the acquisition of AAC skills during this phase of the intervention.

Phase Four: Post-teaching

Once students had reached criterion for each AAC device, post-teaching sessions (see Figure 2.2) were conducted to determine if they continued to show preference for using one of the AAC systems, and to assess the maintenance for each of the AAC options. Although Andrew and Shane did not reach criterion with the MS option, post-teaching sessions were still conducted with these students and with all three AAC options.

These sessions involved placing the three AAC systems within easy reach of students, giving the student 60 seconds of free play with the toys, and then removing the toys while saying, *‘Let me know if you want more’*. After 10 seconds, if students did not select an AAC system, the instructor used a verbal prompt and pointed to the three AAC systems. If no request was made, a 60 second delay was implemented before re-prompting. If a response still did not occur, the trial ended.

Phase Five: Follow-up

Follow-up sessions were conducted for participants between three and ten weeks after the last post-teaching sessions (see Figure 2.3). The follow-up procedures were identical to intervention sessions except that the students were never prompted to make a request.

These sessions also included AAC system preference assessments as described above.

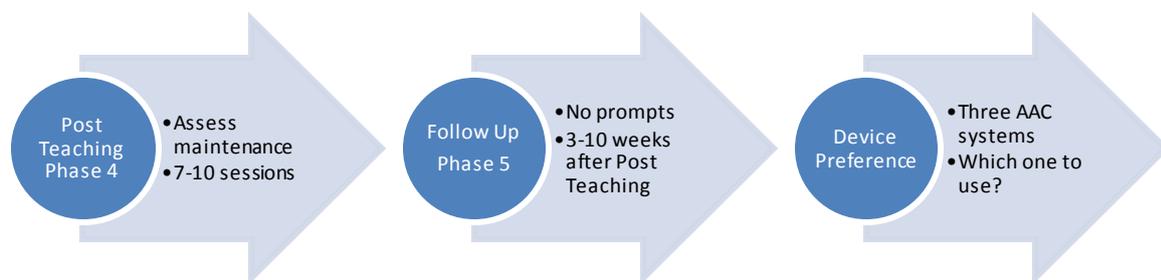


Figure 2.3: Post Teaching Phase 4 and Follow up Phase 5

Procedural Modifications

Six procedural modifications addressed problems that arose during the study. First, in an attempt to improve learning the MS option, the teaching procedure was modified to include ten graduated guidance trials before a MS intervention session occurred for Simon (34th session) and Jimmy (42nd session). Second, to increase Henry's attention during teaching sessions, the procedure was adapted at the 7th session by prompting him to sit in front of the AAC system. A physical prompt was provided (hand on shoulder) and then wait time until he

responded to his name. Then the instructor would say, 'Let me know if you want more' and remove her hand from his shoulder.

Third, in an attempt to develop Simon's use of the three AAC systems, procedural modification took place after the 29th session. Access to the toys was only provided in response to the correct unprompted use of an AAC system. In addition, Simon was given 20 seconds instead of 10 seconds to request.

Fourth, because Simon had difficulty activating the iPod® Touch, possibly because of the small size of the screen, the iPod® Touch was replaced with an iPad® with a larger screen which accommodated larger sized symbols.

Fifth, to boost Jimmy's attention to the presence of toys, the cover of the toy box was left open and the box remained within reach. This modification took place from the 20th session.

Sixth, because Cameron used MS 100% accuracy during baseline, his MS intervention focused on teaching him a two-sign sequence of 'more play'. However, baseline data were not recorded on this skill before the teaching sessions commenced.

Validity and Reliability

Inter-observer agreements were part of most sessions and occurred when the participating student's instructor recorded data on the AAC system (preference assessment) and the presence or absence of a correct request on a trial-by-trial basis was recorded by an observer. For each session, the agreement between the instructor and independent observer was calculated using the formula; $[\text{Agreements} / (\text{Agreements} + \text{Disagreements})] \times 100$. A mean of 88% agreement with a range of 36% to 100% was recorded across the current study (Couper et al., 2014). The variation was influenced by the availability of the research

assistants to accompany the researcher. The time to travel (up to four hours return) and other commitments of the research assistants made it necessary to find other systems to check inter-rater reliability. For this reason some sessions were videoed by teachers, teacher aides or care-givers and these sessions were randomly verified for validity and reliability. Procedural integrity was assessed by an independent observer recording whether or not the instructor followed the procedural steps in order and accurately. These checks occurred on 32% of the sessions. Procedural integrity ranged 52% to 100% (mean = 89%).

Unlike studies that are conducted in clinics, all sessions in the current study proceeded with other adults present. When the sessions were in the student's home at least one parent was present. During sessions in schools, when the researcher and students worked in staff rooms or empty classrooms, principals, teachers, teacher aides or care-givers observed. The location and time of the sessions varied according to the parent's or school's needs with the researcher choosing a time that was convenient for parents, especially for those who worked, or when classrooms or office spaces were available.

Ethical Considerations and Participation Agreements

The design of the research allowed for transparency of procedures for everyone involved throughout the duration of the data gathering stage. At the outset, the original copy of The Vineland Assessment Scale (Sparrow et al., 2005) was returned to each of the parents, along with a report summarising the outcomes. At various stages of the trials, parents were emailed a description of their child's progress.

Section Three

Results

Of the nine students who participated in the first stage of the study, five learnt to use each of the AAC options and requested access to toys. Results demonstrate that most students preferred the SGD, with eight of the nine students indicating it as their preferred choice.

The percentage of correct requests each participant made using the three AAC systems is illustrated in Figures 1, 2, 3. At baseline, two students, Andy and Sam, did not use any AAC system to request access to the toys. Seven students attempted to use the SGD to various levels during baseline. For example, Nico used the SGD correctly on each trial while Andrew used it on one occasion. Cameron was the only participant to use MS (100%) during baseline assessments. No participant used PE during baseline.

The following graphs show the AAC system preference assessment data for each participating student across the study.

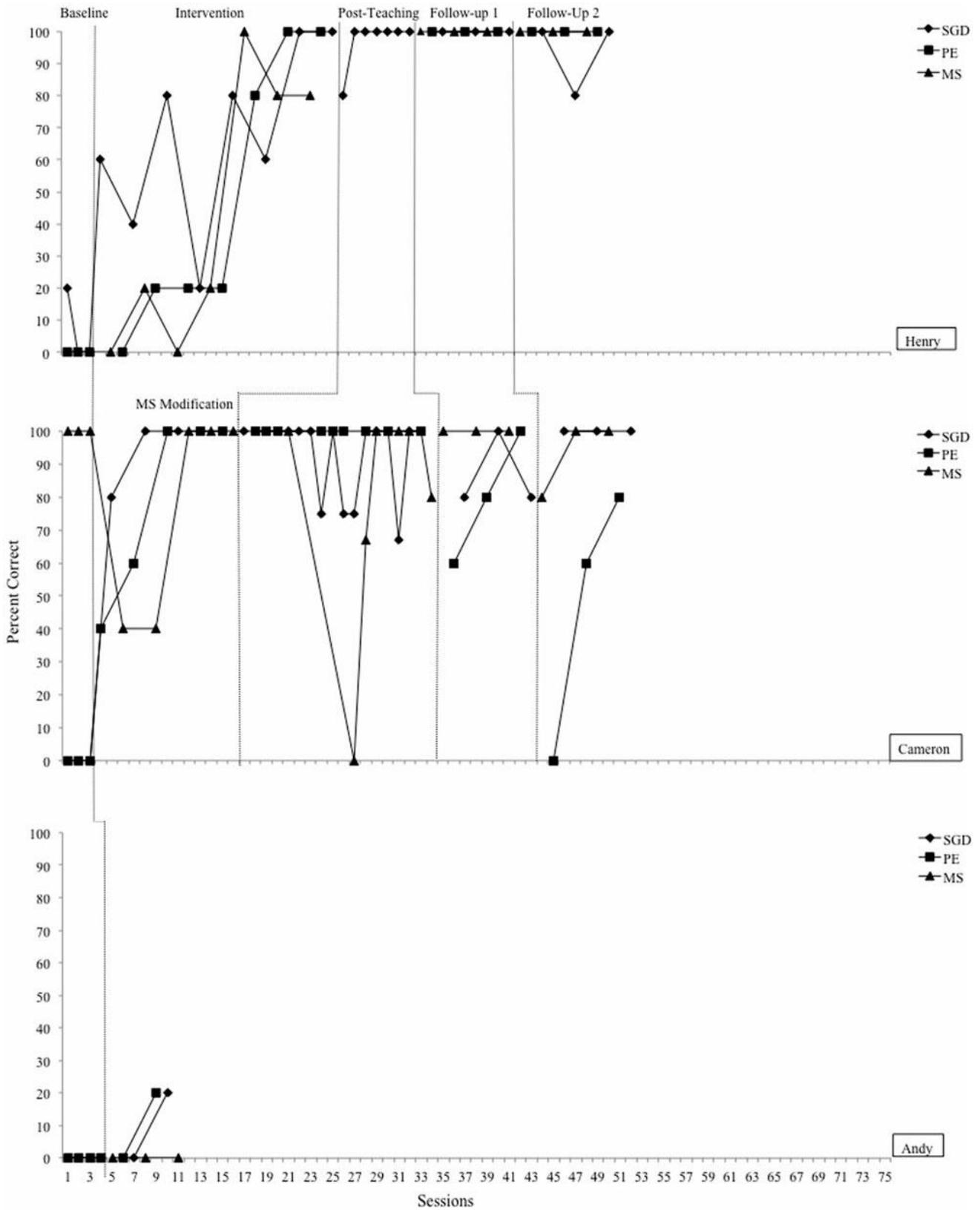


Figure 2.4: Results Henry, Cameron, Andy. Percentage of trials with a correct request across sessions and across the three AAC options. Correct use of the SGD is indicated by a solid black diamond. Correct use of the PE option is indicated by a solid black square. Correct use of MS is indicated by a solid black triangle

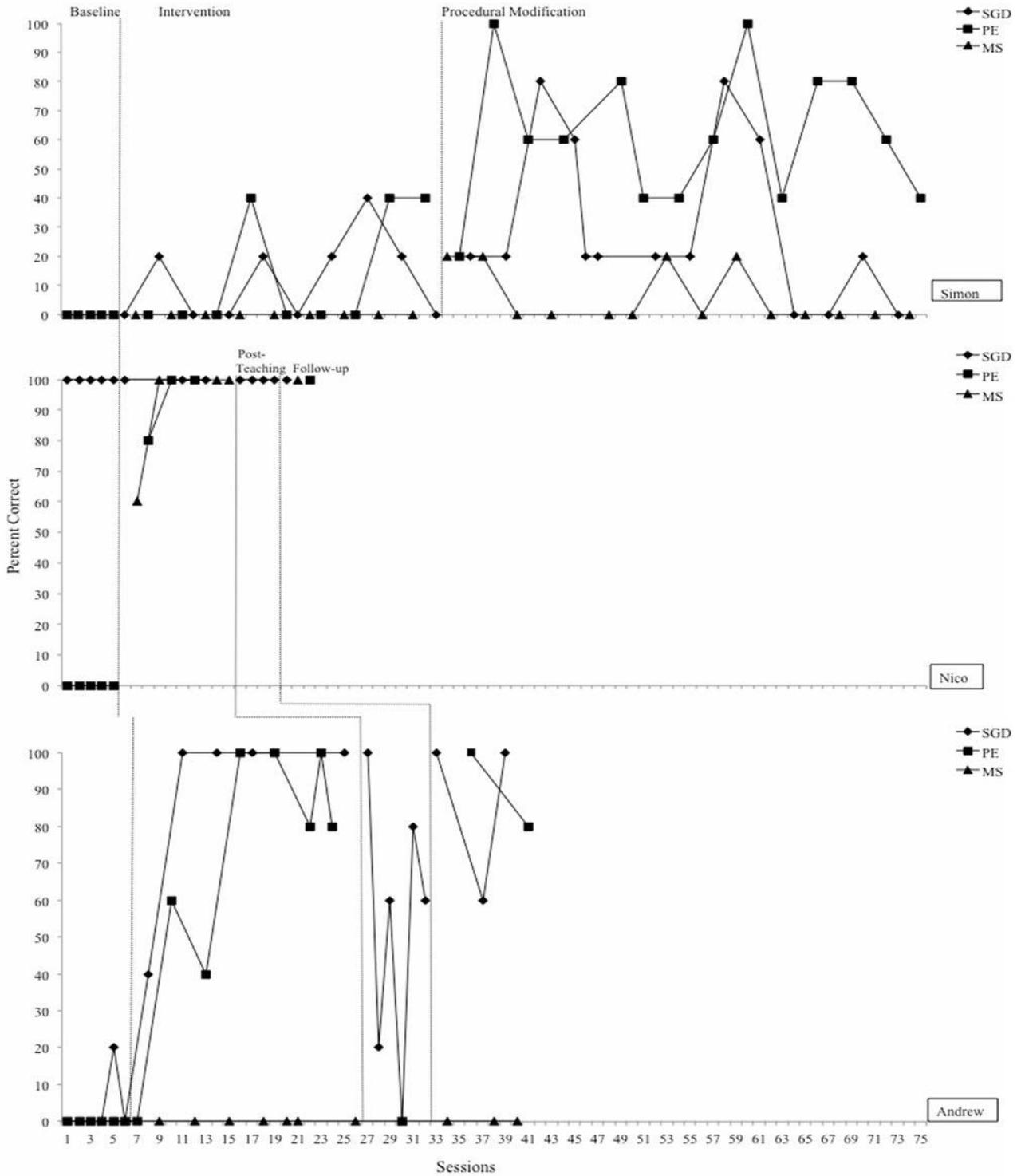


Figure 2.5: Results Simon, Nico, Andrew. Percentage of trials with a correct request across sessions and across the three AAC options. Correct use of the SGD is indicated by a solid black diamond. Correct use of the PE option is indicated by a solid black square. Correct use of MS is indicated by a solid black triangle.

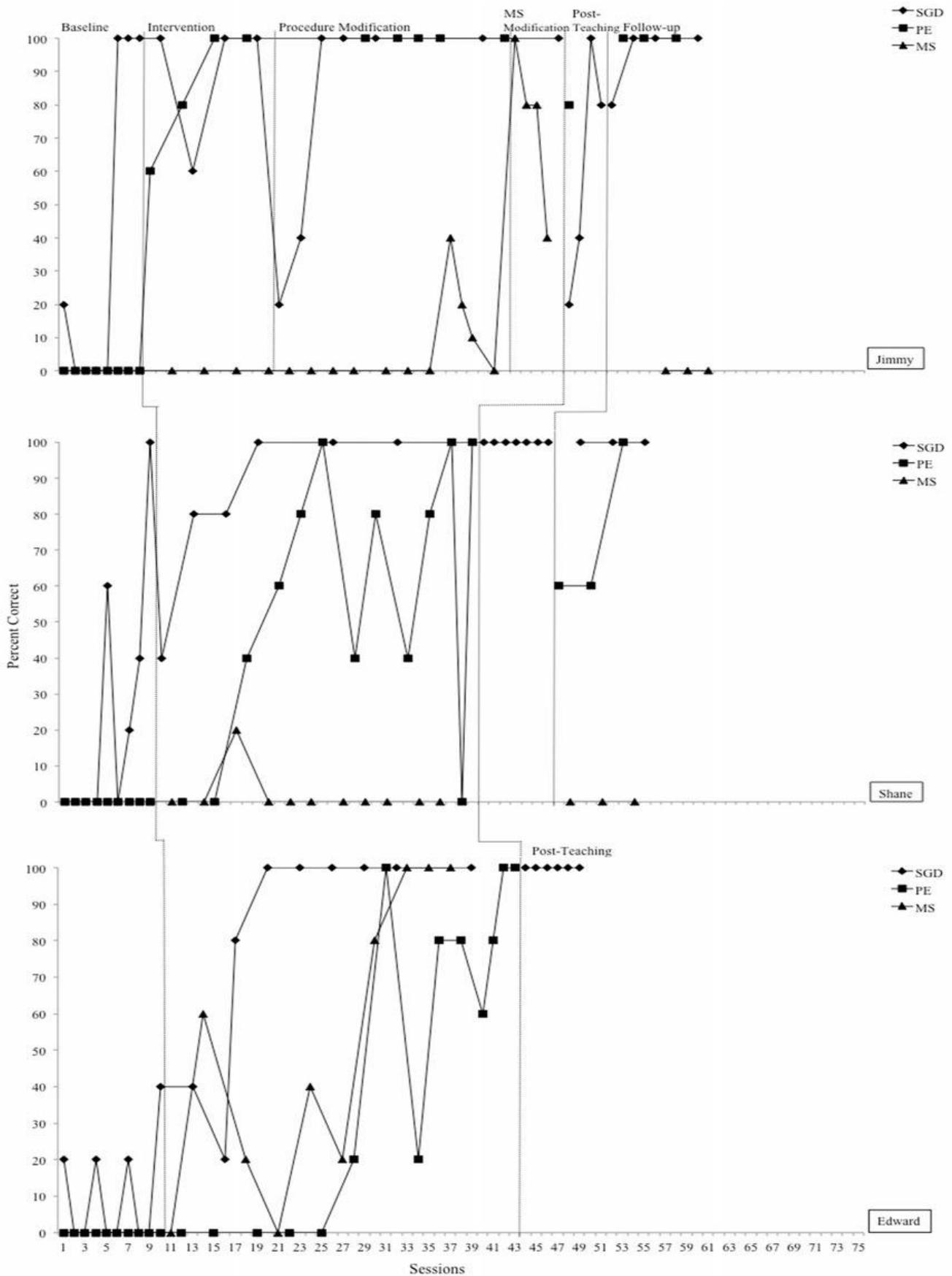


Figure 2.6: Results Jimmy, Shane, Edward. Percentage of trials with a correct request across sessions and across the three AAC options. Correct use of the SGD is indicated by a solid black diamond. Correct use of the PE option is indicated by a solid black square. Correct use of MS is indicated by a solid black triangle.

Individual Results for Nine Participating Students

Henry. During the teaching phase, Henry achieved the 80% criterion for all three AAC systems. This was achieved in nine sessions for the SGD, and seven sessions each for both MS and PE. Henry's use of the three systems was maintained at or above criterion during post-teaching and two follow-up sessions. Henry demonstrated a clear preference for the SGD by selecting this option 61 (86%) of the 71 opportunities presented during the study. Henry selected MS and PE on three occasions each and made no selection on four occasions.

Cameron. Cameron signed more during 100% of opportunities during his three baseline sessions. His target was altered to more play for the subsequent sessions to provide a teaching target. He achieved criterion levels on the 3rd SGD session, and the 5th PE and MS sessions. Cameron maintained criterion levels at subsequent post-teaching sessions, except for one post-teaching session in which he did not use any MS. In follow-up sessions, Cameron's PE skills were below 80% correct on half of the sessions. Cameron made 124 preference selections throughout the study. Of these, 60% (N=75) were for the SGD, 23% (N=29) for PE, and 16% (N=20) for MS.

Andy. Andy demonstrated the use of both SGD (20%) and PE (20%) systems after two teaching sessions. However, he did not use MS during the three intervention sessions. Due to personal reasons, Andy's parents withdrew him from the study after the 7th intervention session.

Simon. During the study Simon did not learn to use the three AAC systems to criterion levels. While he initially appeared to make some progress with the iPad[®], his performance continued to fluctuate and then cease for SGD and MS. After further procedural modifications, Simon's use of the SGD increased to an average of 30% (range 0% to 80%),

PE increased to an average of 61% (range 0% to 100%), and MS to an average of 5% (range 0% to 20%). However, because Simon's performance did not reach criterion levels within the time-frame of the study, post-intervention and follow-up phases were not completed. During baseline-preference assessments, Simon selected the SGD during one session and made no selection during the other four sessions. During intervention, Simon experienced 70 preference assessments during which he selected the SGD on 59% (N=42) of opportunities, followed by no selection on 33% (N=25) of opportunities and the PE on 8% (N=6) of opportunities. He selected MS on only two occasions (Couper et al., 2014).

Nico. Nico achieved criterion use of the three AAC systems during the teaching phase. This was achieved on the 3rd PE and SGD sessions and 4th on the MS session. Nico maintained his use of the three AAC systems at 100% during post-teaching and follow-up sessions. Nico demonstrated a clear preference for the SGD by selecting this option during every preference assessment (100%; N=38).

Andrew. During the teaching phase, Andrew reached criterion using the SGD at the 4th session (mean 85%; range 40% to 100%) and PE at the 6th session (mean 70%; range 0% to 100%). He did not learn to use MS during the seven teaching sessions focused on this system during this study. During post-teaching sessions, Andrew's use of the SGD reduced to 53%. He also demonstrated use of MS during two follow-up sessions. During baseline assessments, Andrew did not make any selection during preference assessments. Once teaching sessions began Andrew indicated a preference for the SGD (69%; N=24) and made no selection on 31% (N=11) of opportunities.

Jimmy. Jimmy reached criterion for use of PE at the 4th teaching session and for SGD at the 9th session. On average, he correctly used the SGD on 82% (range 20% to 100%) and PE on 93% (range 60% to 100%) of occasions across the study. After MS procedural

modifications, Jimmy reached criteria for MS after 18 sessions. During post-teaching sessions, Jimmy's use of the SGD and PE fluctuated and he did not use MS during follow-up sessions. Jimmy demonstrated a preference for the SGD at baseline and across the study (71%; N=40), followed by PE (16%; N=9) and no selection (13%; N=7).

Shane. Shane had 0% correct for PE and MS during baseline but showed an increasing trend with the SGD which related to 100% after four sessions and PE after 13 sessions. However, he did not achieve any success with MS after 11 sessions. Across all sessions he used the SGD with 80% accuracy (range 40% to 100%) and PE with 55% accuracy (range 0% to 100%). During preference assessments, Shane primarily selected the SGD (80% N=36) and made no selection on 17% (N=8) of trials, and chose PE once (2%).

Edward. Edward achieved criterion on his 5th SGD and 14th PE intervention session. He achieved criterion for MS-based requesting on his 10th intervention session. During the post-intervention phase, Edward used the SGD to request 'more' with 100% accuracy. Edward selected the SGD five times (50%) during the baseline preference assessments. During intervention preference assessments, Edward selected either the SGD (85%; N=28) or made no selection (15%; N=5).

Figure 2.7 is a summary of the number of times each option was selected or the number of times the trial ended with no selection during the AAC preference assessments conducted in each phase of the study.

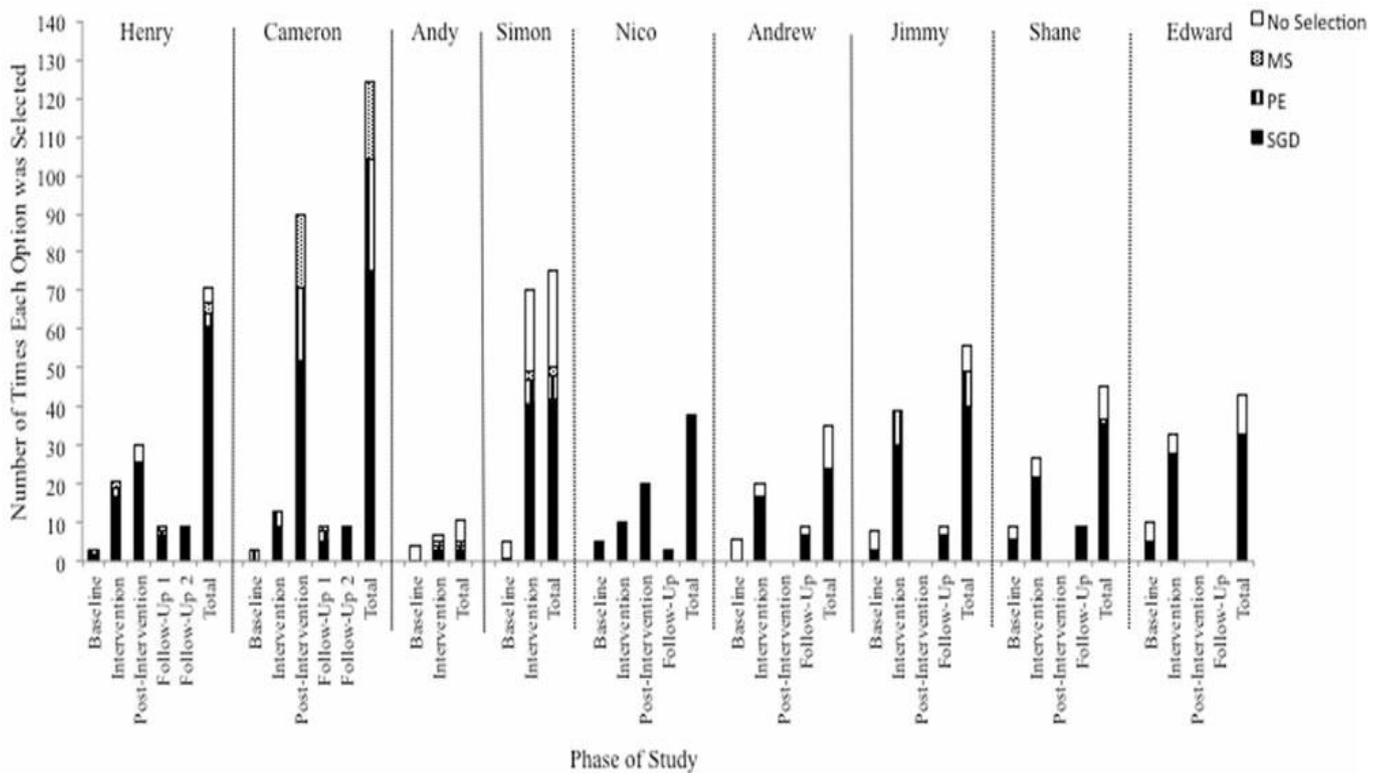


Figure 2.7: AAC Preferences across Phases

Discussion

The first research question examined if students with ASD could learn to use PE, MS and iPod®/iPad®-based SGD to request access to toys. This was partially confirmed, with five out of nine students (Henry, Cameron, Jimmy, Edward, and Nico) learning all three AAC systems to criterion levels. Thus, the present study provided further support for the notion that students with ASD can be taught to use multiple AAC systems for requesting (Boesch et al., 2013; van der Meer & Rispoli, 2010). In contrast, Sam and Andy did not reach criterion levels on any AAC system before withdrawing from the study. Two students (Andrew and Shane) showed particular difficulty in learning MS.

The second question investigated if students could demonstrate a preference for using one of the three AAC options and if that preference was the SGD. Evidence for a preference

would be when a student chose one AAC option more frequently than the other two options during preference assessments. In line with the hypothesis that most students would choose SGD, together with the majority of participants in previous research using tablet technology, eight of the nine students in this study indicated a strong preference for this type of AAC system (Boesch et al., 2013; Flores et al., 2012; Lorah et al., 2013; van der Meer, Didden, et al., 2012; van der Meer, Kagohara, et al., 2012; van der Meer, Sutherland, et al., 2012). Specifically, all students except Andy chose SGD more often than MS or PE. There was variation in the strength of the preference but SGD was always chosen more than 50% of time by all students except Andy. (Andy withdrew from the study after seven intervention sessions). The mean for all students choosing the SGD was 75%.

These findings are consistent with previous reports of student's preference for the iPod®/iPad®-based SGD over PE (Lorah et al., 2013) and other AAC systems (van der Meer, Kagohara, et al., 2012; van der Meer, Sutherland, et al., 2012). The idiosyncrasies of student's preferences were demonstrated by Nico's strong preference for the SGD (100%), compared with Cameron who preferred the SGD (60%), followed by PE (23%) and then MS (16%), and Sam who primarily chose the SGD (56%) but also made no selection (33%) during preference assessments. One student, Andy, made no selection on more occasions than he selected the SGD but six students who participated in follow-up sessions demonstrated a preference for and accurate use of the SGD. Only Henry and Cameron selected PE or MS during preference assessments at follow-up.

The third question as to whether a preferred AAC system influences the rate of acquisition of an ACC system was tentatively answered in the study. Four of the nine students (Cameron, Andrew, Shane and Edward) reached criterion in fewer sessions using the SGD compared to PE or MS. In contrast, Henry reached criterion using PE and MS in seven

sessions compared to nine sessions for the SGD. Similarly, Jimmy needed four sessions to reach criteria using PE compared to nine sessions for the SGD.

The finding that speed of acquisition and preference stability may not hold for all students was also confirmed in a study by van der Meer, Sutherland, et al. (2012) which reported that one student switched preference from SGD to PE during follow-up assessments. The impact of students' preference on the acquisition of AAC skills is receiving research attention. Findings across three studies for twelve students with ASD and other disabilities reported that, for some students, acquisition and maintenance of AAC skills was better with their preferred AAC mode (van der Meer, Didden, et al., 2012; van der Meer, Kagohara, et al., 2012; van der Meer, Sutherland, et al., 2012). Considering the on-going challenges that individuals with complex communication needs experience in accessing and maintaining skills with AAC technologies (Drager, Light, & McNaughton, 2010), it is important that multiple AAC systems are taught together, and the preferred AAC identified.

Students in the study were a diverse group, not only in terms of ages and prior experience with AAC, but also with regard to the contexts in which they operated. There was a mix of pre-school, mainstream and special school attendees with educational settings providing different levels of resource and support. In some situations, significant input and support for interventions was provided by school educators as well as by outside agencies. These differences may explain the variation in speed of acquisition and stability of preference. Generally, the findings were positive, and consistent with a wealth of previous research (Boesch et al., 2013; Flores et al., 2012; Lorah et al., 2013; Son et al., 2006; van der Meer, Didden, et al., 2012; van der Meer, Kagohara, et al., 2012; van der Meer, Sutherland, et al., 2012).

Section Four

Case Studies: The Communication Choices of Three Students with Autism Spectrum Disorder who are Nonverbal

This investigation involved three of the nine students who participated in the AAC study, and was important because it was situated in their real-world school environment. The students were enrolled in their local schools and participated fully in mainstream classrooms. The aims and strategies will be outlined along with the steps taken by the researcher and the responses from parents and school communities.

Andrew is the first student described in this section. He was not only the student who eventually made significant progress in generalising the skills to use his preferred AAC, but also the student with the most need for a communication tool when his behaviour was compared with the other two participants. Andrew reached criterion in fewer sessions using SGD compared with PE or MS.

The second student, Nico, used AAC confidently within a short space of time. He demonstrated how shared input from home and school enabled him to adapt and use his preferred AAC in multiple ways in all aspects of his life. Nico demonstrated a preference for, and maintained accurate use of, the SGD but also reached criterion for PE and MS after three sessions.

The third student, Jimmy, began to verbalise during the study. He needed four sessions to reach criterion with PE and nine sessions with SGD, which was his preferred AAC from preference assessments.

Case Study One

Andrew

Andrew's educational journey began with his pre-school years spent at home on a farm before he became a student in his local school. Andrew's participation in the study will be followed by a summary of how his choice of communication tool, the iPad®, increased his learning and participation in the classroom and other contexts.

Andrew was diagnosed with Autism Spectrum Disorder when he was aged three years, nine months. As with many students diagnosed with ASD, he was non-verbal. Recent estimates have found that 14%-25% of students diagnosed with an autism spectrum disorder have little or no functional language (Lord, Risi, & Pickles, 2004; Volkmar, Lord, & Bailey, 2004). This case study traces the transition process from home to school and the experiences of Andrew's parents and educators as they provided a successful educational experience for Andrew in an inclusive setting. The study will document the impact that technology had on Andrew's learning and how inclusion was strengthened in the classroom and expanded to the school playground.

Early communication behaviours. Andrew is the second in a family of three children. His mother and father share responsibilities for managing their farm, child care and financial provision. When the study began, Andrew's mother was at home and his father worked in the electronic industry in the city about 45 minutes away. Later in the study the roles reversed, with Andrew's mother working as a lawyer for a regional business while his father was at home, responsible for child care and farm management.

Andrew's mother reported that, as a young child, Andrew used pre-linguistic behaviours to communicate by flapping his hands to express whether he was happy or unhappy. He squealed, chewed things or bit his hands to communicate. He lined up objects

such as toy trains and cars, and frequently brought objects to you when he wanted attention. Occasionally his mother noticed a few sounds that were used repeatedly. He was sensitive to loud noises like chain-saws, motor-bikes and lawn-mowers, and became upset if he was exposed to noises even when they were expected. A crowded shopping-mall with people talking was equally distressing for him. Andrew would often run from the house and through paddocks to the edge of the farm where it bordered a main road. He was attracted to the trucks that used the highway and the family were aware that he could climb the fence and reach the road. Once he was enrolled at his local school, which also bordered the highway, a fence was built around the school. However, when he climbed over the fence on his first day at school, this was no longer seen as a barrier and constant supervision by teachers or teacher aides was considered necessary.

At the commencement of the study, Andrew was using visual organisers at school but not at home. He recognised one manual sign - the sign for *'finish'*. An iPod® was used with games that matched shapes especially the 'Thomas the Tank Engine' game.

The programme. Andrew's parents were sent a report summarising the results for two interviews that had taken place with Andrew's mother Sue (pseudonym) in the family home at the beginning of the study. The Vineland-11 (Sparrow et al., 2005) was used to assess Andrew's adaptive behaviour. Adaptive behaviours are the age-appropriate behaviours that people require to live independently and function in their daily lives. The four Domains (Communication, Daily Living Skills, Socialisation and Motor Skills) have a mean of 100 and an average range of 85-115. Each Sub-domain has a mean of 15, with an average range of 12-18.

Andrew's scores are displayed in Table 2.5.

Table 2.5: Andrew Domain and sub-domain scores and confidence intervals

| Communication | 49 | Socialization | 59 |
|---------------|----------------|------------------|---------------|
| Receptive | 8 (6-10) 1;6 | Interpersonal | 8 (6-10) 0;1 |
| Expressive | 5 (3-7) 1;0 | Relationships | |
| Written | 8 (6-10) 1;10 | Play and Leisure | 7 (5-9) 0;8 |
| | | Coping Skills | 8 (6-10) 1;10 |
| Personal | 8 (6-10) 2;7 | Gross | 9 (7-11) 0;7 |
| Domestic | 13 (11-15) 3;5 | Fine | 9 (7-11) 0;7 |
| Community | 7 (5-9) 2;3 | | |

Note: All ages and Vineland-II age equivalences are reported as years; months. Confidence levels reported in brackets.

Eligibility for the Study

Andrew's overall adaptive functioning was in the Low range when compared with other students his age. The scores showed strengths in the Daily Living Skills and Motor Skills when compared with the other Domains. The Sub-Domain Domestic was slightly stronger in the Daily Living Skills Domain. These assessment results confirmed that Andrew was eligible for the study (see page 72 for criteria for eligibility to be included in the study) and the investigation began after consent forms were signed by his parents and school personnel. To confirm that toys were an acceptable reinforcement, the duration of free play baseline data was recorded at his home. It was expected that Andrew would average at least four minutes of playing per session, or playing with the toys. This was achieved.

Andrew had a designated space within the classroom with his own television, a collection of toy trains, a bean bag and some favourite games and books. However, he was usually seated with a group of peers for most of the day with visual organisers attached to the top of his desk, like many of the other students. Andrew used the visual organisers to help him with the order of the day by attaching another new card when an activity ended. Generally, Andrew was quiet and compliant in the classroom but when distressed he could take more than 15 minutes to settle, often using his designated space. According to his teacher, most distress was about having to keep his shoes on. He liked them to be off.

Figure 2.8 shows the sequence of Phases and the number of sessions to reach criteria for each of the Phases, beginning with the Stakeholder Interviews and Free Play sessions. A summary from the field notes for each of the 5 Phases follows.

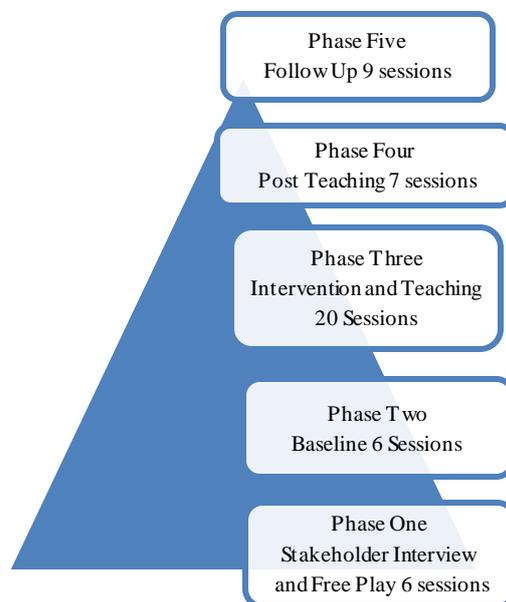


Figure 2.8: Phases and number of sessions for Andrew

Phase One: Stakeholder Interview and Free Play Sessions

The Stakeholder Interview and six sessions of Free Play occurred in Andrew's home with his mother and younger sister. The first two 5 minute sessions of spontaneous play with a toy train and bubbles ran consecutively. At the end of the second session his sister was keen to show Andrew how to blow a windmill, which he managed. His mother commented that she had never seen him blow anything before. After 3 minutes of the third session Andrew ran outside and began to play on a trampoline and then jumped off and ran through a hole in the fence to the road. His mother intervened and commented that he liked to get to the road to play on the metal and also to watch the trucks (Field Notes).

The next three sessions of Free Play occurred during the following week. Midway through session three, Andrew moved to another room to continue playing with a truck from the toy box. Over the six sessions, Andrew averaged 4 minutes of playing per session which enabled him to move to the Baseline Phase.

Phase Two: Base-line

For Andrew, the programme began with six Baseline sessions over four weeks. The six sessions, each of 5 minute duration, were conducted in quiet indoor areas of the school, such as the library or staff room, with the support of either his teacher aide or a specialist teacher. Sessions usually comprised two 5 minute sessions with a break of 20 minutes in between for time outside. Each session involved one- to-one interactions between the researcher, teacher aide and Andrew, with everyone seated on the floor. When the request for more play was given the box of toys was within easy reach of Andrew and the researcher. Once the lid was placed on the toy box it became hard to interest Andrew who was often restrained from running outside between interventions. The stop watch and AAC devices (an iPad®, PE and MS sign) were also positioned close to the researcher.

While there was varied reaction to playing with the toys in the toy box during the six sessions, there was no response to using any of the communication tools. During the first session Andrew uttered a sound like *choo choo* when touching the train. One of the toys was a small cow that made a mooing sound when pressed. Andrew reacted to this immediately by placing his hands over his ears; he also watched carefully to see that it wasn't knocked or touched when toys were placed back in the toy box. Andrew selected the SGD during session five twice (Interruption 2 and 4). This result confirmed that Andrew was not using AAC so was ready for Phase Three: Teaching Intervention.

An AAC preference assessment was undertaken after each Baseline session. Preference Assessments also followed each session in the Teaching Intervention Phase and Follow-up Phase. These aimed to determine if Andrew would continue to select and show a preference for using one of the three AAC systems. Each of the three AAC systems was placed in random order and Andrew was allowed ten seconds to respond to the question, "*Which communication option would you like to use?*" Selecting was defined as touching, holding and manipulating the device. The choice of AAC was recorded after a selected AAC system was used to access the toy box for play.

Phase Three: Teaching Intervention

The procedure for this Phase of twenty 5 minute sessions involved the usual one minute of toy play then an interruption with Andrew being asked to '*Let me know if you want more*'. A correct response was recorded as a '*Yes*' if it occurred within 10 seconds and this required producing the manual sign for '*MORE*' or handing the PE symbol for '*MORE*' or touching the '*MORE*' symbol on the iPad® resulting in voice-output. If the correct response did not occur, some form of prompting, such as pointing to the sign, could be used. Because

Andrew frequently responded to touch negatively with biting, scratching or running from the room or school, prompting for him did not include physical guidance.

The classroom teacher who observed some sessions thought that Andrew waited until the end of each session without making any response as he would be allowed to play anyway. As the sessions continued, Andrew became more relaxed and appeared to understand the 'Stop/Start' procedure with the toys and access to the toy box. However, he also used behaviours to show his reluctance to participate. He would lie on the floor, get under a blanket, bite his hands or the teacher aide's arms or hands, or run from the room into the playground and potentially out of the school.

The Intervention and Teaching Phase included twenty 5 minute sessions with Andrew reaching criterion using the SGD at the 4th session, and using the PE at the 6th session. Criterion was 80% correct or better for three consecutive sessions. He did not learn to use MS during the Intervention phase. An AAC Preference Assessment followed each session in this Phase and showed that Andrew chose SGD 69% of the time but made no selection 31% times.

Phase Four: Post-Teaching Phase

This Phase determined if Andrew preferred to use one AAC system over the other two and also to assess maintenance of learning. Andrew's behaviour during this phase became challenging when he was requested to indicate a choice for one of the AAC systems before being allowed to play with the toys. The behaviour included lying on the floor with his stomach flattened and hands and feet spread. He also babbled loudly using rocking movements with his arms and legs hitting the floor. According to his teacher, similar behaviours were observed in the classroom, with most events triggered when Andrew was required to comply with something that was not his choice.

During the seven post-teaching sessions, Andrew's use of the SGD decreased to 53%. He correctly used the MS during two follow-up sessions. With respect to the AAC preference assessments Andrew chose the SGD 69% ($n = 24$) of the time and made no selection on the remaining 31% ($n = 11$) of opportunities.

Phase Five: Follow Up

This was a much more positive Phase that involved nine 5 minute sessions. There had been a six week summer holiday break between this Phase and the previous Post-Teaching Phase and Andrew seemed relaxed and well. However, the toys now appeared too young for him; he was seen to try and attach one train to another and place two balls into the hole in the box rather than one. He now enjoyed some touch and seemed to enjoy a small roller on his arms for a short time.

Procedures for Follow-up were identical to the Intervention Teaching Phase except no prompting occurred and Andrew received access to the toys contingent on correct requesting. During this Phase he responded positively to both PE and SGD but not MS.

Results

There were several new developments for Andrew's communication skills, as follows:

1. Choosing an activity from a menu before going out to play at either morning break or lunchtime. Within the choice there were refinements of core vocabulary using *I, you, want, like*. Tasks were linked to the playground choices using words, e.g. *I want slide/scooter/play tag*
2. Later the vocabulary became extended to:
 - i. I will take turns with the ball.*

ii. *I will blow bubbles under the trees.*

iii. *I want to ride the scooter on the court.*

3. Using a story book with pictures. For each phase of the story Andrew selected a symbol on an iPad® to retell the sequence of the story.
4. Using symbols on an iPad® for the selection of food from his lunchbox. There were symbols for many food items so, for example, before eating an apple he would select the symbol for apple. Another symbol was used for indicating he was putting the lunchbox away.
5. Indicating on his iPad® when he wanted to go outside for a break.
6. Using an iPad® to indicate that he needed to go to the toilet with the teacher aide escorting him.
7. Taking an iPad® home with the potential for it to be used as a communication tool.
(This was an area needing further support.)
8. Peer support with peers who were familiar with iPads®. During one visit a student told the researcher, *“Andrew can write his name now. I taught him”*.
9. By the end of the study Andrew and his teachers were using his iPad® for Literacy and Life Skills. The teacher modelled how to enter the missing word when a story was being read. The task, which involved matching and sequence activities based on each story, required direct instruction and positive reinforcement to fully engage Andrew.
10. Andrew was able to select the order of tasks or choose which books and in which order he would like to read.

Summary

Andrew made no correct responses during the Baseline Phase. He found it difficult to engage with the practice of interrupted play and would often opt out of the whole session by lying on the floor, avoiding eye contact or running out of the room. As the study progressed he became more aware of the procedure and learning to use the AAC systems improved.

He later showed that he was capable of using the SGD in a maze literacy programme, as well as choosing food from his lunch box and activities in the playground. The researcher offered feedback and suggested resources based on experience with non-readers in other settings.

Teaching and modelling choice as part of a teaching pedagogy expanded and developed effective ways of engaging this student. Sometimes this was a new way of working together for both the student and his teacher. The skills to use the SGD became generalised in multiple settings and the chances of long-term maintenance were more likely to endure when the researcher moved away from the school. This was important as the implementation of communication interventions is costly and requires considerable amounts of time and skill (Achmadi et al., 2014). It was also important as it demonstrated how research can benefit all participants in a research study.

Case Study Two

Nico

Nico lives at home with his brother and parents in a small rural town. He was diagnosed with ASD when he was two-years old. His first vocalisation was babble that was not specifically directed at any one person. He started verbalisation when he was six years old with sounds, then words, then a simple story but without any real understanding of what he was verbalising. His ability to echo adult language (echolalia) was thought to be a sign that speech could emerge, but, as suggested by Millar (2009), this is not always a predictor of functional speech development.

Nico attended his local primary school and received ORS support (Ongoing Resource Scheme) (Ministry of Education, 1997). This entitled him to teacher aide and additional teacher support with some input from Special Education (Ministry of Education, 1997). The researcher visited the school to meet the principal, the SENCO (Special Education Needs Coordinator), class teacher and teacher aide. A short observation of Nico working in his classroom completed this visit.

The Programme. A report summarising Nico's results from the Background Interview and Vineland Assessment Scales was sent to his parents confirming that Nico was eligible to participate in the programme.

Table 2.6: Nico Domain and sub-domain scores and confidence intervals

| Communication | 54(47-61) | Socialization | 48(42-54) |
|---------------|----------------|------------------|---------------|
| Receptive | 4 (2-6) 0;8 | Interpersonal | 4(2-6) 0;1 |
| Expressive | 7 (5-9) 2;3 | Relationships | |
| Written | 8 (6-10) 5;6 | Play and Leisure | 5 (3-7) 0;8 |
| | | Coping Skills | 7 (5-9) 0;4 |
| Personal | 7(5-9) 2;0 | Gross | 8 (6-10) 2;4 |
| Domestic | 10 (8-12) 3;11 | Fine | 9 (7-11) 4;1 |
| Community | 8 (6-10) 3;11 | | |

All ages and Vineland-II age equivalences are reported as years;months. Confidence levels in brackets.

Eligibility for the Study

While Nico's overall adaptive functioning is in the Low range, the results of the Vineland II Behaviour Assessment Scale (Sparrow et al., 2005) show a range of levels within the Domains and Sub-Domains. Nico's scores indicate a relative strength in Communication, particularly in Written Communication. Age equivalents for the Sub-Domain Communication scored by the Vineland11 Behaviour Assessment Scale (Sparrow, D. et al. 2005) gave his Receptive language at 0.8yrs, Expressive at 2.3yrs and Written Communication at 5.6yrs. He read text aloud but without processing and didn't understand the content. The Sub-Domain Daily Living Skills scored age equivalents of 2.0yrs for Personal, 3.11 years for Domestic and 3.11 years for Community. He often needed to be prompted to make eye contact or look towards family or friends. The age equivalents for Socialisation are 0.1 years for Interpersonal Relationships, 0.8 years for Play and Leisure Time and 0.4 years for Coping Skills. Nico appeared to be more interested in things than people. He had delays in Motor Skills; he

frequently had injuries from falls but had no idea where he had been hurt. The Motor Skills Sub-Domain scored 2.4 years for Gross and 4.1 years for Motor Skills.

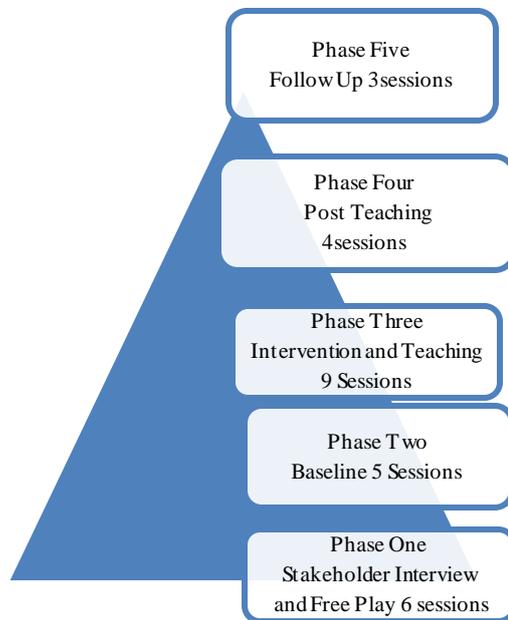


Figure 2.9: Phases and number of sessions for Nico

Figure 2.9 shows the Phases and number of sessions for Nico to reach criteria for each of the five Phases beginning with the Stakeholder Interviews and Free Play sessions. A summary of each of the phases will follow.

Phase One: Stakeholder Interviews and Free Play Sessions

In discussion with Barbara (pseudonym), Nico was described as placid and rarely responded positively or negatively to anything. He didn't respond to rewards or punishers and although he appeared happy showed no desire to learn new skills. Further discussion identified Nico's interests as being quite rigid but included numbers, Bingo games, trains and his tricycle.

The principal of Nico's school described his school philosophy as inclusive and with adequate staff and resources to cater for the needs of students causing concern. Nico was one of five students in the school of 248 students who were ORRS funded. This meant that there was teacher aide support for Nico (five hours per week) as well as Specialist Teacher support (one and half hours per week). He was also entitled to Speech Language Therapy but that had so far included one observation per year. Individual Education Plans (IEPs) were led by Special Education and were held twice a year but at this stage personnel had not met Nico.

The principal and his staff had a warm, supportive relationship with Nico's mother and were managing the learning needs of Nico with very sporadic support from external agencies. Together they had introduced several strategies to support Nico's behaviour and learning. A *Feelings* note book was provided to help interpret his intentions, concerns and requests. At morning tea he had buddies and usually played one game resembling hop scotch before engaging in running up and down the tennis court in a form of ritual. He used the computer with math games as a relaxation activity. He was unable to communicate verbally but used 'squawks' when highly stressed, and then was reminded to use his sign to request help. An example of this was observed when his pencil broke and the teacher aide reminded him to use the sign for help from the '*Feelings*' book so that she was able to support him.

Although visual signs were the preferred communication mode of his teacher aide and teacher, Nico showed that his preferred choice for communication was a SGD. He was able to use both tools confidently and often chose to use both during classroom-based learning. However, he began to show a preference for the SGD at home where he experimented and communicated with his family.

Free Play Assessment. The researcher met with Nico, his mother, Barbara, and the teacher aide in a room that was carpeted and furnished with three chairs and a desk. Already

on the desk, which had been used by a teacher for another purpose, were a box of magnetic letters and a box-file of readers. Nico slowly focussed on the toys in the toy box but had noticed the resources on the desk. He explored each choice of toy and eventually focussed on a yellow, ridged, plastic pipe. He smelt it from top to bottom. He ran his fingers up and down the ridges. He placed the end to his ear and ran his fingers up and down. He placed the end of the tube against his face. He looked down it and tried to see objects through the end. He squeezed it and turned it into another shape. He let the tube bang on the edge of the box and listened to the noise. He held it while he picked up some books and a few other toys to smell. Finally he put the tube back in the toy box. He then went to the box of readers and began sorting them according to the numbers on the book and the box-file. Although the six Free Play sessions confirmed that toys were an appropriate reinforcement for Nico he used only one toy.

Phase Two: Baseline

The first of five Baseline sessions began with Nico only interested in using the yellow tube from the toy box. By Baseline sessions four and five, Nico was repeating the statement '*I want more*' when greeting the researcher. He was beginning to exhibit echolalia during sessions at school as well as at home. Nico had 0% correct with PE and MS during baseline and 100% correct with the SGD.

Phase Three: Teaching Intervention

During the nine Teaching Intervention sessions, Nico chose each of the AAC correctly and chose SGD in the Preference Assessments. He reached criterion on the three AAC systems during the Intervention Phase. Specifically, he achieved criterion on the 3rd PE and SGD sessions and on the 4th MS session.

Phase Four: Post-Teaching

Nico maintained his use of the three AAC systems at 100% during four Post-Teaching sessions.

Phase Five: Follow-Up

During the three Follow-up sessions, Nico always chose the SGD option; he also chose this option during his 38 Preference Assessments.

Summary

The results from Nico's study confirmed that students with ASD can be taught to use multiple AAC systems for requesting. It was also evident that he was capable of selecting and using other than his preferred AAC system. This was important as it meant that other systems could be used if Nico's preferred AAC system was broken or unavailable (Sigafoos & Drasgow, 2001).

Nico's use of his preferred AAC system expanded to include video clips on his iPad®. In addition, he placed still pictures on his visual organiser and PE system that showed him participating in settings such as a climbing wall and camping. This was not only an example of generalisation, but also indicated that long term maintenance of two AAC systems was occurring for Nico.

Case Study Three

Jimmy

Jimmy was formally diagnosed with ASD by Special Education when he was at kindergarten. He lives at home with his mother, who spoke both English and Mandarin, and his father. Jimmy is sensitive to loud noises like lawn-mowers, or crowded spaces like malls with lots of people noise, and he communicated with different levels of babble.

At the beginning of the study, when Jimmy was aged five, he attended his local school until 1.30pm each day and started to use a communication book between home and school. During the first visit, the researcher met with the principal, SENCO, class teacher and teacher aide, and carried out a short observation of Jimmy working in his classroom.

Jimmy's assessments were completed at his home with his mother. A report summarising the results was later sent to his parents. The Vineland-11(Sparrow et al., 2005) was used to assess Jimmy's adaptive behaviour. Jimmy's scores for adaptive functioning are displayed in Table 2.7.

Table 2.7: Jimmy Domain and sub-domain scores and confidence intervals

| Communication | 72 | Socialization | 59 |
|---------------|-----------------|------------------|--------------|
| Receptive | 10 (8-12) 2;5 | Interpersonal | 8 (6-10) 1;3 |
| Expressive | 5 (4-6) 0;10 | Play and Leisure | 7 (5-9) 1;1 |
| Written | 16 (14-18) 5;6 | Coping Skills | 8 (6-10) 1;6 |
| Personal | 9 (7-11) 2;10 | Gross | 9 (7-11) 2;5 |
| Domestic | 14 (12-16) 3;11 | Fine | 9(7-11) 1;1 |
| Community | 9 (7-11) 2;6 | | |

All ages and Vineland-II age equivalences are reported as years; months. Confidence levels in brackets.

Eligibility for the Study

While Jimmy's overall adaptive functioning is in the Low range, the results of the Vineland II Assessment (Sparrow et al., 2005) show a range of levels within the Domains and Sub-Domains. Jimmy's scores show relative strengths in Communication, particularly Written Communication. In his classroom, Jimmy had a desk at the back of the room and shared a class computer. Because he was reluctant to sit on the mat, he was able to choose to sit on the couch during mat time. After break-times, Jimmy would often wander into other

classrooms rather than return to his own classroom, behaviour which concerned his teacher aide or teacher who had to search for him.

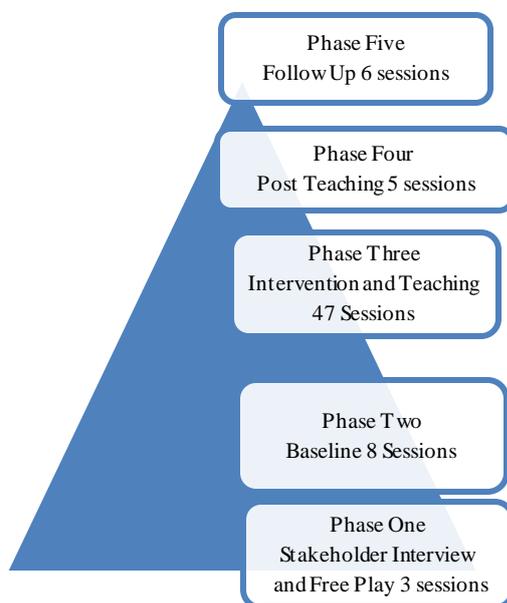


Figure 2.10: Phases and number of sessions for Jimmy

Figure 2.10 shows the sequence of Phases and number of sessions in each Phase required to reach criteria. The Phases began with the Stakeholder Interviews and Free Play sessions. Summaries of the five Phases will follow.

Phase One: Stakeholder Interview and Free Play Assessment

Administration of the Vineland-11 (Sparrow et al., 2005) was one of the requirements to test eligibility for participation in the study. Mary (pseudonym, Jimmy's mother) participated in the Background Interview and completed the Vineland-II Assessment. At the time of the interview Jimmy liked to use visual magnetic letters and correctly spelt cat, dog and bed when requested by his mother.

The duration of Free Play baseline data was recorded for three of the 5 minute sessions to find if toys were an acceptable reinforcement. During the first session, Jimmy was

focussed on the toys but not sure how to 'play' with any of them. During the 2nd session, he needed reassurance that he could touch the toys once the lid was removed. Placing the lid on the box appeared to confuse him. During the 3rd session he wandered away towards the refrigerator when the lid was placed on the toy box. Mary intervened and said, "Bad boy. Go and play with the toys." He came back and reached for the play-dough. He found it difficult to take the lid off the play-dough container and recoiled at the touch of the dough. Mary directed him to the bubble set which was familiar to him and he played with that.

The researcher assumed that the selection of toys was appropriate for all of the students in the study but it became apparent that Jimmy was operating in a different social and cultural context. His play had been confined to computer games and responding to requests to spell three words using magnetic letters on the door of the refrigerator. It became clear from the Free Play sessions that Jimmy was not familiar with the toys, and nor did he know how to play with them. He usually chose the colouring book to flick over pages but changed as the study progressed. Data from the Free Play Assessment showed that Jimmy played with toys for a total of 7 minutes 37 seconds. This total only just reached criterion for toys as reinforcement and, as the study progressed, this became increasingly problematic.

After discussion with his teachers and the researcher's supervisors it was decided to include Jimmy in the study with some modifications to the programme. All other sessions took place in an office space at the school with his teacher aide and or his teacher observing as opposed to being in his home.

Phase Two: Baseline

Baseline sessions were administered in an empty office on the school site. Jimmy completed eight sessions before reaching the criteria for Baseline. Originally all of the sessions were located on the floor with everyone seated around the toy box but Jimmy did not

like this position and found it difficult to get up from sitting. During the later sessions, a desk was used with Jimmy standing close to the toy box.

Throughout the sessions it was difficult to keep Jimmy focussed on actually playing with any of the toys. He appeared unable to recognise or understand what to do with them and avoided any object that required physical manipulation or the removal of a lid. However, he was interested in a colouring book that featured a train with different numbers on the carriages. The numbers became his focus as he held up corresponding fingers for affirmation. When his interest waned, he wandered away from the toy box and, if permitted, out of the building. During one session he became distressed when he saw other students outside the office. Jimmy made one correct request with the SGD during baseline and had 0% correct with PE and MS.

Discussions with his teacher and teacher aide about Jimmy's behaviour suggested that his reluctance to focus and wander was, in their opinion, a form of avoidance and stress. In the classroom he used a couch to refocus. Later, he would join the other students on the mat and so become part of the class again. Jimmy's behaviour may have been a form of communication indicating that he wasn't ready to join the class and needed control over his participation. Generally, Jimmy's variable behaviour was accepted at school enabling the principal and teachers to build a positive, relaxed relationship with him and his family.

Phase Three: Teaching Intervention

There were 47 sessions in this Phase. Jimmy reached criterion for correct use of PE at the 4th intervention session and with the SGD on the 9th session. He seemed unable to physically complete the manual sign for *more* and used a bunched hand that did not move from his chest. The sign was modified so that a bunched hand that touched his head was accepted as a sign for *more*. After the procedures for teaching the MS option were modified,

Jimmy reached criteria for MS after eighteen sessions. He had started making lots of grunting noises as he moved his hands. When he attempted to copy movements that were modelled he lacked control of his hands.

Phase Four: Post-Teaching

There were five Post-Teaching sessions. During the Post-Teaching sessions Jimmy would often pre-empt the requests and his use of the SGD and PE fluctuated. Jimmy appeared to demonstrate a preference for using the SGD (71%; $n = 40$), followed by PE (16%; $n = 9$) and no selection (13%; $n = 7$).

Phase Five: Follow-Up

The six week summer holiday separated Phase Five from Phase Four. During these weeks, Jimmy had begun to repeat words and correctly identify and name objects. When the researcher pointed to pictures or real objects, he correctly said '*green apple*', '*red ball*', '*yellow star*', '*purple circle*' and '*banana*'. Phase Five Follow-Up sessions were completed in 2 days, a week apart, with three sessions each day. He did not use MS during follow-up sessions.

Results

Prior to the researcher's last Follow-Up session Jimmy had begun to make sounds that sometimes resembled words. During some earlier sessions, he had experimented by repeating the numbers that the researcher said when he pointed to numbers on trains in the colouring book or held up fingers. It could be that Jimmy started to link sounds with words during these sessions held as part of the AAC study. Towards the end of the study Jimmy's verbal skills increased to three-word sentences which encouraged everyone to communicate using verbal language rather than the SGD. Jimmy's use of the SGD and PE had fluctuated

during sessions in the AAC study but this was to be expected given his limited access (he shared the one classroom iPad®).

Other agencies supported the use of PE, and once he began to verbalise Jimmy was no longer eligible for consideration for an iPad®. In addition, his parents were hopeful that he would speak; there was an underlying belief that using AAC was delaying the development of Jimmy's oral language. As suggested earlier in a review by Millar, Light, and Schlosser (2006) no data was found to support this suggestion. However, Jimmy did begin to speak. He used three words to greet the researcher in the last visit when he said "*No boots today*". In the first interview with Jimmy's mother, she revealed that he had used two languages until he was three-years old (English and Mandarin), and then stopped all oral utterances.

Jimmy was becoming a successful reader (Level 12 Reading Level) and enjoyed numeracy. During the last session he verbalised '*I want milk*' and '*I want banana*'. He had begun to write on his iPad® and wrote *no more* at the end of the session. His family reported that he was talking and writing at school. Jimmy began to play simple sharing activities with an adult. Although the Manual Sign for *more* was always difficult for him, he did appear to use a sign for *thank you* which was when he slid his hand over his forehead and bowed. This may be the adaptation of a cultural sign for *thank you* which was an established family routine. He also appeared capable of manipulating his fingers and arms to make the sign (which had been a concern earlier in the study).

Summary

The family had high expectations for Jimmy's learning. They expected him to speak as he had done when he was three years old. It is possible that they did not fully support the use of AAC because they felt that this was a substitute for *real speech* which they hoped would develop. Mary was very firm with Jimmy's behaviour and he appeared very compliant. He used his wandering away as his sign to stop the task. Mary gained an understanding of the programme and came to believe that the study may have contributed to Jimmy's learning progress. The idea that Jimmy could make mistakes and have the ability to make choices was a big cultural change for her to accept.

Section Five

Chapter Summary

The fact that some students struggled to learn some AAC systems, especially MS, is not uncommon. It is consistent with a previous report by van der Meer, Didden, et al. (2012) that suggested that the difficulty some students with ASD experience in developing MS skills may be related to (a) increased demands on working memory compared to SGD and PE, (b) a greater level of motor skill required to use MS, and/or (c) student's preference for other modes of communication (van der Meer, Kagohara, et al., 2012). In addition, the use of a black and white line drawing to represent the MS for *more* was possibly conceptually difficult for some students to process. Future research that investigates the effectiveness of alternative forms of modelling, such as the use of video-based systems, may help to improve the efficiency of and motivation for learning MS.

Another explanation is that the MS option is more difficult for instructors to teach (Couper et al., 2014). Sometimes the instructor may be required to use a handover touch to support the hand sign, and touching the student's hand in some situations may not be appropriate or acceptable to the student.

The appeal of SGD. The inherent appeal of the SGDs used in this study compared to the stimuli used to represent PE and MS may have influenced student's preference selection (Light, Drager, & Nemser, 2004). Some researchers suggest that there may be something about the devices, such as their shape, colour, size, or voice output, that may make them more or less appealing (Sigafoos et al., 2005; Son et al., 2006). Three of four students who learned to use all three AAC systems in a study by Achmadi et al. (2014) consistently chose to use SGD during follow-up sessions despite their acquisition and proficiency with the SGD and

PE being comparable. The immediate response provided by SGD (i.e., speech output) compared with PE (which required detaching a Velcro symbol from a card and passing it to an instructor) is suggested as a reason for the selection of SGD. When given the choice to use PE, MS or an SGD, to date most students have shown a preference for using a SGD (Achmadi et al., 2014; Couper et al., 2014; Lorah et al., 2013; van der Meer, Didden, et al., 2012; van der Meer, Sutherland, et al., 2012).

No selection. It is currently not clear why some students chose ‘no selection.’ A high number of non-selections (ranging from 22% to 62%, averaging 38% throughout the Phases) was reported in a study that investigated the use of the three AAC options with four boys with developmental delays (Achmadi et al., 2014). In the study by Couper et al. (2014) ‘no selection’ ranged from 0% to 33% with an average of 14% across the nine participants.

Possible reasons may include rejection, avoidance, lack of motivation to participate in the preference assessment, and/or not understanding the concept of making choices. In some situations, students may have been unfamiliar with making a choice as they have been rarely offered opportunities to indicate a choice. Frequently caregivers and educators make decisions believed to be in the student’s best interests (Gersch, Davie, Upton, & Varma, 1996). Further research into why some students make ‘no selection’ is needed. It is important that students are supported to show preference or choice. Some students have not had direct responsibility for their own progress nor been provided with opportunities to experience a degree of self-determination and empowerment (van der Meer et al., 2011).

Limitations

While the findings of this study were consistent with previous research a number of limitations should be considered when interpreting the findings (Achmadi et al., 2014; van der Meer, Sutherland, et al., 2012). Although all students were able to demonstrate similar language abilities, they were a relatively diverse group of different ages with varied prior experiences with AAC.

A number of procedural modifications and oversights were made during the study that may have compromised the integrity of the experimental design for some students. For example, after recording a high level of use of one AAC system at baseline, Cameron's MS target was revised to '*more play*' without collection of additional baseline data. Similar to Cameron, changes to Nico's communication target would have been appropriate considering his high baseline use of SGD and his fast acquisition of both PE (three sessions) and MS (4 sessions).

Several inaccuracies in the number of baseline sessions conducted with some students also occurred, with Cameron receiving three instead of four sessions, and Nico participating in five instead of six sessions (Couper et al., 2014). This procedural oversight actually resulted in some students receiving one less or one more baseline session than was planned.

The ability to play. Some students had difficulty playing with the toys in the toy box. This was partly because there was a one-minute time limit on play opportunities and some toys were impossible to use for such a short time. Play is not easy for students with ASD and the choice of toys in the toy box was sometimes inappropriate for the student or the task. Generally, play behaviours improved but the students needed to be taught how to play and the

toys needed to be selected to suit the individual interests and skills of the participants rather than using a standardised approach.

The following examples of play responses are from four students in the study:

(1) Jimmy selected the colouring book during most sessions and pointed to the numbers on the trains. When invited to use interactive toys, like toy trains, he usually touched them and then looked away. When the bubbles were used he was happy to watch but not touch the bubbles.

(2) Nico always chose the yellow, ridged, plastic tube which he would feel and twist. Once he went to the bathroom and let water flow through it and another time he made a noise and placed it on his ear.

(3) Andrew liked to flick the pages of the Beatrix Potter book.

(4) Andrew could be persuaded to roll wooden balls through a small wooden tunnel. Teachers said that he disliked touching anything plastic which seemed to explain his two main choices.

(5) Shane focussed on the coloured pencils which he would gather into handfuls and scatter around the room. He also liked to repeatedly tip the toys from the toy box.

Behaviour. Jimmy became passive and displayed avoidance behavior during some sessions when the lid was replaced or the toy box was slid away so a procedural alteration was made with the toy box being retained in close proximity. Several students exhibited challenging behavior that influenced the procedural integrity and treatment fidelity. For example, Shane would leave the table where the session was being conducted, requiring considerable prompting to re-engage in the assessment or intervention activities. At times, he also threw toys and engaged in self-stimulating behavior when the teaching protocol delayed access to the toys.

Challenge from earthquakes. An additional challenge for the study was that it was conducted over a period of time when the local area was recovering from a series of major earthquakes with significant aftershocks occurring throughout the time of the study. Although difficult to quantify, we suspect these events influenced both the recruitment and ongoing participation and performance for some students. One of the outcomes was that few schools or families within the area had the capacity to be involved in a research study so most of the participants were located in rural communities away from the city.

Despite these limitations, the study provides further evidence for the use of new SGD technology to support the communication of students with ASD. In particular, it adds to the growing body of literature investigating ways for students with ASD to choose and use AAC systems that are highly appealing to them. Technology can now provide students with ASD who are non-verbal with the same opportunities for inclusion in the same world as their peers.

Future Research

Tablet technology. Although this popular technology holds much promise for AAC interventions, the use of tablet devices also creates new challenges. For example, a number of students in this study were able to close the AAC application Proloquo2go™ and access other applications on the iPad® (e.g., games). A possible solution is to activate the ‘Guided Access’ feature which removes the possibility of exiting from the application in use (Couper et al., 2014). However, the practicalities of restricting a student’s access to a communication-based application needs consideration as this will limit their access to other potentially beneficial and supportive features of these devices (e.g., applications for other academic learning tasks) (Drager et al., 2010). Research is also needed to identify effective strategies for supporting

students and their communication partners to use these devices in ways that support communication in areas such as social and academic development.

Development of spoken language. During the study, several students developed some spoken language skills. Cameron was observed using seven - ten word utterances, and Jimmy was able to comment, '*No boots today*'. Although research has suggested that AAC intervention may support the development of spoken language for students with complex communication needs (Drager et al., 2010), this was not specifically measured in the current study. Future research could measure the influence, if any, that different AAC systems might have on children's speech and language development.

More communication skills and generalisation. A further area of research could determine the effectiveness of AAC systems such as SGD, PE and MS in developing more complex communicative functions, like commenting and social communication. Additionally, data on the long-term maintenance and generalisation of skills to other more naturalistic contexts with a variety of communication partners will provide further valuable evidence on which to base communication interventions.

New skills for educators and families. The study provides a reminder for speech-language therapists, educators and other AAC practitioners of the need to ensure that adequate time and resources are devoted to developing their knowledge and skills in supporting these new technologies (Drager et al., 2010). The findings reinforce the belief that if students with ASD are to benefit from this technology there needs to be systematic assessment and focused instruction. It should also be remembered that the success or failure of AAC intervention is likely to be influenced by additional factors such as the quality of the instruction, the home and

school environment, communication partners' knowledge and skills to use such technologies, and the student's innate need for communication.

Finally, it is necessary to examine and compare AAC outcomes using a variety of tablet-based SGD and communication technology to ensure students, their families and communicative and education professionals can make evidence-based, informed decisions concerning a student's communication, social and academic development. This may require considerable up-skilling for some family members, peers and professionals together with easy access to AAC and technology support.

The promise of new technology. It is proposed that new technologies can be used to solve the most complex problems and that technology will transform the lives of people facing challenges with communication disorders (Diamandis & Kotler, 2012). However, in order to maximise benefits to students who require AAC, there needs to be improvement with the design of AAC and effective approaches to interventions that include strong links between research and practice (McNaughton & Light, 2013).

The main audience intended for this study was those interested in the experiences of children accessing and using their preferred choice of AAC as a communication tool in contexts other than a clinic or classroom. Chapter 3 will follow three students, Andrew, Nico and Jimmy, into their mainstream playground to investigate how the use of AAC can contribute to their participation and interactions with typically developing peers.

Chapter 3

Can Augmentative Alternative Communication Increase Participation in Mainstream Playgrounds for Three Students with ASD?

The Playground Study

Introduction

The decision to follow three students into the playground occurred once it became apparent that their skills to use their preferred AAC (SGD) were well established and supported in their classrooms. Classroom teachers, principals and parents wanted to investigate if the use of a communication tool could increase opportunities for friendships, play and social interactions to occur naturally for their students with ASD in their mainstream playgrounds.

Many social skills interventions for students with ASD are conducted in clinical settings and often with selected groups of other students with ASD (Kretzmann et al., 2014). Despite generalisation being a high priority, there is little evidence of how the new skills are demonstrated outside the clinical or withdrawal setting and even when efforts are made to mirror a typical classroom context, expectations are not consistent with real-world school environments (Kretzmann et al., 2014). The current Playground Study was important because as well as being situated in each student's mainstream school playground involving their peers without extra resources or staff provision, it was concerned with students with ASD who were nonverbal.

With increasing numbers of students with ASD attending mainstream schools and spending break-times in their school playgrounds there is a need to investigate their

experiences (Ingram et al., 2007). This is the setting in which they can be at risk of victimisation (Zablotsky et al., 2013) but also the setting with the potential for providing opportunities for social interaction and development of friendships (Anderson et al., 2004).

Using AAC in the Playground

The playground study not only aimed to explore the context in which the students operated but also the impact that the use of AAC systems had on those around the three participants. The overall goal was to move each student from isolation and ritualistic behaviours to interacting in some way with a peer or peers for some of the break time in the school playground. This was dependent on the student wanting to and being capable of making a choice of a play activity using an AAC. Additionally it would require changing the perception of the peers of the student with ASD from someone different, without the necessary skills to play, to someone who could reciprocate playful interactions.

Three students, Andrew, Nico and Jimmy, who had learnt skills in choice-making in the AAC study were now given opportunities to use their preferred AAC to indicate their chosen activities during break-times in their mainstream playgrounds.

The following question was addressed:

Can the use of Augmentative Alternative Communication increase participation in mainstream playgrounds for three students with ASD who are nonverbal?

It is acknowledged that the researcher's own values and beliefs around inclusion and the search for securing student voice for students who are nonverbal, underpin the study's aims, research methodology, questions and design. The case studies that conclude the chapter will describe each of the three student's individual playground experiences with a focus on their choice -making skills, use of their preferred AAC which was the SGD and the

development of peer relationships. The final section uses the framework of the three principles of the Treaty of Waitangi as a guide for reflecting on the researcher's practice.

Inclusion and the mainstream playground

Many parents enrol their students in their local mainstream school with an expectation that there will be opportunities for social interaction and play between students with ASD and typically developing peers (Anderson et al., 2004). Impairments in play skills such as symbolic or socio-dramatic play including imaginative and pretend play are features of ASD which can isolate students from interacting with their peer group in age appropriate games (Brewster & Coleyshaw, 2010; Lydon et al., 2011). In addition, as has been stated, many students with ASD do not develop speech or have limited intelligible speech so lack sufficient speech to communicate their basic academic or social needs (Matson et al., 2010).

It is not surprising that time in the playground makes students with ASD fearful and anxious when playing the simplest game that requires some form of interaction with another student (Palmer, 2007). Research has shown that students with ASD can identify feelings of loneliness and exclusion (Brewster & Coleyshaw, 2010). However, one of the measures of an effective school playground will be how successfully, isolated students can be moved into the everyday play of their classmates (Doll & Brehm, 2010).

All students including those with ASD have the right to engage in play and leisure activities as described in the United Nations Convention on the Rights of the Child (Commissioner for Children, 1989). Yet some students still spend their time in the school playground during break times in isolation, feeling lonely sometimes even being removed from the playground to the book corner or to 'play' on a computer but still alone (Bauminger, Shulman, & Agam, 2003; MacArthur & Gaffney, 2001).

Researchers have found that students with ASD can be victims of bullying and that this unacceptable, aggressive behaviour often occurs in school playgrounds (Doll & Brehm, 2010; MacArthur & Gaffney, 2001; Morewood et al., 2011; Rowley et al., 2012). However when incidents of negativity are reduced, competent social interactions are prompted, peer acceptance is increased, and friendships form and are maintained. Friends are important despite the struggle that students with ASD have with making and keeping friends (Bauminger & Kasari, 2000). According to MacArthur and Gaffney (2001) having friends and siblings around may be the biggest deterrent to becoming a target for bullies. They believe that schools where students have friends are safe places for students with disabilities.

Many researchers confirm that time in the school playground can be challenging and a concern for students with ASD and also for their peers, their teachers and their parents (Bellini, Peters, Benner, & Hopf, 2007; MacArthur & Gaffney, 2001; Mulryan-Kyne, 2014; Rao, Beidel, & Murray, 2008). Students with ASD often engage in ritualistic, repetitive activities without an awareness of basic social understanding required for active participation with their peers so joint play is difficult (Bauminger-Zviely, Eden, Zancanaro, Weiss, & Gal, 2013). They are also missing the triggers for social interaction and language development generated by play when they are not participating with their peers (Bopp & Mirenda, 2009).

The peer group in the playground is potentially an instructional asset and it is possible that the student with ASD will be seen by the peer as a possible play partner outside of the school playground and able to foster meaningful friendships (Lang et al., 2011). It cannot be assumed that students with ASD will interact with their peers so teaching students with ASD requires educators to seek alternative ways for these students to participate in social learning activities (Peters et al., 2013).

The most vulnerable students with ASD are reported to be those who are high functioning and in mainstream settings because those who are low functioning have increased support or spend less time in inclusive settings (Zablotsky et al., 2013). The mainstream playground is where inclusion is seriously tested for students with ASD (Couper et al., 2013; MacArthur & Gaffney, 2001; Zablotsky et al., 2013).

On a more positive note, other research has reported that students with ASD can learn to play and interactions between same aged peers and students with ASD develops and fosters social activities (Schoen & Bullard, 2002). Because typical play behaviour is difficult for students with ASD they need peers as models in the playground (Hess, 2006; Kasari et al., 2011). Research confirms that students with ASD frequently want to be part of a group and have friends but do not have the knowledge to know how to make this happen (Bauminger & Kasari, 2000; Brewster & Coleyshaw, 2010). When students were asked about their difficulties in playing with friends it was found that even when they wanted to play with friends after school, they never asked and in turn were never asked by their friends (Brewster & Coleyshaw, 2010).

The playground is considered to be a useful research site by Ingram (2005) because it provides observers with an environment that is relatively free from adult control and where students own the play and social interactions. A school playground is where students can be observed not only playing in an unstructured environment, but also where they may develop friend-ships, enjoy physical activity, have contact with nature, experience seasonal change, use playground equipment and communicate feelings and wants in a variety of ways. This is a context that can provide opportunities for play as a vehicle for improving communication and acceptance of students with ASD who are nonverbal. It is also becoming the only place for interaction with peers that can develop into real friendships that matter (MacArthur & Gaffney, 2001).

The car ride to and from school has limited contact with peers as does the disappearance of backyards and streets where students used to play (Blatchford, 1998; Pellegrini, 1995). Even more worrying is the marginalising of break-times when schools shorten or even eliminate time in the playground (Pellegrini, 2005). The decision is usually based on an assumption that more time in the classroom is necessary for teaching the expanding curriculum and that negative behaviour including bullying will decrease. Both of these assumptions may result in students with ASD being placed out of their playground so that they are not able to participate with their peers during break-times.

The Research Design

This section details the methodology, results and discussion including the aims and conceptual framework for this part of the study. First, the research design and its implementation will be discussed followed by the methodology and the overall approaches of the study, the participants, data collection and data analysis. Ethical considerations, participation agreements, validity and reliability issues are reported.

The Playground study was positioned within and as an extension to, the previous AAC study which had supported students to learn to make choices and then to experience the immediate consequences of those decisions. Moving choice-making and the potential for communication from one context into another provided opportunities for generalisation and maintenance of the skills mastered during the previous interventions in the AAC study.

Validity and Reliability

The researcher became an observer, an interviewer, and a non-participant researcher. It was anticipated that relationships of various kinds would develop over the three year data

collection period between the researcher, the participants and other educators, parents and whānau (extended family members). Measurements of change to the participants' behaviours were reported by those closest to the participants with observations during school visits providing evidence to establish reliability. All interventions and observations by the researcher were either in the participant's home or school in the company of parents, teachers or teacher aides providing opportunities for everyone to test subjective inferences and the validity and reliability of the data.

Methodology

The Playground study used a narrative approach to include the stories of the three student participants and those around them, their parents, principals, teachers, teacher aides and peers with the particular views of all participants contributing to the inquiry process. The narrative inquiry design enabled input from those closest to the participants both in the individual schools and home environments (Clandinin & Connelly, 2000). The current study which was located in schools involving teachers already familiar with using narrative descriptions of behaviours and experiences allowed the researcher to explore the significance of their stories, interviews, playground observations and researcher's field notes. According to Moen (2006) story is particularly suitable for researchers who are exploring the educational experiences of teachers because story telling is a natural way for them to recount experiences.

The research design enabled a methodology that included a diverse range of data collection methods. The researcher and those closest to the participants developed a collaborative process that was comfortable, non-judgmental and with a sense of equality. Teachers and parents were able to have a voice in a field of research that concerned them in

their daily lives now and in the future. The narrative approach also provided a platform for reflection on the study using the structure of the Treaty of Waitangi principles

One of the other advantages of the research design was that it incorporated the longitudinal nature of the study with the three students who had participated in the AAC study now continuing in the Playground study. Documentation of the behaviours of the three participants in different settings over time allowed the researcher to plan for the establishment of manageable steps to ensure the long-term success of the interventions. Each participant's behaviour was documented in more than one setting and data included feedback from other observers and educators during follow up visits. The behaviours of the participants that were described along with the interventions and anecdotal observations provided data in relation to improvement or change.

The Role of the Researcher in an Ecological System Approach

Brofenbrenner's (1994) ecological approach at a microsystem level places the student in the centre of a circle and in doing so influences the way data gathering occurs for the Playground study. The role of the researcher is to act as a link (meso system) between the various systems with the aim of facilitating the successful inclusion of each student in a mainstream playground. The aim is to enable the participant to have a voice through indicating *liked* playground activities. Additionally semi-structured interviews, playground observations and peer interactions will focus on the participant's likes and dislikes from other people's perspectives within the microsystems in which the student is situated.

Within a framework of socio-cultural theory it is important to understand the participants' behaviours in the social context in which they will occur. Human learning and development happens in social and cultural contexts because according to Vygotsky (1978)

they operate according to social context. The playground is a real world context providing an introduction to life outside the school gates for the participants. Links between play, social interactions and communication during joint play activities are expected to strengthen both language and social competence.

The principals, teachers and teacher aides with their school policies and procedures together with the school culture (guided by the eight principles of the New Zealand Curriculum) comprise Bronfenbrenner's (1994) exosystem and macrosystem respectively. Within each school community attitudes towards diversity is influenced by compliance with these principles and will be modelled by the researcher's practice and expectations. The duration of the study will include monitoring and adapting represents the outer circle, the chronosystem of Bronfenbrenner's model.

The three students will have diverse levels of communication and behaviours and situated in different schools with educators with different expectations, values and beliefs so the researcher will take a pragmatic position, mixing different kinds of methods to reflect the complexity of the contexts and the need to make decisions, 'to get the job done' (Tashakkori & Teddlie, 2003, p. 101). Comparison between participants will be limited because there will be only three participants with different contexts and individual differences in communication, social and academic ability together with contrasting influences of parents, teachers, teacher aides, principals and peers. Consequently the focus is not comparative but will be presented as in-depth and unique investigation of each of the three participants. Although the Playground study will be strengthened by the perspectives of many sources the responsibility will remain with the researcher to verify and interpret the findings into a credible study.

Data Collection Procedure

First an information pack explaining the study and a consent form was sent to the parents of possible participants, and to principals, teachers and teacher aides in the schools in which the students were involved. (Appendix 2 provides a copy of the information and consent pack for the boys and their parents)

Data were gathered from four main sources.

(1) Visual Feedback Sheet

In an effort to let the student's voice be heard the visual feedback sheet was designed with faces on which to indicate likes or dislikes. (Appendix 3 is the Visual Feedback Sheet that was completed by the boys).

(2) Playground Observations

Anecdotal observations of playground activities were completed and grouped under main headings. Information described the physical environment, choices of activities, evidence of engagement in play or play skills with peers (Osterling, Dawson, & McPartland, 2001).

(3) Checklist

The Ingram-Troxell Playground Observation Checklist was used as a guide for the observations and data analyses (Ingram et al., 2007). It was linked to the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007). (Appendix 1 illustrates how these links were made).

(4) Semi-structured Interview

Semi- structured interviews gained the perspectives of those closest to each child reporting what they considered was a good or not so good play day and what could be changed.

Visual Feedback Sheet

The Visual Feedback sheet was provided so that each participant, with support from family members, could indicate the things he liked or disliked doing. See Table 3.1 for a summary of the three students' likes and dislikes as indicated on the Visual Feedback sheets. This was done by circling either a smiling or a sad face. Some of the activities were expected to be available in the school playground. Prior to the semi-structured interviews, the results were shared with parents, principals, teachers and teachers' aides. This enabled the voice of each participant to be heard and for the researcher to gain an understanding of the participants' preferred activities from their own perspectives. For some participants, this was a unique experience as they were in an environment where previously others had decided what activities they were going to do in the playground.

Table 3.1: Students' Choices of Likes and Dislikes from Visual Feedback Sheets

| Activities | Andrew | Nico | Jimmy |
|-------------------|---------------|-------------|--------------|
| swinging | Yes | Yes | No |
| running | Yes | No | No |
| ball | No | Yes | Yes |
| with others | No | No | No |
| scooter | Yes | Yes | No |
| sitting on seats | Yes | Yes | Yes |
| bike | No | Yes | Yes |
| books | Yes | Yes | Yes |
| swimming | Yes | Yes | No |
| music/dance | No | Yes | Yes |
| digging sand/dirt | Yes | Yes | No |
| eating lunch | Yes | Yes | Yes |
| APG | Yes | Yes | Yes |
| cars/trains | Yes | Yes | No |
| slide | No | Yes | No |
| on my own | Yes | Yes | Yes |

Playground Observations

The first observations investigated the behaviours of the three boys in their playgrounds and these data contributed to the baseline for the study. While each of the participants were completing the AAC study they were often observed unofficially in the playgrounds during the play-breaks. The researcher recorded up to ten playground observations for each participant

during the four months from May to August in the second year of the study. Interval recording of either 1 minute or 5 minutes depending on the movements of the participant and the length of the break-time enabled the researcher to estimate the time involved with each activity. After discussion with their teachers these activities were then identified as ritualistic or non-ritualistic.

Identification of ritualistic behaviours. Ritualistic behaviours were considered to be activities that were repeated continually in each and every play opportunity and used by each individual in a unique pattern. They were unique to each student but frequently included similar mannerisms such as squealing, babbling and unusual hand movements while moving between designated places in the playground. Typically they were activities that consciously avoided any contact with others. Non-ritualistic behaviours were most other activities that happened randomly and that were not part of a set repeated routine.

Engaging in ritualistic behaviours was seen to be isolating the students with ASD from their peer group. The assumption was that peer interactions could increase during non-ritualistic behaviours. Once ritualistic and non-ritualistic behaviours had been identified they became easy to observe and record. From the observations, the percentage of time engaged in ritualistic behaviours was estimated. This became the baseline data on which to measure the effectiveness of the intervention.

Anecdotal playground observations. Anecdotal observations were completed by the researcher and grouped under headings describing the evidence of participants' play and play skills that may or may not involve their peers. Time spent in ritualistic behaviours was noted. The Ingram-Troxell Playground Observation Checklist (Ingram et al., 2007) was used as a guide for observations and data analysis linked with the aims of the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007). (Appendix 1)

Observed playground choices. The observations of playground behaviours were in blocks of 1 minute or 5 minute intervals and showed that the boys' choices of activities were varied but with some similarities. They all walked, ran or skipped around the playground alone. They often squealed or babbled with rapid fine motor or hand movements particularly when engaging in their ritualistic routine activities. Two liked to sit on the bench close to the classroom door. One liked to climb a tree and bounce on a branch or use his scooter to ride a line around the tennis court. One liked to be close to adults. The activities were categorised as ritualistic or non-ritualistic behaviours as a method of measuring change. Some activities were duplicated such as hand-flapping while running.

Table 3.2: Baseline: Observed Ritualistic and Non-Ritualistic Playground Behaviours

| | Nico | Jimmy | Andrew |
|----------------------------|------|-------|--------|
| Ritualistic Behaviours | 80% | 93% | 58% |
| Non-ritualistic Behaviours | 20% | 7% | 42% |

From these observations the percentage of time engaged in ritualistic and non-ritualistic behaviours was estimated and contributed to baseline data. Observations of playground behaviours over time were able to show changes in the rate of ritualistic and non-ritualistic behaviours. Details of the choices the individual participants were making will be followed up in the case studies.

Links with Key Competencies of the New Zealand Curriculum

The playground observations were matched to a checklist of behaviours developed by Ingram (2005) that included social interactions as well as language and motor skills in a free

play environment (see Appendix 1). The behaviours from the Ingram checklist were linked to the Key Competencies of the New Zealand Curriculum which include the following five key competencies for living, learning, working and contributing in a community; (1) Thinking, (2) Using Language symbols and texts, (3) Managing self, (4) Relating to others, (5) Participating and Contributing (Ministry of Education, 2007). Using the Key competencies as a guideline reinforced for educators the notion that the playground was an essential learning resource in which the boys participated and were included.

The links between the Playground Checklist and the Key Competencies of the New Zealand Curriculum also demonstrated that the students could achieve some of their IEP goals in this setting. The playground was confirmed as an important curriculum resource where students could move from isolation to increased interactions with others. The expectation of the researcher was that the students were able to take first steps to becoming learners within the essential learning areas of the New Zealand Curriculum. Teachers recognised that the students were achieving through not only being physically present but also participating in an inclusive educational setting.

Semi-structured Interviews

Semi-structured interviews that gained the perspectives of those closest to each student were recorded. This information was used to determine what was considered a 'good' and a 'not so good' day for each of the students while they were in the playground and what could be changed.

The semi-structured interviews were analysed and emerging themes identified from key words. The themes identified that the students liked time in the playground because it was unstructured time, when they could do what they liked. This was often rituals or time alone.

For two students it included time to enjoy being outside but for one student who didn't like being outside it was time spent opening classroom doors and going inside or finding an adult to walk alongside. All interviewees reported that none of the students liked interacting with other children. Analysis also revealed an underlying belief that a characteristic of students with ASD was that they needed rituals and that this behaviour was acceptable.

The need and accommodation for engaging in rituals influenced the duration of the intervention. The intervention was limited to a small part of break-times for several reasons. First, only a small part of the playground had ever been used by some students with few opportunities during break-times for interaction in any way with their peers. It was important to avoid a major change with the potential for adding stress or anxiety and that the intervention succeeded in the eyes of the school and parents. A tentative, flexible approach was developed following the lead of each student.

Suggested interventions from semi-structured interviews. Data from the playground observations, links with the Key Competencies and the themes from the semi-structured interviews were shared with those closest to the students; the principals, parents, teachers and teacher aides. In the three schools, teacher aides and teachers began moving the students from isolated activities in the playground by finding buddies to interact with them for short spaces of time with simple tasks or games.

Two schools agreed that difference could be achieved for their students with the use of a menu of desired activities on an iPad® prior to time in the playground. The activity could include a buddy when the activity required it. A menu of three possible activities was selected by each student from their preferred activities as indicated on the Visual Feedback sheet. The menu used symbols for the activities and was on an iPad® for Andrew and Jimmy and for Nico on a visual poster as well as symbols or a video on an iPad®.

A *sanctuary* with comfort activities that may attract others was suggested by one principal who thought that some outdoor furniture with cushions and books would appeal to his student who had indicated he liked to be inside with books.

Using an iPad® in a playground is not an easy option but prior to moving outside into the playground it can provide choices for play activities. This was highly motivating for the students when they made choices for playground activities that were immediately available. Choosing games or toys for play can result in reduced levels of disruptive or negative behaviour and increased language and social play skills (Carter, 2001). Choice-making provides ways to exert control and express preferences and ultimately individual wants and needs in everyday life situations. Taking ‘choice-making’ into the playground was also a small but significant step towards generalisation and maintenance of a SGD as a communication tool.

Generalisation and maintenance of new skills in a highly structured environment such as a clinic or withdrawal space is thought to prevent spontaneous use of targeted behaviours and leads to lack of generalisation (Schreibman & Ingersoll, 2005). The school playground during break-time is not only an unstructured time but it also offers opportunities for peer interaction and potentially opportunities for active participation in play. Play generates and requires communication and for students with ASD who are nonverbal this environment may be the only setting in which they see and experience interactive communication skills.

Timing

Data for the Playground study were collected over two years with a period of overlap at the end of the third year of the AAC study. The proposal for the Playground study began as the data gathering for the AAC study was completed at the end of year one. Separate Ethical

Approval from the University of Canterbury Ethics Committee and consents were received for the three students, their parents and school staff at the beginning of year Two. Pre and post data using playground observations were collected in the three schools over a 4 month period from May to August in year three.

The Timing of the Study

| | July 2011 | July 2012 | July 2013 | July 2014 |
|------------------|-----------|-----------|-----------|-----------|
| AAC Study | ← | | | |
| Playground Study | | | | |

Implementation of the design

The Playground study sought to answer the research question in the following ways: First to find how the SGD (which was the preferred communication choice for the three participants) could be used to increase their choices of playground activities and secondly if that action would increase interactions with their peers in the school playground (See Figure 3.1). Results from the AAC study had already demonstrated that Andrew, Nico and Jimmy selected their preferred communication system with an increase in speed of acquisition and with a variable degree of maintenance. The previous interventions in the AAC study generated responses that were limited to answering a question after interrupting play with toys. In contrast, the Playground study focused on requesting choices of playground activities.

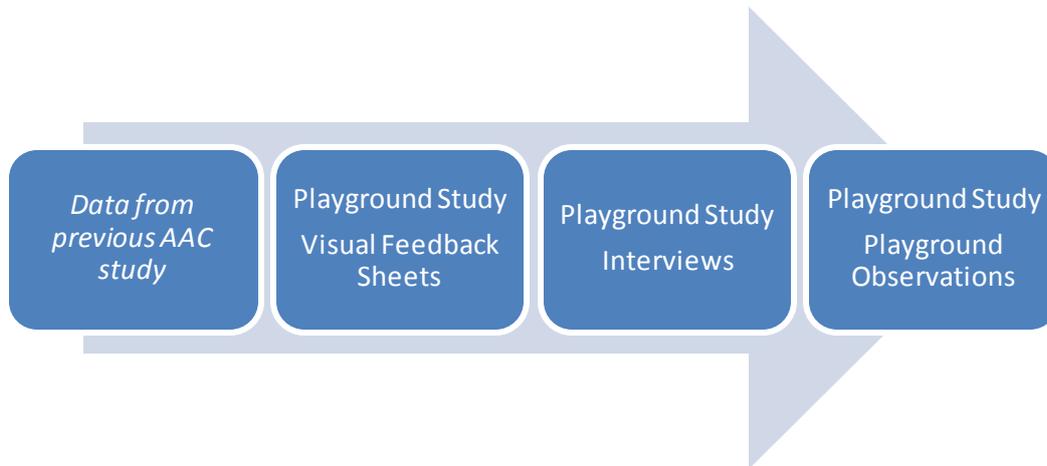


Figure 3.1: Playground Study Design

The Mainstream School Playground

In New Zealand, school playgrounds include a large grassed play area as well as hard courts, sand pits, seats and various bars and adventure playground equipment. Typically, in a rural primary school playground as is the case for the three schools in the study, one teacher is on playground duty with the role of monitoring behavior and interacting with students. Students use the whole playground and play together regardless of gender or age. However, students with ASD can find their inclusion in a mainstream school playground a challenge when the following negative conditions are present:

1. Close proximity of adults such as teacher aides is hindering peer contacts.
2. Students are excluded from their peer group by being placed inside with a computer game or with a younger age group.
3. The physical playground equipment is not distributed in a way that the student can easily access.
4. The student's preferred playground activities are not known or accepted.
5. The social environment is unfriendly or even threatening.

6. Friendships and interactions with peer groups may not be a focus and nor has the peer group been taught the skills to engage with the student. This may include the skills to use a SGD such as an iPad®, manual signing, or picture exchange to enable communication exchanges to occur.

Data Collection

Data were gathered from several sources as shown in Table 3.3.

Table 3.3: Summary of Data Collection Procedures

| Data Collection Method | Administrator of Assessment | Collection Method Explanation |
|-----------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Play ground Observations three schools | Researcher | <p>Observations aimed to record a baseline of participation choices of each participant in their mainstream playground. They determined how the use of AAC was contributing to the participant's interactions and activities in the playground.</p> <p>Observations gathered information about peer interactions, physical environment and play provision and used 1 minute intervals and summarised under categories for ritualistic and non-ritualistic behaviours.</p> <p>Playground observations for at least 120 minutes per student.</p> |
| Visual Response sheet | Researcher and parents | <p>Visual sheet to gain student feedback, with pictures of 16 possible activities that were liked or disliked. With the support of their parents the participants circled a picture of smiley or frowning face. A summary grid compared and contrasted between participants and showed disparity with findings from playground observations.</p> |
| Interviews with parents, principals, teachers and teacher aides | Researcher and those being interviewed | <p>Audio recording and identification of key themes in response to the following three questions:</p> <ul style="list-style-type: none"> • <i>What does he like in the playground?</i> • <i>What doesn't he like in the playground?</i> • <i>What would make a difference?</i> |
| Adapted Observation Checklist | Researcher | <p>Observations checked against the Key Competencies of the NZ Curriculum and Ingram-Troxell (2007) Playground Checklist. A summary grid demonstrated participant achievements and needs when related to the NZ curriculum and social competence of the Checklist.</p> |
| Play ground Observations. Discussions with teachers and teacher aides | Researcher | <p>After several months return visits to the schools observed changes in playground behaviours. Graphed results show time in ritualistic and non-ritualistic activities. Other developments were recorded according to the schools' actions and perceptions. For one student this required the researcher to visit a new context, a secondary school.</p> |
| Field and journal notes | Researcher | <p>A journal was kept to record dates of contacts, emails and phone calls to all educators involved with the study. Extensive field notes were kept as the study evolved and responded to the teachers and teacher aides practice initiatives. Each of the three schools became enthusiastic participants in various ways. Other agencies influenced some aspects of the study which are outlined elsewhere.</p> |

Participants in the Research

Parents

Initial interviews with parents helped them understand the aims of the programme. For most parents there was an expectation that this was a chance to improve the communication outcomes for their child. Although they were not involved on a daily basis they were regularly emailed results and kept informed of visits. Parents were excited by small gains and appreciative that someone was noticing their child.

Students

The three students, Andrew, Nico and Jimmy who participated in the Playground study were aged between 7 and 11 years. The summary of their communication capabilities as found when they were tested using the Vineland Assessment Scales (Sparrow et al., 2005) is provided in Table 3.4. (See Chapter 2 for a detailed breakdown.)

Table 3.4: Summary of Communication Capabilities for Three Students

| Name | Date of Birth | Diagnostic Age | Assessment Age | Receptive Language | Expressive Language | Written Language |
|--------|---------------|----------------|----------------|--------------------|---------------------|------------------|
| Andrew | 22.12.05 | 3;4 | 5;8 | 1;6 | 1;0 | 1;10 |
| Nico | 8.08.02 | 2;0 | 8;11 | 0;8 | 2;3 | 5;6 |
| Jimmy | 16.01.07 | 3;0 | 5;1 | 2;5 | 0;0 | 5;6 |

Note: All ages are reported as years; months. All names are pseudonyms.

The participants attended schools that ranged in size from 50 to 300 students and were in mainstream classrooms throughout the day and with their peers and siblings in their

playgrounds at morning and lunch break-times. The three playgrounds were fenced and included large grassed spaces and sealed areas. There were trees, gardens and playground equipment such as Adventure Playgrounds, drinking fountains, bike sheds, rugby goal posts and netball hoops. In each of the schools all students play anywhere regardless of age or gender. There was one teacher on duty during each of the break-times in each school. One student, Andrew was also supervised by a teacher aide or the principal during these times.

Principals

Principals were informed of and understood the programme procedures. They had given consent before any actions could be taken in their schools. The researcher made an appointment prior to visiting the schools and checked in with the principals before working with the students. Other educators within the schools provided additional information, support and advice for the researcher as the study proceeded.

Class Teachers/ SENCO (Special Education Needs Coordinator)

Class teachers or SENCOs were usually available during their morning tea break. They offered feedback after each session and emailed comments between the researcher and themselves. In two schools, extensions to the Proloquo2Go programme were initiated and other related learning opportunities developed including curriculum based use of the iPad®. The goals for the Individual Educational Plans (IEP) were often discussed with the relevance of the gains from the research programme noted. An IEP is an individual planning process which is the basis of collaborative planning between, home, school, and specialist services. The goals are based on the needs of the child in line with the New Zealand curriculum (Ministries of Health and Education, 2008).

Teacher Aides

In each school, the teacher aides frequently acted as the link between the researcher and the staff of the schools. They offered support and important information about the student behaviour and best practice for managing each student's programme. They gave feedback about the progress in between visits and kept the researcher informed about the health and well-being of the students and other happenings within the school such as concerts, camps and sports days.

Peers

Other students often seemed unaware of the researcher's visits. This may have been because the student with ASD was often visited by people from outside the school. Generally the peer group were quick to help if asked but also appeared able to ignore the sometimes disruptive behaviours of the students with ASD.

Other Agencies

Each student was supported by other agencies such as Speech Language Therapists and Ministry of Education staff. Occasionally, visits would coincide but generally there were no organised links between the researcher and other agencies. The researcher noted the involvement of these professionals and when visits coincided approximately once each term, shared levels of improvement or confirmed shared goals for the participants that were often documented in the participant's Individual Education Plans. A summary of the participants and their actions is reported in Table 3.5.

Table 3.5: Summary of Participants and Actions

| | |
|---------------------------------------|-----------------------------------------------------------------------------------|
| Principals (Board of Trustees) | <i>First contact for the study. Interviews, Email contacts.</i> |
| Classroom Teachers | <i>Interviews, Feedback, Email contacts</i> |
| Teacher Aides | <i>Regular feedback. Observed/supported researcher. Initiated new solutions.</i> |
| Special Education Needs Coordinators | <i>Appointments for observations. Regular feedback.</i> |
| Specialist Teachers | <i>Followed session progress. Initiated new skills/ peer support. Linked IEP.</i> |
| Speech Language Therapists | <i>Incidental contacts. No contact with researcher.</i> |
| Ministry of Education Representatives | <i>Directed student goals with IEP. No contact with researcher.</i> |

Benefits to Participants

Article 2 Convention on the Rights of the Child (Non-discrimination) states that no child should be treated unfairly on any basis. However, there can be a dilemma when the focus is on students with deficits that need remediation. Is the focus on the deficits or on the development of approaches that foster skill development? Some educators see students with ASD as a distinct group of learners requiring specialist teaching while relatively recent research reported that teachers believed that interventions were relevant and effective for all students regardless of social background, ethnicity, gender or disability and that the peer group should and could be involved resulting in gains for everyone (Florian, 2012 Norwich & Lewis, 2005). Approaches that fostered engagement with typical peers in natural settings

were encouraged and intentionally developed which was also an important characteristic of the Playground study.

Ethical Considerations and Participation Agreements

The shift from a 'medical' model of disability to a 'social' model has challenged educators especially when policies require students to be actively involved in their own futures despite their abilities or disabilities (Russell, 1996). The shift from decisions being controlled by an outside expert to the participating child is also supported by Glasser (1998) who suggests that behaviour is a response to satisfy basic needs and is enhanced by making personal choices.

Students' rights to be heard and to have their views taken seriously are embodied in the United Nations Convention on the Rights of the Child (Convention of the Rights of the Child, Sept. 7, 1990). Article 12 was ratified in New Zealand in 1993 with obligations for educators to listen to students, to take their views seriously, to recognise the child's personality and autonomy and the child as an autonomous person and not just the object of concern (Freeman, 1996).

Ethical Approvals

Ethical approval was obtained from the University of Canterbury Educational Research Human Ethics Committee (Reference Number 2013/11/ERHEC) (See Appendix 4). All advice and guidelines for the research which was approved by the University of Canterbury were followed through-out the research study. The secure storage of files, research notes and data that was stored in locked filing cabinets and computer as required. Ethical issues were a central concern throughout the research process and in educational

research confidentiality and anonymity were forefront in the mind of the researcher (Mertens, 2010). Maintaining a high standard of ethical practice has been critical to the protection of the schools, educators, parents and students involved in the study and demonstrated by the ethical behaviour of the researcher for the duration of the research.

Student Consents

Several actions demonstrate the effort of the researcher to listen to the students, to take their views seriously and to recognise the diversity of the students and their need for autonomy despite past or present treatments by other agencies. An effort to inform the students of what the study was about and their part in the study was considered in the student consent form. It was hoped that being informed would avoid stress or anxiety about the presence of the researcher in the school or in the playground. (Information that aimed to inform the students about the study and to gain their consent is included in Appendix 2). Seeking student's perspectives about their learning, understanding, relationships and experiences is a new experience for some educators who are comfortable with making professional judgements based on their understanding of what is in the best interests of the child. In some school environments this was a challenge for observing educators.

Although all of the students were nonverbal it was thought that they were capable of indicating consent in some way or if not their parents signed consent on their behalf after the playground study was explained to them by their parents. This included the students in the decision making process and prepared them for future activities.

Students were empowered in the AAC study by indicating their preferred choice of communication tool and now in the Playground study by indicating their preferred playground activities. It is easy to accept that adults can act in the best interests of a student

but judgements are often based on what others consider *best* and not on the views of the child (Oakley, 1994). Smith (1998) posits that students need to be given adequate information so that they can decide if they even want to participate in research. When students agree to participate they need to be reassured that their perspectives will be listened to respectfully. Ultimately this allows researchers to find out more about how students experience their daily lives and make better decisions (Smith, 1998).

Consent forms were also provided for parents, principals, SENCOs, teachers and teacher aides. Signatures were obtained after face to face visits with each participant and following reading the Information sheets.

Observational Consents

Consent to observe the behaviours of peers as well as the participants in the playground was obtained from the principal of each school and through him/her the agreement of the Board of Trustees for each school. All interviews and observations were conducted in the participant's usual location. The researcher was familiar to the participants and the usual location helped to reduce any stress or anxiety. Consents for participants in the research stressed anonymity and this included signed consents for all adults involved in the study.

Potential Conflict or Harm

Teaching or parenting a student who is nonverbal with ASD is complex and challenging. Both parents and teachers involved with supporting students often question and reflect on their practice. Solutions can appear just out of reach so feelings of anxiety may surface during the semi-structured interviews. However the potential for these was kept to a

minimal risk as they were asked to share only what they wished to contribute. All participants had the right to withdraw totally or partially at any stage of the study including the approval of the transcripts of their contributions.

The case studies which follow will investigate the individual experiences of the three students and will provide additional background by detailing their journeys as participants in mainstream school playgrounds.

Case Study One

Andrew

Fifty students attended Andrew's school and there were two break-times when students went into the playground and chose a variety of playground activities. The first morning break was between 10.30 and 10.45 and the second was the lunch break from 12.30 to 1.30pm. Students tended to sit on the benches outside their classroom to eat a packed lunch and sat with siblings or friends. All students played anywhere and with any age group. The playground was fenced and included a large grassed area for ball games and sealed courts for tennis and other activities. Sports equipment was in a shed that was open and available to all throughout the day. There were drinking fountains, a bike shed, rugby goal posts and netball hoops, an Adventure Playground, swings and a swimming pool. The school had a native garden, bird feeders, nesting boxes, large trees and an area of grape vines. Data were collected from the following sources to explore Andrew's playground experiences.

Visual Feedback Sheet

The visual feedback sheet indicated that Andrew liked swinging, running, using the scooter, sitting on the seats, reading books, swimming, digging, eating his lunch, playing on the adventure playground, playing with cars and trains, and being on his own.

Playground Observations

Andrew engaged in a variety of activities including several indicated on his visual feedback sheet. The Adventure Playground (APG) included several joined structures for climbing, sliding and swinging.

Table 3.6: Playground Observation from 12.30- 1.30 Snowy Day

12.30 Inside classroom eating lunch.

Teacher aide supervised from bench until 1.00pm then principal.

12.40 Andrew the only one in the playground. (He refused to wear a jacket.) Climbs onto the climbing frame of the Adventure Playground. Begins eating snow off the ledge. Climbed down, jumped onto the concrete tuatara with hand flapping. Runs across the field squealing. Kicks snow and begins to walk.

12.45 Back to APG. Eats snow off the tree trunk. Goes to wooden deck with more snow. Kicks the snow, jumps, squeals flaps. Returns to snow on flat area. Stops to pull up his socks then runs back to APG.

12.50 Climbs to top of APG and begins to balance on top rail of the stairs. Flaps and squeals on top of rails. Stays there 5 minutes.

12.55 Jumps on top deck with head down. Squeals and flaps both hands. Flicks fingers. Goes to the edge and looks down. (*Principal comments everything loses its novelty*)

1.00 Comes down slide. Pulls up socks and walks through snow. Now nine other students in playground. Kicks snow avoiding contact with other students. Goes up to the bank. Returns to flat area and picks up a spade. Eats snow then drops spade. A snowball hits him. He acknowledged it and avoids being close to the boy who was making and throwing snowballs.

1.05 Runs along the bank then back to flat area with snow while flapping arms. Eats snow then runs back to bank.

1.10 Begins to climb a tree (approx. 8 foot high branch). Another boy is on the branch. Andrew jumps off branch.

1.15 Stands on bank looking at others who are throwing snow balls. Gets back onto branch and organises himself to drop onto the ground frontwards while holding another branch. On the ground and pulls up socks.

1.20 Runs along the bank then back to the tree, back to the bank. Eats snow. Goes to a far corner then runs around a group of students back to the bank. Pulls up socks. Runs around two students squealing.

1.25 Climbs to top of APG. Jumps on deck.

1.30 Bell rings. He ignores it. Principal goes to bottom of slide and asks him to slide down. Eventually he complies after 30 seconds and returns to classroom.

The activities were grouped and identified following several observations that included both morning playtime of 15 minutes and lunch hours of 60 minutes. During a total of 245 minutes Andrew was found to engage in ritualistic behaviours for 58% of his time in the playground.

Table 3.7: Observed Playground Behaviours

| Behaviour | Time (minutes) | % of time |
|---------------------------------------------------------|----------------|-----------|
| Tree climbing and bouncing on a branch | 18 | 7.34% |
| Adventure Playground slide, climbing frame, jumping off | 30 | 12.24% |
| Repeated walking, running, skipping alone | 48 | 19.59% |
| Squealing, babbling with finger or hand movements | 27 | 11.02% |
| Watching others | 23 | 9.38% |
| Eating food, taking bag to cloakroom, changing boots | 28 | 11.42% |
| Other activities | 71 | 28.9% |

Observations Linked to Key Competencies

From the playground observations, links were made to the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007) and the Ingram-Troxell Playground Observation Checklist (2007). Andrew used some behaviours found within the Key Competencies. It was important to show these links to his teachers and teacher aide as they now considered time in the playground an important learning time for Andrew with the same status as the classroom.

Table 3.8: Andrew Links between Key Competencies and Observed Playground Behaviours

| Participating and Contributing | Using Language symbols and texts | Managing Self | Thinking skills | Relating to others |
|-----------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------|-------------------------------|
| Watches and learns from others | Sometimes attempts to interact with others | Runs, throws, climbs, swims, bikes and uses scooter | Finds another way to get his needs met. | Not observed. |

Semi-Structured Interviews

Key themes identified from interviews with the principal and teacher aide confirmed that Andrew liked to participate in a variety of playground activities but preferred to be on his own. The exception was that he liked to be swung around and would go to older students or teachers with his hands up. He liked to use his scooter on the hard courts but although others

were doing a circuit, he would find a space to scoot around them and create his own circuit. He was well liked and understood by his peers but he would never initiate an interaction other than when he wanted to be swung around. The principal described Andrew's skill in climbing trees and fences. The school's strategy to keep him within the boundary was to ensure he was wearing shoes as this made it difficult for climbing the high fences. At all times his behaviour in the playground was monitored by either the teacher aide or the principal.

The Intervention

A decision was made to place symbols on Andrew's iPad® so that he could choose what he wanted to do, with the choice sometimes including an activity with a peer. It was important that Andrew remained in control of his choices. In the AAC study Andrew had chosen the SGD as his preferred communication tool so now this was accepted not only in the classroom but also in the playground. Andrew's teacher first loaded the symbols for a variety of tasks on the iPad® from his preferred activity list from the Visual Feedback Sheet. This was later expanded to represent activities both in the classroom and the playground.

Student Voice

By providing opportunities for his voice to be heard, valued and acted upon, the teacher positioned Andrew as an active participant in co-constructing his learning. Andrew's opportunities to make choices that mattered to him and those around him were increased and actively encouraged. Many students including those without speech can communicate in a variety of ways 'their voices may be heard through sign, gesture, visuals, voice activation devices and eye gaze' (McIlroy & Guerin, 2014, p. 221). Andrew also used unacceptable behaviours to communicate which generally helped him to get his needs.

Results

Following participation in the Playground study positive progress was made with Andrew's behaviour and his interactions with both adults and peers. The most important change occurred with the reduction in ritualistic behaviours once he indicated his choice of playground activity using his iPad®. He frequently indicated 'I want swing' or 'I want swim' or 'I want scooter'. When these requests were made, activities were immediately available and this reinforced the use of the AAC. Prior to the intervention over half of Andrew's behaviours had been categorised as ritualistic. As a result of engaging in preferred activities the rate of ritualistic behaviours decreased considerably from a pre-intervention level of 58%, to 26% following the intervention, (see Figure 3.2). Andrew had become part the playground population rather than the boy who repeatedly climbed or ran backwards and forwards alone. These activities involved Andrew being in the same environment as his peers.

One of Andrew's preferred fun activities following the Playground study was being rolled up in a mat by his peers or playing hide and seek with the principal. He had become more noise tolerant and displayed an interest in people and things such as seeking to find out what was in containers or boxes. He was beginning to choose activities that used his skills and demonstrated that he had perfect balance by frequently standing on the top bar of the Adventure Playground and waving his hands without falling.

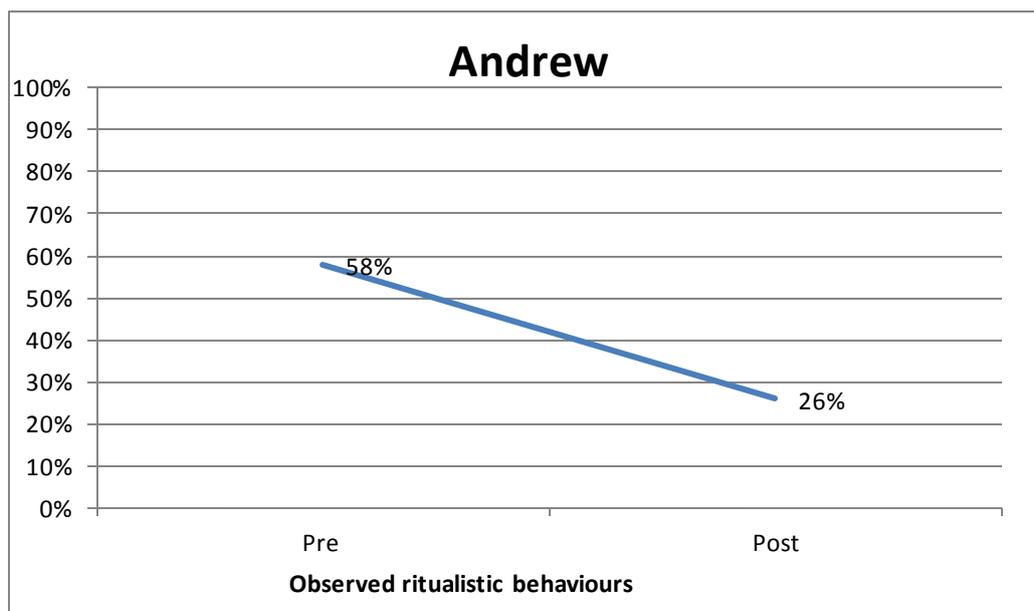


Figure 3.2: Andrew Ritualistic Behaviour

Summary

The Playground Study demonstrated how the links between theory, professional practice and the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007) could be made. The class teacher and teacher aide expanded the links to create and deliver a literacy programme for Andrew that became part of his literacy goals for the year. He was now viewed as a learner not only in the classroom but also as a play partner by his peers in the playground.

Case Study Two

Nico

Nico's school had two break-times when all students went out into the playground. There were shaded and shelter areas so regardless of the weather, students were outside for 15 minutes in the morning from 10.30-10.45 and for an hour from 12.30-1.30 each day. One teacher was on duty for each of these break-times with the main role to provide friendly interactions and support when or if required. The playground included an Adventure Playground with slides, climbing frames, tunnels and swings and a large flat grassed area for ball games. The hard surface court area which was close to Nico's classroom had goal posts for netball and was marked out for hopscotch and 4 square. Most important for Nico, the court had painted lines that formed a grid and a gutter that stretched down one edge of the court which he liked to run along. Data were collected from three main sources to explore Nico's playground experiences.

Visual Feedback Sheet

The visual feedback sheet required Nico to indicate which of sixteen illustrated activities he liked or disliked by circling a smiley or a frowning face. It was expected that Nico's parents would support him to complete this task. The aim was to gather information from Nico rather than to make assumptions about his likes or dislikes. Nico indicated that he liked swimming, playing with balls, using the scooter, sitting on the seats, looking at books, swimming, listening to music or dancing, digging in the garden, eating his lunch, playing on the Adventure Playground on the slides, playing with cars and trains, and being on his own. Next the researcher observed Nico in his playground noticing if he engaged in any of the activities that he had indicated he liked.

Playground Observations

Early observations of Nico in the playground showed that for 10 of the 15 minutes of the morning break-time he was physically active. He skipped 6 times, walked 7 times and ran 3 times although he had not indicated that he liked any of these physical activities by circling the smiling face on the Visual Feedback sheet. However, most of these observed actions centred on the gutter that ran along the tennis court outside his classroom block. He did not interact with anyone and near the end of the time he hovered close to the classroom door and when the bell rang was first into the classroom.

The next observation was during a lunch hour from 12.30 to 1.30. This break-time usually began with Nico seated outside the classroom with his class eating lunch. The students sat wherever they chose and with whoever and remained seated until the teacher on duty signalled that they could go to play.

During the first lunch time playground observation the researcher noticed two girls initiating a conversation with Nico while they were seated together eating lunch. The interaction lasted 2 minutes. The teacher on duty interacted with him on one occasion for one minute. The rest of Nico's behaviours were listed with the number of times he engaged in them recorded. This provided a menu of activities and the beginning of identifying Nico's rituals. A summary of Nico's observed behaviour is presented in Table 3.9.

Table 3.9: Observed Playground Behaviours

| Behaviour | Instances |
|----------------------------------------------|-----------|
| Two girls initiated a conversation with Nico | 1 |
| Teacher on Duty interacted with Nico | 1 |
| Nico rocking on a seat | 3 |
| Nico seated on bench | 3 |
| Nico leaning on bars | 4 |
| Nico runs/walks along gutter | 15 |
| Nico walks to gate | 6 |
| Nico walks between Office block and trees | 2 |
| Nico kicked a ball | 2 |
| Nico watching | 3 |

Semi-structured Interviews

The interview with Barbara (Nico's mother) began by discussing what Nico liked and didn't like doing in the school playground and what she thought should change. Some key themes emerged, in relation to improving interactions between Nico and others in the playground and also with friends and family at home. A successful intervention would include encouraging others, such as teachers and peers noticing Nico more often in the playground so Nico was supported and not solely responsible for changing his behaviour.

The researcher asked Barbara two questions: How did she feel about Nico doing some different activities in the playground? Should Nico be left doing what he usually did in the break times? Barbara responded by saying that she had been talking to the teachers about his routines during play times. She wondered if peers should be encouraged to interact with him.

Her suggestion was to leave him doing what he was doing but follow his lead until he showed signs of establishing more social interactions.

The researcher suggested that some symbols from Nico's visual feedback sheet of 'liked' activities could be offered on his iPad® prior to his time in the playground in order to encourage peer interactions. In some situations this would require the teacher aide preparing peers as buddies and locating sports equipment. The change would be gradual and for only a small part of the break-time because Nico's routines were considered to be important too.

Reasons suggested for routines. Barbara suggested that there were several reasons for Nico's routines. She believed that they enabled him to operate alone, with everyone including teachers letting him to do his own thing. Barbara thought the rituals (routines) that Nico performed allowed him to avoid any contact with others and gave him time to regulate his emotional level while he engaged in some form of low level physical activity. His routine was familiar and at break-times perhaps he was unable to think of any other options. The researcher suggested that it may be easy to link this intervention with the first study when Nico was asked 'Let me know if you want more play' and now to ask 'Let me know if you want more play with the scooter or more play with the ball.'

The Intervention

From discussion with the teachers, teacher aide and Barbara, it was decided to trial the iPad® symbols prior to Nico's time in the playground during the first ten minutes after eating lunch, with one of the choices being playing skittles which Barbara would bring from home. Nico liked playing skittles and it was an activity that would be mutually enjoyable and a novelty for everyone. Barbara agreed that play and communication could progress together and that this may be a way of sharing ideas and forming friendships.

Playground Observations Continued

Following the first playground observation and discussion with the teachers, teacher aide and Barbara it was decided to provide Nico with three of his preferred choices from his visual feedback sheet by placing symbols on the iPad®. Prior to going into the playground Nico was invited to indicate which of three activities (one of the choices included skittles) he would like to do.

In addition, a visual poster of photographs or videos of Nico was used in the same way. The photographs or video showed him playing on the Adventure Playground, playing with a ball or riding his scooter. This helped him to recall previous activities and provided opportunities for the preparation of his peers to interact with him. Nico's usual choice was playing with a ball and sometimes bouncing it over a hedge and running to catch it.

Once it was observed that Nico could bounce and catch a ball, other games were suggested and peers recognised that he was able to join in their games with mutual enjoyment. After two months, the researcher received an email from the teacher aide who supported Nico saying, "Nico has started asking peers to play games sometimes at lunch time." The teacher aide and teacher had shared with the class their aim of including Nico in playground activities and this generated spontaneous interactions that included a suggestion from peers to do bounces together.

During a lunch hour observation, a further two months after the email, the teacher aide had increased her interactions with Nico (4 minutes total). During that lunch hour Nico ate his lunch while seated beside two girls for 20 minutes but once again did not interact with them. However an invitation from one of the girls to bounce a ball followed and then a mixed group of peers played skittles with Nico for 17 minutes.

These observations (see Table 3.3) suggest that Nico liked others to initiate interactions or play activities and he responded and participated willingly as long as it was within his comfort zone and skill level. After the teacher aide directed a peer, they bounced and caught a ball. Carrying the box of skittles, setting up the skittles and scoring became an important part of the game for Nico. He responded to requests from a peer to pack up and helped to carry the box back to the storeroom but would not have completed this task without peer support. Social impairment is identified by many researchers (Bellini et al., 2007; Kretzmann et al., 2014; Rao et al., 2008) as the most enduring issue for students with ASD and interventions to address this issue are a high priority especially in the school environment (Kasari & Smith, 2013). Break-times are first and foremost an opportunity for developing key social and life skills and this is as important for Nico as it is for his peers (Blatchford, Baines, & Pellegrini, 2003).

Nico quickly returned to a ritualistic familiar activity once the interaction with his peers ended. The skills to catch or bounce a ball were important steps in helping the peers participate in simple games with Nico but when a girl invited him to do passes, he reacted by throwing the ball into the garden and returned to his rituals. This possibly indicated that Nico can engage in playful activities with others but only for some of the time and he still needed time to be on his own and to perform his rituals as can be seen in Table 3.10.

Table 3.10: Playground Observation: Break-time with Nico in the School Playground

| | |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.30 -12.45 | Seated outside classroom on bench with two girls eating lunch. |
| 12.50 | Bell goes. He goes inside with lunchbox. |
| 12.51 | Skips across the tennis court then runs across field then to APG. |
| 12.52 | Plays briefly on APG. |
| 12.53 | Returns to tennis court. TA directs a peer to interact. |
| 12.54 | Peer says " <i>TEN bounces N</i> " They complete ten. |
| 12.55 | Peer says " <i>Now bowling N</i> " N follows peer to get gear. |
| 12.55 | TA carries box of skittles to spot for skittles. Peer carries board and N carries ball. |
| 12.56 | N helps to set up skittles. Ran back to have his turn and squeals. Repeats the run twice. |
| 12.57 | Bowls and all skittles are down. Runs back as if to have another turn. |
| 12.58 | Peer asks him to help set up the skittles. He ignores. |
| 12.59 | Peer has turn and all skittles are down. Peer asks twice for help to set up. Ignored |
| 1.01 | Nathan has turn. All skittles are down. Peer asks for help and N sets up two skittles. |
| 1.03 | Peer has turn and all skittles are down. N goes to help set up without prompting. |
| 1.05 | N has turn, knocks all down and peer says " <i>now we have to pack up.</i> " He complies. Peer asks him to carry the balls. Both take the gear back into the office area. Peer says " <i>Free time now</i> " |
| 1.10 | Goes under trees side skips to back area clicking fingers. |
| 1.11 | Runs length of building. Quick look across at me. Repeats walk up ramp |
| 1.12 | Jumps to bell area. Walk across to shade area. |
| 1.13 | Skips along edge of tennis court twice. |
| 1.14 | Stands in shade area making noises then runs back and forth. |
| 1.15 | Side skips around short area four times. |
| 1.16 | Walks along tennis court to flagpole. |
| 1.17 | Bounces a ball with one hand 4 times. |
| 1.18 | Goes to back fence bouncing ball with one hand while walking. |
| 1.19 | Girl asks "Do you want to do passes?" She throws the ball to him. He throws it in the garden. |
| 1.19 | He walks past a yellow ball to the shade area and skips to line at the bell area. |
| 1.20 | Walks towards the seat squealing. Runs along line to other side of court then returns. |
| 1.21 | Goes to TA and touches her back. (<i>She says he sniffed her hair</i>). |
| 1.22 | Picks up another ball walked bouncing the ball continually. |
| 1.25 | Bounces ball along the line on the tennis court. |
| 1.30 | Bell rings. Throws the ball. He is first into the classroom. |

Observations Linked to the Key Competencies of the New Zealand Curriculum

The school found that Nico could play with a partner at school for short periods of time although he refused to play with anyone at home (Barbara's interview). It was decided by the teachers that he could manage a short time of interacting with others in the playground and this could be linked with the Key Competencies of the New Zealand Curriculum (Ministry of Education, 2007) as seen in Table 3.11. Status to time in the playground increased its importance as a learning context and guided goal setting for Nico's IEP and for planning next steps for teaching.

Table 3.11: Nico: Links Between Key Competencies and Observed Playground Behaviours

| Participating and Contributing | Using Language symbols and texts | Managing Self | Thinking skills | Relating to others |
|---------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|
| Not observed | Reads the body language of others. Beginning to express needs. | Understands and follows rules. Observes some unwritten rules. Manages self-care. Shows body awareness. | Not observed | Not observed |

Consultation with Nico's mother and school staff regarding the changes that were happening for Nico in the playground was important but it required everyone to explore their own values and beliefs around how or if the behaviours of students with ASD should or could be changed. It was also an example of recognising the relationship between research and the participants in the research. The contributions made to the design and delivery of the intervention particularly the pace of the changes, involved reciprocity from everyone.

Results

Nico did lead the intervention, as suggested by Barbara and his voice was listened to and acted upon. Prior to the intervention, 80% of Nico's observed behaviours were categorised as ritualistic. After four months of the Playground study ritualistic behaviours had reduced to 18% of the observed time in the playground (255 minutes) as can be seen in Figure 3.3. Interactions with peers in the playground increased from none to four times in a break-time. Following the Playground study Nico was choosing to use playground equipment for some of the time with teachers on playground duty, the classroom teacher and teacher aides becoming proactive in providing alternative playground activities, often with volunteer peers. The skills to play a game which included following rules, ball handling skills, turn taking, scoring were developing, resulting in interactions with peers becoming mutually enjoyable. Nico's ball handling skills improved to the point that it was possible for Nico and a peer to play at the same level and for both to learn about winning and losing.

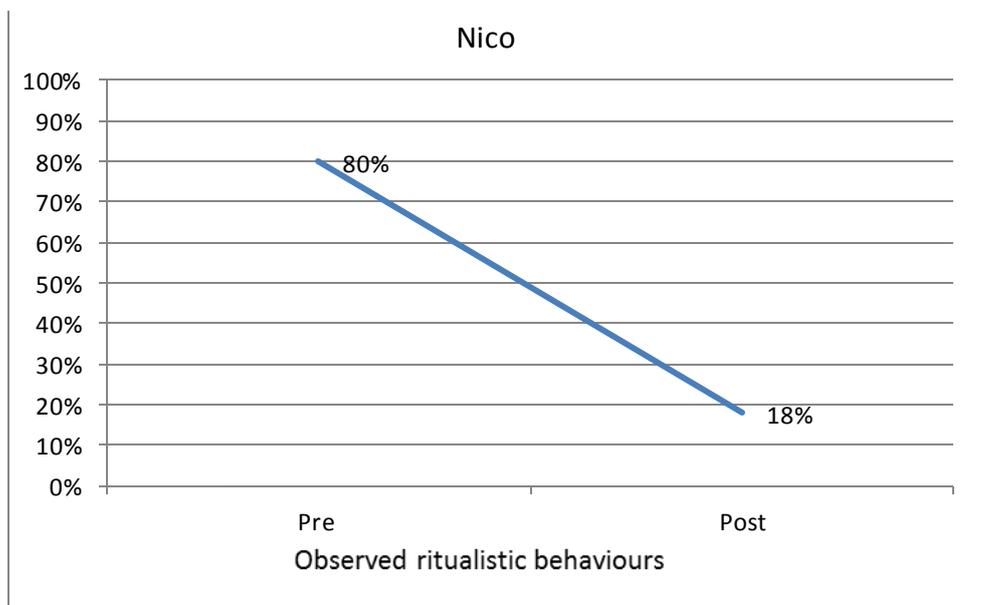


Figure 3.3: Nico Ritualistic Behaviour

Following the Playground study, school staff and peers began to view Nico as capable of more than ritualistic behaviours. They initiated feedback about Nico's play or activities such as videos of him participating in rock climbing or displayed posters of Nico engaged in playground ball games like 4 Square, Ball Bounce, Tunnel Ball and Ball Tag. Spontaneous invitations from peers to play or share an activity began to occur and Nico was observed on at least one occasion inviting others to join his game.

The teacher aide's practice changed to become slightly more distant and she reported that she was *backing off* and encouraging peers to invite Nico to participate. Peer interactions happened more frequently as peers saw that Nico could play indoor games as part of the class programme especially after being coached by peers during Tunnel ball.

A visual chart picturing Nico participating in both indoor and playground games expanded his options of playground activities. Activities were also videoed and placed on his iPad® so that Nico, his teacher aide and his parents could talk about how to play games like 4 Square and Skittles. Gradually Nico began to make choices not only for preferred activities but also with whom he wanted to play mostly for a maximum of 10 minutes at break-times.

Summary

The school designed a plan that they believed addressed Nico's needs. The plan combined the regular use of both an iPad® and visual charts and this was a decision compatible with his choice-making skills as both AAC (PE and SGD) scored highly in the previous AAC study. PE had been recommended by his Speech Language Therapist for a number of years and the school had resources to support this particular communication tool. The iPad® was regularly monitored by Nico's parents and became a valuable communication

tool within the family, between home and school as well as for indicating choices for activities in the playground.

The positioning of the intervention within the context of his newly acquired skills improved Nico's engagement with everyone. When Nico indicated on his iPad® that he wanted to play a ball game his peers responded with immediate appropriate reinforcement of that skill. This context contrasts with social skills that are taught in a clinic or classroom making it difficult to transfer the skills (Bellini et al., 2007). The school playground is the natural context for initiating spontaneous, genuine, social interactions with same-aged peers (Sowden et al., 2010).

The intervention can be considered effective because Nico increased his choice - making skills not only in the playground but also in other areas of his life and this improved the general responsiveness of those closest to him. Peers and teachers now spontaneously interacted with Nico. The teacher aide who had supported Nico for many years had previously seen her role as Nico's protector and friend but as a result of the Playground study she initiated actions to support peer engagement and Nico's self-determination. The reduction in ritualistic behaviours was important as the intervention demonstrated to the teachers and teacher aide that reducing these behaviours resulted in an increase in social behaviours and was not at the expense of his enjoyment. Nico's mother was a staunch advocate for the interventions and her enthusiasm and support not only influenced the outcome but also the initial cautious decision of the teachers who had chosen not to interfere in any way with Nico's time in the playground.

Case Study Three

Jimmy

Jimmy's school roll was 243 students. The playground had a large grassed playing area as well as a smaller hard surface area with a sandpit and climbing frames. There were netball hoops and various markings for hopscotch and the ball game 4 square. The school had three break-times: the first was from 10.30-10.45, the next was from 11.30-12.0 and the last break-time was from 1.30- 2.0 pm. Both break-times were for eating and playing. School began at 9.00am and finished at 3.00 pm. During his first year of schooling Jimmy finished school at 1.30pm but by the time of the Playground study he was attending from 9.00am to 3.00pm. Data were collected from a variety of sources to explore Jimmy's playground experiences and the responses from those around him.

Visual Feedback Sheet

The Visual Feedback sheet allowed Jimmy to indicate what he liked and disliked with support from his parents. The task generated a form of communication between Jimmy and his parents and the results were shared with the school staff. From the visual sheet it appeared that Jimmy liked playing with a ball, sitting on the seats, riding a bike (which was questioned by his teachers) books, music / dance, eating lunch, the Adventure Playground (also questioned by teachers) and being on his own. Jimmy did not like swinging, running, being with others, riding a scooter, swimming, digging in the sandpit, playing with cars or trains or going down the slide. For a summary of Jimmy's likes and dislikes see Table 3.1.

(1) Playground Observations

The researcher observed Jimmy in his playground, noticing if he engaged in any of his preferred activities and if there were opportunities for interaction with his peers. Jimmy was observed for 60 minutes in the playground over several days. During the first half-hour observation, he played with the ball taking turns to shoot hoops with his teacher aide. He later walked around the playground with a teacher on duty and then the teacher aide, avoiding any contact with his peers. He appeared to reluctantly walk along a balance log with support and eventually left the teacher aide and walked to the far end of the field flapping his hands. He repeated this walk three times.

During the second observation (4 months later) Jimmy became very distressed because he saw a student called Edgar (pseudonym) in the playground. No one knew why this student caused him concern and when the teacher aide said, 'Edgar gone' Jimmy went into the playground. He walked along the wooden edge of the sandpit but soon found the duty teacher and attempted to hold her hand. The classroom teacher who was also in the playground commented that there was too much noise and that Jimmy would prefer to lie on the couch with books. However, a few minutes later a peer came and held Jimmy's hand and they walked to the Adventure Playground. Five minutes later Jimmy asked the teacher aide in his own way using hand gestures, "Can I have the ball?" He waited while others shot hoops and didn't appear to notice other balls that were thrown around him. Another adult came into the playground and he bounced the ball away and went to touch her sleeve. Jimmy ignored the bell which rang to end the break but he responded positively when a peer came to him and took him to line up and then go into the classroom.

From these observations it appeared that Jimmy was comfortable with adults and with certain peers and he liked physical contact. He had begun to use a ball for short periods

of time but it was still a solo activity. It was reported by his teacher that on Wednesdays he brought a scooter on to the hard court independently but rarely scooted on it. Jimmy responded to some peers but only let students he knew help him in anyway. He indicated he had people that he liked and disliked.

Observations linked to the Key Competencies.

Jimmy used a variety of communication systems to make his needs known. He used socially appropriate behaviours most of the time but flapped his hands and squealed when he was anxious or distressed in any way. High pitched squealing which is unpleasant for others is thought to deter peers from interacting and this may have been Jimmy's intention (Schoen et al., 2011). Jimmy was able to take turns and related to selected others as seen in Table 3.12 but he still indicated that he preferred to be with adults or alone.

Table 3.12: Jimmy: Links Between Key Competencies and Observed Playground Behaviours

| Participating and Contributing | Using Language symbols and texts | Managing Self | Thinking skills | Relating to others |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------|-------------------------------------------|
| Not observed | Reads the body language of others. Attempts oral language with adults Beginning to use behaviours to express needs. | Not observed | Not observed | Can take turns. Can wait for his turn. |

Semi-Structured Interviews

The first interview with the principal revealed that most of Jimmy's anxious behaviours were associated with managing unexpected events. School assemblies were a challenge as they only happened about three times a term so were not regular enough to become familiar for Jimmy. The behaviours of crying, squealing, flapping of hands that happened in the playground usually occurred when a group of students came too close to him.

As already suggested the principal liked the idea of a *sanctuary* which could include peers and be a stepping stone to moving Jimmy out into the big playground. Another suggestion was that Jimmy could use a camera which would require him to be in the playground alongside his peers. The principal favoured using peers rather than the teacher aide as a support person in the playground but felt unsure about how much difference would be achieved for Jimmy. Time in the playground was viewed by the principal as free time and he didn't want to make break-times structured or regimented. He believed that break-times were opportunities to satisfy the Key Competencies and to gain important skills for all students to be successful in the big world and Jimmy was included in this vision. This meant that Jimmy was accepted as he was, with support provided for his needs which may include sitting on a bean bag with books.

The second interview was with Jimmy's teacher aide, who had recently started shooting hoops with Jimmy to help get him out into a mix of other students. Sometimes another student was involved and Jimmy would shoot hoops independently for a short time. However the teacher aide reported that it was difficult to use peers as supports as Jimmy would not follow their instructions and would wander away from them to find an adult.

Jimmy liked to walk along the obstacle course with physical support from his teacher aide. This activity was thought to be chosen because it allowed him to be physically close to an adult. One day he showed an interest in watching an ambulance after being encouraged by his teachers to look at it.

The sandpit was not a preferred choice because Jimmy disliked the feel of the sand on his hands although he liked to use a water tray tipping water in the sandpit with other students. If left, he would sit for half of the break-time eating his lunch on seats close to the classroom door. When it was slightly cold he would come back into the classroom as soon as he could. Jimmy's first choice would be to sit inside on the couch with books. He did like music and since he had become more verbal he liked to sing, but not with everyone else. To avoid the interruption of Jimmy singing when he needed to be listening during school assemblies the teacher aide took little pieces of apple to give him when he needed to be quiet.

The Intervention

From the discussions after the interviews and observations it was decided to provide Jimmy with a space during break-times that allowed him to be with books, to be warm and to share with selected peers when that was his choice.

Results

Following the Playground study the principal and teachers put Jimmy's needs first and adapted the environment to accommodate him so that he could be an active participant in some school events. He took part in the school cross country with his mother running beside him, he had a part in the school production and was included in all school assemblies. Jimmy's teachers and teacher aide interpreted his behaviours and responded to achieve

positive outcomes. Prior to the intervention Jimmy's behaviours were almost entirely categorised as ritualistic (93%) as shown in Figure 3.4. Post intervention Jimmy's ritualistic behaviours reduced to 70% but he was still anxious in the playground and there were new concerns with his coordination and lack of physical stamina.

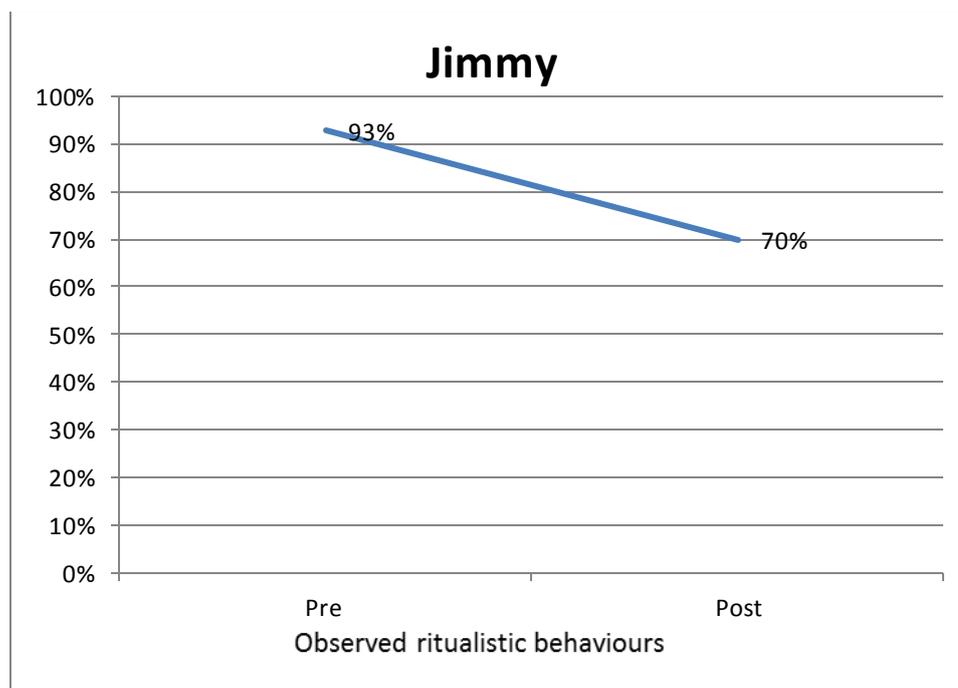


Figure 3.4: Jimmy Ritualistic Behaviour

The intervention did appear to have an effect on Jimmy's play and in addition prompted changes to the school environment including providing a special place (sanctuary) for Jimmy when he chose to be alone.

Chapter Conclusions

The Playground study was welcomed and well received by all schools and a range of outcomes was observed. There were some differences between participants' reported play preferences and those in which they actually engaged during playground observations. Teachers and teacher aides also reported these differences.

Baseline observations indicated that all three students were spending large amounts of time alone in the playground engaging in ritualistic behaviours. Using the original playground intervention as a starting point, schools expanded the scope and programme with innovation and enthusiasm as can be seen in Table 3.13.

Andrew now used symbols on his iPad® for ordering curriculum tasks, food choices and as part of a literacy programme. Nico expanded his use of the iPad® from symbols to videos of any activities in which he participated. The menu of activities provided him with a record of achievements as he flicked through them with his peers, parents and teachers using his iPad®. He also expanded his visual displays on charts showing his participation in rock climbing, camping and camp and school events. In contrast, Jimmy did not have continuing access to an iPad® other than during the researcher's visits. Jimmy was no longer eligible for funding from The Ministry of Education for an iPad® as he had started to verbalise. His anxiety and interactions with his peers remained unchanged but his ritualistic behaviours did decrease slightly.

Table 3.13: Summary of Actions and Outcomes for the Three Students**What happened?**

| Name | Action | AAC used | Additional Outcomes |
|-------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Nico | Selected choices of play and with whom he wanted to play. | iPad® with symbols. Visual chart with photographs. | Videod previous play or activities included on iPad®. |
| Andrew | Selected choices of play activities that included; swimming, scooter, swing, climbing trees. | iPad® with symbols. | Used iPad® to select food choices, order of work tasks, provided missing words in a story. |
| Jimmy | Bean bags and books placed outside. | Now verbal using three word sentences. No AAC. | Remains anxious with some peers. |

The biggest behavioural change in the playground was the substantial reduction of ritualistic behaviours for two of the three students and a more modest reduction for the third student. Table 3.14 shows the percentage reduction from ritualistic to non-ritualistic behaviours observed for the three participants. There was a notable change for Nico and Andrew who began to spend more time in the playground engaged in their preferred activities

providing opportunities for interactions with and even responding to interactions that were initiated by their peers. Post intervention, both Andrew and Nico spent the majority of their observed playground time engaged in non-ritualistic behaviours. Although Jimmy made more modest changes, it is important to note he did increase his non-ritualistic behaviours more than four fold.

Table 3.14: Post Intervention Ritualistic and Non-Ritualistic Behaviours

| | Nico | Jimmy | Andrew |
|----------------------------|------|-------|--------|
| Ritualistic Behaviours | 18% | 70% | 26% |
| Non-ritualistic Behaviours | 72% | 30% | 74% |

Discussion

Inclusion is not just about placement in regular classrooms. It is about feelings of belonging in the whole school community and that includes being able to participate in the school playground without feelings of anxiety, isolation, or vulnerability. For some students with ASD, the size, noise and being surrounded by students moving around them in the playground creates stress and confusion.

However, time in the mainstream playground is important for all students and especially for those with ASD as this is the natural context for learning and using skills in social competence and communication (Doll & Brehm, 2010). It is where play occurs and is valued, with an increasing number of educators and parents recognising the importance of play in the lives of all students regardless of their diversity (Palmer, 2007; Pellegrini, 2008; Terpstra et al., 2002; Woolley et al., 2006; Yuill et al., 2007).

Andrew, Nico and Jimmy began to be viewed differently by their peers and teachers once they were visible and engaged in the playground where they were seen to be learners once their behaviours demonstrated links with the New Zealand Curriculum (Ministry of Education, 2012). Those closest to the students were influenced by the behaviours of the students as can be seen in Table 3.15.

Table 3.15: Summary of Outcomes and Effects on Those Close to the Participants

| <i>Name</i> | <i>Peers</i> | <i>Parents</i> | <i>Teachers</i> | <i>Behaviours</i> | <i>Skills</i> |
|---------------|---------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------|
| Nico | Observed Nico catching a ball so included him in their games. | Met with teachers and offered suggestions and sports equipment from home. | Duty teachers noticed Nico. Teacher aide initiated peer group support, interactions and new games. | Ritualistic behaviours reduced. | Can follow rules, score, take turns, help set up and pack up sports equipment. |
| Andrew | Volunteered to play and gave positive feedback to teachers. | Email contacts. One meeting with father. | Teachers linked new learning to NZ curriculum. Higher expectations. New goals included in IEP. | Ritualistic behaviours reduced. | Transferred choice-making skills using the iPad® to life and learning environment. |
| Jimmy | Chosen peers shared books and bean bags in the playground. | Participated in sports day with him. | Duty teachers noticed and supported him. Participation with students in playground. | Slight reduction in ritualistic behaviours. | Verbal skills increased with progress in reading, written language and math. |

Article 2 of The Convention on the Rights of the Child (Non-discrimination) states that no child should be treated unfairly on any basis and this includes a child's right to play. Play is important as it is a primary form of acceptance by students of one another. Acceptance by their peers is far too important for students with ASD so they should not be left out of opportunities to play (Terpstra et al., 2002).

Results of the Playground study also revealed that some of the chosen playground activities had the potential to become leisure activities at home. There is often a challenge for the families of students with ASD to create an environment that protects their children's rights to be able to grow and reach their potential that includes engaging in leisure activities that do not always involve solo screen time (Article 4 Convention on the Rights of the Child).

Student participants were given opportunities to indicate their communication preference and with this acknowledgment self-determination followed in other settings. The students then had a voice enabling them to say *yes* or *no*, to appropriately exert control, express preferences and indicate wants and needs rather than using unconventional behaviours (Sigafos et al., 2009). Potentially, this permitted Andrew, Nico and Jimmy to become active participants rather than passive dependents on the services and adults around them.

Participants in the Playground study were three students who reportedly generated feelings of inadequacy and failure in both their teachers and school principals. Teachers cannot make inclusion work in isolation and a strong relationship with the researcher and the research process was welcomed by teachers in the three schools (Ravet, 2011). Approaches that fostered engagement with typical peers in natural settings were encouraged and teachers began to make decisions that assumed student competence (Jorgensen, Mc Sheehan &

Sonnenmeier, 2007). The skills and ongoing practice of the teachers, parents and school management was elevated as the research was led by a university researcher providing them with new insights and an expectation for positive change. The choice of a communication skill provided an efficient way for participants to exert control, express preferences in other settings and indicate wants and needs resulting in improved behaviour and also alerting teachers to possible different teaching strategies. Choice making demonstrated during the AAC study provided teachers with a pedagogy that provided students with some basic opportunities to increase choice and control in their lives. The choice opportunities initially required the students to choose from three play activities, which food they wanted from their lunchbox, which book they wanted to look at or the order of tasks.

Chapter Summary

This investigation examined how the use of an AAC system could increase participation in mainstream playgrounds for three students with ASD who were nonverbal. Results suggest that increasing opportunities to make personal choices of playground activities may have reduced ritualistic behaviours and contributed to increased peer interactions and inclusion in the playground. The results demonstrated that an AAC system can be generalised and maintained in a more naturalistic setting from a clinic or classroom where the original teaching interventions occurred.

It was important that the new skills for the preferred AAC system that had been learnt and mastered were now used for tasks that enabled students to communicate in a variety of contexts that were not confined or limited by the research. This allowed innovation and input from teachers and teacher aides far exceeding the expectations and parameters of the study.

Nico indicated that he could use several AAC systems depending on his needs while Andrew expanded his use of the SGD to academic learning and other choice-making situations like selecting food, the order of daily activities or the selection of a book or programme that he preferred to use.

The students made small changes to their time in their mainstream playgrounds. As described in the case studies two of the three students Andrew and Nico made changes to their break times through using AAC that resulted in an increase in non-ritualistic behaviours. Jimmy made changes to his behaviour but these resulted mostly from the school changing the environment around him to address his wants and needs.

Finally, four factors appeared to contribute to the changes in the playground behaviours of the three students:

- (1) Participants were able to select their preferred choice of playground activity using AAC which built on previously learnt skills (selection of an AAC system to request more play with toys from a toy box).
- (2) The chosen playground activity was for a small part of the time in the playground, usually less than 15 minutes to allow students to use the rest of the time as they chose. This free time was often used for various forms of ritualistic behaviours or for positioning themselves in comfort spots like seated on the seat close to the classroom door or some repetitive action like walking or running between gates or fences.
- (3) The use of AAC was successfully generalised to indicate preferred activities in the playground, but engaging with others in play still required time and support from peers as well as adults.

- (4) The use of AAC occurred prior to break times. This became the only practical way to use iPads® in the schools although Andrew did take a mini iPad® to the Adventure Playground and was seen indicating that he wanted *more* swing.

Reflecting on Research Practice

The Playground Study explored how three students could generalise their use of an AAC system to the playground with the aim was of increasing their participation and interactions with their peers. The intervention involved many participants other than the researcher and the students. The peer group, parents and teaching staff became participants and actively involved all stages of the study. In order for this to happen the researcher's practice had to be inclusive and collaborative.

It was useful for the researcher to consider the principles of The Treaty of Waitangi as a framework for reflective practice (Bishop & Glynn, 1999). The Treaty of Waitangi, signed in 1840, forms part of New Zealand's constitution and it is often helpful to consider the three broad principles in any form of interactive process. The significance of this document to Māori and Pakeha's shared understandings are recognised and this model was used to guide the researcher's practice particularly for the Playground study.

The key identifiable factors for the success of this study included research strategies that were underpinned by the three principles of the Treaty of Waitangi: Partnership, Protection and Participation. These principles are considered through all policies for students in New Zealand schools (Ministry of Education, 2007) and are included by deliberate choice by the researcher as a relevant and appropriate way of examining the methodology. The IBRLA model (initiation, benefits, representation, legitimation, accountability) presented in the template below (Table 3.16) operationalises the three Treaty Principles in relation to the

five issues of power and control as they interacted with the research methodology of the Playground Study. The aim was that participants experience something done *with* them rather than done *to* them (Bishop & Glynn, 1999). Table 3.16 provides a summary of key examples of alignment in response to the reflective questions which are explored in more detail below.

Table 3.16: Model for Evaluating and Reflecting on Research Design and Practice

| | <u>Article 1:</u> <u>Partnership</u> | <u>Article 2: Protection</u> | <u>Article 3:</u> <u>Participation</u> |
|-----------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| | Strong partnerships promote power-sharing relationships. | Activities promote and enhance student wellbeing, identity and mana. | Participant input is enabled and contributions valued. |
| Researcher Reflection | <i>How well did my interactions enable partnering and power-sharing throughout the journey?</i> | <i>How well did I ensure that the wellbeing and dignity of my participants were kept intact?</i> | <i>How well did I genuinely enable participant input and value their contributions?</i> |
| Initiation | Participants indicated that they wanted to participate in the study, from initiation through to closure. | Consents and documentation used language and formats that were respectful and easily understood. | Participation was flexible and conditional to particular views, wants and needs. |
| Benefits | Participants engaged in discussions about the purpose and benefits of the proposed study. | Students' and educators' aspirations, wellbeing and perspectives informed study design and method. | Students' participation resulted in the acquisition of new skills. Educators also were enabled to provide |

| | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | ongoing teaching and learning of new communication skills. |
| Representation | Study situated within students' home and school environments. Student voice / views / choice imbedded in method. | Direction from educators guided pace and progress of the study. Avoiding interruption of students' existing programmes guided planning and progress. | Teachers present and actively participated in the study. Playground observations shared to gather input from peers /teachers /parents. |
| Legitimation | Pace and entry based on student capacity. | The shared understanding of data and results was prioritised. Regular communication between researcher and participants was critical. | Final documentation was legitimated in small steps, with perspectives valued and reinforced as a result of input from all. |
| Accountability | Students and educators informed of expectations and outcomes in partnership. Visual prompts were offered to enable student voice and consent. | Results from observations and interviews were shared with parents and educators to ensure alignment with original aspirations. Visual feedback sheet from students used as basis for observations. | Programmes were videoed and modelled for educators and parents. Open process with school principal enabled participation and input throughout the study. |

Adapted from Bishop & Glynn (1999, p. 199)

The Principles of the Treaty of Waitangi

The three articles of The Treaty of Waitangi that includes three principles as demonstrated in Table 3.16 will be expanded and linked with the aims and methodology of the researcher.

(1) Partnership.

Strong partnerships promote power-sharing relationships.

How well did the researcher's interactions enable partnering and power-sharing throughout the journey?

The language used for information and consents was familiar to the participants with simplified visual booklets created for the students with information and consents for the study. Using language that did not include jargon ensured that expectations and outcomes were able to be co-constructed by everyone. It was important to ensure that the students not only understood the process but were able to have a voice and provide input using the simplified visual booklets. This meant that the participants were well informed and had a knowledge base about the study. They were able to participate in a *partnership* with equal power relationships.

(2) Protection.

Activities promote and enhance student wellbeing, identity and mana.

How well did the researcher ensure that the wellbeing and dignity of the participants were kept intact?

Concern for the wellbeing of the students, their parents and teaching staff was a major consideration for each step of the programme. The school's daily programme was considered

when planning appropriate times for visits or observations were expressions of care and *protection* of the participants' rights and 'mana'.

(3) Participation.

Participant input is enabled and contributions valued.

How well did the researcher genuinely enable participant input and value their contributions?

As well as modifications of written and visual materials for the child participants, the contributions of the adults closest to the participants were also considered. Teaching staff and parents were present and participated in the data gathering which included gaining and valuing their input. Interventions and teaching sessions were videoed and the programme modelled for teaching staff which enabled ongoing supportive practice in between researcher visits. The principal of each school was informed and involved from the beginning and contacted during every visit. This maintained support from all school staff for the duration of the research. Regular email contacts between the researcher, parents and schools ensured everyone was kept informed and involved. Small steps were reinforced and all input from everyone was valued and documented. The participants were enabled to *participate* and share the journey.

Benefits for Everyone

There were significant benefits for everyone involved in the study. First, the skills and practice of the teachers and parents were elevated as they became active in supporting a study led by a university researcher. They welcomed the direction and guidelines of a theory based

programme for students whose needs were complex and beyond their normal educational programmes.

Second, following the interventions the students were viewed differently by their peers, parents, and teachers as they were seen to becoming teachable and learners. Ritualistic behaviours can be perceived as a salient difference between students and their peers, but when the students in the playground engaged in some form of interactive play activity with their peers they were seen as playmates and not invisible or ignored. This was evidenced when Nico was spontaneously asked if he would like to do 'ten bounces' once he was seen by a peer as able to bounce and catch a ball.

Thirdly, the students now had a 'voice' so they could communicate and express their wants and needs with significant positive changes to behaviour. For some students this was the first time in their lives that they had a communication mode and the opportunity to indicate choice.

Fourth, the links between theory, professional practice and the New Zealand Curriculum were demonstrated. This was very significant for teachers who are required to report on the academic progress and access to the New Zealand Curriculum of all learners.

Fifth, the study included approaches that fostered engagement with typical peers in natural settings in mainstream schools that can be developed and repeated with no extra cost or additional resources. The more students with ASD are isolated from their peers, the more likely they are to develop rigid play routines without their peers to serve as models and play partners (Hess, 2006). Engaging in any form of play activity helps students to get to know and accept each other making the playground the context for friendships to develop naturally. For this reason, time in the school playground should be considered just as important as time in the classroom (Woolley et al., 2006).

Finally, the teachers in the three rural schools were encouraged and commended for making decisions that assumed their competence in managing the learning of students with complex needs. They were considered capable with an opportunity to learn and grow. Their learning had involved theoretical knowledge as well as the skills to change their practice and this could generate self-sustaining change. The growth and learning of the researcher occurred with the co-construction of an intervention and learning through the real world development and application of an intervention to promote inclusion.

The previous pages have examined the reasons for the choice of research design, methodology and methods and detailed the steps taken by the researcher to carry out the study. Careful planning, consultation with other researchers, school personnel and parents has enabled this study to flow and grow but with sufficient parameters for the findings to be considered reliable and valid.

Chapter 4

Discussion and Conclusion

When a student is diagnosed with ASD, many families face an unexpected, anxious journey. While the diagnosis is a relief for some, nothing can prepare families for the significant lifestyle changes that are ahead particularly when the student is non-verbal. Regardless of the severity of the condition all students are entitled to attend their local school, to learn, to play and to participate in the whole school community. Inclusion has been a strong focus of this thesis. This is because increasing numbers of students with ASD attend mainstream schools, with enrolment of their students in their local school being the choice for six of the nine parents in the study.

The research in this thesis was situated in two contexts, the classroom/clinic (AAC Study) which was guided by three questions and the playground (Playground Study) by a fourth question. The first question examined if students with ASD could learn to use PE, MS and the iPod®-/iPad®-based SGD to request access to toys. Five of the nine students, Henry, Cameron, Jimmy, Edward and Nico reached criterion with all three AAC options during the intervention phase. This confirmed findings from other studies that students with ASD can be taught to use multiple AAC modalities for requesting (Boesch et al., 2013; van der Meer & Rispoli, 2010).

The second question examined whether the participants could demonstrate preference for one of the AAC systems and if that preference was SGD. Results confirmed findings from previous studies that students with ASD can indicate preference, with all but one of the nine students choosing one of the AAC options more frequently than the other two (van der Meer, Didden, et al., 2012; van der Meer et al., 2011). One student withdrew from the study after 7 interventions.

Most students assessed to date have shown preference for using a SGD as did eight of the nine students in the current study (Achmadi et al., 2014; van der Meer, Didden, et al., 2012; van der Meer, Kagohara, et al., 2012; van der Meer, Sutherland, et al., 2012), confirming the hypothesis that SGD would be participants' preferred option. It is not clear why students prefer the SGD over PE or MS options but it is suggested by Light et al. (2004) that SGDs are more inherently attractive due to their visual appeal and voice-output feature. The immediate voice output response of the SGD may be more rewarding when compared to PE where the student pulled a black and white symbol from a board and handed it to the instructor. Memory recall is required for MS and in the study by Achmadi et al. (2014) it was reported that MS was the least preferred option and required more trials to reach criteria.

Perhaps SGDs were the preferred AAC simply because they are more socially acceptable and seen to be used by peers and families around students with ASD (Light & McNaughton, 2013). Cell phones including Smart phones, tablets and entertainment technology are widely used in schools, homes and cars as are toys that are activated by technology. Preference for SGD ranged from 56% for Simon to 100% for Nico with the mean for all students was 75.5%. Not only was the SGD more appealing for reasons already stated but the other AAC options appeared dull and inappropriate by comparison. They lacked colour and their presentation did not appear to be student friendly.

The third question investigated whether students would learn to use their preferred AAC mode more rapidly than their less preferred options and this was partly confirmed. Four students (Cameron, Andrew, Shane, Edward) reached criterion in fewer sessions using the SGD compared to PE or MS. However, some students needed more sessions to reach criterion for SGD even though they were indicating SGD in the device preference assessments. A positive relationship did exist between preference and maintenance of correct requesting for six students who participated in follow up sessions (i.e., Henry, Cameron,

Nico, Andrew, Jimmy, and Shane) as they demonstrated preference for and accurate maintenance of the SGD.

The Playground study investigated how the use of AAC could increase participation in mainstream playgrounds for three of the nine students (i.e., Andrew, Nico, Jimmy) who had participated in the AAC Study. Findings revealed that the skills to use an AAC system to choose a play activity were generalised from the classroom/clinic to the playground for two of the three students. Play activities involving peers not only changed the perception of difference but also reduced ritualistic behaviours for Andrew and Nico. This behaviour change, though small, presented one of the students as a potential play partner when he joined his peers in games of bounce and skittles. The third student, Jimmy did participate differently in the playground post intervention, when the environment was changed to accommodate his needs and evidenced more modest reductions in the use of ritualistic behaviours in the playground following the intervention. Generally, participating educators in the Playground study changed some environmental factors impacting on the students rather than expecting the students with ASD to do all the adapting. These environmental adaptations may also have contributed to the positive outcomes which were observed post-intervention.

Although the playground has been identified by many researchers as a challenging environment for students with ASD, it also is a potential setting in which friendships and skills in social competence can develop (Doll & Brehm, 2010; MacArthur & Gaffney, 2001). However, very few studies explore the physical structure, play choices, the role of adults or the preparation of peers to act as buddies or play partners to initiate change for students with ASD in their school playgrounds (Mulryan-Kyne, 2014). Some teachers in the Playground study had previously believed that their students with ASD were happy and comfortable in their playground, alone and engaging in ritualistic behaviours, others saw the students as learners but requiring special pedagogical approaches.

The current Playground study has contributed to the literature by investigating how the use of AAC can influence the playground experiences of three students with ASD. The lack of functional spoken language is a serious barrier to any form of social interaction with others for students with ASD who are non-verbal unless they use some form of AAC. Research has shown that when students use their preferred communication mode they can access the curriculum, participate in the social and instructional life of the classroom and increase positive behaviours (Finke et al., 2009; Hart & Malian, 2013; Sigafos et al., 2009). Long-held beliefs about disability and the cognitive ability of students with ASD are challenged by the successful use of AAC.

Implications for Practice

Most of the interventions in the AAC Study took place in schools or the student's home (or a clinic) observed either by parents, principals, teachers or teacher aides. This resulted in the modelling of strategies for engaging with the students and using an AAC programme. Some schools' personnel seized the opportunity to expand their classroom programmes to include a new method of working with their students between the visits of the researcher.

The classroom or home location of the intervention sessions enabled feedback, generalisation and maintenance through the proximity of parents or educators. The students appeared comfortable in the familiar settings and became more responsive to the demanding tasks required with the interventions. This was in contrast with the student who used the clinic who often responded to the small unfamiliar enclosed room by becoming distressed and uncooperative.

Time to engage with educators or parents during and between visits was essential to develop relationships built on trust and respect for each other's knowledge. The researcher did not want to be viewed as an outside expert or that data gathering was the only reason for the study. Empowering teachers and teacher aides influenced their professional practice ensuring the long term continuation of the interventions.

It was important to be guided by the teachers in each of the schools about the health and wellbeing of the students. In some situations, students were unwell or tired requiring sessions to end part way through or to not take place despite the time and travel involved. One student frequently appeared sleepy at school as he often slept for very short periods at night. Visits to the schools were planned so that numerous interventions could occur throughout the day alternating with break-times to allow students with some down-time.

Technology has transformed the lives of everyone by providing a method for communication which now includes students with ASD. The AAC study demonstrated the benefits of improving functional communication for students who have been unable to communicate their needs via speech. There is even speculation that AAC can impact positively on speech development and this may have occurred for Jimmy who developed verbalisation during the study (Millar, 2009).

Three of the nine students participated in both the AAC study and Playground study. A significant change occurred when the teachers recognised the playground as a curriculum resource where some of the key competencies were being achieved by their students with ASD. Principals, parents, teachers and teacher aides began to view the students as capable learners and value their own teaching and learning practice.

The articles of the Treaty of Waitangi which is the founding document of Aotearoa, New Zealand includes three principles that can be a useful tool for reflecting on how

effective power-sharing relationships have been established in any form of interaction or inquiry between colleagues, parents, teachers and students (Bishop & Glynn, 1999). In the Playground study the three principles of partnership, protection and participation became a reality and were embedded in the researcher's practice and personal reflection.

Limitations

Although five of the nine students in the AAC study reached criterion with all three AAC options during the intervention phase and demonstrated similar levels of communication abilities pre-intervention, they were a relatively diverse cohort in terms of ages and prior experiences with AAC. The students represented a variety of cultures with parents from India, Thailand and Germany and also from both rural and urban locations in New Zealand. The diversity likely contributed to the varying success of the interventions but the intervention design was sufficiently flexible to successfully meet the varied needs of the students whilst maintaining a consistent structure. The students were situated in different schools receiving different levels of support during the interventions. Sometimes other educators or support agencies encouraged participants to use their non-preferred AAC modes between researcher visits and this may have influenced the communication choices and potentially the outcomes.

When Jimmy began to verbalise, the use of AAC was considered redundant by his supporting teachers and by his parents. Not all participants including Jimmy (who became ineligible for a Ministry of Education funded SGD) had access to their preferred communication mode other than during visits by the researcher. This meant that students had unequal opportunities to practice and to become familiar with the SGD and this variable was not controlled for.

There were some procedural modifications and oversights during the study that are worth noting. They included revising Cameron's target at baseline without collecting additional baseline and not revising Nico and Shane's target behaviours when they achieved high levels of correct SGD use during baseline. Some procedural alterations were made for Jimmy and Shane's behaviours. None the less, the results are consistent with previous studies that used similar intervention procedures (Achmadi et al., 2014; van der Meer et al., 2012).

Using multiple trainers with varied backgrounds and experience was necessary because of the number of students and the length of time required for each study. However achieving consistency was challenging despite the training and manuals provided. Difficulties also arose in the monitoring of students who were not part of the researcher's responsibility. Treatment fidelity was an important part of the investigation and steps taken to mitigate the influence of using multiple trainers included training, observations and the provision of a Training Manual with detailed procedures for each phase of the study.

Many schools had been affected by two years of severe earthquakes in the district so this limited the number of participants willing to take part in the study. Some schools closed, amalgamated with other schools or were functioning with damaged buildings. A large number of families were also in damaged houses or relocated so participating in the study was not an easy choice. Many participating families and schools were in rural areas requiring hours of travel and this resulted in fewer but longer visits than originally planned. However, the longer time in each school provided an unexpected opportunity to be present in each student's whole school environment and time to establish reciprocal relationships with students and educators and contributed to the richness of the data.

Future Research

The use of AAC interventions such as tablet devices is essential for students with complex communication needs to maximise their social and academic development. Students in the AAC study chose the SGD as their preferred AAC but there challenges with the AAC application Proloquo2go™. Some students were able to close the application and access other applications on the iPad®. Restricting a student's access to a communication-based application is not an easy solution as this limits the student's access to other beneficial and supportive features of the devices (Drager et al., 2010). Research is needed to develop tablets and technology that are attractive to students and support communication in areas of social and academic development.

While it is suggested that AAC interventions may support the development of spoken language for students with complex communication needs, this was not specifically measured in the AAC study (Drager et al., 2010). Future research could explore the effects that different AAC systems might have on a student's speech and language development. Research that investigates links between AAC and language development is important as many parents are reluctant to provide any form of AAC mode as they believe that this will impede oral language development (Millar, 2009).

A further area of research could determine the effectiveness of AAC systems such as SGD, PE and MS in developing more complex communicative functions such as commenting and social communication. The AAC study was concerned with maintenance and to a certain extent monitoring generalisation but the main factor that limited this practice was time. The long-term maintenance and generalisation of AAC skills in a range of contexts and with a variety of communication partners would provide valuable evidence on which to base future interventions.

The AAC Study demonstrated that speech-language therapists, educators and other AAC practitioners need to ensure that adequate time and resources are devoted to developing knowledge and skills in supporting these new technologies (Drager et al., 2010). The findings reinforce the notion that in order for students with ASD to benefit from technology there is a need for systematic assessment and focused instruction. The success or failure of AAC interventions is likely to be influenced by the quality of the instruction, the home and school environment, communication partners' knowledge and skills to use such technologies, and the student's innate need for communication.

Examination and comparison of AAC outcomes using a variety of tablet-based SGD and communication technology is necessary to ensure students, their families and communicative and education professionals can make evidence-based, informed decisions concerning a student's communication, social and academic development. This may require considerable up-skilling for some family members, peers and professionals and easy access to AAC and technology support. It would be useful to specifically investigate the affect that training teachers, teacher aides, parents and peers in the skills to use AAC has on a student's acquisition, maintenance and generalisation of an AAC system.

Although new technologies may solve some complex communication problems and that they have the potential to transform the lives of people facing challenges with communication disorders the design of AAC still needs improvement (Diamandis & Kotler, 2012). The translation of research to practice requires effective approaches to interventions that maximise benefits for students who require AAC (McNaughton & Light, 2013). However AAC is more than providing a tablet, but must be part of a well-designed targeted plan with adequate resourcing for training and with links to teaching practice and curriculum goals.

Parents often expect their child to benefit academically and socially from the allocation of teacher aide hours but this is often at the expense of student independence, peer interactions and self-efficacy (Blatchford & Bassett, 2009). The increase in this form of support requires clarification of the roles and responsibilities of both teachers and teacher aides. A shared understanding of the aims and expectations of inclusive practice needs to be well understood and monitored by senior management. Research reports that without the whole school sharing the same vision for inclusion, teacher aide support can do more harm than good, as students with ASD become disadvantaged by receiving less teacher time and fewer opportunities to interact with peers (Symes & Humphrey, 2011). Because the numbers of teacher aide hours provided to schools is increasing, the role of teacher aides both in the classroom and the playground is an area requiring urgent research (New Zealand National Party, 2014).

The value of break-times as an educational opportunity with the potential to be an instructional context for play activities and social interaction with typically developing peers for students with ASD needs further investigation. Increasing numbers of parents are choosing to enrol their students in mainstream schools with the expectation that there will be opportunities during the school day for making friends and joining in playful activities. Research has reported that students with ASD do feel lonely and do want to be involved in social relationships but guidance is needed to help this to happen (Bauminger & Kasari, 2000). While the current study represents one of the few to investigate the linking of playground participation with the key Competencies of the New Zealand Curriculum this needs to be addressed with a larger cohort (Ministry of Education, 2007).

Research for the current study has brought to light additional gaps in the literature pertaining to break times for students with ASD in mainstream playgrounds. It would be useful to find how behaviours during break-times influences classroom behaviour and if

targeting specific goals such as those included in Individual Educational Plans affects relationships between peers and students with ASD both in and out of the school environment. Studies could include evaluating structured playgrounds versus unstructured playgrounds during break times for students with ASD.

Many interventions for improving social interactions are confined to small groups or interactions with adults but the school playground is the naturalistic context to teach and test these skills. Play generates many communicative functions such as commenting, initiating conversations, and questioning with a variety of communicative partners (Carr & Felce, 2007). Changes to school policies and procedures in relation to the role of teacher aides have the potential to significantly influence experiences in the playground for children with ASD. While the playground settings were described and participant's interactions with them were recorded, the influence of playground variables was not explored. The experiences during break-times for students with ASD is not well understood and warrants particular attention to examine if the layout and design of playgrounds, availability of equipment, the role of adults, increased choices and opportunities for play can impact positively on students' inclusion in mainstream school playgrounds.

The use of an ecological systems model (Bronfenbrenner, 1994) can provide a framework to examine the many levels of influence of the contexts in which the student with ASD develops. It has been important to be concerned with gaining the perspectives of the school principals, teachers, teacher aides and parents during the various stages of gathering data, designing interventions and reporting findings. In many ways the researcher has modelled inclusion and 'welcomed in' rather than 'placed out' the participants. Specifically the use of The Treaty of Waitangi principles to examine decision making, consultation and collaboration may provide a useful mechanism for future research to utilise when working with students, parents and schools to develop and support strategies for inclusion. Power

differentials can exist in populations when there are barriers to knowledge. The problems of imbalances are seen in relationships when there is a dominant group and others at a variety of levels (Bishop & Glynn, 1999). Barriers can exist between researcher and participants unless a deliberate and an appropriate philosophical and theoretical model is provided. Future research could consider the benefits of an approach that gives a 'voice' to all involved.

Conclusion

The studies presented will interest those concerned with the experiences of students accessing and using a preferred AAC as a communication tool in two different contexts, the classroom and the mainstream playground. The AAC study made several important discoveries. Firstly, five of the nine students were able to learn to use three AAC systems to criterion and second, that all were capable of using choice-making skills to indicate their preference. The third finding was that SGD was the most preferred AAC for eight of the nine students and lastly, that four of the nine students required fewer intervention sessions to learn the SGD compared with MS or PE. This is significant not only because utilising a student's preference is cost effective as it takes less time to teach but also because it provided each student with a voice and an opportunity to develop choice-making skills.

The Playground study demonstrated that two of the three students could change their playground behaviours with the support of AAC. The third student did change his behaviour but remained anxious and preferred to be with adults rather than his peer group. By providing opportunities for choosing activities prior to time in the playground the three students with ASD who had previously been left out of peer group play were prepared to engage in a game or play activity for a short part of each break time. This helped the peer group to see the student with ASD as a play partner rather than someone performing ritualistic behaviours for the total duration of break times. The rituals had become barriers to any spontaneous peer

interactions yet principals and teachers in the three schools were cautious about this change as they saw rituals as a characteristic of students with ASD. It was accepted that play and playing games were not easy for students with ASD but teaching the skills to enable this to happen were not considered.

The combined studies have shown that there are benefits for students with ASD who are nonverbal when they are not only provided with a functional communication mode but importantly with opportunities for choice-making. Seeking the students' preferred AAC option was at the heart of the study as it provided students, sometimes for the first time, with a measure of self-determination and control. Student voice and choice-making skills were modelled throughout both studies and helped educators and family members recognise and respond to their students' capabilities to express wants and needs. Together with technology, opportunities for choice-making provided the students in the study with a legacy of skills that will enable them to take the first steps to be included in the same world as their peers and where their partnership, protection and participation is valued.

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Appendix 1

Links between the Ingram-Troxell Playground Observation Behaviour Checklist , Behavioural Indicators and the Key Competencies of the New Zealand Curriculum

| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Ingram-Troxell Playground Observation Behaviour Checklist (2007) Original wording. | Key Competencies and Behavioural Indicators Through Play (L. Couper, 2011) | Key Competencies Capabilities for living and lifelong learning. Key words from NZ Curriculum (2007) | |
| Engages in social play with peers <i>The child actively seeks out other children and becomes involved in play with one or more children</i> | The Participant <i>Watches and learns from others Shows enjoyment in the environment</i> | Student A | <u>Participating and Contributing</u> Belonging, confident, contributing, connecting |
| Is not socially isolated from peers <i>Does not remove himself from others. Does not engage in solitary play most of the time</i> | The Participant <i>Can join in Seeks to be with others Plays or engages in playful activities</i> | | <u>Participating and Contributing</u> Belonging, confident, contributing, connecting |
| Respects boundaries and personal space <i>The child does not invade personal space e.g. touching others inappropriately, intrudes into other's play (walking through structured games).</i> | The Manager <i>Understands and follows rules Observes unwritten rules Makes choices</i> | N N | <u>Managing Self</u> Resilient, capable, can lead, can follow, independent |
| Does not exhibit socially inappropriate behaviour <i>The child does not exhibit socially inappropriate behaviours e.g. picking nose, touching genitals, mouthing objects, flapping hands, walking on toes, rocking or spinning repetitively</i> | The Communicator <i>Reads the body language of others Respects others Expresses needs or wants Uses socially acceptable behaviours</i> | N J J | <u>Using language, symbols and texts</u> Uses some mode of communication |
| Follows the rules of a game <i>The child can participate in a structured game or activity, follows rules, takes turns and keeps the score.</i> | The Co-operator <i>Takes turns Shares Adjusts to change Aware of needs of others</i> | J | <u>Relating to others</u> Shares, cooperative, appropriate behaviours. |

| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p>Responds to winning or losing <i>The child shows an awareness of winning or losing e.g. anger, congratulations, high fives, cheers, and shows joy or disappointment based on the outcome of the game.</i></p> | <p>The Manager <i>Copes with winning or losing Understands the outcomes of some activities or behaviours</i></p> | | <p><u>Managing Self</u> Resilient, capable, can lead, can follow ,independent</p> |
| <p>Initiates communication with peers <i>The child approaches another child and spontaneously speaks to the child , shows the child something or requests something from the child</i></p> | <p>The Communicator <i>Rehearses Attempts oral or any language skills with peers</i></p> | | <p><u>Using language, symbols and texts</u> Uses some mode of communication</p> |
| <p>Sustains a conversation with a peer <i>The child initiates a conversation with a peer and sustains the conversation by responding to what the peer says</i></p> | <p>The Communicator <i>Listens to others. Attempts to interact with others</i></p> | A | <p><u>Using language, symbols and texts</u> Uses written, oral, visual , physical, or technological modes of communication</p> |
| <p>Does not exhibit gross motor in-coordination <i>The child does not have difficulty with coordination , gait, or motor skills e.g. running, climbing, throwing, catching</i></p> | <p>The Manager <i>Managers self-care Self regulates emotions Shows body awareness Runs, throws, climbs, swims, bikes, scooters.</i></p> | N N A | <p><u>Managing Self</u> Resilient, can lead, can follow, independent, physically capable</p> |
| <p>Uses playground equipment functionally <i>The child uses playground equipment for the intended purpose e.g. swinging on a swing, sliding down a slide.</i></p> | <p>The Thinker <i>Practices effective thinking skills Flexible in thinking Finds another way</i></p> | A | <p><u>Thinking</u> Problem solves, accepts a challenge, curious, questions.</p> |

Appendix 2

Student and Parent Information and Consents

Contact Emails: llyween.couper@pg.canterbury.ac.nz

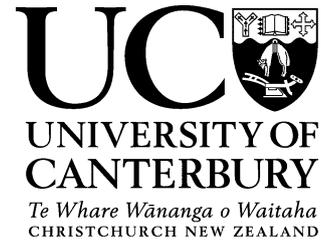
dean.sutherland@canterbury.ac.nz

anne.vanbysterveldt@canterbury.ac.nz

Telephones Llyween Couper: 0211707694

Dr Dean Sutherland 64 210690553

Dr. Anne van Bysterveldt: 03 3667001 ext.6056.



Project Title: The Playground Experiences of Students with Autism Spectrum Disorder

Information Sheet for the Boys in the Study

Dear Andrew, Nico and Jimmy,

There are two ways for us to find out what it is like for you when you are in the playground.

The first way
Looking

- We can look at what you do when you are in the playground.

The second way
Asking Questions

- You can use a sheet with pictures and others can also tell us what you like and don't like in the playground.

Dear Parents,

Please read this with your son and help him to understand what is happening in this study.

From the playground observations we will identify the social interactions and play activities happening as well as the communication methods used by your son and his class mates. When it is possible we will also gather information from your son using an adapted visual sheet.

In addition we expect that the semi-structured interviews of about 30 minutes with those closest to your son will help us gather another perspective about what is working or what needs to be changed in the playground. The results from this study are expected to provide information about how time in the playground is an important positive learning experience for your son.

If you are happy for this to happen then please ask your son to sign his name on the Consent Sheet or please sign on his behalf.

Thank you,

Llyween Couper

PhD Candidate Wheki 251

University of Canterbury

Phone (03) 3667001 Extension 6263

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Appendix 3

Visual Feedback Sheet

Name

Things I like to do in the school playground. *(Circle the happy or sad face)*

I like swinging



I like running



I like playing with a ball



I like to be with other children



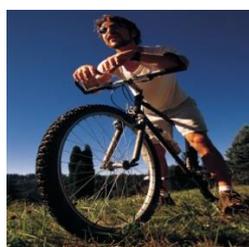
I like riding my scooter



I like sitting on the seats



I like riding my bike



I like looking at books



I like swimming



I like music and dancing



I like digging in the garden



I like eating my lunch



I like the Adventure Playground



I like playing with little cars and trains



I like to be on my own



Tell us about something else you like to do in your school playground.

I like to

A large, empty rounded rectangular box with a thin black border, intended for a student to write their answer to the question above.

Appendix 4



HUMAN ETHICS COMMITTEE
 Secretary, Lynda Griffioen
 Email: human-ethics@canterbury.ac.nz

Ref: 2013/11/ERHEC

15 April 2013

Llyween Couper
 School of Health Sciences
 UNIVERSITY OF CANTERBURY

Dear Llyween

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal "The playground experiences of three nonverbal children with autism spectrum disorders" has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 8 April 2013.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Nicola Surtees'.

Nicola Surtees
 Chair
 Educational Research Human Ethics Committee

"Please note that Ethical Approval and/or Clearance relates only to the ethical elements of the relationship between the researcher, research participants and other stakeholders. The granting of approval or clearance by the Ethical Clearance Committee should not be interpreted as comment on the methodology, legality, value or any other matters relating to this research."