What are the Considerations for Selection and Introduction of a Speech Generating Device for a Preschool Autistic Child in Aotearoa New Zealand?

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Abstract

A speech generating device (SGD) is a high-tech augmentative and alternative communication (AAC) system that supports communication by producing an electronic voice activated by the user. In recent years, advances in technology have enabled more SGDs to support people who cannot rely on speech alone to be heard and understood. Autistic children (Takiwātanga tamariki) may have speech that is unreliable, intermittent, or insufficient to communicate effectively and hence benefit from the use of SGDs.

Early intervention supports better language and social communication outcomes generally and is essential for autistic children to thrive. AAC is recommended as early as possible for those who may benefit and, hence, forms a crucial part of early intervention.

Selecting and introducing an SGD for a young autistic child requires consideration of many factors. There are models and frameworks to support AAC and SGD selection generally, but none specifically for autistic children or for Aotearoa New Zealand. This study aimed to gather information to support the potential development of a framework to support teams in the selection and introduction of SGDs for young autistic children in Aotearoa New Zealand.

This thesis describes a study with 19 participants from four groups: (1) Whānau of autistic children (people from the child's home environment), (2) educators, (3) speech-language therapists, and (4) those with a kaupapa Māori perspective.

Qualitative data was collected using interviews and focus groups. Resulting data was coded and organised into six themes with related subthemes: (1) Aotearoa New Zealand Considerations, (2) Autistic Child Considerations, (3) SGD System Considerations, (4) Whānau Considerations, (5) Team Considerations, and (6) Selection and Introduction Considerations.

The Bioecological Model is explained and used to present the findings. The study provides a range of considerations to support decision-making when selecting and introducing SGDs for preschool autistic children within Aotearoa New Zealand.

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Ms Rosanna Tilyard

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Introduction

Communication is vital. It is a developmental skill, a driver and reinforcer of culture and the promoter of social inclusion. When speech alone is not sufficient to be heard or understood, augmentative and alternative communication (AAC) may be used. AAC includes speech generating devices (SGDs) which are high-tech devices with voice output. In recent years, there have been rapid technological advances (Draffan & Banes, 2022), and this has supported more access to SGDs.

There are international indications that the incidence of autism may be rising (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022). In the USA, Shaw et al. (2023) reported that Autism Spectrum Disorder (ASD) occurred in 1 in 36 four-year-olds in 2020 and that this is 1.6 times the diagnosis rate seen in the same group in 2016.

Estimates vary, but approximately 25-30% of autistic children do not use speech or have less than 30 spoken words and are considered minimally verbal (Brignell et al, 2018). For those children for whom speech alone is not sufficient to be heard and understood, AAC may be introduced. SGDs are a high-tech form of AAC which may be selected as part of augmenting children's multimodal communication (Sterrett et al., 2023).

In Aotearoa New Zealand, public funding is available for purchase of SGDs following an assessment and application. SGDs may also be purchased through other funding sources including self-funding.

Early intervention leads to better outcomes for autistic children (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022). For some children an SGD may form part of their early intervention and ongoing support for communication. As most children In Aotearoa New Zealand spend time outside their home at 4-years-old (Morton et al., 2017), the context of intervention may include wider family or whānau and educational settings.

Aotearoa New Zealand is a country formed on a bi-cultural agreement, Te Tiriti o Waitangi (The Treaty of Waitangi, henceforth Te Tiriti), between the British and the indigenous Māori (Meechan & Brewer, 2021). It is a colonised country with approximately 40% of the population

belonging, at least in part, to a non-European culture. Nearly half of these people are Māori (Webb, 2020). It is a multi-lingual country that is rapidly changing.

There are also shifts in the ways that disability is constructed. Using a social model of disability, the impacts of social factors rather than individual impairments are often used to explain disability (Chapman, 2020). The neurodiversity movement describes the differences in the functioning of the brain as part of the variety that is present in humanity (Rensnick, 2023).

Aotearoa New Zealand is a country with unique and evolving characteristics, and the changing landscape of AAC, autism, technology, early intervention, and neurodiversity interpretation is occurring within this context. Although there are frameworks available to guide teams in selecting and introducing AAC, they typically originate overseas and consider a broad age range and wider population. This study aims to gather the experiences of those who use, select, and support SDGs with preschool autistic children.

The introduction begins with a positionality statement from the researcher. The research aim and thesis structure are introduced. The terminology used throughout the thesis are explained within an introduction to key elements of the research. Information regarding the scope of this thesis is described and followed by an introduction to selecting and introducing an SGD. Bronfenbrenner's Bioecological Model is introduced and used through the thesis.

Ko Wai Au? Who am I? A Positionality Statement

It is essential for a researcher to consider their personal perspectives, as they underpin the value systems on which the research stands. However, it is difficult to have a full understanding of these at any point in time as they are ever evolving (Braun & Clarke, 2022). To support the reader's understanding of my position in this research, I offer the statement below which reflects my understanding of my positionality.

I moved to Aotearoa New Zealand from the UK in 1999. Over the years, I am gradually coming to understand what it means to be a 'Kiwi'. I am tauiwi, tangata Tiriti, a non-Māori in Aotearoa New Zealand, and I was raised in Western values. As such I hold a privileged position within a colonised country. My journey to understanding the bi-cultural nature of Aotearoa New Zealand and, to adequately serve the multi-cultural community in which I work, is a continuing

journey. As a relatively small country, home-grown knowledge and written evidence is not always easy to find. Although international research is useful, it does not always fit neatly into the context of Aotearoa New Zealand.

I have an overriding inclusion philosophy that leads me to let people participate, at their level, with support, without prior assumptions. I am also female, and I often stand for the inclusion of women. I am familiar with neurodiversity from different viewpoints. Autism has been a part of my life since I can remember.

As a speech-language therapist (SLT), I work each day in early childhood education (ECE) settings with teachers who are striving to care for and educate young children. Autistic children and children who are considered neurodiverse, are present in every place that I visit. Most services have children who are not-yet using speech as their primary method of communication at an age where this would be considered typical.

The philosophies, practices and everyday work for those working in early childhood in Aotearoa New Zealand are qualitatively different than my experience in other countries. The systems of support also differ from international literature (Alliston, 2007). As an SLT, I strongly consider myself part of a team supporting young autistic children and my philosophy is to work in partnership.

My life has included AAC since I was a teenager. I have worked throughout the technology revolution of the last 20 years and all the changes this has brought. However, when I support the selection of AAC with young autistic children, I usually find myself with more questions than answers. Hence, this research was born.

Research Aim

This study aimed to explore the considerations for selection and introduction of SGDs with preschool autistic children Aotearoa New Zealand, informed by gathering information from a range of participants. The data gathered aimed to support the potential development of a framework to support teams in the selection and introduction of SGDs for young autistic children in Aotearoa New Zealand.

Thesis Structure

This introductory chapter introduces the terminology and topics within the thesis: Autistic children, augmentative and alternative communication (AAC), speech generating devices (SGDs), the concept of whānau and the Bioecological Model of Human Development, henceforth referred to as the 'Bioecological Model' (Bronfenbrenner & Morris, 2006).

Chapter Two provides information related to the study from current literature. The research is linked with the systems of the Bioecological Model. The Aotearoa New Zealand context is explained and linked to literature in the areas of AAC and autism. The current understanding of the communication skills of autistic children compared with those with neurotypical development are then outlined. The literature review then moves to describing key research relating to early intervention and the use of AAC in developing communication skills with preschool children. The organisation of SGDs is explained and literature supporting the preference for SGDs explored.

Autistic children are then located within their family and whānau contexts and the impacts of having a child with autism and/or using AAC are described from the literature. AAC use and supports for whānau of autistic children are highlighted. The team members supporting the child and their whānau are described and research supporting the influence of speech-language therapists, teaching teams, paraprofessionals and peers is included. Research related to wider impacting considerations, such as culture, are explained. The chapter concludes with information regarding Aotearoa New Zealand's funding systems and currently available models for selection and introduction of SGDs.

Chapter Three outlines the methods used for the current study. It begins by reminding the reader of the research aim before outlining the theories and rationales underpinning qualitative research and phenomenology and the use of interviews for data collection. The recruitment of participants is described. The question design and the Hui Process (Lacey et al., 2011), used for interviews and focus groups are described. The process of inductive thematic analysis and the actions taken to support trustworthiness in the research complete the chapter.

Chapter Four presents the results from the study using the six resulting themes and subthemes. Each section is introduced with a figure showing themes, subthemes and when further

breakdown is needed, codes. The themes are then described in detail using participant quotes to give authenticity and support the understanding of the reader.

Chapter Five begins by locating the results within the Bioecological Model. Each system within the model is then discussed with reference to the pertinent literature.

Chapter Six concludes the thesis. It begins by reminding the reader of the purpose, design and rationales underpinning the study. The limitations of the study are discussed with reference to derivation of the research question, participant aspects, limitations of method and of result interpretation. The chapter then moves to reiterating the supports taken to ensure quality of the research. The implications of the study for practice are considered. The researcher concludes with some final thoughts.

Terminology Use

The use of vocabulary and language can shape perceptions, perpetuate or reduce stigma (Han et al., 2022). Therefore, careful consideration is needed. In this research, terminology and descriptions have been sought from contemporary sources with some words and phrases chosen specifically. However, sometimes the terminology used reflects that used by the original authors or documents. This section begins with an explanation about the use of te reo Māori (Māori language). Explanation of the terminology then starts the introduction of the pertinent areas to the research including whānau, autistic individuals, preschool, people who cannot rely on speech alone to be heard and understood, augmentative and alternative communication (AAC) and speech generating devices (SGDs).

Kupu (Māori Words).

Where appropriate in the thesis, Māori words are used. They are typically presented, as in this title, with a bracketed interpretation of the word in English at first use. The interpretations are taken from the relevant cited literature or a participant explanation. If an interpretation was not sourced in this way, the Te Aka Māori Dictionary definition was consulted to support a definition (Moorfield, 2024). The exception to this is a whakataukī (proverb) offered by a participant where the explanation offered follows the whakataukī.

Whānau as a term

Whānau is a Māori term which may encompass a range of people with a similar purpose. It does not mean the same as the English word ‘family’. As child rearing diversity increases, the concept of a nuclear and extended family may not hold true in any culture (Lawson-Te Aho, 2010), and consideration to a group that are wider than parents may be needed. The term whānau is used in this study to encompass the people who support a young child’s development from a ‘home’ perspective, unless the literature being reviewed uses a specific term such as parents or family which cannot be correlated exactly. The term whānau is used to support inclusion of a bi-cultural view, but I acknowledge the cultural tension in using this term in this way.

Autistic Individuals

Reference to autism in literature varies and contemporary debate regarding nomenclature is ongoing. Buijsmann (2023) reports that culture and language may impact the preference of terms, and that identity first language may be preferred more by English speaking people. In Aotearoa New Zealand, the identity first language of ‘autistic person’ has been adopted in the newest edition of the Aotearoa New Zealand Autism Guideline: He Waka Huia Takiwātanga Rau: Third edition (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022) and therefore is used.

In keeping with the understanding that ‘words have power’, the term ‘Takiwātanga’ (one’s own time and space) was created to support the narrative of autistic individuals in te reo Māori (Māori language) (Opal, 2017). In keeping with Te Tiriti, this term is also used.

Autistic individuals are a group of people with a neurodevelopmental difference or condition which can be noted from an early age (Wang et al., 2017). The conceptualisation of autism has changed significantly since it was first considered as a diagnostic criteria in the 1940s (Vivanti, 2020). Currently, to be considered as autistic or having Autism Spectrum Disorder, an individual will have differences to neurotypical development (impairments) in the areas of social communication and restricted patterns of behaviour and interests (American Psychiatric Association, 2013). Many of these differences can be termed in neurodiverse affirming language such as ‘passions’ or ‘reactions to heightened sensitivities’ (Marsh & Heyworth, 2024). Autism is present from early

childhood, and this study is related to preschool autistic children. They usually belong in a whānau and often attend ECE.

Preschool

Young children in Aotearoa New Zealand usually attend a service offering early childhood education (ECE) (Morton et al., 2017). Children enter formal schooling between five and six years of age and, therefore an age description is problematic. The noun ‘preschool’ can also sometimes be used to describes a specific type of ECE setting. This is not its intended meaning here. In this study the term ‘preschool’ is used as an adjective to describe the period before compulsory schooling.

People who Cannot Rely on Speech Alone to be Heard and Understood

The use of terminology to describe “people who cannot rely on speech alone to be heard and understood” has evolved over time (CommunicationFIRST, 2023). This terminology, reported to be preferred by this group of individuals, will be used wherever possible. The terminology is not yet widespread in communication literature where references to complex communication needs and people with minimal speech are still common. Where necessary to refer to the literature with fidelity, these terms are quoted.

Augmentative and Alternative Communication (AAC)

The International Society of Augmentative and Alternative Communication (ISAAC) explains AAC as tools and strategies to provide and enhance effective multi-modal communication when speech alone is not sufficient to be heard and understood. (International Society for Augmentative & Alternative Communication, 2020). AAC includes unaided or aided systems with an increasing level of included technology. No-tech systems are unaided systems such as manual sign. Low-tech systems include written words, printed pictures, and communication boards or books. Examples of mid-tech systems include a single message button with an attached picture. High tech devices with communication apps are often known as speech generating devices (SGDs) (Battye 2017).

It is estimated that across the world there are 97 million people who may benefit from some kind of AAC (Beukelman & Light, 2020). For some, this will be a temporary situation, but for others they will require support to communicate throughout their lives. The population of people using

AAC is heterogenous (Beukelman & Light, 2020). However, for all people, being able to receive and express communication “is essential to participation” (Wegner, 2021, p.95) and inclusion. An AAC system can support inclusion but does not guarantee such (Wegner, 2021).

For more than 30 years, AAC has been considered an early strategy for children with a physical disability. For this group, communication needs were considered a lifelong impairment and access to AAC granted. Historically, other children who did not speak were often required to demonstrate prerequisite behaviours before AAC was considered (Cress & Marvin, 2003). Thinking has changed, and AAC systems have moved from being seen as a last resort, to being viewed as front line communication supports (Romski et al., 2015). With new technology and information sources, individuals and those who support them are now making decisions based upon information and tools that are widely available. In this way, they are changing the selection and introduction processes (AAC-The Rehabilitation Engineering Research Centre on Communication Enhancement, 2021; Caron, 2015). Traditional AAC assessments now need to evolve and support teams to utilise these (Ogletree et al., 2018).

Speech Generating Devices (SGDs)

An SGD is an electronic device which produces spoken language upon the activation by a user (American Speech-Language-Hearing Association, 2024). Although definitions vary, SGDs are always considered to be a high-tech version of AAC. SGDs have symbols and text that are linked to digitally synthesised speech. They usually also have the capacity for recording and playing recorded voice through digitised speech (Schlosser & Koul, 2015).

SGDs were first used with students with autism in the 1970s (Mirenda, 2009). The surge in technology in recent years has supported everyday technology such as tablet and mobile photos to become SGDs by using an AAC Application (app), and the voice output integrated in the app and underlying technology (Bourque & Goldstein, 2020; Gevarter et al., 2020). In the early 1990s, much consideration was given to synthesising voices and, over time, quality has improved greatly (Schlosser & Koul, 2015).

SGDs are durable in contrast to paper-based systems where materials may be damaged over time. The use of more mainstream technology supports community acceptance and increases

consumer voice in selection (Light & McNaughton, 2013) and they can be purchased in everyday retail environments (Caron, 2015).

SGDs also have disadvantages. Feasibility and practicalities may impact on their provision and use. Electronic systems are often more expensive than other AAC methods (Boesch et al., 2013; Lorah et al., 2015). Portability and weight can pose a challenge for those with a physical disability (Aydin & Diken, 2020) or young children.

Selecting and Introducing an SGD

In order to select an SGD, information is gathered and often SGDs are trialled before the selection decision is made. The device is therefore introduced to an autistic child, either whilst the selection is being considered, or as a result of the selection. The focus of this study is to consider the factors for selection and introduction of an SGD with a focus towards a future model to fill a gap which will be outlined through the literature review.

Many research articles refer to implementation or outcomes from use of an SGD or AAC system more generally. Although this would be the ultimate aim in selecting an SGD, implementation requires strategies, education, and actions to support the SGD's use. This is not within the scope of this study.

However, to trial an SGD there may need to be some initial support or training in its use. There will also be a consideration of its future use by the autistic child and their supporting team members (Webb 2019). I acknowledge this grey area between selecting and implementing a device with the word 'introduction'.

AAC Selection Models and Frameworks

Early work in system selection in AAC focused predominately on assessing the individual's skills (Light, 1989). Research and ways of thinking have progressed to considering both the individual and the places in which they communicate. Including the individual and family contributions (Caron, 2015; Mitchell & Alvares, 2015) and other supporting team members (Chung & Stoner, 2016) in selecting and introducing practices are now used. These changes are recognised in models such as SETT (Zabala, 2020) which includes both 'Student' (S) and Environmental (E) factors. The use of AAC to support participation within a user's communication

environment is recognised in models such as ‘The Participation Model’ (Beukelman & Mirenda, 2013).

As technology has progressed, models matching newer technology attributes with child characteristics, within cultural and contextual factors have been proposed (Murray et al., 2020; Webb et al., 2019). The models available are discussed in more depth in the literature review chapter. Some models and frameworks may be useful in Aotearoa New Zealand for supporting decision making but do not have specificity to this country or to autistic children.

Section Summary

This section has introduced some of the major topics and terminology related to the current study. The progression of models for selection have been described in their progression from individually focused toward including a wider range of influences. The next section focuses on supporting understanding of the wider considerations impacting the selection and use of an SGD using the Bioecological Model.

The Bioecological Model

In 1979, Bronfenbrenner wrote a seminal work introducing ‘Ecological systems Theory’. This was later amended by himself and partner to the ‘Bioecological Model’ of human development. At the time it was written, this model was a revolutionary shift from a focus on individual needs (O'Toole & Halpenny, 2023), to a broader conceptualisation that acknowledges other important influences.

The Bioecological Model proposes that development of an individual, in this case an autistic child, occurs within the influence of society, systems and policies. The interplay of relationships and the contexts in which they live are also included. It proposes a nested model of concentric circles with an individual at the centre.

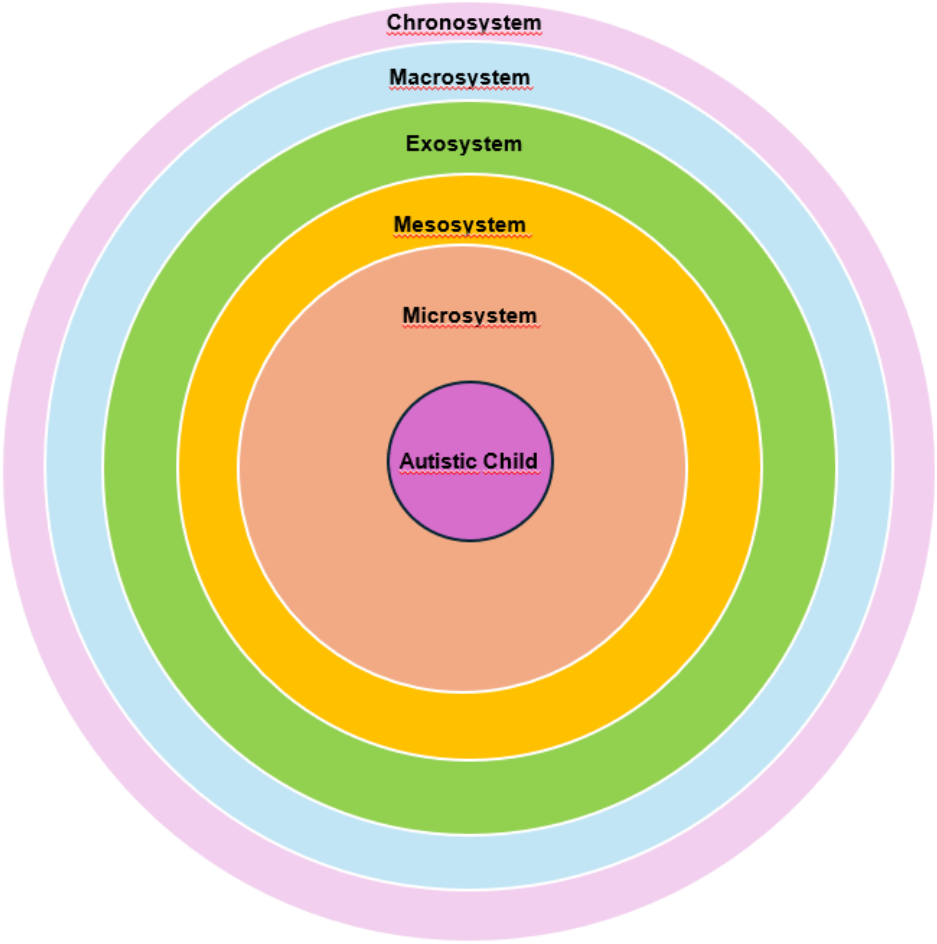
There are different representations of the model. Figure 1 shows a representation of the Bioecological Model based on a model from Guy-Evans (2024) and is adapted to include the autistic child in the centre, to locate the model specifically in this research.

Bronfenbrenner (1979) introduced the systems nomenclature for these concentric circles. At the centre is the individual, the autistic child. The autistic child is directly influenced by

relationships with family, whānau and regular interactions such as teachers or supporting professionals. The next circle, Microsystem(s). includes those places and people in the which the individual lives. These Microsystems interact and influence each other within the Mesosystem (Hayes et al., 2022).

Figure 1

The Bioecological Model [Adapted from Guy-Evans (2024)]



Moving outwards, the Exosystem includes factors such as support networks for the Microsystem. Finally, the Macrosystem influences all through the cultural and political climate and policy. Bronfenbrenner later added the Chronosystem, which refers to the passage of time, to acknowledge changing influences (O'Toole & Halpenny, 2023). Another key feature of the model is the networks and relationships between the systems which overlap and influence each other (Neal & Neal, 2013).

The Bioecological Model has been applied to research into AAC. Using the concept of an individual at the centre of interwoven systems of influence, Biggs and Hacker (2021) employed Bronfenbrenner's model to consider interventions and outcomes using AAC. Mandak et al. (2017) also drew from Bronfenbrenner's model to propose a model in which family systems theories interact within the family of a child who could benefit from AAC. Although similar in structure, the model used by Mandak et al. (2017) included the Mesosystem within the nested circles, rather than as an interplay between systems as used by Biggs and Hacker (2021).

The Bioecological model itself is embedded in curriculum development in Aotearoa New Zealand through Te Whāriki (Ministry of Education, 2017). This supports its use in this research located in the preschool years in Aotearoa New Zealand.

Resources in the Bioecological Model

Biggs and Hacker (2021) and Mandak et al. (2017) discussed application of the model to interventions and services for children with AAC. This current research is linked to decision making for a tool, in the form of an SGD, to support the individual's development. The use of this model could be questioned in relation to selection and introduction of SGDs. I argue the use of the model from three different perspectives: the SGD as an 'asset', other research using this model in relation to technology, and the impact of communication within the model.

Resources within the Bioecological Model are 'liabilities and assets' which influence interactions with systems (Bronfenbrenner & Morris, 2006, p. 812). The provision of an SGD can be considered a tool or asset to support an individual's development and therefore the decisions surrounding it are subject to different levels of influence as described in this model.

Technology impacts children's development at all systems levels. O'Toole and Halpenny (2023) discuss the considerations of technology within the model. Although wider influences such as the internet are primarily addressed, this research considers the use of technology by an individual.

Finally, communication is strongly linked with interpersonal interaction. Policy and cultural influences are disseminated in the Macrosystem through communication. Within the Microsystems,

children are impacted by whānau and educators through communication. Communication in all forms is integral to the model.

Summary

This chapter has introduced the thesis. It has introduced the researcher, the aim of the research and the thesis structure. The terminology and related topics to the research have been described and further details of the relevant literature will be included in the next chapter. The progression of underpinning research and models to support selection and introduction of SGDs have been included and will be elaborated upon later. Finally, this chapter concludes by introducing the Bioecological Model which will be utilised throughout the thesis.

Literature Review

Employing the Bioecological Model as a conceptual framework, this chapter explores literature relevant to selecting and introducing a speech generating device (SGD) for an autistic child in Aotearoa New Zealand. While the literature might be best presented within the Bioecological Model moving logically from inner systems towards outer systems, this is not feasible. For example, in order to understand the literature about early intervention to support communication skills of the autistic child, the reader first has to understand the communication profiles of autistic children and that early intervention is required. To support the reader to locate the literature in the Bioecological Model, the relevant system label is used in section titles.

The chapter begins with setting the context for Aotearoa New Zealand by explaining its Macrosystem. Elements of the Macrosystem including the population and languages spoken are described. The Early Childhood Education (ECE) system is explained to support an understanding of the context for preschool children's education. The autistic population of Aotearoa New Zealand is then introduced. The Macrosystem is further explored culturally, and bilingual and multilingual individuals introduced. Autism as a culture is introduced to conclude the Macrostructure section.

The chapter then moves to the innermost system of the Bioecological Model and describes the literature regarding communication development in neurotypical preschool children. This is followed by a review of the literature pertaining to autistic children's communication skills. Echolalia and the debate regarding gestalt language learning is explained.

Moving into the topic of intervention to support autistic children, the literature underpinning early intervention is described and related to autistic children. Augmentative and alternative communication (AAC) and early intervention is considered.

The literature supporting the role of AAC in developing communication skills is first explored. The consideration of the age of the child when selecting AAC and SGDs is explained, and this section concludes with a detailed description of the different types of SGD systems.

Moving outward, the Microsystems of families and whānau are explored with reference to families and whānau in Aotearoa New Zealand and the impact of having an autistic child on whānau. AAC use by whānau is explored and known impacts of AAC stated. The section on family

and whānau concludes by considering the role of the whānau in selecting and introducing AAC. It then considers literature about supports to whānau.

The team supporting a whānau is introduced and the literature concerning key team members: speech-language therapists, teaching teams, paraprofessionals and peers are introduced. The section on teams concludes by introducing elements of teamwork in the Mesosystem.

Within the Exosystem, wider considerations including educational policy in Aotearoa New Zealand and the literature around screen time are explored. The literature presented within the Bioecological Model finishes with the Chronosystem and the considerations of SGDs across the lifespan. Finally in this chapter, models and frameworks for selecting and introducing an SGDs are described and their relevance to autistic children is explained.

The Macrosystem of Aotearoa New Zealand

Odom et al. (2004) describe the Macrosystem within the Bioecological Model as the broader cultural influences. For example, in their research about the inclusion of autistic children in preschools, they found that educators noted factors related to policy, advances in technology and societal and cultural factors within the Macrosystem.

Aotearoa New Zealand is a country of 5 million people. Its indigenous people are Māori and Māori iwi (tribes) and hapū (subtribes) make up 17% of the total population (Statistics New Zealand, 2020). The country is more diverse than many people assume, with many residents born outside of the country (Webb, 2020). The largest ethnic group identify as European (70%) with 16% Asian and 8% Pasifika. Many New Zealanders identify within more than one of the groups (Statistics New Zealand, 2020).

Te Tiriti o Waitangi was signed in 1840 and established a “bicultural relationship between Māori and the British Crown” (Meechan & Brewer, 2021, p. 339). Aotearoa New Zealand is a colonised country, and the impacts of ongoing colonisation have led to inequities in many areas including healthcare and education (Zambas & Wright, 2016). Māori have been disadvantaged in many ways including socially and economically as a result of colonisation. This has led to impacts such as lowered life expectancy and income (Hobbs et al., 2019).

In the ‘Growing up in New Zealand study’, Morton et al. (2017) reported children in Aotearoa New Zealand are often living in poverty with 28% considered in this category. Data from 2022 showed this percentage remained similar, with Māori, Pacific and disabled children more likely to live in poverty. Approximately a third in each group fall in this category (Stats NZ: Tatauranga Aotearoa, 2023).

Languages Spoken

Although more than 150 languages are spoken in Aotearoa New Zealand (Webb, 2020), there are three official languages: English, te reo Māori and New Zealand Sign Language. English is widely spoken, and Morton et al. (2017) found that nearly all four-year-olds in their study of more than 4,500 participants could speak English. Te Reo Māori is the next most frequently spoken language with 4% of adults able to use the language conversationally (Ministry of Social Development, 2016b). Interestingly, 10% of four year olds were able to speak Te Reo Māori in 2017 (Morton et al., 2017) and the population of people who can speak te reo Māori at a higher level than a “few phrases” has risen 6% in the period 2018 – 2021 (Stats NZ: Tatauranga Aotearoa, 2022). Samoan, Tongan, Hindi, Northern Chinese (including Mandarin) are the next most prominent languages (Morton et al., 2017).

Māori words or kupu are widely used in Aotearoa New Zealand English with approximately nine per thousand of this origin in the year 2000 (Macalister, 2006). Recent reports of kupu used in the media shows a surge in everyday incorporation of the language (Lester, 2022).

Early Childhood Education (ECE) in Aotearoa New Zealand

By the age of by the age of four, 97% of children in Aotearoa New Zealand spend time with people other than their parent. This is typically in ECE services or organised home-based care (Morton et al., 2017), led by teachers or parent or whānau (Tupou et al., 2023). ECE services may be accessed until a child enters school when aged between 5 and 6 years of age. The national early childhood curriculum Te Whāriki is followed within all ECE but itself is a compound of two curricular, one with a Kaupapa Māori focus based upon the same framework (Ministry of Education, 2017).

Autistic People Living in Aotearoa New Zealand

There is no national prevalence data for diagnosis of Autism Spectrum Disorder (ASD) within Aotearoa New Zealand. However, using international prevalence data, it is estimated the autistic population nears 93,000 people (Neurological Foundation, 2019). Diagnosis for younger children is usually supported by child development teams (Thabrew & Eggleston, 2018) and a diagnosis of “Global Developmental Delay” is often given as an initial diagnosis (Bowden et al., 2020).

In their study, Bowden et al. (2020), using linked data sets, found ASD was more commonly diagnosed in individuals of European ethnicity than in Māori and Pasifika populations. Gender differences reflected international data showing much higher rates of males. Urban areas had higher identification rates than rural areas.

In 1998, the Government commissioned a review of autism services known as the ‘Curry Report’. This heralded the publication of the New Zealand Autism Spectrum Disorder Guideline in 2008. Through a living guideline process, this is now in its third iteration (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022).

Within a wave of international movements towards social and educational inclusion (Verma, 2016), strategies and initiatives in Aotearoa New Zealand align in this way. The New Zealand Disability Strategy 2016 – 2026 has a vision for the country to be “a place where disabled people have equal opportunities to achieve their goals and aspirations” (Ministry of Social Development, 2016a, p. 6). Alongside this strategy, the Enabling Good Lives (EGL) initiative has supported a shift towards giving disabled people more control over their lives and the services they receive (Enabling Good Lives, 2024). The Principles of EGL are self-determination, beginning early, person-centred, ordinary life outcomes, mainstream first, mana enhancing (enhancing prestige, authority, power, spiritual force), easy to use and relationship building. It is within this wider social context that this research is situated.

Macrosystem: Culture and AAC

The use of AAC is highly entwined with cultural perspectives and occurs within a socio-cultural environment (Ripat & Woodgate, 2011). Ripat and Woodgate (2011) also explain the belief

and value system of a group as the ideational perspective of culture. These values then impact the actions and assigned meanings within everyday living. The use of assistive technology, which includes SGDs, is heavily underpinned by Western ideology in which independence and individual success are considered goals for an individual. Western culture still dominates in AAC research and very few studies have considered culture in AAC (Amery et al., 2022). As a tool for social construction and language, AAC may be the most highly culturally influenced technological device (Ripat & Woodgate, 2011).

The meaning of disability and diversity is formed culturally. This then underpins the extent that accessing support is accepted (Ripat & Woodgate, 2011). In cultures where disability is considered a family matter, accessing services, or tools such as SGDs, may draw unwanted attention (Parette et al., 2000). In their study Parette et al. (2000) found that for some parents, AAC drew attention to their child as having a disability within their cultural group. This, in turn, had an impact on the parents' wellbeing.

Cultural Leaning Theory suggests that children's learning takes place within the social world. The construct of the social world includes interactions, symbols and experiences (Stronach & Wetherby, 2017). Language is entwined in the construction of culture socially (Ripat & Woodgate, 2011). Therefore, language and communication not only serve to support learning of culture, but also support children to develop and live within it. Relating specifically to AAC, Huer (2000) found that AAC users varied in their perception of symbols used within systems depending on their cultural/ethnic group.

In Aotearoa New Zealand, Durie (2001) defined culture as "the ways members of a group understand each other and communicate that understanding" (p. 4). In Te Ao Māori (the Māori world), communication expectations and use of language are different than other cultures. For example, Neha et al. (2020) found that reminiscence is an integral part of interaction between Māori mothers and their tamariki (children) and is an important element of education for tamariki involved. They also proposed that some strategies to support communication development are used differently when compared to European culture.

Recognising that differences for tamariki takiwātanga (autistic children) are interpreted differently in Te Ao Māori, Tupou et al. (2023) found that educators may view the interests and uniqueness of the child as linked to a guardian or Atua (God). For example: Tangaroa, who is the Atua of the sea, may embrace a child who enjoys fish and sea creatures. Tamariki takiwātanga may also be viewed as able to link with the spiritual realm.

Culture may also underpin understanding of autism and the interventions chosen for family or whānau members. Mandell and Novak (2005) studied the influence of culture on decisions of families for their autistic children's interventions. They pointed out that culture may affect decisions because of associated links to socioeconomics or geography. The home activities among cultural groups are also different (McWayne et al., 2015). For instance, the oral narrative environment for Māori children creates a different and enriched oral environment compared with that for New Zealand European children (Neha et al., 2020; Reese et al., 2008). Neha et al. (2020) found that maternal reminiscence coupled with reading books were more indicative of early academic skill in Māori children. This difference in language and learning means that early learning may be less visible to Western-based educational systems. The types of language used and required in these varying language-based activities are important when considering SGDs to support communication.

Bilingual and Multilingual Individuals

Students from culturally and linguistically diverse backgrounds are now becoming a majority population worldwide (Kulkarni & Parmar, 2017), with bilingualism and multilingualism common. Davis et al. (2024) noted that more than 25% of autistic children may be within bilingual environments. In general, studies suggest that bilingual adults can speak both languages with their autistic children (Dai et al., 2018), and that autistic children can thrive in mono-lingual, bilingual and multilingual language environments (Hambly & Fombonne, 2012; Tupou et al., 2023).

Families of autistic children around the world worry about the impact of using two or more language, concerned that bilingualism will confuse their child and contribute to language delays. This is different to parents of neurotypical children (Hampton et al., 2017). Bevan-Brown (2004)

found some Māori whānau were concerned that speaking te reo Māori and English to their tamariki takiwātanga would have a detrimental impact.

When using an SGD, being multi-lingual requires that the language(s) are developed into a robust language system for use (Ward et al., 2023). Despite an increase in research in AAC systems in other languages in the last decade, access to systems other than English remains poor (Amery et al., 2022). There remains a lack of te reo Māori options in AAC (Collin-Stone, 2019).

Autism as a Culture

In 2004, Mesibov et al. (2004) described “Autism as a Culture’’. This view challenged the medical model, where the diagnosis is based on failing to meet the development of neurotypical children. A medical diagnosis may be viewed as exclusionary to wider society because of this premise. If autism is viewed as a culture, neurodivergent perspectives are considered, and it then becomes important to understand how this culture views AAC use.

In recent years, autistic adults have shared their experiences of using AAC and their use of AAC (usually SGDs) rather than speech in communication exchanges (Donaldson et al., 2021; Zisk & Dalton, 2019). Speech in autistic adults has been described in different ways than is expected in neurotypical adults. It can be intermittent, where a person can access speech at some times and not at others; unreliable, where speech does not match the meaning intended; or insufficient, where more is needed to fully communicate. In all of these situations, AAC is a useful tool (Zisk & Dalton, 2019). The choice to use AAC and the normalisation of AAC have been described by speaking autistic adults, who use AAC, as supportive strategies to communication (Donaldson et al., 2021).

Section Summary

This section has explained the Macrostructure of Aotearoa New Zealand, its languages and culture. It has introduced autistic people and the cultural aspects of Aotearoa New Zealand and autism. Links to AAC and SGDs have been drawn where appropriate. The following section moves to the innermost system of the Bioecological Model to describe early communication development in neurotypical and autistic children.

Individuals: Children's Communication Development

The focus age for this research is the preschool years. Social communication differences are noted from an early age for autistic children. This section provides an overview of research related to social communication and how these skills develop in neurotypical children. The similarities and differences in development for autistic children are then outlined. The literature and debates around echolalia and gestalt language learning are explained.

Social communication is embedded within the domain of social interactions. The term social communication is used to separate the function of communication for relational and sharing purposes from those that request from or seek to change the behaviours of others (Bottema-Beutel, 2020; Bradshaw et al., 2021).

Social communication and social interaction involve a complex interaction developmentally and can be difficult to define into required or sequential skills (Bottema-Beutel, 2020). There is no universally agreed mechanism of social communication (Vivanti, 2020).

Early Social Communication Development in Neurotypical Children

As newborns, neurotypical children engage in imitation. This skill develops in the first two years and imitation of vocalisation, gesture, facial expression and with objects are all noted (Brien & Prelock, 2021). Imitation plays a role in communication development and linked closely with later expressive language skills. Imitation also serves to support early social communication (Rogers et al., 2003). In typical communication development, the emergence of prelinguistic skills such as gesture, vocalisation and facial expression pre-empt the rapid language development that comes in the second and third years of life (Bradshaw et al., 2021).

Attention is another crucial skill. Attention changes from dyadic interaction between the infant and caregiver to include an object or event through triadic attention (De Schuymer et al., 2011; Mundy et al., 2013). Attention skills support the move to relational aspects of communication (Crais & Ogletree, 2016).

Intentional communication in the pre-linguistic period rises rapidly from once per minute at 12 months, to five times per minute at 24 months (Crais & Ogletree, 2016). At some point, from around 10 months of age when children "demonstrate utility with preverbal behaviours" (Brien &

Prelock, 2021, p. 56), communication moves from pre-linguistic forms to using symbolic communication through word learning and expressive verbal words. At this early word level, a single expressed word is used to convey many functions of communication. For example, “no” might mean ‘I don’t want to’ or ‘stop it’ or ‘not that’.

From the beginning, language development is pointed towards increasing use of complex language to allow for discussion of abstract ideas with rich vocabulary use (Adamson et al., 2014). At five years of age, children can hold short conversations, answer questions and tell short stories (Zubler et al., 2022).

Autistic Children’s Early Communication Development

Atypical social communication is one of the two domains required for diagnosis of Autism Spectrum Disorder (American Psychiatric Association, 2013). In studies of social communication development, a different trajectory of skills in those who later receive an ASD diagnosis can sometimes be seen from an infant stage. Differences in skills such as gaze and attention patterns (Hamner & Vivanti, 2019), and others, such as imitation skills (Vivanti & Hamilton, 2014) and gestures are noted by a year of age (Watson et al., 2013).

Joint attention skills are highly predictive of receptive and expressive language skills in both neurotypical children (Slaughter & McConnell, 2003) and autistic children (Charman, 2003). Autistic children spend less time in joint interactions, and initiate and respond less than neurotypical peers (Bottema-Beutel, 2020).

Earlier studies on supports for communication development in autistic children focused largely on the skill of requesting (Pak et al., 2023). There are a multitude of studies in this area with many including the Picture Exchange System (PECS) (Bondy & Frost, 1998). There is now recognition that communication extends beyond communicating wants and needs. Supports are also required to develop other functions of communication such as communicating information and the development of social relationships (Margaret et al., 2014).

Speech in autistic individuals is often reported as delayed or atypical (Iverson & Wozniak, 2016). Estimates vary, but approximately 25-30% of autistic children do not use speech or, have less than 30 spoken words, and are considered minimally verbal (Brignell et al, 2018). We cannot

yet predict which individuals will continue to be a person who cannot rely on speech alone to be heard and understood. It is likely that there is no single underlying reason for not acquiring speech (Tager-Flusberg & Kasari, 2013).

Delayed or absent verbal communication does not discriminate autistic children from others with communication needs. Distinctive features of autistic children's communication include lack of attempt to compensate for speech difficulties with gestures or other forms of nonverbal communication (Vivanti, 2020). Although there is a distinct pattern of skills, Vivanti (2020) reports that the individual skill development in an autistic child follows the same sequences as neurotypical communication.

Echolalia and Natural Language Acquisition (NLA). Echolalia is the repetition of chunks of language. It been recognised in the development of many autistic children's language. Research, for example the work of Prizant and Rydell (1984), altered the perception of echolalia from non-functional to serving a wide range of functions. Understanding functional use of echolalia has developed into the term 'gestalt language development' or 'gestalt language processing' (Peters, 1983). Blanc et al. (2023) expanded previous descriptions to detail six stages of gestalt language development, terming it Natural Language Acquisition (NLA). Gestalt language development is often contrasted with analytical language development where single words are built to sentences. Most SGDs' vocabulary systems are set up with an analytical style of language development and modifications might be needed (Blanc et al., 2023). Gestalt language processing is controversial and aspects, such as the existence of stages in gestalt language development, contrast with other research on the communication development of autistic children (Beals, 2024).

Section Summary

In this section, the literature related to neurotypical and autistic children's communication development has been explored. The literature review now moves to explaining the theoretical underpinning of early intervention and the supporting literature related to intervening early for autistic children.

Macrostructure: Supporting Children through Early Intervention

Early intervention is supported by the theories of neural plasticity and supporting neural pathways for optimum outcomes in development (Rogers & Dawson, 2010). Early intervention enables caregivers to receive support early in their child's life and later issues may be prevented (Johnson et al., 2015). Early intervention is also cost effective when compared to later supports required if it is not provided (Pye et al., 2024).

Early Intervention and Autistic Children

Recent research has indicated that stable diagnoses of ASD are achievable by 14 months of age (Pierce et al., 2019). Truly early intervention is therefore achievable.

The importance of early intervention for autistic children was stated in the 2001 evidence-based report by the United States National Research Council (NRC) Committee on Educational Interventions for Children with Autism. Beukelman and Mirenda (2013) also emphasized that the critical element in AAC intervention with autistic children is to start early.

Starting early supports better language outcomes for autistic children (Vivanti, 2020) and supporting development of early communication can have positive effects in many other important areas of development (Brien & Prelock, 2021). It is known that functional language by the age of 5 years is associated with better life outcomes for autistic children (Tager-Flusberg & Kasari, 2013).

In intervening with autistic children, Vivanti (2020) espouses the influence of social neuroscience perspectives. These support shared experiences and social exchanges in which interactions can be learnt at early times of brain plasticity. Therefore, early intervention is optimum for social communication interventions (Bottema-Beutel, 2020), especially as an infant moves towards symbolic communication (Bradshaw et al, 2021). In practice, this can be difficult to achieve as autistic children spend less time in social play and have less variety of play activities (Charlop et al., 2018).

Section Summary

In this section, the theoretical background of early intervention has been described and the literature related to early intervention and autistic children explored. In the following section, the

literature review moves to considering AAC and SGDs at an early age. It includes the role of AAC in developing children's language and the role of the child's age and preference.

Augmentative and Alternative Communication (AAC)

AAC is a suite of tools and strategies that support effective communication for people who cannot rely on speech alone to be heard and understood. Speech generating devices (SGDs) are high-tech devices with voice output and are one form of AAC. Literature in this section refers to AAC generally or SGDs specifically and this terminology is used to support the reader.

This study is focused on SGDs for preschool autistic children. SGDs have been introduced in the introduction chapter briefly. However, to support a more in-depth understanding, this section begins with a more detailed description of SGDs. It then explores AAC and early intervention. Considerations regarding the age and preference of children in selecting SGDs concludes this section.

Speech Generating Devices

The communication software or Application (app) installed on an SGD is usually based within one of three types of organisational system: literacy based, visual scene display (VSD), or grid based. In their recent systematic review of mobile AAC technology (SGDs) with autistic individuals, Lorah et al. (2024) reported most were utilising some form of grid based system. Gevarter et al. (2020) found that both VSD and grid displays may be suitable options for young autistic children.

Literacy based systems require the individual to use their knowledge of letters and conventional spelling skills to generate a message which is then spoken. This organisational system is not elaborated here as the focus is on young autistic children who have not yet accessed formal literacy education.

VSDs can be used on SGDs to embed messages within photographs, scenes or videos Some researchers have noted that the contextualisation of communication may be particularly useful for young autistic children (Shane et al., 2012). Social communication benefits are also reported when images of people are used in VSDs (Gevarter et al., 2020).

A grid-based display utilises rows and columns with a symbol, icon or picture representing the word or message spoken (Thistle & Wilkinson, 2015). Most grid-based designs include dynamic screen utilisation so that when an individual activates the screen, the screen will change automatically to display different symbols. Grid based systems include access to language through multileveled screen changes. Language access may be supported through language prediction, or by semantic compaction, wherein icon sequences denote a specific item. Vocabulary may be organised in categories (also termed schema or taxonomies), and/or syntax based groups or alphabetically (Bornman et al., 2024).

Some systems are based within the principles of motor planning which stresses consistency of location of symbols. The Language Acquisition through Motor Planning (LAMP). intervention approach uses this as one of its core components (The Center for AAC & Autism, n.d.). Studies have found that consistent locations support speed of access (Thistle et al., 2018). There is some emerging research for this approach being supportive for autistic children (Naguib Bedwani et al., 2015; Thistle et al., 2018).

Supports like colour coding and hierarchical displays, which allow a user to start on a simplified version of a larger system, may support SGD introduction and ongoing use (Tönsing et al., 2024). The size, number of symbols per page and spacing may also be important in layout options (Lund et al., 2021). Caron et al. (2017) state that simplifying the programming for those undertaking this task can increase use of the SGD.

Webb et al. (2019) correlated participants rankings of the characteristics of SGDs in relation to children. They found that the language package was the most important reported characteristic of SGDs. The layout consistency, ease of customisation, and vocabulary organisation were also highly important. A range of other practicalities were also found to be important in selection of SGDs for children. These included durability, portability and access considerations. Cost, voice and appearance factors were ranked as the least important factors related specifically to the SGD itself.

AAC and Early Intervention

In their meta-analysis of the literature of AAC and early intervention, Romski et al. (2015) considered studies which were largely single case design, across a range of users and over a 30

year span. They found the literature supported the use of AAC to enhance single words and vocabulary development, and multiword utterances. AAC use was also found to increase initiation and parent-child communication. “It is clear that AAC use with infants and toddlers can be a critical component in early intervention” (Branson & Demchak, 2009, p. 275). Faldt et al. (2020) later advised that AAC is recommended as early as possible for individuals that could benefit.

Griffen et al. (2024) found that introducing SGDs whilst promoting existing forms of communication supported language development. However, for a variety of reasons, including attitudinal and knowledge barriers (Meadows, 2018) and availability and training requirements (Gohsman & Johnson, 2023), SGDs are often not available to preschoolers. They are often introduced to low tech or simpler systems before SGDs (Binger & Light, 2006; Meadows, 2018). Gevarter et al. (2020) propose a detrimental effect on using SGDs as a result.

Role of AAC in Developing Communication Skills

Ganz et al. (2023) conducted a meta-analysis of characteristics which predicted outcomes for autistic individuals and/or those with an intellectual disability, who were school age and using AAC. Although specificity was an issue in literature included, they concluded that AAC interventions were effective whatever the individual characteristics and previous experiences. However, the variability in success was signalled for future research.

Several studies have found that preschool children with limited spoken language skills become verbal from exposure to AAC, including PECS (Sulzer-Azaroff et al., 2009), and SGDs (Walters et al., 2021). In their study Walters et al. (2021) found that toddlers who received interventions including SGDs gained a larger vocabulary than those who received a ‘standard’ approach. In a recent study, interventions with SGD use were found to support social communication and expressive language (Weili et al., 2024). Research has also indicated that older children can also make good progress using SGDs (Syriopoulou-Delli & Eleni, 2021).

Despite these outcomes, using AAC with children in the pre-linguistic stage of language development continues to be problematic (Chavers et al., 2021; Snodgrass et al., 2024). There is a need for further research in supporting social communication needs through AAC (Chavers et al., 2021). Beukelman and Mirenda (2013), citing work by Rogers and Dawson (2010) among others,

warn against formal language-based AAC without first building a range of social communications skills such as joint attention.

As social communication needs are part of autistic people's communication profiles, these findings are significant. Studies indicate that it could be possible to support social communication using AAC (Logan et al., 2022). However, the need for increasing generalisation and maintenance programming to ensure longer lasting effects of AAC use is also highlighted (Crowe et al., 2022).

Consideration of Child's Age in AAC and SGD Selection

The age of the individual receiving AAC is often considered in the selection process (Lynch et al., 2019). However, age as a predictor of successful use of an SGD has been questioned (Ganz et al., 2017). Some researchers have noted more success using AAC with autistic children who are older (Sievers et al., 2018), and some have found better success with preschoolers (Ganz et al., 2014). In their latest analysis of research of autistic children and those with intellectual delay, Ganz et al. (2023) concluded that support must start as early as possible for autistic children and intellectual delays, without denying AAC to older individuals.

Autistic Children's Preference for SGDs

Motivation and independence are fundamental to the progression of a child's communication ability (Koegel et al., 2012). Chapin et al. (2022) highlighted the motivational factor of SGDs infused with video content, rather than static images, to support more communicative turns. Lynch et al. (2019) highlighted the 'child's choice' considerations are important for SGD selection. In their meta-analysis of older children (mean age of 7 years), Elizabeth Lorah et al. (2021) found that 84% (n=31) of autistic individuals preferred to use a high-tech SGD over paper-based or lower technology systems.

Section Summary

In this section, SGDs have been examined in further detail as a tool to support communication. AAC and early intervention has been explored. The literature regarding the age of selection of SGDs and preference of the child for SGDs has been noted. In the following section, the literature review moves to summarising research related to families and whānau of autistic children and those using SGDs.

Microsystem: Families and Whānau

In selecting an SGD, Lynch et al. (2019) elaborated on previous findings from the United Kingdom. They found that selection decisions included considerations of the child and the features of the device. The decisions made were also informed by cultural and contextual factors. Cultural factors have been explored in a previous section. The following section now reviews contextual factors beginning with the families and whānau Microsystem. Whānau is used to refer to people in the 'home' environment.

Autistic Children and their Whānau

Autistic children are usually part of a family or whānau. There are positive and negative effects perceived by members of the whānau in having an autistic child (Hamama, 2024). Similarly, there are challenges in being a parent of a child who uses AAC (Fjeldvang et al., 2023). These effects influence the role of a family or whānau in selecting and introducing an SGD.

The next section introduces families in Aotearoa New Zealand. It talks about how communication at home with whānau is different than in other relationships, and introduces the impacts of autistic children and use of AAC on the whānau. The subject of supporting whānau is introduced to lead into the literature about teams.

Families and Whānau in Aotearoa New Zealand

In the 'Growing up in New Zealand' report, Morton et al. (2017) found that the two-parent family structure is most commonly found in Aotearoa New Zealand. When compared with other groups, Māori families had a higher proportion of one-parent families. Extended families were more common in Māori, Pasifika and Asian families than European families. Pasifika families and communities, although varied in composition, often include grandparents, aunties, uncles and cousins as part of everyday family (vĀsifika Our autism journeys, 2023). However, there is no formal research to date that addresses issues of autistic people in a Pacific population (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022).

Internationally, literature implies complex factors which impact on how families are involved in the upbringing of children (Bailey et al., 2006), and there are many different constructions of a

family or whānau (Marshall & Goldbart, 2008). Each requires and desires different supports and solutions (Mitchell & Alvares, 2015).

Impacts of an Autistic Child on Whānau

The functioning of a family or whānau is critical in an autistic child 'doing well' (Szatmari et al., 2021).The impact of an autistic child upon parents and whānau can be significant, and the experience different for each person (Hamama, 2024).

There are positives of having an autistic child, such as increased empathy for all whānau members and increasing roles and skills in siblings (Hamama, 2024).

There can be negative impacts too. Ennis-Cole (2019) described the challenges families can face and how they may become overloaded as a result. Everyday routines such as sleep, eating, challenges from their child's behaviour as well as the perceptions of others, financial difficulties, and a lack of support contribute to the stress felt. Capacities and stress can impact whānau ability to be involved in supporting their autistic child (Vasilopoulou & Nisbet, 2016).

Parental involvement in intervention for autistic children is usual, and many studies link to an early diagnosis being paramount to accessing services and outcomes (Musetti et al., 2021). Gaining and receiving a diagnosis of autism for a child has emotional impacts upon a family (Makino et al., 2021). The diagnosis is linked to gaining targeted supports, but the label of autism has stigmatisations that are different to other developmental labels (Okoye et al., 2023). In Aotearoa New Zealand, a diagnosis of ASD is often significantly delayed and this is variable across the country (Bowden et al., 2020). There is also variable practice in following best practice standards and parents have expressed dissatisfaction in processes (Taylor et al., 2021).

Family and Whānau AAC Use

Research across different populations indicates that children's AAC use at home is qualitatively different to its use in other contexts (Caron, 2015). Doak (2021) reports that, as children often have access to most areas and items at home, effective communication is often achieved with interpretation of non-symbolic communication. In this situation, AAC is often viewed as inefficient (Johnston et al., 2020).

AAC Impacts on a Family or Whānau. Although families can identify opportunities for communication in the home (Mercurio-Standridge, 2014), there can be resistance to implementing AAC in home environments (Lynch et al., 2019). Moorcroft et al. (2021) found that many parents who had abandoned an AAC system for their child were often not satisfied with the system selected. Using AAC at home changes family routines (Ripat & Woodgate, 2011), is an additional task for the family (Moorcroft et al., 2021) and increases responsibilities (Delarosa et al., 2012).

Parents have reported that the demands of family life are often a barrier to implementation of an SGD (O'Neill & Wilkinson, 2020). Although the technology used in SGDs is becoming more mainstream, an SGD often requires parents to have a high technical ability (Anderson et al., 2014). The learning involved, the technology maintenance and SGD reliability may also lead to potential abandonment (Delarosa et al., 2012).

This impacts of AAC on families are considered so important that the the Family Impact of Assistive Technology Scale for AAC (FIATS-AAC) was developed (Delarosa et al., 2012; Ryan et al., 2018). This tool supports assessment of the impact of AAC with child factors such as self-reliance and social versatility, and parental factors such as supervision, family role and caregiver relief considered.

Selecting AAC: Families and Whānau. Families and whānau are integral to selecting and using AAC (Angelo, 2000). Mitchell and Alvares (2015) found that extended family members wanted to be included in the selection of the child's AAC system.

Families of children using AAC are often experts on their child's communication. Marshall and Goldbart (2008) found that parents could talk knowledgeably about many areas of their child's communication and their personalities. Senner (2011) found that parents have in depth knowledge of the pragmatic skills of their teenagers who use AAC. This may be particularly pertinent for autistic children who may have communication development which is different than neurotypical development.

In their research, Moorcroft et al. (2021) found that families' involvement in AAC selection and implementation correlated with parents' emotional readiness to use AAC. Families may be concerned that AAC will be relied upon, or will not allow speech to develop (Johnston et al., 2020).

Therefore, there may be a timing consideration for selection and introduction of an SGD that is dependent on family acceptance and 'readiness' (Moorcroft et al., 2019).

Supports for Whānau using AAC

Supporting families and whānau is viewed as a critical part of success when introducing AAC and for ongoing use. In the early 2000s, the lack of family-centred practice by SLTs was highlighted (Mandak et al., 2017). Although family centred practice has increased in recent years, there is no research that specifically evaluates the effects of family centred practice on AAC use (Mandak & Light, 2018). Most SLTs agree on the importance of working in this way (Mandak & Light, 2018), and many are dedicated to partnering with families (Biggs et al., 2024).

The delivery of culturally appropriate family focused services can be difficult however. Despite good intention and relationships there continues to be a need to increase family centred practices in AAC (Biggs et al., 2024).

Mandak et al. (2017) identified a lack of knowledge and skills to implement AAC family-centred services effectively as a barrier. Parents' feel that professionals need to understand and respond to the realities of family life (O'Neill & Wilkinson, 2020) and often rate family centred practice more negatively than the professionals involved (Mandak & Light, 2018).

Lack of time and resources, especially in initial stages of AAC introduction may hinder support (Moorcroft et al., 2019). In Anderson et al. (2014), Australian parents using SGDs with their children requested support in technical areas such as customisation, and the use of interaction and aided language techniques.

Section Summary

This section has summarised the literature about families and whānau who live in Aotearoa New Zealand and the related impacts of having an autistic child. The role of whānau in selecting and introducing AAC has also been explored. The section has finished with discussion of the supports needed for whānau. The following section continues with literature related to those who support whānau with autistic children and with AAC.

Microsystems and Wider Systems: Teams

In the early years, autistic children and their whānau may have a number of different team members who support them. These include parents, whānau members, teachers, other professional and supports to the whānau. Some may be directly within their Microsystems of everyday interactions, for example, teachers or peers. Some may be located within wider systems. For example, a social worker who provides family support may fall within the Exosystem. This section introduces some of the team members that may typically be involved in a team selecting and introducing an SGD.

Speech-language Therapists (SLTs)

The team supporting an autistic child typically includes an SLT as the professional with knowledge of supporting communication skills (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022). The Aotearoa New Zealand Scope of practice for SLTs also includes the selection and establishment of an AAC system (New Zealand Speech-language Therapists' Association, 2012).

Within Aotearoa New Zealand, SLTs are employed within different organisations positioned in the private, education, health and disability sectors. SLTs provide support within various systems of the Bioecological Model. For example, they may work as staff members within an educational context directly supporting an autistic child (forming part of this Microsystem). They may support and advise the educational Microsystem or provide AAC within the Exosystem. Most research regarding AAC assumes SLT inclusion and places them within supports to Microsystems.

Binger et al. (2012) describes the SLT role in selection of AAC devices, placing them in guiding, facilitating, and supporting roles. In the United States, the lack of information and the perceived knowledge of SLTs are recognised as barriers to SLTs working in AAC. Factors related to their employing organisations such as time, management support and lack of funding, can also contribute to barriers (Gohsman & Johnson, 2023). The perceptions of school-based SLTs in implementing AAC in Aotearoa New Zealand revealed many of the same factors were considered as difficulties (Arriola-Bagayas, 2021). Despite the difficulties encountered, Donaldson et al. (2023)

champions the position that SLTs have a responsibility to provide access to AAC for young autistic children in ECE.

Microsystem: Teaching Teams

A teaching team may involve a number of teachers and paraprofessionals in ECE contexts. Sun et al. (2020) advocate that the preschool environment is an ideal place for a child to learn to use AAC. However, there is little known about how to effectively support AAC in education (Quinn, Kurin, et al., 2023).

Communication is one of the strands of the New Zealand Early Childhood Curriculum Te Whāriki (Ministry of Education, 2017). This curriculum has recently been supported with the newly released Kōwhiti Whakapae online resources, designed to strengthen practice of early childhood teachers in key areas, including a focus on oral language and literacy. The use of multi-faceted communication including AAC is woven into the framework. It provides an expectation that educators will use AAC in everyday practice (Ministry of Education, 2024).

Teachers are critical to supporting autistic children. The experiences of autistic children in ECE are highly influenced by the knowledge and attitude of their teachers (Tupou et al., 2023), but they often have little say in intervention decision making for their students (Kasilingam et al., 2021).

Quinn, Kurin, et al. (2023) discuss the importance of increasing educators' motivation and buy-in to AAC. Reducing scepticism and debunking the perception that use of AAC reduces verbal speech for children are seen as key factors to adopting AAC (Quinn, Atkins, et al., 2023). Biggs and Hacker (2021) found that the skills, knowledge and confidence of teaching teams varied and that some felt they had no training, knowledge or skills in supporting AAC. Increasing training around AAC is often quoted as an important support for adoption and implementation (Andzik et al., 2019; Quinn, Kurin, et al., 2023).

Quinn, Atkins, et al. (2023) advocate for use of the Bioecological Model to support consideration of wider contextual factors to understand the barriers related to AAC introduction by educators. For example, Donato et al. (2018) found the time for educators to learn technical skills were a barrier in the use of AAC.

Microsystem: Paraprofessionals

Paraprofessionals, often named education support workers in Aotearoa New Zealand's ECE settings, may also be part of a teaching team and form part of the education Microsystem. Kasilingam et al. (2021), in their study of early intervention for autistic children, found that most parents in Aotearoa New Zealand reported paraprofessionals were part of the support provided. They concluded that further training should be considered for this group to enhance support. Douglas et al. (2013) found as little as two hours of coaching in using AAC with children could improve the strategies used by paraprofessionals.

Microsystem: Peers

Young children, as peers to an autistic child and/or a child with communication needs, provide the models and expertise in being a child within the Microsystem (Charlop et al., 2018). In this way, they are supports to participation (Biggs & Hacker, 2021). Peer mediated interventions may therefore be used to support interaction and participation (Katz & Girolametto, 2013). In their study with preschool peers, E Lorah et al. (2021) found that when shown an SGD and other low-tech systems, the neurotypical peers stated clear preference for the SGD. They were also found to understand their autistic peer better when SDGs were used.

Mesosystem: Teamwork

The Mesosystem relates to the interactions between different environments that are considered Microsystems. For a young autistic child, Microsystems may include different places of living, educational settings and other places where they spend time. In considering the Mesosystem for preschool children, the most commonly discussed interactions are between the Microsystems of home and educational placement (O'Toole & Halpenny, 2023).

Szatmari et al. (2021) found that collaboration provides optimum conditions to support autistic children. Working as a team also supports the inclusion of autistic children in education (Simón et al., 2023).

The need for information to be gathered from different parts of the team has been recognised since early models of AAC selection, including by Woltosz (1988). The need for parents to be involved in the team supporting the introduction of AAC is often mentioned (Marshall &

Goldbart, 2008) but families have often reported that they were not listened to in selection of AAC devices (Kim & Soto, 2024).

Quinn, Atkins, et al. (2023), in their study of ECE classrooms in the United States, found their participants viewed strong relationships across a team as vital to the introduction of AAC in general. However, teams have limited guidelines to support them in how to work together effectively to select and introduce AAC (Lynch et al., 2019; Webb et al., 2019). Practicalities such as time pressures also impact on effective collaboration (Quinn, Atkins, et al., 2023).

Section Summary

The section has described some of the key people in a preschool autistic child's team. It has focused on literature about SLTs, teaching teams including paraprofessionals, and peers. These people usually form part of the Microsystems of the child but can also be involved in wider influencing systems. This literature review now moves to wider considerations in the Exosystem and Chronosystem including educational policy, effects of screen time and planning for a child's future.

Exosystem: Wider Considerations

The Exosystem contains influences of settings that do not directly include the child, such as parental workplaces. Policies that influence a child's setting, and areas that impact the wellbeing and networking of adults in children's lives are represented in this system (O'Toole & Halpenny, 2023). In their study of ecological systems impacting on AAC users, Biggs and Hacker (2021) found that AAC access, support networks for parents and educators, and the school system were relevant factors in the Exosystem. The following section introduces some wider considerations in Aotearoa New Zealand including policy and screen time.

ECE System Policy in Aotearoa New Zealand

With ECE subsidises for 3 and 4-year-old children, and a policy focus of attendance in Aotearoa New Zealand, children of this age are often expected to attend ECE (Sudfelt, 2022) but this is not compulsory. Many autistic children attend ECE alongside their neurotypical peers (Tupou et al., 2023).

The ideology of the education system in Aotearoa New Zealand is inclusive education (Bevan-Brown, 2013), but international research suggests this does not always translate to inclusive practice (Haug, 2017). The (United Nations Educational Scientific and Cultural Organization, 2020) reports that children who are in the early stages of communication development continue globally to experience exclusion in education.

Screen Time

"There is little doubt that New Zealand children have greater availability to personal screen-based devices than ever before" (Stewart et al., 2019, p.5), but the provision of technology to preschool children is not without controversy. Internationally, guidelines have been introduced to suggest limiting screen time for young children due to concerns about the effects on their development (Hill et al., 2016). In Aotearoa New Zealand, a maximum of one hour per day is recommended for children aged 2 to 5 years (Ministry of Health, 2017). Children who had extensive screen time at 24 months were found to have detrimental health effects (Stewart et al., 2019).

Although obesity is often noted as a key health concern, poorer motor skills and higher propensity for hyperactivity are also found (Stewart et al 2019). Considering that Antshel et al. (2013) found that 31–95% of autistic children have "significant symptoms of inattention and/or hyperactivity/impulsivity" (p. 1118), this needs to be considered.

There is also research indicating "vulnerabilities in motor performance" in the preschool years for those 'at risk' of ASD (Focaroli et al., 2016). Mazurek and Wenstrup (2013) found that some autistic children's negative behaviour was linked with too much video game time.

Much of the early literature about screen time is linked to passive viewing of television, with researchers now considering other uses of screens (Ministry of Health, 2017; Stewart et al., 2019). However, there is no specific research linking SGDs into this body of literature. The Aotearoa New Zealand guidelines differentiate between educational and non-educational programming and exclude social connection through video chatting from their recommended times (Stewart et al. (2019). This exclusion points towards the use of technology for interactive purposes being considered in a different light than passive use and is of relevance to SGDs.

Madigan et al. (2020) noted that the development of verbal language is often used in screen time research as it is a marker of developmental risk. Boys are often reported to have lower language skills (Rinaldi et al., 2023). There are some concerns that boys may be more at risk from exposure to screens, especially at crucial early language learning levels (Madigan et al., 2020). As most diagnosed autistic children are boys (Maenner et al., 2020), this is a consideration of note.

In their meta-analysis, Madigan et al (2020) further explored the characteristics of screen time variables upon language development. They found that the effects on child language were varied, with co-viewing having a positive effect on language development, especially for boys. Educational content and especially programmes that label specifically and provide opportunities for the child to respond may be most beneficial.

King et al. (2014) note that having an educational professional guiding the use of technology greatly supports its functional use. In linking to this current research, an SGD could be argued as innately having educational content and certainly labels referents on the screen. Co-viewing and joint attention to the screen also occurs frequently.

Chronosystem: Future Planning

Snodgrass and Meadan (2018), in a longitudinal case study, found that teams required expert support across time not only to continue to support the individual's communication but also to consider changes needed to support. King et al. (2020) described how for one individual, both hardware and software was changed many times through his life. At times this individual used more than one software at a time in different locations. Lynch et al. (2019) found that in the United Kingdom, SGDs were sometimes selected on the forecasted need of the individual.

Section Summary

This section has focused upon the wider influences which impact the selection and introduction of AAC with a preschool autistic child. Issues related to educational policy, screen time and future planning for a child have been introduced. In the final section of the literature review, the process of selection of SGDs is described.

Selecting and Introducing an AAC system

The American Speech and Hearing Association (ASHA), states on its AAC introduction web page, that the 'bottom line' in choosing AAC aided systems "is a critical, discerning process that involves the ongoing consideration of multiple factors" (American Speech-Language-Hearing Association). In a mega-analysis of literature relating to children with intellectual and developmental disability, Crowe et al. (2022) found a continued need to build evidence for the decisions made in AAC. Initial assessment and trials may not be enough to support success with AAC and ongoing assessment is critical (American Speech-Language-Hearing Association, 2024)

In this section, assessment for selection and introductions of SGDs, and funding in Aotearoa New Zealand is introduced. The links between selection and successful implementation are explored. Finally, selection and introduction frameworks and models are introduced and linked to preschool autistic children and the Bioecological Model.

AAC Assessment and Funding in Aotearoa New Zealand

AAC equipment including SGDs are funded publicly through Whaikaha - Ministry of Disabled People or through the Accident Compensation Corporation (ACC). Public funding is available through assessment led by a suitably credentialled assessor.

In the early 2000s, in an effort to quantify the population requiring AAC, Sutherland et al. (2005) found that a rate of 0.15% of people 21 years and under could utilise AAC in Aotearoa New Zealand. In this study, those with ASD were the fourth most common group using AAC.

The Aotearoa New Zealand Autism Guidelines recommend that all autistic children have goals related to "spontaneous communication, socialisation and play" (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022, p. 26). AAC systems are recommended within the context of providing supportive access to modes of communication.

Selection of AAC is Integral to Implementation

Decision making in AAC is challenging (Smidt & Pebdani, 2023) and involves a multitude of factors. Provision of AAC, is in itself not enough to support communication (Ganz, 2015; Lorah, Holyfield, Miller et al., 2021). The selection of a device is necessarily wrapped up in its ongoing implementation (Loncke, 2019).

There are a range of issues identified with SGDs that may lead to them no longer being used. Technically, the reliability of high-tech systems has been found to be a factor in device abandonment (Baxter et al., 2012; Waller, 2019). Smidt and Pebdani (2023) discuss several factors linked to SGDs that may impact their use. These include the time required for constructing messages, voice and language options not suiting the user, and individuals choosing another mode of communication such as gesture or speech. Furthermore, attitudinal barriers pose a barrier to effective AAC introduction and use (Johnson, 2020).

Selection, therefore, not only includes consideration of the skills, environments, preferences and needs at the time, but also the goals and forecasts for the years to come.

Selection Frameworks, Processes and Models

Mercurio-Standridge (2014) outline a five-step process for supporting decision making in AAC selection and introduction. This process is clearly aligned with the Bioecological Model and the steps are outlined below with reference to the model. The steps include exploring views from individuals, caregivers and staff (Individual and Microsystems with influence from other systems), gathering assessment data from the individual and context (Microsystem) and the interface between them (Mesosystem), matching tools to these assessment data, trialling, and establishing implementation plans.

Recently Burnham et al. (2024) wrote a scoping review on assessment for aided AAC (SGDs). They included 14 assessment models meeting their criteria. They included a study by Light et al. (1998) in which they adapted an earlier theoretical model and illustrated it's use with a six-year-old autistic boy. Beyond this, there are limited examples or models to guide AAC selection specifically for autistic individuals (Wegner, 2021). Some of the frameworks, processes, and models for selection of AAC are described below.

Communication Competence by Individuals who use AAC. Assessment of individual characteristics have been integrated into models and frameworks of assessment in AAC. In 1989, a model by Janice Light introduced a definition of communicative competence. It introduced the idea that in order to use an AAC system competently, the user needed to be able to operate the AAC (operational competence), use it for language expression (linguistic competence), use AAC

strategically to communicate effectively in different Microsystems (strategic competence), and use it socially (social competence) (Light, 1989). This model was updated in 2003 to include factors such as motivation, resilience, attitude and confidence which were grouped as psychosocial factors and environmental supports (Light, 2003). In 2014, Light and McNaughton expanded this again to adapt and include more recent literature to this model, expanding the competence areas. Although not strictly a framework for selecting and introducing an AAC system, the competencies described have been included in selection of the best AAC tool as they provide a way to match the features of the AAC system to an individual. The model focuses on individual skills, implicitly including the social Microsystems in which the individual communicates.

SETT. SETT is a framework from Joy Zabala (Zabala, 2020) used to consider assistive technology selection across education and disability/health systems. The acronym SETT stands for Student, Environment, Tasks and Tools. It is designed as a way to organise information derived from many sources to support decision making at different stages in the use of assistive technology (Zabala, 2020). This framework is used extensively in the selection of SGDs and funding processes in Aotearoa New Zealand. Linking SETT and the Bioecological Model, the 'Student' is the individual at the centre. The term 'Environment' is an overarching term and relates to all other systems in the model.

Participation Model. The Participation Model for AAC (Beukelman and Mirenda, 2013) outlines a flowchart process for identifying and remediating barriers for effective participation. As part of identifying access and opportunity barriers to participation, both individual and environmental factors are considered.

Social Networks Communication Inventory. The Social Networks Communication Inventory (Blackstone & Berg, 2012) is a resource with a participatory and person-centred framework. It supports assessment of communication and interaction using circles of communication partners moving from frequent and closest partners (families and partners) to those who are unknown and occasional or single interaction communication partners. In this model, the Microsystem of individuals is expanded through the use of different communication partners.

Identifying Appropriate Symbol Communication Aids for Children who are Non-Speaking I-ASC. This report and resulting model from the UK documented the findings of a large mixed methods study about decision making in selection of communication aids (SGDs) for children. They found matching AAC systems to child characteristics was a priority and, that a child's motivation to use an SGD was a clear factor in the system chosen. The report included scaled tables of characteristics of child factors and AAC factors. The model of clinical decision making included these factors in addition to access features, ways of working, transition and available resources (Murray et al., 2020).

Capability Approach. In a new proposal, Smidt and Pebdani (2023) seek to widen the views on use of AAC to include the choice and preference of individuals. They note that some people may choose to use an SGD in one situation but not in another. They also highlight opportunity and access in terms of barriers and facilitators in "conversion factors" which allow a method of communicating to be utilised in a particular situation. This links strongly with views of autistic people such as on Zisk and Dalton (2019) who advocate a focus on supporting choice and individuality.

Section Summary

This section has introduced some of the complexities in the discerning process that is selecting and introducing AAC including SGDs. It has outlined the systems in Aotearoa New Zealand for public funding of a device and introduced the concept of selecting a device as integral to ongoing implementation. International models to support selection and introduction have been introduced.

From this brief description of common models used in AAC selection, you can see a specific focus upon the individuals who may benefit from AAC, their choice and individual needs. Some models match AAC systems to these considerations specifically. Many models consider the Microsystems surrounding a child. For example, the communication partners in the Microsystem are considered in the Social Networks Communication Inventory and are the Environment (E) considered in the SETT framework. The role of other influencing systems is implied within many but are not explicitly addressed.

Summary

Selecting and introducing an SGD for an autistic child requires a multi-faceted approach with information, opinions and practical considerations integrated to decision-making. The Macrosystem of Aotearoa New Zealand, its culture, languages and education, influence selection. Influences in the Exosystem such as policy and beliefs, sculpt the thoughts and actions of individuals with the Microsystems of the child's life. The autistic child themselves, their family or whānau and supporting team personnel all contribute to the decision making of selecting and introducing an SGD.

Although there are models that may guide in some areas of the selection and introduction of an SGD, there is no model that specifically supports the important decisions for young autistic children, either internationally or in the Aotearoa New Zealand context. This is the underpinning rationale for this current study which asks: What *are the considerations for selecting and introducing an SGD for a preschool autistic child in Aotearoa New Zealand?*

Methods

This methods chapter begins with explaining the research aim and question of the current study, which is underpinned by social constructivism epistemology.

Qualitative research methods and the specific phenomenological approach are explained. The chosen data collection methods, online interviews and focus groups are then described.

The study procedures are described. The participant groups, recruitment strategies and selection processes are outlined first. The question and hui process for interviews and focus groups are then presented and the thematic analysis process for the resulting data explained. The chapter concludes with analysis of the trustworthiness of the data and ethical considerations pertaining to this research.

Research Aim and Question

The aim of this study was to gather information to support the potential development of a framework to support teams in the selection and introduction of SGDs for young autistic children in Aotearoa New Zealand. The research question is closely aligned to the aim and reads: *What are the considerations for selecting and introducing an SGD for a preschool autistic child in Aotearoa New Zealand?*

Qualitative Research Design

This research seeks to gain the perspectives of those who have knowledge and/ or experience with SGDs to answer the stated question. Hence, a qualitative approach was chosen. Qualitative approaches support a researcher to find patterns from the documentation of what happens to people in their everyday contexts (Patton, 2015), and what their actions and thoughts mean to them (Erickson, 2023). The data collected are non-numerical (Braun & Clarke, 2013) and the data are drawn from naturalistic settings or the experiences described from participation in those settings (Patton, 2015).

Qualitative research has developed from different disciplines and through time. It encompasses different theoretical underpinnings and methods (Denzin & Lincoln, 2018). Theoretically, this study uses a phenomenological approach (Braun & Clarke, 2022), which is often used within research of communication ‘disorder’ (Hinckley, 2013). This study seeks to investigate the insights arising from experience by a group of people (Creswell et al., 2007), accepting the

meaning derived from their experience. These experiences can then be linked back to theoretical knowledge to provide a link between theory and practice (Hinckley, 2013). In this study, the phenomenon explored was the participants' experiences with SGDs with preschool autistic children in Aotearoa New Zealand.

The researcher acknowledges here the Western cultural paradigm from which this research design originates. Māori tikanga (custom) and kawa (processes) were considered in the research design. However, the research is not considered from a kaupapa Māori perspective as it is not grounded in Māori world views (Haitana et al., 2020). Further details on consideration of tikanga and kawa are described in the hui process section.

Data Collection Methods

Focus groups and interviews were conducted using semi-structured interviews in an online meeting platform. These were video recorded and transcribed for analysis. Interviews and focus groups are a common method used by researchers conducting qualitative research using a phenomenological approach, to gain experiences and perspectives around the topics of interest (Creswell 2018). In their book, Merriam and Tisdell (2016) describe qualitative interviews as an interactive experience. They note that the interaction may include the interviewer and one other person, or a group of people, who engage with the topic questions. Both interviews and focus groups are led by the researcher and involve interpersonal conversations. They provide for a greater depth of data than written data gained from questionnaires (Koch, 2024), and are useful where observable data are not relevant, appropriate or practical (Patton, 2015).

Semi-structured interviews. Semi-structured interviews are used to support the gathering of viewpoints of participants. The topics to be explored are prepared within a guide, but the questions posed and the order chosen can be tailored to suit the context of the interview. Probe and follow-up questions are used to clarify or seek further explanations (Mashuri et al., 2022).

Individual Interviews. Individual interviews are useful for understanding emotional drivers of participants' decisions, as participants share more readily in a personalised setting. They also allow for a depth of discussion. The data gathered is not influenced by others' contributions, as can be the case for focus groups (Koch, 2024).

Focus Groups. Liamputtong (2011) explains a focus group as “a group of people gathered together to discuss a focused issue of concern” (p. 31). Focus groups can be selected for homogeny, using shared social, cultural or experience backgrounds. This enhances sincerity and depth of discussion (Liamputtong, 2011). Morgan (1997) describes the segmentation of groups to support the matching of participants to distinct categories, to allows conversations to flow. This segmentation of groups allows data from different perspectives on one focus area to be analysed. The homogeny of focus groups in this study was considered important to allow for free-flowing conversation. The group selection is described following the introduction of participants.

Online Research. All participants took part in the study via an online platform**.** Online research is an effective and cost-efficient method of research (Dendle et al., 2021). It allows for participants from a wider geographical area to participate. It also offers practical advantages, such as reduced time and location expenses (Liamputtong, 2011). Virtual groups enable strangers to come together which supports honesty, and minimises the impacts of pre-existing relationships (Peek & Fothergill, 2009). Using online conferencing software for virtual focus groups allows for more interaction, especially for marginalised groups (van Eeden-Moorefield et al., 2008). Personal disclosure can be increased leading to interaction from a group (Liamputtong, 2011) and the depth of data can be greater in virtual groups when compared to face-to-face groups (van Eeden-Moorefield et al., 2008).

There are known issues with this way of researching. Confidentiality is a particularly important consideration when using online platforms. Technical difficulties are a common potential issue to be mitigated prior to the start of any online session, so that data are not lost (Gaiser, 2008).

Participants

The online nature of this study allowed participants from across Aotearoa New Zealand to be included. Participants were recruited to represent four separate groups:

1. Those with lived experience of autism or whānau of autistic children *(*an autistic individual or whānau member of an autistic child who has experience of SGDs).
2. Participants with kaupapa Māori perspectives.

3. Speech-language Therapists (SLTs) with expertise in SGDs and/or communication supports for autistic children.
4. Other people (e.g. kaiako, early intervention teachers) who support autistic children in the early years.

Use and Rationale for Participant Groups

Individual interviews were selected for the group of participants who identified as having lived experience or were whānau of autistic children. Individual interviews supported the confidentiality of the participants, and offered a more personalised and responsive approach . This addressed potential issues such as time constraints or work or childcare impacting availability. At least one participant in all participant groups was interviewed.

Two focus groups were used for the SLTs. These were split to support homogeny of groups. A group of SLTs with experience in leading the selection of SGDs formed one focus group. The other focus group included SLTs who work in early intervention services.

Recruitment through Social Media

Participants were recruited by advertising (see Appendices A and B) through selected organisations and social media pages. A koha (contribution), in the form of a grocery voucher, was offered for participation.

The organisations approached were determined based on the following criteria: that they were a national organisation and, either employed staff or had an audience including the target groups for the study. Each organisation was contacted, and approvals gained before advertisements and information sheets were circulated. Table 1 shows the organisations, a brief description and the advertisements shared.

Consideration was given to also advertising through Te Whatu Ora to reach staff with a health perspective. A major national restructure was underway however, and each geographical area potentially had different requirements for recruiting staff to the study. It was felt that those working with autistic children were likely to encounter an advertisement through the social media sites who support parents and professionals in this area.

Table 1

Organisations Used for Recruitment: Descriptions and Advertisement(s).

Organisation	**Description of Organisation**	**Advertisement and information sheet for those with lived experience and whānau of autistic children**	**Advertisement and information sheet for the other groups**	**Related notes**
Massey University Speech and Language Therapy Programme.	The researcher's academic institution.	Yes	Yes	These posts were offered to other sites for onwards sharing if needed.
Altogether Autism	Autism information and advice organisation.	Yes	Yes	
Zealand Speech-language Therapists' Association (NZSTA)	NZSTA is the national body for SLTs.		Yes	
Ministry of Education	Employs staff in target groups.		Yes	Sent to staff through internal communications.
Talklink Trust	Employs staff in target groups with an AAC focus.		Yes	Sent to staff through internal communications.
NZ ECE (Early Childhood Educators). Discussion Group - social media page	A group for educators within ECE.		Yes	

Upon contact with the researcher, the four groups of participants were described, and the participant was asked which of the group(s) they identified within if not already specified. They were then provided with information sheets and consent forms. Separate information sheets and consent forms were designed for focus groups and interviews with an easy-to-read version also available for interviews (see Appendices C, D, and E). For those who identified as whānau, an individual interview was always organised first. Following the interview, an invitation was then offered to participate in a focus group. In the situations this occurred, the invite was not accepted due to timing or the participant stating they felt they had given their views. Therefore, each participant was either interviewed or attended a focus group.

Question Design and Review

A set of questions were designed to support the semi-structured nature of the interviews and focus groups. Questions derived arose from the research questions and themes from the literature review. The questions were related to experience with autistic children and SGDs, Aotearoa New Zealand considerations, autistic child considerations, SGD considerations and the benefits and concerns related to SGD selection and introduction.

The questions were reviewed by both a kaitohutohu and an adult autistic SGD user. Both reviewers gave suggestions of theme areas that they would like to emerge from the data, for example bicultural considerations and child choice. As the interview question guide was broad, there was opportunity for these topics to emerge from the data.

Hui Process

Both focus groups and interviews were conducted following the Hui Process (hui meaning meeting) (Lacey et al., 2011) (see Appendices F and G). Interviews were estimated at 45 minutes and focus groups at 90 minutes. In reviewing this, the autistic SGD user and kaitohutohu gave feedback on the time it would take to participate, the need for whānau or SGD users to have the option to invite support people to attend, tikanga, chosen karakia and the researcher's introduction. These suggestions were integrated into the protocol with allowances, such as additional time, available for participant support if needed.

With an Aotearoa New Zealand perspective being a key element of the research, it was vital to follow protocols in meetings which uphold the tikanga and practices of the Hui Process. Personally, I reside in Papaioea, Palmerston North, and Rangitane is the largest iwi in the region. In my journey, I recognise the processes or kawa of this iwi, noting that these are different for other iwi. With an online forum for hui, it was not possible to engage in shared kai which is often used within tikanga.

The hui began with a greeting and the opportunity was given for participants to open the process. If this opportunity was not taken or the researcher felt that this was uncomfortable, then the karakia *Whakataka te Hau* was offered. The researcher then explained that there would be time to get to know each other after a preamble. This preamble included rights, responsibility, recording, consent, and other notes for research. The floor was then set for whakawhānaungatanga, whereby each participant introduced themselves and got to know each other to create a safe atmosphere for further discussions.

Participants were typically asked questions in the same order. Allowances to this were made if a topic had already been brought forward by the participant, or the flow of the interview required reordering. At points, the researcher prompted the participant(s) with the statement “tell me more about that (or naming part of a previous comment)”. This allowed the researcher to gain the participants’ thinking by extrapolation, rather than relying on an assumption, and to determine any further details or linked thoughts. The final question of the process gave the opportunity for any additional ideas or thoughts. Following this, the researcher thanked participants and outlined next steps in the research. The opportunity to close the meeting was given to the person who opened, and the meeting was closed by the researcher if required.

Data Analysis through Thematic Analysis

Transcription of both focus groups and interviews was produced by in-built recording software. The researcher reviewed the recorded video and amended the transcript for accuracy and, in particular, transcription of Māori words. Transcripts were checked by participants before release for analysis.

Data was analysed using inductive thematic analysis. Thematic analysis involves the seeking of patterns across a data set (Braun & Clarke, 2022). The six phases of thematic analysis described by Braun and Clarke (2022) were utilised to guide the analysis: familiarisation, coding, generating initial themes, developing and reviewing themes, naming themes and writing. Familiarisation with the data was obtained by reading all transcripts following the meeting and again following the release by the participant.

In thematic analysis, codes are established to drive an interactive sense making process. In using codes, the researcher interprets and mediates the meaning of the reported experiences and thoughts of the participants (Creswell et al., 2007). Meaningful sections of text were selected, and a code name ascribed to it. Coding was supported by use of NVivo14 software (Lumivero, 2023), which has a function for linking codes to the transcript text from which it was generated.

Coding included description focused coding, where the topic of a phrase is described by a word or phrase, and interpretation-focused coding, where the meaning of the data given is interpreted and the code matches the interpretation (Adu, 2019). This allowed the surface and deeper meaning of participants data to be coded (Braun & Clarke, 2022). The use of these types of coding are typical in phenomenological approaches (Saldana, 2024). A codebook (Appendix H) was established to provide a definition and example of a text excerpt which was coded in this way. This was refined through the following steps.

Initial themes were generated through categorising the characteristics of the codes and grouping them by commonality (Creswell & Poth, 2018). Frequency data, related to the number of times the code was used, helped refine and group codes. Those codes which had low frequency were sometimes integrated into an overarching theme. When codes had higher frequency, the possibility of multiple themes was considered (Guest et al., 2012).

Reviewing and developing the themes occurred through investigating the relationships of the initial themes using a concept map with connection lines. In each connection, investigation of the underpinning data occurred to check assumptions on the relationship were substantiated (Adu, 2019). As discussed later in the results chapter, there are several sub-themes which could have been located legitimately in two or more themes. In this case, the researcher allocated to the

theme perceived to have most relevance. Research supervision supported discussions of theme development, with views and rationales discussed. At the conclusion of the process, six themes with associated subthemes were established. The naming of themes involved discussions with supervisors and the kaitohotohu, to support the identification of names that accurately encompassed the included subthemes and coded data.

Trustworthiness in Qualitative Research

Trustworthiness in qualitative research supports the reader to have confidence in the findings (Elo et al., 2014). Tracy (2010) introduced the “Big-Tent” criteria for qualitative research and these qualities are introduced below with the rationales and steps taken to meet the criteria.

Worthy Topic

The literature review, prefacing this study, supports the topic and research question as relevant and timely.

Rich Rigor

Theoretical constructs of the study methods are addressed in this chapter. The sample size was small but allowed the integration of perspectives from different participant groups. Rigor in the data collection process was achieved with the semi-structured interviews and use of the Hui Process. Rigor in analysis was achieved through the use of NVivo 14 and through supervision.

Sincerity

The researcher’s position is addressed in the introduction chapter through my personal positionality statement. This supports the reader to understand viewpoints which have influenced the research. As part of sincerity, the next paragraphs support an understanding of reflexivity in the study.

Reflexivity

Reflexivity is inescapably present in all research. The choice, constructions and analyses of studies and the data are shaped from the researcher’s views. Reflexivity does not equate to bias or error but must be acknowledged along with the complexity it brings (Whitaker & Atkinson, 2021). It forms part of trustworthiness, as a part of dependability and trusting the researcher.

In this study, my reflexivity was paramount as the research question arose from my own clinical practice as an SLT, and my belief that our selection and implementation frameworks are not adequately supporting decisions in this country for preschool autistic children. The paucity of literature supports the reasoning of the study.

My position, driven by the research question, can be questioned through participant selections such as including kaupapa Māori participants, whānau and SLTs. However, no participants meeting the criteria for participant groups were excluded, unless authenticity was an issue (see ethical considerations section). My position can be viewed in method choice through choice of individual interviews for whānau members due to my experience of working with whānau. Discussions with supervisors confirmed the reasoning for confidentiality and whakawhānaungatanga in this decision.

In SLT focus groups, the researcher worked to actively take an 'outsider' role as an interviewer rather than becoming a part of professional conversations as an 'insider.' This was stated to both focus groups and supported the researcher to acknowledge statements mostly non-verbally to allow flow from participants' discussion.

Some journal entries were made throughout the research. To support reflexivity in coding and theming, the emerging codes and theme documents were kept. This enabled comparisons and consideration of the decisions made in combinations and amendments to codes, subthemes, and themes.

Resonance

Results are illustrated in the next chapter with supporting participant quotes. This allows naturalistic generalisation of key themes and subthemes. Resonance of transferable findings has been supported by the results chapter being read and resonance agreed by three participant members.

Credibility

As part of trustworthiness, credibility relates to showing reality through results (Stahl & King, 2020). Credibility of results in this study is supported with rich data in the form of quotes from the participants themselves.

Participant data triangulation (Hassan, 2024) supports credibility of themes, with multiple participants from different groups being required in order for an overall theme to be considered trustworthy. Subthemes were noted by different participants but this may not always have included participants from separate groups. This was anticipated in the study with separate groups expected to produce data answering different parts of the research question and, therefore, did not necessarily invalidate a subtheme.

Meaningful Coherence

This chapter has outlined the methods to achieve data to support stated goals. In the next chapters, the findings and interpretations will support the coherence of the study.

Ethical Considerations

Ethical approval was initially obtained through the Massey University Human Ethics Committee to conduct the research (Appendix I), and a review later sought minor changes due to participant authenticity concerns. A subsequent ethics approval was obtained through the Ministry of Education Ethics Committee prior to recruitment of their staff into the study. The key ethical considerations for this research were informed consent, confidentiality, mitigation of potential harm and participant authenticity.

Informed Consent. Informed consent was obtained through the use of detailed information sheets. There were separate sheets for focus groups and interviews (Appendices J and K). The information sheets covered the rights and responsibilities of participants, the aims and benefits of the research, data storage and information about next steps. Splitting the information sheets allowed for differences in time and participant rights to be accurately stated. Each participant signed a consent form to signal their consent to participate. Interviewed participants also signed release of transcript forms. These consent forms will be held within Massey University for five years.

Confidentiality. Confidentiality of participants was considered in several ways. For focus groups, the limits of confidentiality that arise from being part of a group were detailed in the information sheet. For all participants, the information sheet described the recording of the meeting and the storage of information separately to consent forms, supporting confidentiality .

Massey University technology systems were used to enable use of university security for online and data protection. In presentation of data, a participant was randomly assigned a number within the participant group to which they belonged and referred to using this group and number reference. The final thesis was reviewed to ensure that no individuals could be identified inadvertently from any comments, pronouns or identifiers used within it.

Participants were asked if they would like to be named as taking part. These names, alongside other supporting people have been included in the acknowledgement at the start of the thesis. No other identifying features, such as the participant's role in the study, were recorded.

Cultural Appropriateness. An awareness of the bi-cultural aspect of research in Aotearoa New Zealand has been supported by the advice of a kaitohutohu. This advisor has supported discussions in research design, questions, processes, terminology and aspects of trustworthiness in the research. Advice has been provided throughout the research process. Additionally, some advice at design stage was obtained from an autistic SGD user.

Mitigation of Potential Harm. As this study involved interviews with whānau of autistic children, and potentially autistic people themselves, the risk of an emotional reaction whilst telling their stories was a key ethical consideration. The study design specifically considered this with individual interviews planned to allow individual attention. The information sheet included a freephone number for available counsellors. Within the interviews, the Hui Process was utilised to support cultural safety, and time was taken in relationship building to support an open and friendly interview space.

Participant Authenticity. This study had an unconsidered ethical issue relating to questionable participant authenticity. There are growing concerns in research in recruiting participants through social media. One recent study, (Kumarasamy et al., 2024), found that 84% of their 37 participants conducting healthcare research had encountered fraudulent participation. Some participants in Kumarasamy's research shared their experiences related to compensation arrangements such as vouchers.

Within recruitment of participants for this study, a pattern emerged in some respondents' email configuration, with sparse answers to initial questions, and incongruence in communication.

Interviews were conducted with two of these participants early in the data collection process. Concerns over participant authenticity led to these two interviews not being used in the study, and further actions taken to ensure future participants' authenticity. A revision to the ethics proposal was obtained to ensure that participants used their camera throughout the interview or focus group, and that participants had to reside in Aotearoa New Zealand. This was checked by requesting a physical address for the koha voucher.

Summary

This chapter has described the methodology of this study. It has introduced the research question and research design with relevant theoretical underpinnings. The four participant groups and their recruitment have been explained and rationales and processes for use of semi structured online focus groups and interviews have been given. The use of a six-step sequence (Braun & Clarke, 2022) for inductive thematic analysis has been described. The coding and collation process to establish themes has been introduced. The trustworthiness of the study has been defended reflecting on eight key characteristics (Tracy, 2010), and included the consideration of ethics throughout the research. In the following chapter, the results from the study are presented within the six major identified themes.

Results

The purpose of this study was to gather qualitative data which could inform a framework for the selection and introduction of SGDs with preschool autistic children. This information was gathered through interviews and focus groups with relevant participants. The resulting data was thematically organised through inductive analysis.

The chapter begins with an introduction to the participant groups including their overlapping roles. Participants' known heritage, geographical locations and experience with SGDs are explained. An overview of the resulting six themes and their related subthemes is then displayed to support understanding of the elaboration of themes that follows.

Participant Background Information

As described in the methods chapter, participants in this study were recruited to provide the different perspectives of speech-language therapists (SLTs), educators, kaupapa Māori perspectives and whānau of autistic children. A total of 19 participants were included in the study. Two additional participants were removed because of authenticity concerns. This is described in more detail later.

Although identified within specific groups, the experience of the 19 participants overlapped. Table 2 indicates the overlapping experience of participants.

Table 2

The Overlapping Experience Between Participant Groups

Participant Group	**Number of Participants within group**	**Number of Participants in other groups who also identified within this group**
Speech-language therapists	9	2
Educators	2	3
Whānau	5	2
Kaupapa Māori participants	3	3

Whānau participants held the roles of parents, grandparents and siblings. To support confidentiality, these roles are not further described and all whānau participants are referred to using this terminology.

Participants were recruited from Aotearoa New Zealand, in locations spread across both main islands with a cluster of eight participants from the wider Manawatū region. In total, six participants spoke of their Māori heritage. European origins were stated in some participants' introductions and some SLTs spoke of their experience overseas and used this background to compare and contrast experiences.

Participants were asked about their journeys with autism and SGDs, and a range of experience with SGDs were described. Two participants were aware of SGDs and had considered them for autistic children but had not actually used one. As expected for whānau, some participants had experience with selecting and introducing an SGD for one autistic child. In general, those with multiple experiences of assessment and introduction of SGDs identified as SLTs.

Overview of Themes

Information gathered from 19 participants was coded (codebook in Appendix H), and organised into six themes: Aotearoa New Zealand Considerations, Autistic Child Considerations, SGD System Considerations, Whānau Considerations, Team Considerations and Selection and Introduction Considerations. Table 3 shows the themes and subthemes.

Each theme is then introduced with a figure showing the subthemes and codes within it. The theme data is then explained using pertinent quotes from participants to illustrate it.

Results Pertaining to Ongoing Implementation of SGDs

In the introductory chapter, the scope of the research was explained as including only factors in selection and introduction of an SGD. However, as stated, the introduction of a device and ongoing implementation overlaps.

In the Results chapter, some subthemes established could be argued as falling more into implementation of the SGD stage. For example, within the 'Communication Partner Strategies' subtheme, the two codes of 'Partner Needs to Ensure Meaningful Communication Opportunities'

Table 3

Inductive Themes and Subthemes

Theme	Subthemes
Aotearoa New Zealand Considerations	Biculturalism and Te Reo Māori
	Cultural Considerations in Assessment
	Multiculturalism
	Aotearoa New Zealand Vocabulary and Icons
Autistic Child Considerations	Other Diagnoses
	Sensory
	Motoric Skills and Motor Planning
	Communication
	Child's Preference
	Changing Needs Across Time
SGD System Considerations	Individualisation
	Practical Considerations for Child's Use
	Voice of the SGD
	Practical Considerations of Concern to Team
Whānau Considerations	Whānau Composition
	Whānau Involvement
	Whānau Stress or Capacity Limits
Team Considerations	Awareness of SGDs and their Potential Benefits
	Communication Partner Strategies
	Team Feelings, Opinions and Teamwork
	Available Support
Selection and Introduction Considerations	Contexts to Consider
	Timing of SGD introduction
	Decision Process Considerations
	Wider influences

and ‘Partner Interaction Skills’. However, these partner skills may also be a factor in the successful introduction of a device (Gevarter et al., 2020) and were therefore included for this reason.

The codes ‘Amount of Adult Support’ and ‘Screen Time’ located within the subtheme ‘Wider Considerations’ in the theme ‘Selection and Introduction Considerations” could also be argued as an implementation consideration for an SGD. However, they have been included as participants discussed these considerations when considering SGDs.

Positioning of Subthemes

The positioning of subthemes into themes was often complex, as there were links across data to different themes. For example, the subtheme of ‘Whānau Grief’ could have been logically and relevantly placed in the ‘Whānau Considerations’ theme. However, on careful analysis of the data, this subtheme was more clearly related to the impact of this factor on the ‘Timing of SGD Introduction’, and it was positioned as such.

Another example occurred with the ‘Voice of the SGD’ subtheme. As will be discussed later, codes included in this subtheme could also have been positioned within other themes. The decision to group these codes within ‘Voice of the SGD’ was made because ultimately the voice output of a device is included within the SGD itself.

Codes Within Subthemes. In some subthemes, individual code data are discussed. This occurs where the description would not be complete without mentioning a particular code specifically.

Resulting Themes

The following sections describe the resulting themes, subthemes and related data using participants’ quotes as examples. Participants are referred to in the theme sections by their participant group title and the participant number randomly assigned within the group, for example: SLT P9 and Whānau P3.

Aotearoa New Zealand Considerations

The first theme in the data relates to Aotearoa New Zealand considerations. It is termed Aotearoa New Zealand Considerations because, although many of the subthemes relate to culture and languages, there were other aspects specific to this country including vocabulary and icons,

and the selection and introduction of SGDs. In this study, the term whānau refers to the group of people supporting an autistic child from a 'home' context. Figure 2 shows the subthemes in Aotearoa New Zealand Considerations.

Biculturalism and Te Reo Māori

Participants from all groups spoke about the need for SGDs in Aotearoa New Zealand to have access to te reo Māori. "I mean…I would think that awesome if there was obviously te reo" (Whānau P2) and "this is something unique to Aotearoa New Zealand, if there are use of te reo Māori words you know …. Kia ora (sic)" (Kaupapa Māori P2).

Participants noted sometimes Māori kupu are so readily used that New Zealanders may not even recognise that they are from Māori origin. For example, SLT 1 told a story about the word 'puku' (meaning stomach or tummy in this instance). A colleague had said "that's not a Māori word". The SLT analysed "because it was so part of her lexicon that it hadn't occurred to her that it was a non-English word" (SLT 1). Participants also explained that Māori words are used in Aotearoa New Zealand where there are no English equivalents for conceptual understanding (Whānau P5).

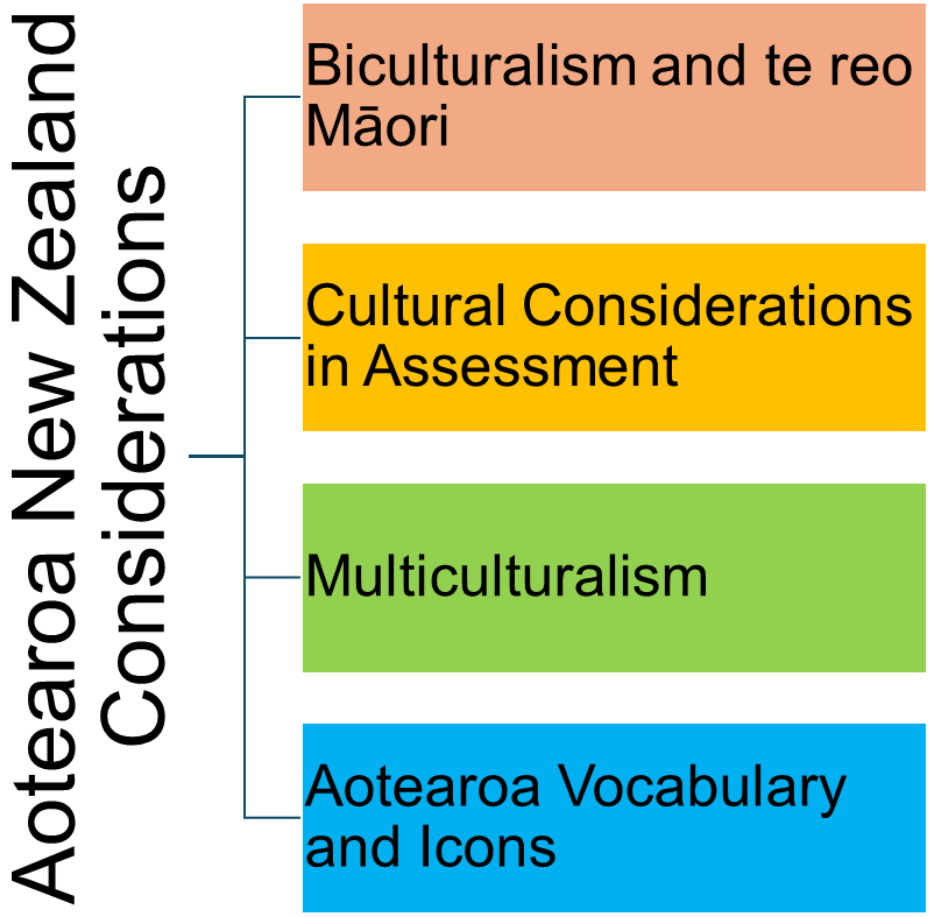
Participants spoke of the difficulties in using te reo Māori on SGDs with many talking about this as a barrier to overcome. Some SLTs were aware of projects underway in this area. Several SLTs and whānau participants spoke about adaptations or ways in which they had supported te reo Māori to be used in both paper-based systems and SGDs. For example, translation, adaption of English-based systems to accommodate syntactic variations between the languages, and use of voice recording features. Participants spoke about the complexity of te reo Māori in terms of length of sentences and the syntax involved. One participant wished for a system - in this case a low-tech system - "that has core word[s] that we use in in te reo and in particular our sentence starters" (Kaupapa Māori P3).

Adding to complexities in this area are dialectal and regional differences in te reo Māori. As Kaupapa Māori P1 stated: "We've got to make sure that the language covers those different communities".

Although, on the surface, the addition of another language to an SGD could be considered as a feature on an SGD, in Aotearoa New Zealand the protection of te reo Māori is viewed under

Figure 2

The Subthemes in the Aotearoa New Zealand Considerations Theme



Te Tiriti. This influenced the name and placement of the subtheme of ‘Biculturalism and te reo Māori’. Kaupapa Māori P1 offered this whakatauki to illustrate this:

> He puawai putiputi te Māoritanga, ko āna taketake ko te reo, tapahi ngā taketake, ka mate te pūāwai putiputi, whakakorengia te reo, ka mate te Māoritanga.
>
> A flower represents the Māori culture. Its roots represent the Māori language. Cut the roots and the flower will die. Without the Māori language, the Māori culture will die.

In their kōrero, this same participant made a case for the application of this to SGDs with these statements:

> So, we’ve got to maximise opportunities for our kids to live as Māori, you know and it applies to all of our kids, even our kids with special needs. They’re tāonga and must be respected accordingly. These kids don’t have a reo, so this is their reo.” (Kaupapa Māori P1).

Cultural Considerations in Selection Process

This links with the theme: Selection and Introduction Considerations. It is situated here because of its close links to culture. Consideration of culture, language and identity were included in data from every group. One whānau participant stated: “every person and child comes from a unique background” (Whānau P1).

Participants spoke about Western world concepts influencing selection and introduction practices. As one SLT stated: “[It] is really hard with AAC devices because there isn't anything that is currently culturally appropriate or developed specifically for the indigenous population” (SLT P9). A dominant Western paradigm, resulting from colonisation, was ascribed to the AAC systems considered. For example: The design of AAC systems using ‘core vocabulary’ (Carnett et al., 2023) was considered by SLTs to be a Western concept with research from an English language perspective.

Participants spoke of culture and family values impacting the use of technology (Educator P2), different views of disability across cultures (SLT P9), and the conceptualisation or acceptance of autistic individuals within cultures (Whānau P4). Participants reported their desire to work in a

culturally appropriate way. SLT P5 noted that herself and her team were trying to consider Te Ao Māori more carefully in their work using SGDs in Te Kōhanga Reo (Māori early education service). The use of bilingual SGDs was discussed by SLTs. They expressed interest in possibilities, discussed projects completed and others in progress (SLTs 8, 3, 5). SLTs in focus groups discussed their desire to continue to learn about and use SGDs within different language environments.

Multiculturalism

Participants from all groups talked about Aotearoa New Zealand as being a multicultural country and the considerations required. “We’re probably quite a big multicultural culture as well, so we probably have to make sure that we are talking in home languages more than just English and te reo.” (Educator P2).

Participants spoke about the integration of vocabulary, language and cultures to educate children through multicultural stories. For example: “Chinese New Year. …like my relatives who work in Kōhanga, for example. They build it into the curriculum because taniwha is our term for the dragon.” (Whānau P1).

Aotearoa New Zealand Vocabulary and Icons

In addition to culturally specific vocabulary, participants spoke of the need to have vocabulary appropriate to Aotearoa New Zealand and to the places, people, and events important to autistic children. An example of this was ‘Matariki’ (Māori new year). given by whānau P1. Educator P1 identified “New Zealand's natural dialect is really, really important,” and gave examples of greetings ‘chur bro’ and family titles such as ‘Koro’ or ‘Goldie’.

Other participants spoke of the casual culture of Aotearoa New Zealand in relation to the vocabulary (SLT 4) and slang (SLT 5) that is used. For some participants, the use of everyday vocabulary rather than vocabulary originating in other countries was important. For example: “They would say horseback riding when we would probably say horse-riding... they use sidewalk when we use footpath.” (Educator P2).

For others it was important that we consider the icons used on the device. Kaupapa Māori P3 gave an example of changing the image and word of a ‘barn’. The same participant discussed

the need for relatable pictures for Aotearoa New Zealand. Kaupapa Māori P2 also echoed the importance of use of appropriate pictures or icons when depicting Māori children in story books. This participant summed up the story with “I think that's really important particularly in these days now as well that the pictures are, yeah, that they are. Oh, what's the word? You know, they're tasteful.” (Kaupapa Māori P2).

One participant noted considerations regarding appropriate vocabulary to include in children’s AAC systems should involve organisations who have the authority to support design from a Māori worldview such as “rūnanga, which is boards from different hapu, different iwi” and “places like Mātāwai -which is the national family driven te reo Māori Kaupapa.” (Kaupapa Māori P1).

To complete this sub-theme, we return to the consideration of biculturalism and icons with reference to tikanga in Te Ao Māori symbols. For example, Kaupapa Māori P1 discussed the sacred status of a ruru (owl). as an example. “A ruru is quite a sacred bird. A ruru is quite spiritual…so we're not, we're not conflicting what the design with tikanga with what's acceptable tikanga.” (Kaupapa Māori P1).

Autistic Child Considerations

In the theme ‘Autistic Child Considerations’, participants spoke about the skills and needs of individual autistic children and related considerations. Figure 3 shows the related subthemes for this theme.

Other Diagnoses

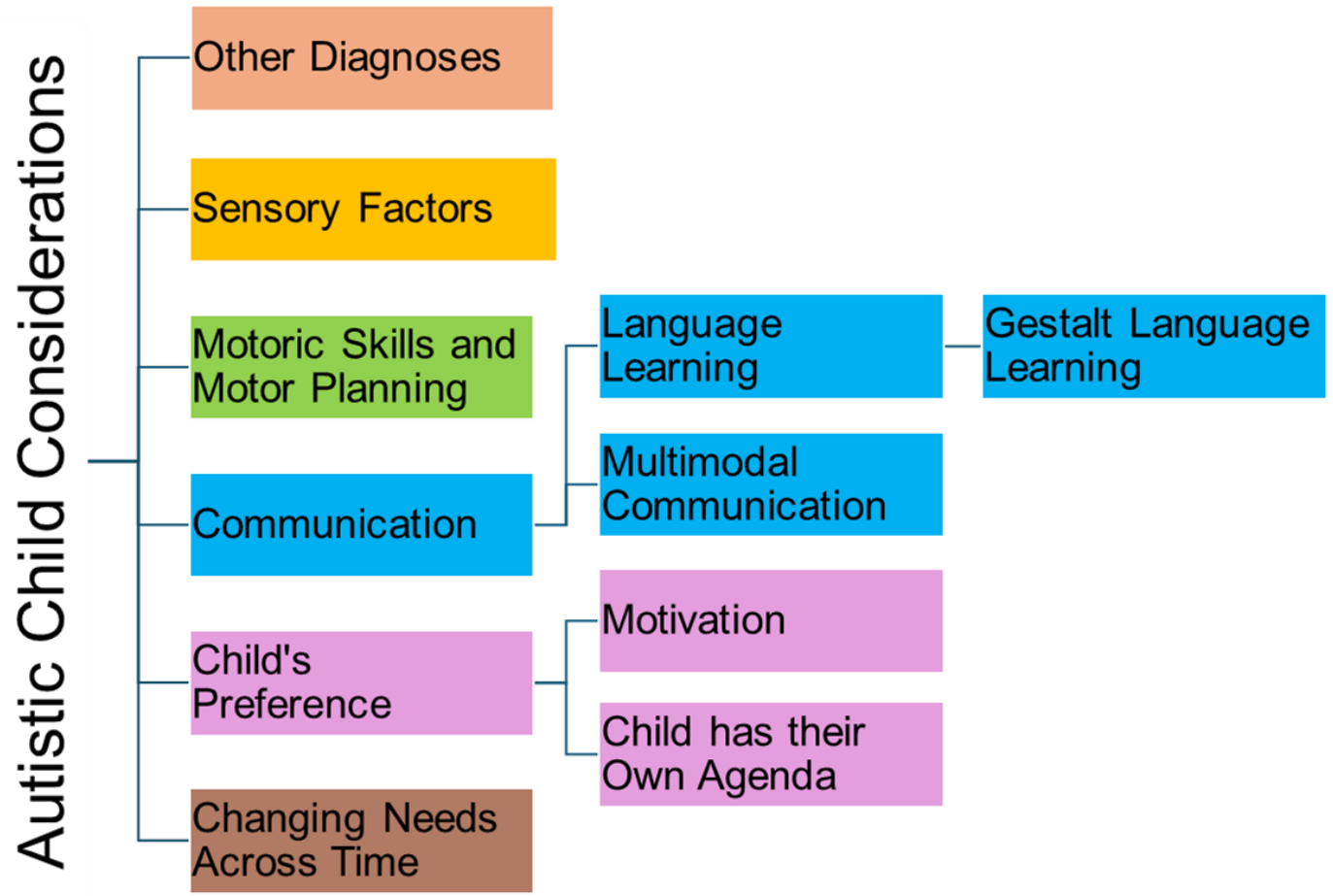
Although, the subject of other diagnoses for autistic children was not a prevalent theme, some participants talked about developmental delays being present for some children. The relevance of other diagnoses was related to the child’s skills and, therefore, which features were considered in selection of an SGD. As Educator P2 stated: “So even though they might be four, they might be actually at a two-year-old level or 18-month-old level.”

Sensory Factors

The sensory considerations of autistic children were linked to selection of SGDs in many ways. Firstly, related to the reaction to the device itself: “Sensory wise, do they have aversions

Figure 3

The Subthemes and Codes in the Autistic Child Considerations Them



to…the lights or the sounds or the even the touch of it? Are they better to have textures…or better not to have textures?" (Educator P1).

Participants indicated an SGD may "help their senses feel more regulated" (SLT P4) or result in children being "overstimulated or over aroused." (Kaupapa Māori P1).

Others considered that SGDs have many features that make use of sensory preferences. For example: "Children are visual learners, or you know, like verbal language. I know for (my child) likes to be able to touch things." (Whānau P3). Sensory considerations were also linked to the contexts in which young children use devices. One example was water play which is common in the preschool years. This is discussed in the theme of 'SGD System Considerations'.

Motor Skills and Motor Planning

Consideration of children's motoric skills and motor planning were noted by participants in most groups. Participants referred to children who may not have the strength to activate the SGD. Others spoke of "motor planning strengths" (SLT 1) in some autistic children. Others referred to applications (apps) which are organised with motor planning principles.

Communication

The communication skills of autistic children were described in two main codes: 'Language Learning' (encompassing the subcode 'Gestalt Language Learning'), and 'Multimodal Communication'.

Language Learning. In language learning, participants in each group, spoke about the development of language and different models of learning language. Participants talked about having vocabulary that was developmentally appropriate and supported ongoing development. For example, when discussing the available and appropriate vocabulary, Educator P2 talked about "making sure that you can always keep continuing extending the child," by having unfamiliar vocabulary available to support the teaching of emotion labels. The example was illustrated by "[a] three-year-old doesn't know what frustration is. We're the ones who teach them at four and five and six what frustration is, what it looks like." (Educator P2).

In discussing how SGDs had not worked for her autistic whānau member, one participant felt the SGD was too complex given that "his understanding of his vocab and stuff was more like an

18-month-old.” (Whānau P5). Whānau participants in particular spoke about the matching of language, phrases and vocabulary to suit the child’s development. SLTs whilst acknowledging the child’s current abilities, also considered how the SGD could enhance language development. SLT P3 stated: “Why are we looking at short term? I think ability to grow with the child's language development is really important.”

Gestalt Language Learning. Of concern to SLTs exclusively was the concept of gestalt language learning. There were contrasting reactions and confidence levels regarding the concepts, and challenges were identified. SLTs considered the development of language and the use of SGDs for those who use gestalts. SLTs were concerned about their ability to programme SGDs to meet the needs of individuals. They expressed confusion regarding individuals whose language processing is not yet evident because they do not speak. SLT P6 summed up her thoughts in these areas with this insight: “I feel like I mostly have more questions than answers around that at the moment. This still feels like a newer, big idea and that our systems really aren't made to accommodate that.”

Multimodal Communication. Participants from all groups talked about an SGD as being one part of an overall communication system available to a child. Within this subtheme, participants hoped an SGD would be a temporary support and would support verbal communication development by “being able to help with the communication ’til such a time that they are able to, you know, navigate their way through…without." (Kaupapa Māori P2).

Other participants gave examples of contexts in which an SGD might be useful to augment communication including when experiencing fatigue, or within certain sensory situations. An example from a whānau participant, who talked about an older child, illustrated this point. “When he feels overwhelmed, he will hide, and he will message on his phone rather than having a face-to-face conversation.” (Whānau P5).

Child’s Preference

Participants in all groups spoke of the child’s preference in selecting SGDs. Participants spoke about technology being neurodiverse friendly and that navigating technology is often a skill for autistic individuals. Educator P1 noted: “We don't give them access to talkers or other electronic

devices to generate communication or anything like that, but yet they can quite quickly jump on a cell phone or that iPad or navigate themselves around YouTube." (Educator P1). The child's preferences were considered in the motivation to use an SGD, and a child may have their own agenda in using technology.

Motivation. The concept of the child's motivation was also included in all groups' data. This code has the highest overall references within this theme. A child's motivation related to interest in the SGD was noted. For example: "Yes, it really captures (my tamaiti) attention and (my tamaiti) connects to that sound." (Whānau P1). Conversely Whānau P5 stated their child was disengaged from the SGD. They stated "none of it was something he was interested in doing. It was awful."

Participants had multiple ways that they supported motivation to use an SGD. These included making the technology 'cool' and desired by other children, including motivating content, using motivating items and activities, using familiar voices and sounds, using soft toys with voices and including peers.

Child has their Own Agenda. Several participants discussed how some children may want to use the SGD for other activities that they have typically accessed on technology, such as watching songs. Participants spoke about autistic children's choice to not use an SGD for communication as the child "doesn't want others' participation" (Whānau P2).

Changing Needs Across Time

Participants realised that autistic children grow quickly and that the selected SGD may need to be changed or replaced in the future. This subtheme linked strongly to the subtheme 'Multimodal Communication' as one of the anticipated changes is a move to spoken communication.

Other participants spoke about changes across the introduction of the SGD including expanding the contexts of use and considering next steps following initial introduction. SLTs noted considerations of AAC systems through time. They reported considering speech output devices such as single message devices to support the start of a process. Others felt that a robust language system should be implemented from the onset to support longer term use.

Changing needs over time was also related to the development of languages across time. This comment was made with reference to te reo Māori in particular. Kaupapa Māori P1 participant noted that changes may be needed as “our reo was constantly growing.”

The future school of the autistic child was reported to be important to consider when selecting an SGD. One participant noted a school would not use certain apps and therefore the use of an individual’s SGD ceased. However, most comments related to the skills of future teams to implement the SGD. One whānau participant recalled: “I said, well, well, let's go with whichever one's the TA (teacher aide) at the school already know how to use. You know, there might be someone that is already using one, just make it easy.” (Whānau P5).

SGD System Considerations

The third theme from the data related to the SGD or the communication app loaded onto it. Figure 4 shows the related subthemes: Individualisation, Practical Considerations for Child Use, Voice of the SGD, and Practical Considerations.

Individualisation

Data in this subtheme related to the aspects of the device needing to be adapted to meet a young autistic child’s individual needs.

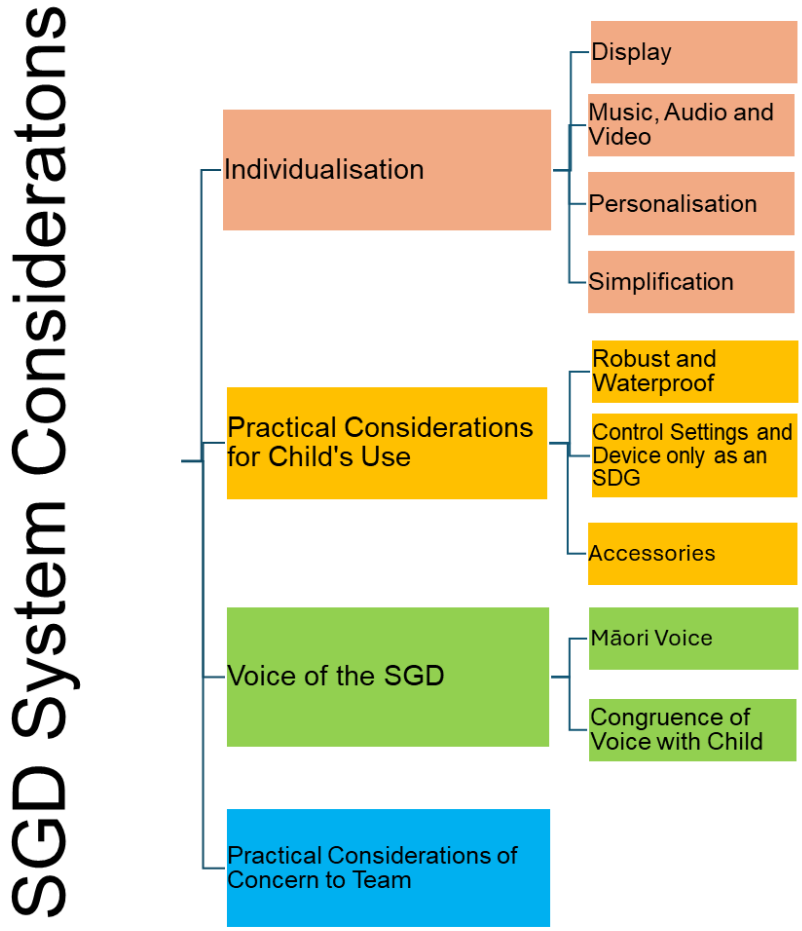
Display. Two aspects were discussed in relation to display considerations by single participants: Icons or Pictures and Dynamic Display**.** In addition to specific Aotearoa New Zealand considerations for icons, participants spoke about the need for relatable and character-based icons and options for colours or monochromatic icons (SLT 8). Another aspect of icons was related to contemporary icons that matched this time, with some icons felt to be outdated (SLT P7).

Dynamic display, the ability for a screen to change to a new one following activation of the first screen, was discussed by SLTs. Considerations highlighted included the cognitive load of multiple screens to view, the language prediction supported by dynamic display, and the impact upon the number of cells per screen.

Keyboard as Part of Display. Five SLTs identified the need for a keyboard or access to literacy for young autistic children. Four participants shared examples of individuals with whom

Figure 4

The Subthemes and Codes in the SGD System Consideration Theme



they had worked for which literacy was a skill. Others highlighted the potential for hyperlexia or interest in letters and words in this population (SLT 1 & 7). Some spoke of early use of literacy such as:

> those skills around that they're very interested in letters and words, and they can type out letters and words, you know, should we be providing them with something where they can type words and hear what that word is and then people react to it (SLT 8).

Others identified access to literacy as something that may support or had supported autistic individuals at a later age or stage in life.

Music, Audio and Video*.* Whānau participants and SLTs talked favourably about SGDs incorporating multimedia content including music (Whānau P 1), audio and video clips (SLT 2), animal sounds (SLT P6), and photos (Educator P1, Whānau P3). These multimedia aspects were linked to motivation, buy-in from the child or whānau, or personalisation of the device.

Personalisation. The need to personalise the content and look of an SGD was noted by all groups of participants. Motivational and sensory preferences drove considerations related to cases for the device, personalisation of vocabulary, use of photos and recording of the autistic child or whānau members. In considering the use of personalised vocabulary, one SLT noted: “I think it's quite important for families to be able to add their own words in and I think that is particularly important for the autistic population, who might have very specific interests, which might not be in the device already, but it's very important to have in there” (SLT P7).

Simplification*.* Linked closely to personalisation of an SGD was the concept of simplification of a device and all participant groups provided data in this area.

Some reported simplifications included removing vocabulary for items not available to support effective communication, and use of non-linguistic sounds, such as animal sounds, to support motivation. Simplification was usually linked to manageability, ease of use of the device in introductory stages, developmental appropriateness and concentration on earlier functions of communication such as requesting.

Simplification of an SGDs was discussed as difficult and the lack of manualisation for introduction processes were expressed. For example: “I almost feel like we need different stages of

the AAC, so here's level 1, which is just one app then here's level 2 and you know, like build up the confidence.” (SLT P4).

Participants talked about hiding or deactivating buttons, the number or size of buttons per page, or masking (hiding) vocabulary as a concept to simplify vocabulary. The number of presses before a message spoke was also considered. In addition, SLTs spoke about introducing SGDs without simplification to adults supporting the autistic child: “Many of them have constantly said, can we peel it back? Can we just have one screen for the starters?” (SLT P4). Participants also noted ways that they use to introduce simplified SGDs:

> I introduce it masked on like two or three buttons and get a balloon now or something like that so, they can see it working straight away and it doesn't look too scary. And then I flick to full setting and look one day they can do all this (SLT P9).

Practical Considerations for Child’s Use.

The practical considerations for selection and introduction of an SGD were discussed by participants. Most frequently mentioned was the need for a system to be portable with a young autistic child. “Those practical things can be a big drawback, can't they? If it's something that's big and hefty…. like child’s never gonna carry that themselves.” (SLT 8).

Whānau spoke of the difficulty of young families carrying SGDs for the child: “if you're out and about and I've got like a baby on my hip or something.” (Whānau P2).

The smaller size of the device was linked to portability. Other factors mentioned in relation to size were the importance of straps when switching between an adult and child carrying the SGD or having a larger interface so that it could be used and modelled more easily in whānau situations.

Robust and Waterproof. After portability and size considerations, the next frequently mentioned practicality was robustness and waterproofing. As Educator P1 noted: “if it’s a young child, it's probably gonna get thrown to the ground.” Concerns around robustness included concerns the autistic individual may “throw it and smash it” (Kaupapa Māori P3), as well as concerns about the device being inadvertently dropped or other children’s interactions with it such as chewing or mouthing.

Protection from water in particular was mentioned by SLTs who noted that it is necessary to consider that an SGD may get “water on them or sand on them.” (SLT P4). However, in reality at present, “I don't think you'll ever find a device that you can freely run under the tap.” (SLT 1).

Control Settings and Device only as an SGD. Frequently mentioned was the need to be able to stop a child entering or editing the SGD. One parent said: “We live by guided access and probably just ways to … keep the information so that he can't accidentally delete it.” (Whānau P3).

Linked into this control was the discussion of a device with a communication app being locked to being a communication device. This was viewed both positively by supporting the child to remain on a communication app and as potentially confusing as children use mainstream devices such as iPads and phones for other reasons.

Accessories. Participants noted other accessories that may be useful for some individual children. Stands for devices, headsets and keyguards to support accuracy of touch were reported as helpful.

Voice of the SGD

The fact that SGD has a voice was discussed throughout the data as a key area of consideration. This subtheme links to many others but is included here for clarity. Voice output was noted as a key feature of using an SGD.

> I think voice output is more essential for children, for autistic children in terms of their AAC choice. I think it really does seem to be really valuable to have voice output rather than relying on communication partner voice to label what you're pointing to on your low tech (SLT P9).

The voice output needed to be considered for many different reasons. One whānau participant noted that the tone of the voice “whole rounded sounding voice, probably a male voice.” (Whānau P1) would suit the child’s sensory needs. Also considered was “a different voice might help them to shift their attention a little bit more when modelling is happening.” (SLT 1).

Volume of the voice was discussed in terms of meeting a child’s sensory needs as loud noises may be uncomfortable for the child. However, the volume level required for loud

environments such as early childhood centres in which these children play was also a consideration (SLT P5 & Educator P2).

Māori Voice. “There are so many qualms and issues around voice selection, given that there's no te reo Māori or even New Zealand English accents voices available.” (SLT 2). The lack of a voice that sounded like a ‘kiwi’ was mentioned by all groups. As one participant states: “I think it would be really lovely if the person that's actually doing the kōrero or on those devices sounds like somebody from Aotearoa New Zealand.” (Kaupapa Māori P2).

Participants spoke about pronunciation and accent spoken by the SGD, particularly in relation to spoken te reo Māori. One SLT expressed “I'm very passionate about people being able to express their identity through any device and that, yeah, your accent and your vocabulary is such a big part of that.” (SLT P5).

Congruence of Voice with Child. Closely linked was the idea that the voice output on the device needed to match the child. This was implicit in data but overtly stated by this whānau member: “I just I just know that like if I had a speech generating device, I'd want my voice to match me.” (Whānau P4).

Practical Considerations of Concern to Team

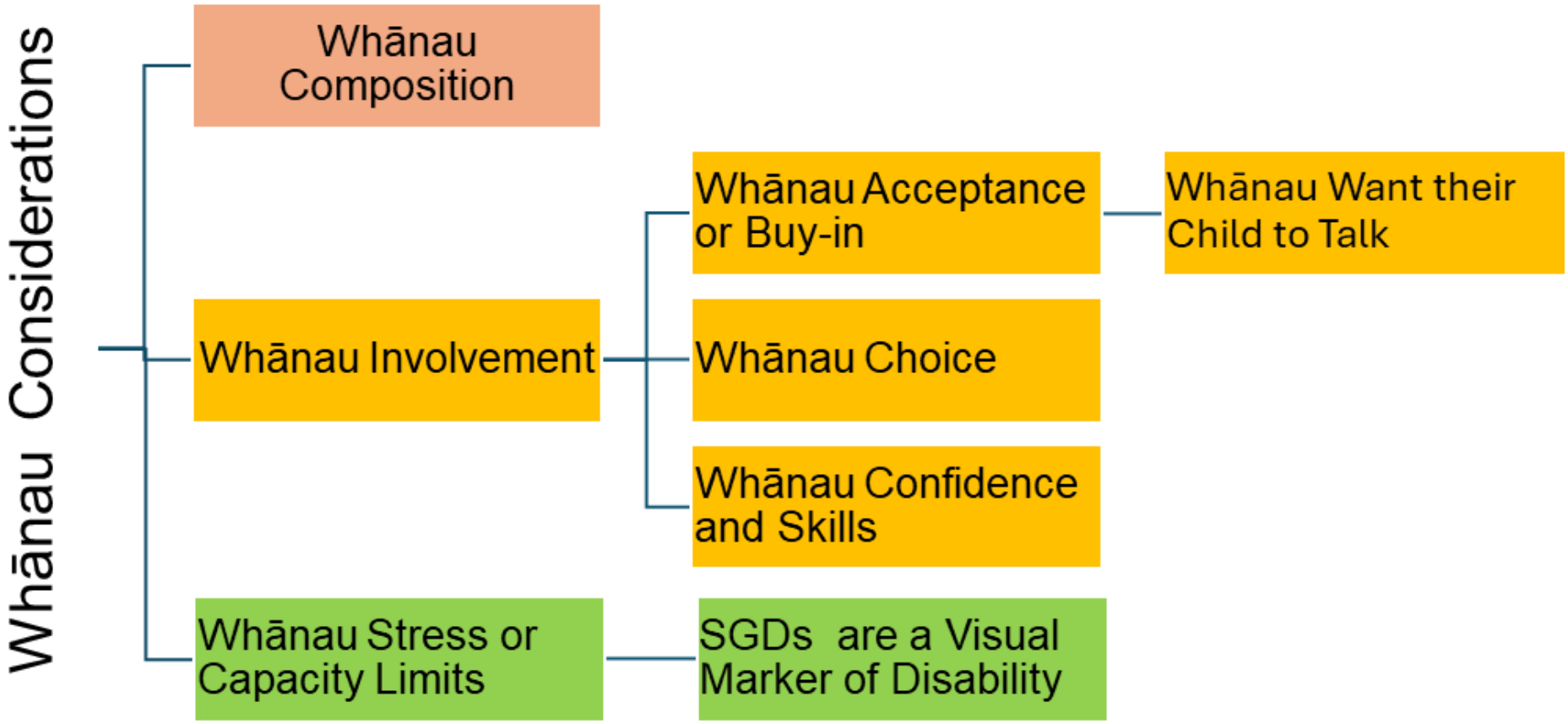
Finally, in this theme were practical issues which were mainly of concern to the supporting adults. Battery life and access to internet in rural areas were noted. However, by far, the most frequent issue stated by participants was the issue of loss or breakage of the device. The knowledge of repair procedures, required insurances, and ownership were often proposed as potential issues. To illustrate, one participant talked about a parent who “said that it had been taken into a swimming pool and it was no longer functioning.” (SLT P3).

Whānau Considerations

This theme related to whānau involvement in the selection and introduction of an SGD. Some subthemes presented in other themes also include whānau. Figure 5 shows the subthemes and related codes.

Figure 5

The Subthemes and Codes in the Whānau Considerations Theme



Whānau Composition

The composition of whānau for a young autistic child is important. Although participants realised that all families and whānau are different, extended whānau were frequently discussed as being part of young children's lives in Aotearoa New Zealand. "I think that's quite a New Zealand thing is… actually that you have very involved grandparents, aunties, uncles [and] extended family." (SLT 1). The extended support for the child was seen as a strength. "The couple of times that I have had someone bring another family member along, I found that that's worked really well." (SLT P7). The issue of co-parenting or parents who live in different houses was noted by one participant as difficult to navigate.

Whānau Involvement

The data within this subtheme was analysed in three main codes: 'Whānau Acceptance or Buy-in', 'Whānau Choice' and Whānau Confidence and Skills'. Whānau involvement in SGD selection and introduction and ongoing use was viewed as paramount to success "the whānau will remain consistent throughout the child's life and if you get them on board, you just get a really consistent team who are gonna advocate for that child when the things change around them in other environments." (SLT P9).

Whānau Acceptance or Buy-in. In their interviews, whānau participants reported differences in the acceptance of SGDs by themselves and wider whānau members. Not surprisingly, as they volunteered to be part of this research, the participants themselves accepted use of SGDs. However, one whānau participant described her excitement to try SGDs, but that it did not work for their whānau. Many whānau participants spoke about the acceptance of other whānau members as being problematic. Three whānau participants introduced the idea that older generations may find acceptance more difficult.

Acceptance by whānau was noted by some SLTs to be of paramount importance but they also noted that this was sometimes difficult to achieve. SLT P7 gave an example of a whānau who despite being "really supportive, really loving, but absolutely no interest in AAC at all. You just say, okay this isn't going to be successful."

Whānau Want their Child to Talk*.* One reason for a lack of whānau acceptance was their wish for the child to talk. Examples included: “My only concern would be that he would rely on it and then maybe that would stop him from talking as much” (Whānau P2). Another reported that their whānau are “still waiting for [whānau member] who's going to talk.” (Whānau P4).

Whānau Choice. Different aspects of whānau choice were described: whānau choosing from own their own knowledge of AAC systems and SGDs without a formal assessment, the selection decision as the whānau choice, and situations where whānau may be given too much choice and feel overwhelmed.

One SLT spoke about whānau who from previous experience or exposure may want a specific SGD or app. Another spoke about whānau who may have tried different apps and are reluctant to be involved again. Others spoke about supporting a selection decision made by whānau even though they did not agree. SLT P6 spoke about the balance of empowering whānau to make decisions and having enough information without being overwhelmed with information. One whānau participant who had been through an assessment and selection procedure felt “that choice thing has just gone like a little bit too far.” (Whānau P5).

Whānau Confidence and Skills. Whānau confidence to use an SGD within the community was described by two participants. The technical abilities of whānau and confidence to utilise the whole whānau for support were also mentioned.

Whānau Stress or Capacity Limits

Most whānau reported the issue of additional stress related to having a young autistic child. Overlapping with this area was information related to whānau grief and the stress and impact on the capacity of whānau. In selecting an SGD, this whānau participant noted: “It just seemed like so much to put on my end. Maybe I was in a bad space or something… most parents of autistic children are in a stressed-out bad space.” (Whānau P5).

This stress is also recognised by those supporting whānau. As one SLT explained: “You know, some of the families I've worked with in the preschool years are so in absolute survival mode, they do not have the capacity for complex pieces of equipment.” (SLT 1).

SGDs are a Visual Marker of Disability. Related to stress of whānau was the idea that the SGD gave a visual reference to the child's disability or need. This was recognised by whānau themselves and also by SLTs that support them. "So, when your family is the odd one out because your child is carrying a device that speaks, then yeah, there needs to be more acceptance, I suppose, everywhere." (Whānau P4).

Team Considerations

Considerations related to people and professionals who support the autistic child or whānau are presented in the theme of 'Team Considerations'. In collected data related to the adults supporting an autistic child, general terms such as 'adults' or 'communication partner' were typically used without further designation. Sometimes whānau were mentioned specifically and when so, this information was described in the theme above.

Even with representation of educators and SLTs in participant groups, data only produced three subthemes related to specific groups of people other than whānau. Firstly, peers were discussed as part of a team. SLTs described thoughts on their own competence and confidence, and educators specifically noted consistency of use of the SGD and the teamwork required to support this to occur. Figure 6 shows the subthemes and related codes.

Awareness of SGDs and their Potential Benefits

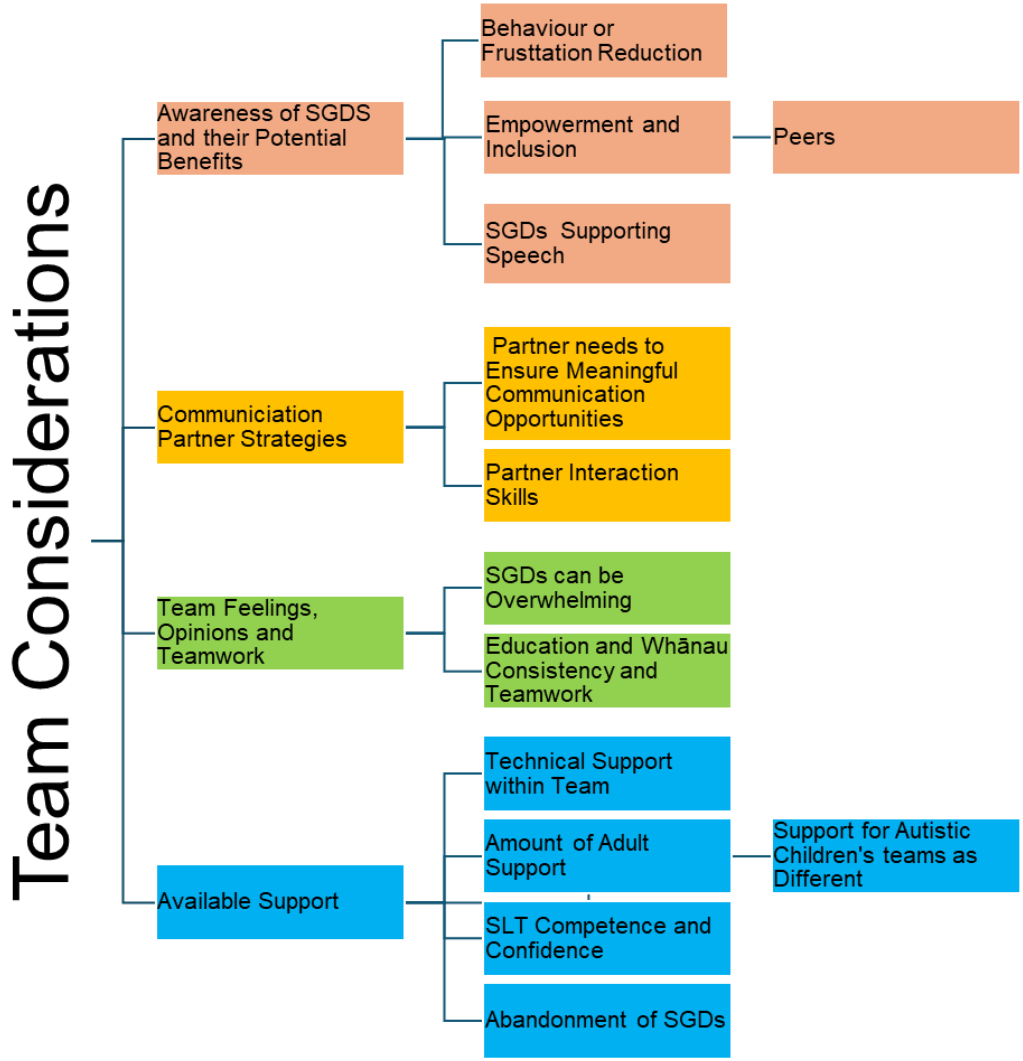
Participants described their ideas of potential benefits of SGDs for preschool autistic children.

> It puts them on the beginning of a trajectory that could mean that they can be more involved in the education long term and that they're more likely to have friendships, that they're more likely to have meaningful relationships with their families, and they are more likely to access the curriculum (SLT P6).

Potential benefits were grouped in three main areas: Behaviour or frustration reduction, empowerment and inclusion, and potential for SGDs to support verbal communication.

Figure 6

The Subthemes and Codes in Team Considerations Theme



Behaviour or Frustration Reduction. Participants from all groups spoke about the potential benefit of SGDs as supporting a reduction in the autistic child's frustration. This is captured in the voice of two whānau participants. The first noted use of an SGD "when the frustrations, the mamae (hurt), the anger that …often comes out as a result of the not being, you know, understood" (Kaupapa Māori P2). The second linked the use of SGDs to longer term benefits and reasoned that it reduces "the struggle…communication difficulties can create just an internal battle frustration." (Whānau P2).

Empowerment and Inclusion. The most common benefit raised by participants in all groups was the potential of SGDs to support young autistic children's inclusion. Concepts such as "freedom" (SLT P5)., "being recognised" (SLT P9)., "supporting identity and whānaungatanga"(relationships). (Kaupapa Māori P1). and "building self-esteem" (SLT P7) were mentioned. This quote encapsulates the overall theme in the data: [SGDs] "empower them to be able to communicate about what they want to communicate about, when they want to communicate about, with whoever they want to communicate about with it." (SLT 1).

Peers. Within the subtheme of inclusion was a code named 'Peers'. The potential benefits of using an SGD with peers of their own age was noted by participants in all groups. As a whānau participant noted: "They'll [adult's will] take the time to really understand and try to really workshop what it is he's trying to say and you know, other 3–4-year-olds won't do that with him, of course." (Whānau P2). SLTs and educators spoke of the benefits of using SGDs with reciprocity with peers, supporting other children to know about SGDs from a young age and as a means to developing friendships. As one educator said, "peers would also say, so and so talked to me, I'll talk back". (Educator P1).

SGDs Supporting Speech. Two participants with SLT backgrounds mentioned the idea of SGDs supporting the development of verbal communication. One SLT explained that her understanding was that research clearly supported the increased likelihood of young autistic children developing spoken language if the child has access to an SGD.

Communication Partner Strategies

The concept of team members being the communication partner of the autistic child was used by all groups of participants. As they spoke about introducing the SGD, strategies to support meaningful and reciprocal communication were stated. These strategies were mostly grouped into two main codes: ‘Ensuring Communication Opportunities’ and the ‘Skills of the Partner in Interaction’.

Partner needs to Ensure Meaningful Communication Opportunities. Many participants reported the need to specifically ensure the availability of meaningful communication opportunities in the introduction of SGDs with young autistic children. This was sometimes linked to the specific needs for autistic children in social communication. One whānau participant talked about this from a home perspective. However, most spoke about all supporting adults generally. An SLT explained that without scaffolding the opportunities: “They [autistic children] can go where they want, they can find the things that give them joy, but that is not necessarily where they're going to have opportunities for communication.” (SLT P9).

Partner Interaction Skills. Linking closely to many other subthemes was the idea that partners need to use their interaction skills to engage the young autistic SGD user. As one whānau participant noted: “you always need a person though” (Whānau P1). Partner interaction skills were also linked to partners recognising the importance of using the SGD in motivating activities. Conversely, using the SGD in less motivating interactions may lead to “the instantaneous rejection of the of the speech generation device, because this person’s going toilet, toilet, toilet in their face.” (SLT P6).

Team Feelings, Opinions and Teamwork

“It's about having all on the same page.” (Educator P2). Participants recognised that team members had their own feelings and opinions and that these may have an impact on the team working together.

As noted in the theme ‘Whānau Factors’, there may be many areas of support needed for a young autistic child. These areas may be supported by different professionals leading to a necessary consideration of priorities. For example: “The EIT (Early Intervention Teacher) saying

most of their focus is on behaviour and sensory regulation. People aren't bringing up communication as an issue at that point. It's like it's just firefighting crisis and behaviour." (SLT P9).

Philosophies were also identified as impacting team understanding. Some teams were noted to have foci in one specific developmental area, such as physical development, and to not focus on communication. For example, one SLT spoke about a team where intervention is "based on physical and sensory and they have no interest in AAC at all" (SLT 6).

The philosophy of the SLT involved may potentially impact on the SGD or other AAC introduced to the team. Lastly team philosophies of support such as transdisciplinary or interdisciplinary practice can impact on how a team works to support the introduction of an SGD. Educator 1 noted that "the value of a transdisciplinary or multidisciplinary team is that cross pollination of skill sets" (Educator 2).

SGDs can be Overwhelming. Sometimes, opinion or emotional reaction were attributed to the overwhelm felt when an SGD was introduced. One SLT gave this example:

> Just last week with my teacher, she said to me [name omitted], how do we peel this back? I'm just overwhelmed with having to go through the pages and then trying to keep my child engaged, but also model and demonstrate the language - and I hear her like I totally hear her (SLT P4).

Education and Whānau Consistency and Teamwork. Whānau and educators spoke of linking of the two key environments in which the child lives. Two whānau participants spoke of the SGD moving between environments, allowing communication between them. However, the most common thought expressed was consistency. As one whānau participant states, the SGD "needs to be consistent in the home and consistent in the learning setting or wherever they are." (Whānau P1).

Available Support

Most participants talked about support needed for introduction of SGDs. Support was noted in terms of technical support within team, amount of adult support, SLT competence and confidence, support for autistic children's teams being different than others and resulting abandonment as a perception of lack of support.

Technical support within Team. The technical support needed for SGDs in order to programme and set up for successful use was recognised in most participant groups. These areas require a knowledgeable team member.

Amount of Adult Support. Data from SLTs specifically introduced the differences in specialist service models (particularly SLT) in Aotearoa New Zealand in comparison to other countries. They also spoke about the quantity of teacher interactions in early childhood settings and the quantity of paraprofessional supports within these settings.

SLTs added to this area in discussing the differences they perceived in the ongoing nature of support needed for teams surrounding young autistic children with SGDs. One SLT contrasted between children who aren't autistic.

> Quite often when they are very motivated to communicate after an initial big push to set up the AAC system and lots of communication partner support. They will continue to develop skills and have a desire to use their AAC without needing lots of extra support and prompting…. For some autistic children, they are going to need a high level of communication partner input and support for their whole life (SLT P9).

SLT Competence and Confidence. In focus groups, SLTs discussed their own confidence and competence. SLTs also felt overwhelmed by SGDs at times. They discussed wanting to know and continue to know the research, gain knowledge and have professional discussions. Confidence was also discussed in reference to considering SGDs with young autistic children: “I think there's just a confidence for practitioners working with that age group around that this is valid and something that we can consider.” (SLT P1).

Abandonment of SGDs. The idea that SGDs are abandoned was reported by those with an SLT background as linked, sometimes implicitly, to the support available to teams. SLTs noted visiting places where devices were not in use or were used for other purposes other than communication. One SLT felt that the level of support that was used at selection and introduction stage was unable to be maintained. “Once you've handed it over and that's where it kind of falls apart.” (SLT P5).

Of concern to SLTs was the thought that if an SGD was abandoned after having been introduced to a young autistic child, the negative experience may inhibit later use.

Selection and Introduction Considerations

The last theme was related to the selection and introduction of an SGD. Figure 7 shows the subthemes and codes relating to this theme.

Contexts to Consider

In addition to the home, participants identified a wide range of other contexts that should be considered if relevant to the autistic child. The complexity of a preschool autistic child's weekly routine was discussed as a complicating factor. One SLT noted that, in her geographical area, in addition to home and education: "They often have a day with Nana, and they have a day at this [named early intervention centre]." (SLT P6).

The educational environment was the most quoted context for consideration. Although, this research focused on preschool autistic children, many participants spoke about considering the tools and experience within the anticipated school the child would attend. Participants talked about the type of ECE service as a required consideration. The type of service had implications for language of instruction, the routine of the child and which team members were involved.

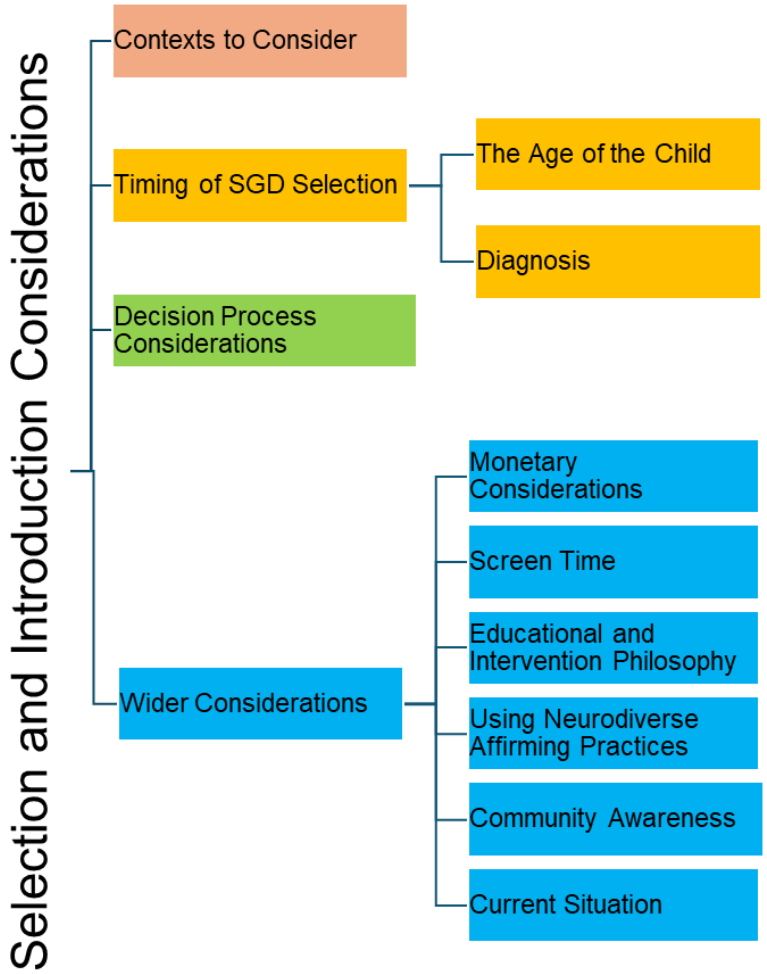
Community contexts were widely identified and included places children access for cultural and religious and medical reasons. Outdoor places, such as sandpits and parks and pools, were reported as places where autistic children spend time. For Māori autistic children a "lot of the learning is in the environment. It's about working in Te Ao Turoa (the earth)., it's about working in ngahere (forest)., at the moana (beach) and at the marae." (Kaupapa Māori P1). Participants recognised that interaction also occurred within transportation between contexts.

Timing of SGD Selection

There were a range of opinions and contributing factors described related to when selection of an SGD should be considered. An understanding of cause and effect, social engagement, having communication intent and being ready to learn were all noted in consideration of timing of the device.

Figure 7

The Subthemes and Codes in Selection and Introduction Considerations Theme



Multiple participants spoke of the idea that an unsuccessful process may result in a lack of participation with SGDs in the future. As Kaupapa Māori P2 stated: “They are going to love it or shove it.”

Other timing factors related to the team and whānau supporting the child and supporting environment. One SLT stated: “It's a lot easier to sort of get everyone involved [in the preschool years] and have a…friendship group who will all support and have that peer learning.” (SLT P6).

Finally, referrals to the assessment process and waiting times were included in the consideration of the timing for SGDs.

The Age of the Child. A specific question to participants addressed the age of the child in selection. Many participants ascribed to the concept of ‘the earlier the better’ in selection and introduction of SGDs. One educator felt: “I think sometimes we restrict children by their age rather than actually …. give them opportunity to experience.” (Educator P1).

Diagnosis. The journey to an autistic diagnosis was described by some whānau participants in depth. They spoke of the time taken to get a diagnosis, sometimes about their relief at the diagnostic label and their journey to acceptance and understanding. Some related diagnosis as a start of further supports. The timing of diagnosis was felt to be a factor in the timing of SGD selection. SLT 6 noted: “So when we're talking about the process of AAC for preschoolers, if they're not even getting a diagnosis or input until after three, they're not even getting anywhere near high tech.” (SLT P6).

The reaction by whānau to the diagnosis was the consideration voiced most often. This was recognised by participants in all groups and summed up here by SLT 1.

> After the diagnosis …even if you have felt for a while that there's something different about your child, and even if you are very neurodiverse affirming and you, you know, are pragmatic … there is a period where you have to consider that the world may not be an easy place for your child and that you have to come to terms with that… And then all of a sudden, the speech therapist is throwing a communication system in front of them, and they haven’t even considered that their child won't learn to speak.

Decision Process Considerations

Decision process considerations relate to many other themes and lead us back to wider influences upon the selection and introduction process. One SLT spoke about the use of the SETT Framework (Zabala, 2020) as a comprehensive framework to support selection of a device. Another spoke of the need for team members leading the assessment to have "been in and seen for themselves what the world around them [the child] looks like to them." (Kaupapa Māori P2).

Whānau themselves spoke of having different roles in the process of selection and introduction of SGDs and this has been described previously in the whānau involvement selection. Although generally the role of whānau in the process was considered important by other members of the team, the role was described as varying considerably. Some whānau "come with a very set idea of what they think is the right thing. So, they will have had an experience of something, or they've watched a video or a YouTube clip, or they've spoken to someone or whatever it might be." (SLT 1).

In one SLT focus group, a discussion about the introduction process occurred. SLTs talked about starting introduction in an educational setting, to elicit success, and then supporting whānau to become more involved. A discussion in the group revealed different experiences with success using this approach.

Wider Considerations

In considering the selection and introduction of SGDs several wider influences were noted. These ranged from monetary considerations to philosophy and currently held beliefs such as screen time, educational and intervention philosophy, neurodiverse affirming practice, community awareness and the current situation.

Monetary Considerations. SGDs are a relatively costly commodity and participants in all groups talked about the financial considerations involved. Some spoke about the funding in Aotearoa New Zealand as "freely available for everybody who needs it, even if there is now gonna be a delay with when you might get it." (SLT 1). SLTs spoke of their perception of less barriers to public funding than experienced in other countries. Other

participants had more negative perspectives and talked about the confusion in systems and information available about public funding.

Screen Time. The fact that an SGD involves using a screen was noted by participants from all groups. Although participants themselves did not report this as a personal consideration, they had experienced situations where this was the case. For example, “they think, oh, it's another screen, we don't like them being on screen. So, I have to try and really explain…. it’s for their voice.” (SLT P5).

Educational and Intervention Philosophy. Strongly linked to the subtheme of ‘support available’ within the ‘Teams’ theme, the philosophy of educational pedagogy and intervention was noted by educators and SLTs. Some contrasted the practices within early years education to experiences in other countries. “The difference in early years provision was mind blowing for me. How much more freedom and play based childcare was here, which is great for children who are able to play independently and form peer relations.” (SLT P9).

The idea that the introduction of an SGD was only a component of intervention and not the culmination of support was also voiced: “Is it the only thing we're going to do then?...We've given them a speech generating device, the child doesn't need anything else?” (Educator P1).

Others spoke of philosophies that underpinned intervention or individual practices. These included those that may seek to cure autism or use behaviourally based interventions.

Using Neurodiverse Affirming Practices. “I suppose it's about really understanding our tamaiti’s (child’s) world” (Kaupapa Māori P2). Participants from all groups spoke about understanding neurodiverse individuals and understanding that the autistic child may have a different way of being in the world. SLTs spoke about their profession as becoming more neurodiverse affirming.

> Like we're trying to do it from a neurotypical angle, maybe we need to think of it slightly more from a neurodivergent angle as to what's going to help their learning the

best in the environment that we keep putting them in, which is very much a neurotypical environment. (SLT P4).

Community Awareness. Many participants spoke about the need for wider community awareness of SGDs and communication needs in general. “What I have noticed in the parks that they're starting to put up the AAC boards across the country and to a building that awareness.” (Whānau P1). Another whānau participant explained the impact on her son who found a paper based AAC system (coreboard) at a park and instantly recognised it and related it excitedly to himself. Participants explained ways they had supported community awareness and gave suggestions for future projects.

Current Situation. Lastly in this subtheme came discussions about the current situation in Aotearoa New Zealand with SGDs. Participants mentioned the current political, research and practice relating to preschool autistic children and SGDs. One SLT stated: “I think also in New Zealand, it’s only really just starting…. It's not usual for preschoolers to have access to high tech devices.” (SLT P9).

Summary

This chapter has outlined the six major themes arising from participant data: Aotearoa New Zealand Considerations: Autistic Child Considerations, SGD System Considerations, Whānau Considerations, Team Considerations and Selection and Introduction Considerations. Each theme has been described including subthemes and illustrated by participant quotes.

In the discussion chapter, the resulting subthemes are linked back to the Bioecological Model and represented visually within the model. The results are discussed with reference to literature.

Discussion

This study sought to answer the research question: What are the considerations for selecting and introducing an SGD for a preschool autistic child in Aotearoa New Zealand? Data were collected using interviews and focus groups from four different groups of participants. The resulting data were analysed revealing six themes: Aotearoa New Zealand Considerations, Autistic Child Considerations, SGD System Considerations, Whānau Considerations, Team Considerations and Selection and Introduction Considerations.

In this chapter, the results are structured within the Bioecological Model (Bronfenbrenner & Morris, 2006). A visual representation of the model with the subthemes mapped within it is presented. Each of the systems from the Bioecological Model is then discussed with linked results of this study, and with reference to the current literature.

Discussion of Results within the Bioecological Model

In the introduction to the thesis, the Bioecological Model was shown in concentric circles, representing the systems relating to an autistic child. This section positions the results within the Bioecological Model and discusses the related considerations. Figure 8 shows the Bioecological Model including the results headings from this study. In doing so it forms a model specific to the selection and introduction of an SDG for a preschool autistic child in Aotearoa New Zealand.

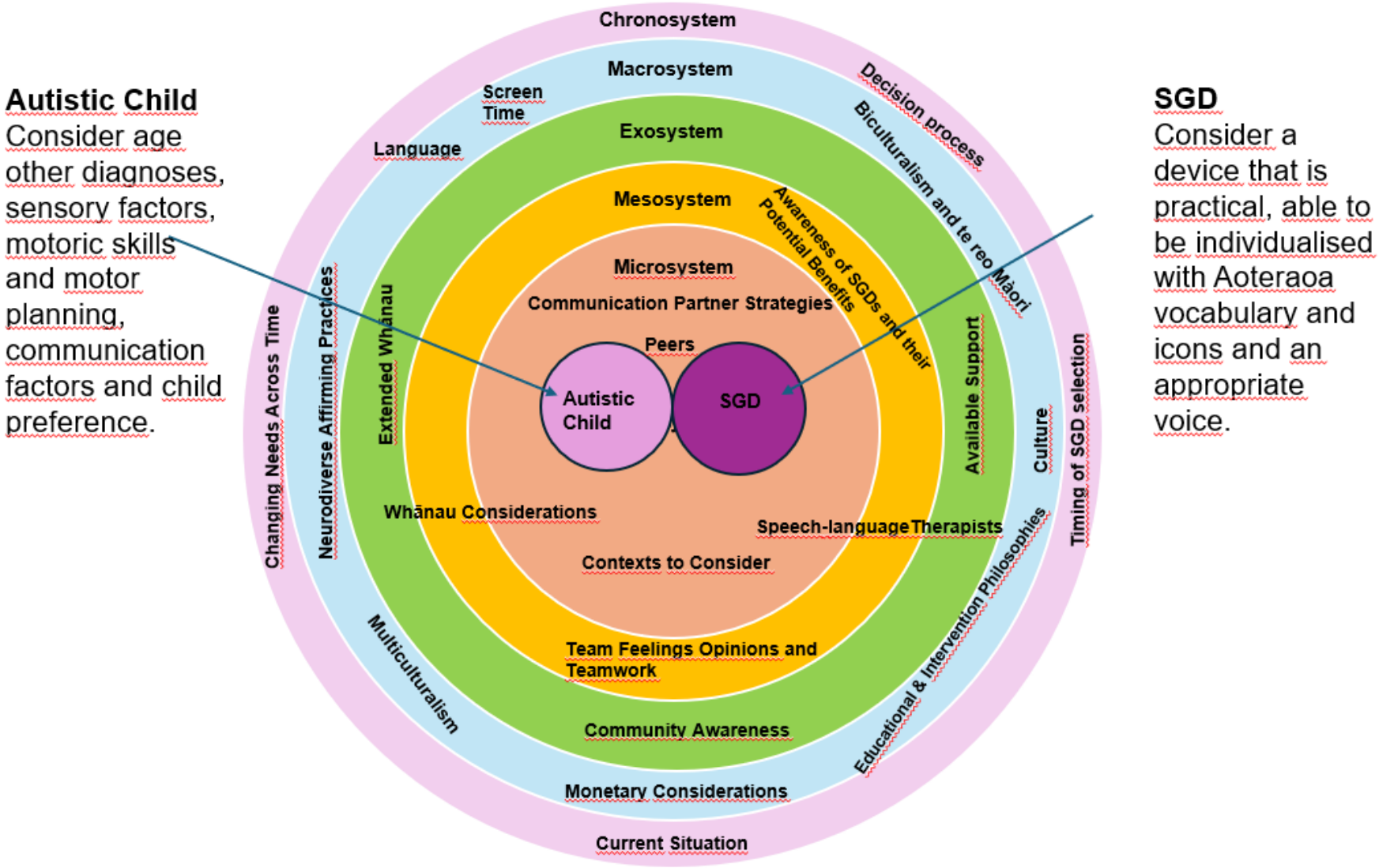
Positioning of Results in the Bioecological Model

The results were positioned into the Bioecological Model using the following process. Firstly, the theme heading was considered within the model to ascertain any direct correspondence in results. The theme of ‘Autistic Child Considerations’ mapped easily into the inner most circle.

Secondly, each subtheme was considered. Where subthemes of a theme fitted into different systems of the model, they were either placed into the respective systems or the theme label placed across systems. For example, for the theme ‘Whānau Considerations’,

Figure 8

The Bioecological Model: Considerations for Selection and Introduction of an SGD for a Preschool Autistic Child in Aotearoa New Zealand.



the subthemes were positioned across Microsystem, Mesosystem and Exosystem because the subthemes themselves could not be positioned easily within the systems of the Bioecological Model. In contrast the four subthemes of 'Team Considerations' each mapped into specific systems in the Bioecological Model and were positioned as such.

Lastly each code within subthemes was considered and placed into appropriate systems if this supported clarity of the subtheme. This was used for codes within the subtheme 'Wider Considerations' as codes related to different systems within the Bioecological Model. The rationale for the positioning of SGDs and Speech-language Therapists (SLTs) are now described.

SGDs. A circle representing the SGD was depicted as touching the autistic child circle. This showed the relationship of the child's interaction with the SGD. An SGD could be considered unique in the model as it is influenced by, and influences the autistic child themselves, through supporting their communication. It is also influenced by, and can influence Microsystems, such as interactions with peers. In wider circles of influence such as the Macrosystem, the SGD has potential to be the voice of the autistic child in the context of cultural and philosophical influences. In the widest circle, Chronosystem, it has the potential to support the autistic child to influence the development of SGDs for the future.

SLTs. SLTs remain a vital part of SGD selection, introduction and ongoing use (Lorang et al., 2022). Mirroring other areas of work, SLTs working with autistic children can utilise a number of different service delivery options including direct work with the children, as well as consultative services to ensure participation, training of others, and family and team support (Campbell & Mears, 2012). Hence, their role may lie within Microsystems, Exosystem or Mesosystem and the word 'SLTs' is placed to fit across the circles representing these systems.

Formatting limitations of the model require that the considerations for the circles of Autistic Child and SGDs are placed in a text box outside of the main model. Each text box is linked into the model with an arrow. In each of the other circles, the relevant headings are

contained within. In the following section, the results of each system within the Bioecological Model are discussed with relevance to current literature.

Individual Level (Autistic Child)

In the centre of the model is positioned a preschool autistic child. The considerations relating to the child are outlined outside the figure in a related text box. The considerations of diagnosis, sensory factors, language learning, motoric skills and planning, prerequisite skills and the child's preference are now discussed.

Autistic Children: Diagnosis. Participants in this study related diagnosis of ASD and the time taken for whānau to come to terms with this diagnosis, to the timing of discussions regarding SGD implementation. The relationship between diagnosis and provision of SGDs is recognised internationally (Fletcher-Watson, 2024). The average age for ASD diagnosis is 6 years, 6 months in Aotearoa New Zealand (Eggleston et al., 2019). This, inevitably, will have a significant impact upon allocation of SGDs to preschool autistic children.

SLT participants spoke of supporting the selection of an SGD where an ASD diagnosis had not been given. Although not specifically stated by participants, this alludes to the view that there are differences in the considerations for autistic children and those who are not autistic.

Research points to the early use of AAC as important (Ganz et al., 2023). Therefore, over time, both a reducing average age of diagnosis and implementation of SGDs should support preschool autistic children's communication. The consideration of diagnosis highlights the complexity in factors and practices impacting the selection and use of SGDs for young autistic children.

Sensory Factors. Results indicated the child's sensory preferences, needs and dislikes should be considered. Sensory considerations include tactile, sounds and visual aspects. Consideration of what supports a child to be regulated and what contributes to their dysregulation, should form part of selection and strategies for introduction. Some research, for example, Lancioni et al. (2016) has considered sensory aspects in relation to SGDs where the individuals have known visual impairment. Sensory differences are a

characteristic of autistic children, but there is a paucity of information relating to sensory preferences and SGD selection for autistic children. The need for further consideration of this aspect is noted in recent literature such as Saxena-Chandhok et al. (2023).

Language Learning. The autistic child's language learning skills need to be considered. Determining vocabulary and language systems that are immediately appropriate, and considering goals for the next 'level' of communication should be determined to inform selection and introduction of AAC (Beukelman & Mirenda, 2013). The child's overall communication skills should also be considered so that an SGD augments a multi-modal communication system. All forms of communication can then contribute to an autistic child being heard and understood in all Microsystems of their life (American Speech-Language-Hearing Association, 2024; Lorah, Holyfield, Miller et al., 2021).

It is notable that some SLTs felt that introducing the 'wrong language system' on an SGD could potentially be harmful. This statement was linked to gestalt language learning which includes learning language through echolalia (Haydock et al., 2024). Research in the area is presently very limited. It is signalled here as a current issue with emerging discussion in the literature.

Motoric Skills and Motor Planning. Neuroscience now recognises differences in motor functions in autistic children (Donnellan et al., 2013) and the importance of supporting consistent motor planning. Manufacturers of SGDs are now integrating the idea of motor planning, through consistent symbol locations, into access to vocabulary. In a recent study, Thistle et al. (2018) considered the effect of consistent symbol locations preschool children who did not have a disability. The results of the study showed a time advantage in accessing symbols when consistency of location is maintained.

Prerequisite skills. Some participants in the study spoke about needing skills for the use of SGDs. This could be interpreted as requiring pre-requisites for SGD use for young autistic children. In relation to this subject, participants often qualified statements noting different AAC, such as low-tech solutions or technological supports, such as switches, as a means to develop skills. The skills developed may be associated with later SGD use.

Cress and Marvin (2003) reflected, over 20 years ago, that devices with voice output did not need particular pre-requisites for implementation. They considered SGDs part of young children and even infants', communication systems. Their examples, however, showed personalisation and simplification of beginning systems.

Joint attention skills have been quoted often for their importance in underpinning language based AAC systems (Beukelman & Mirenda, 2013). In a review over the period of 5 years preceding 2021, Sterr et al. (2021) found that more research was required to consider prerequisites for different AAC modalities. Most recently a study by Sterrett et al. (2023) indicated that autistic children with higher joint attention skills and language skills may benefit more from SGDs. Without disputing access rights to SGDs, the research by Sterrett et al. (2023) indicates that some skills may be associated with better use of SGDs. Further clarity in this area will, no doubt, be very welcome in practice.

Child Preference. Article 12 of the United Nations Convention on the Rights of a Child (1989) affords children the right to express their views in matters that affect them, appropriate to their age. This article could be argued to endorse the provision and use of any equipment, such as SGDs, that will support the expression of a young child.

It also poses an interesting question about how a young child, who cannot rely on their speech to be heard or understood, expresses their choice. In literature, including that involving young autistic children, modality sampling has been offered as a way to support choice. This involves presenting different communication modalities (such as speech, pictures, and SGDs) and considering the frequency of use of the different modalities to support understanding of the child's preference (McLay et al., 2017). Many studies indicate autistic individuals have a preference to use SGDs (Bethune & Boyle, 2023).

Linked to the concept of choice, another key feature noted in autistic individuals is that of reduced cognitive flexibility (Van Eylen et al., 2011). Cognitive flexibility is part of executive functioning which supports shifting between two or more information sets (Shende & Mudar, 2023). In order to make a choice to use an SGD, the information sets pertaining to both use of an SGD and communication without an SGD must be compared.

Participants reported that autistic children sometimes do not want to participate in communication with others. The need to communicate is implicit in a social world and expectations such as communication are heavily influenced through a skills lens of neurotypical development. Some theorists view communication needs in autistic children as linked to less social motivation (Chevallier et al., 2012). Another theory links communication needs with transactional perspectives and the responses they receive to communication attempts. This highlights the impact of reciprocal communication and the response from communication partners (Su et al., 2021).

Article 26 of the Universal Declaration of Human Rights (UDHR) supports “full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms” (United Nations General Assembly, 1948). This creates a tension when considered in relation to supporting communication. An autistic child’s motivation, preferences and what they choose to do with an SGD may be viewed as balanced with striving to support communication essential for rights and freedoms.

SGD

In selecting an appropriate SGD for an autistic preschool child, participants responses indicate that practicalities are important. The SGD hardware must be robust and waterproof and also weather anything that preschool children or preschool life may enact upon it. It must be easily and safely carried by the child and adults, have enough battery life and may be involved in motivating the child’s use.

The software or app upon the device may also support motivation through multi-media use and personalisation. This motivational factor of technology is supported by research from different fields such as assessment (Marble-Flint et al., 2019) and video gaming (Millington et al., 2022). The choice of software or app for an autistic child, to support communication, remains a decision dependent on team knowledge, preferences, features and underpinning theories.

Keyboard. The development of literacy skills is often a secondary

consideration to language development in the reasoning for use of AAC (Tönsing et al., 2024). Provision of a keyboard for preschool autistic children was noted by only about 25% of participants in this study, all of whom were SLTs. Conventional literacy skills may not be taught until compulsory schooling but literacy skills, including letters and included in Te Whāriki as an important step towards a life-long literacy journey (Ministry of Education, 2017). This indicates that further work may need to be done to promote early literacy as a crucial practice.

Voice. The voice expressed by an SGD was a consideration that linked across themes. An appropriate voice is likely to motivate use of an SGD (Westley et al., 2019). Participants in this study had differing views on what might be an appropriate voice for the child(ren) they knew. This study provides yet more evidence for developing a voice suitable for users in Aotearoa New Zealand as essential.

On an SGD, synthesised speech can be generated by the device from text or digitised speech from recording of a real voice (Cowley & Jones, 1992). In this study, Māori voice and congruence of voice with the autistic child were noted as key considerations alongside mentions of volume and other factors. Work is already underway in Aotearoa New Zealand to build a synthesised Te Reo Māori voice through the ‘Tua o Te Pae’ project lead by Geneva Hakaraia-Tino (Shivas, 2022).

Voice banking, whereby an individual records their own voice for later use, is especially useful when the individual has a neurodegenerative disease and is aware of a probable future need for an SGD (Mills et al., 2014). In their study, based in Aotearoa New Zealand, Westley et al. (2019) found that voice banking of te reo Māori speakers supported use of the language and pronunciation. They note te reo Māori is especially difficult to synthesise due to intonation and pronunciation. Banking one’s own voice is reliant on the user currently having speech and language. Therefore, this will not usually be a viable option for obtaining a voice for preschool autistic children.

Another kind of voice banking relates to the use of a donated voice which is then generated into a digitised voice. There have been issues in intelligibility with using digitised

speech of younger children. In their study using voices of 4-7-year-olds, Drager & Finke (2012) found increasing intelligibility with age. Artificial intelligence may support in the future, but a suitable voice may not be easy to produce. However, the inclusion of a voice appropriate for the use of the individual preschool child is viewed as paramount.

SGD Terminology. Terminology in the field of AAC can be problematic. To support clarity, the International Society for Augmentative and Alternative Communication (ISAAC) published a glossary of terms calling for translations for other countries (International Society for Augmentative and Alternative Communication, 2010). In this study, the terminology SGD is used to refer to a high-tech AAC device which speaks. However, in literature a variety of other terms are used; for example, high-tech AAC. Many participants in this study used the term ‘talker’. Konyn et al. (2022) conducted a study of terms with 500 people in the AAC community and found that both ‘SGD’ and ‘talker’ were non-preferred terms, recommending generally against their use. However, they did note that ‘talker’ was noted as a term used for young children. This caveat may provide insight into its use by participants in this study given the focus of the research on the preschool years. Aligning terminology in literature for members of a team such, as whānau and educators, who are an integral part of the selection and introduction for SGDs, may support further teamwork in introduction of SGDs. (International Society for Augmentative and Alternative Communication, 2010).

Selection and Introduction of an SGD. The considerations for selecting, introducing and using an SGD may appear to follow a linear sequence of progression. However, this is not the case. In order to select an SGD, the immediate need of an individual may be balanced with a longer-term need and requires consideration of maximising future communication outcomes (Beukelman & Mirenda, 2013).

Participants in this study spoke about simplification and individualisation of SGDs in order to support their use. However, to simplify an SGD implies that there is something more complex to simplify and an ‘end point’ in sight (Frick Semmler & Bean, 2023).

In neurotypical children, complex language is achieved in the preschool years (Adamson et al., 2014). In their work on application of developmental models to language

learning to AAC in young children, Binger et al. (2024) discuss different AAC approaches. The interdependent communication areas of pragmatics/ social communication, vocabulary and grammatical development are considered. Binger et al. (2024) concluded that there is not one solution that meets immediate and longer-term language needs. For autistic children, specific needs in social communication and future needs in this area may require additional and ongoing consideration (Chavers et al., 2021).

Introducing an SGD, begins a journey of its implementation and, therefore, it is imperative that the introduction is conducive to continued development. **"**Once a system is selected, AAC intervention requires more than taking the device out of the box and handing it over to the individual" (Thistle & Wilkinson, 2015, p. 124). Quinn, Kurin, et al. (2023) discuss implementation research to support adoption of AAC. They note equipment provision, time, teamwork, supports and planning as necessary elements. In this current study, data related to the overwhelm from whānau and other team members, belief in the 'Potential benefits' of SGDs and 'Communication Partner Skills' are important to consider in this context. Research supports this study's findings of the importance of considering attitudes (Johnston et al., 2020; Moorcroft et al., 2020; Moorcroft et al., 2021) and partner skills (Cress & Marvin, 2003).

Additionally, participants identified the available support to the introduction of an SGD was important. Moorcroft et al. (2020) found that many parents felt unsupported in their attempts to introduce an AAC system. Support at an early stage, therefore, may be paramount to successful continuation of use of an SGD.

Microsystem

In correlation with research by Biggs and Hacker (2021), participants in this study reported the home and the educational environment were important contexts to consider. A variety of cultural, religious and outdoor places were noted as important places for some children.

Peers were included as a separate part of the microsystem as they may be found in many locations. Participants spoke of peers as contributing to the rationale of SGD use, as

they are not yet conventionally literate and may have lower communication partner skills. In research, preschool peers also have clear preferences for SGDs over other AAC systems (Lorah, Holyfield, Kucharczyk et al., 2021).

Developing social communication and friendships with peers were perceived by participants as potential benefits for using an SGD with an autistic child. This perception is supported by research. Developing social communication and social interaction is a pertinent goal for autistic children (Drager et al., 2009). Early friendships are also viewed as important as they help young autistic children develop a range of skills that supports a foundation for later adult relationships (Tullemans, 2012).

Mesosystem

The Mesosystem includes the supports and influences upon the Microsystems. In the results, the ‘Awareness of SGDs and their Potential Benefits’ and ‘Team Feelings, Opinions and Teamwork’ relate to this system. In addition, Whānau considerations and SLTs form part of this system.

Studies have shown the importance of interprofessional collaboration for children with ‘speech-language and communication needs’ (Langner & Fukkink, 2022). Working together to support young autistic children (Bateman et al., 2022) and working with families with AAC (Moorcroft et al., 2020) have also been researched. Moorcroft et al. (2020) indicate that linking the Microsystems in which the child communicates is important. This was voiced by participants in this study as important within the Aotearoa New Zealand context. The priorities and opinions of team members related to an autistic child’s needs and SGDs were noted. Team members were noted to consider the benefits of SGDs for communication and, felt there were related benefits such as behaviour reduction. The whānau supports and teamwork were noted as both barriers and opportunities in selection and introduction. The feelings of overwhelm by team members was identified as a key barrier for SGD introduction, indicating a potential need for simplification and supports.

Macrosystem

Considerations placed in the Macrosystem of Aotearoa New Zealand may seem to be positioned a long way from an individual child, but they are nevertheless hugely influential and impact autistic children on a daily basis. Biculturalism and Bilingualism and Screen time are discussed in particular within the Macrosystem.

Biculturalism and Bilingualism. The bicultural framing of Te Tiriti between Māori and Tangata Tiriti (non-Māori party to Te Tiriti) is now resting on a history of colonisation, war, injustice and redress. Tensions continue in the country with proposed parliamentary act changes and protests (Palmer, 2024). Participants in this study had awareness and reported implementing bi-cultural practice. In general, the research in supporting Māori speech and language practice is scarce (Meechan & Brewer, 2021). Although there is little research applied to AAC in particular, there are models which may be used to support assessment practices in general. These may be useful to explore in relation to selecting and introducing SGDs. Models such as ‘He Ritenga Whaimōhio’ (Macfarlane, 2016) support evidence-based practice within a cultural framework and may be useful in supporting bicultural practice.

With te reo Māori kupu used extensively in everyday language (Macalister, 2006) and a rising population who speak te reo Māori (Stats NZ: Tatauranga Aotearoa, 2022), this could be considered a priority for SGD development in this country. Appropriate vocabulary will not be enough. The iconography or symbols used will need to be considered further. The history of Māori symbols holds specific significance in a culture where written language was not used until colonisation (Symbolikon, 2024). Participants requested ‘tasteful’ depictions of themselves (Kaupapa Māori P2). and for symbols to consider the spirituality afforded to entities in the natural world.

A recent scoping review by Mitchell & Baker (2024) concluded that further development of bilingual AAC generally is required worldwide. They note that bilingual AAC is linked to promotion of self-identity. A specific issue for SGD use in Aotearoa New Zealand is the use of te reo Māori as a language on an SGD. Kaupapa Māori P1 stated that “Māori language is the heart of culture”. For some takiwātanga tamariki, an SGD is the access to,

and expression of their language and identity. As such, it is essential to their ability to live as Māori. There is emerging research, for example Collin-Stone (2019) and resources in Aotearoa New Zealand but this journey needs to continue. Internationally, AAC resources are likely to be created for languages spoken by large populations and will be accessed in Aotearoa New Zealand. Only people in this country can fully realise and drive bilingual te reo Māori SGDs. Participants in this study expressed the drive and stated ideas to progress these resources.

Screen time. Research is pointing to the detrimental effects of screens on preschoolers, and recommendations for very limited exposure (Stewart et al., 2019). Further research differentiating passive use and use as a communication tool is needed. Linking with increasing SGD awareness, the need to understand SGDs as communication tools may be essential. Although participants in the study were not generally concerned about screen time, there were many stories told relating to others' concerns about screens.

One of the supporting factors in advocating for SGDs may come from autistic individuals themselves. The community are asking for attitudinal adjustment and further actions to increase AAC use as an accepted communication method (Donaldson et al., 2021).

Chronosystem

Children grow up. What is suitable as an SGD for a 4-year-old is probably not suitable for an adult. Skills will develop, environments and goals will change, and technology will keep advancing. Participants considered the future environments of the child such as school as important to SGD selection and introduction. It may sometimes be possible to choose a child's school early and predict the knowledge and use of SGD systems in another environment in order to include this information.

The most discussed consideration for timing the selection of an SGD was the 'readiness' of whānau supporting the child. Whānau deal with the everyday needs of their preschool autistic child including care and behaviour needs. Timing and amount of support were noted, alongside awareness and acceptance considerations. Perhaps as we move to

the future, changes within the Macrosystem will change perceptions and influence ‘readiness’.

Chapter Summary

This chapter has placed the results of the study within the Bioecological Model to form a visual representation that shows considerations relating to selecting and introducing an SGD with an autistic child in Aotearoa New Zealand. Factors within the model's systems have been discussed with reference to relevant literature. The concluding chapter explains the study, its strengths, limitations and the measures to support trustworthiness of the data. It outlines ideas for practice, and further research.

Conclusion

This concluding chapter summarises the purpose, design, and findings of the study. It addresses the strengths and limitations and potential implications of the results. The trustworthiness of the data and analysis procedures are reviewed and the chapter concludes with some final thoughts from the researcher.

Purpose, Design and Rationale

Some autistic children have speech which is unreliable or inconsistent (Zisk & Dalton, 2019) or is not sufficient to be heard and understood (CommunicationFIRST, 2023). These children may benefit from use of an SGD (Whaikaha-Ministry of Disabled People & Ministry of Education, 2022). Worldwide, there are increasing rates of Autism Spectrum Disorder (ASD) diagnosis, coupled with a decreasing average age of diagnosis. Early intervention, culturally sensitive and neurodiverse affirming practices are encouraged and set a scene for the rationale of this study for using SGDs with preschool autistic children.

This study sought to gather information from a range of participants, who knew or used SGDs with autistic children, through a phenomenological qualitative study using interviews and focus groups. Participant groups comprised of whānau of autistic children, educators, SLTs and those participants with a Kaupapa Māori perspective. This research fills a gap in the literature with a specific Aotearoa New Zealand perspective, for autistic children using SGDs.

Inductive coding was used to analyse the obtained data, and the resulting codes were organised into subthemes and themes. The subthemes were then placed within the Bioecological Model. The resulting model can be used to support exploration of a wide-ranging set of considerations to support decisions in selecting and introducing SGDs with autistic children.

Study Strengths and Limitations

This study's strengths lie in the diversity of perspectives obtained within the data. This included different groups of participants and a geographical spread of participants

within Aotearoa New Zealand. Ethical considerations, outlined in the Methods Chapter, were carefully considered and addressed through the research process.

There are several areas in this study outlined here for consideration. Firstly, the derivation of the research question is discussed. Limitations pertaining to participants are described, with topics of diversity, authenticity and experience summarised. Potential limitations in the method and interpretation of results close the section on study limitations. In each section, steps taken to strengthen the research are given.

Research Question Derivation

Research questions can be co-constructed with stakeholder groups to ensure the voice of those with lived experience and a rigor and worthiness of the question (Cascio et al., 2021; Slunge et al., 2019). The question that guided this study, arose from a practice background. Steps to include autistic participants or their whānau and those with Māori perspectives were taken through advice given by an autistic adult prior to data collection, and a kaitohutohu through the process of research.

Participants

Strengths and limitations with regard to participants are described below. They include issues of participant diversity, authenticity and experience.

Participant Diversity. Participants were gained from each of the planned groups. The two educators interviewed had previously taught in early childhood settings (ECE), but their current positions were within specialist support services to children and ECE. In one regard, this provides strength to data, as these educators have broad experience. However, the voice of educators currently teaching children is not present.

Māori voice was included in the study specifically. Multi-culturalism and other languages were both represented in the data. Participants' backgrounds indicated a lack of Asian and African voices and a need to strengthen Pasifika voice, to fully represent a multi-cultural view.

Whānau from different locations and different whānau roles were captured. However, although intended in the study, the voice of an autistic person or an AAC user was not

directly captured. Autistic individuals did not eventuate as participants from recruitment, and logistical limitations meant further recruitment was not possible.

Participant Authenticity. Within this research, authenticity of participants was questioned. As a result, two participants' transcripts were discounted from the research. Other participants of concern responded to the advertisement but did not follow through the process to attend the meeting. These were not followed up. It is possible that genuine participants were excluded.

Participant Experience. As outlined in the results chapters, the experience of participants using SGDs ranged from those who knew about SGDs, those who had one experience with SGD selection and introduction and those who were regularly involved in the process. A spread of experience with SGDs was inevitable, given the designed participant groups.

Strengths and Limitations of Method

Strengths and limitations in the method of data gathering are also noted. As a small study, this research design split participants into four groups. Greater segmentation of groups of participants are usually correlated with a higher overall number of participants (Peek & Fothergill, 2009). In this study, segmentation of groups is high with to up to three interviews or focus groups per participant group. In addition, participants were grouped with those from similar perspective. An alternative grouping of participants, using focus groups including participants from differing perspectives, may have yielded different results.

Both interviewing and focus groups produce quality qualitative data. Both require skills in stimulating the data through skilled questioning and the interpretation of data. In this study, the process of meeting participants followed the Hui Process (Lacey et al., 2011). This process formed part of the advice from the kaitohutohu but was undertaken by the tauiwi researcher.

Strengths and Limitations in Interpretation of Results

Interpretation of results has been subject to supervision, cultural advice and discussion and participants checking for credibility. In this study, the interpretation of data,

coding and theming were all undertaken by the researcher. As a preliminary study, it has laid the foundation for a further research project designed and interpreted by a team of stakeholders.

Supports to Enhance Quality of the Research

The researcher has engaged several strategies to support the quality of data. These included use of advisors through the research, reviewing participant authenticity when this became an issue, use of online focus groups and interviews to support participant inclusion and confidentiality, use of a code book in iterations to support rich data, trustworthiness, reflexivity and ethical considerations. These are detailed below.

The research utilised advisors from an autistic SGD user and a kaitohutohu, in addition to supervision processes. This advice has supported quality in the process, terminology and interpretation of data within the study.

Participant authenticity arose as an unforeseen consequence in this study. This issue is becoming widespread in health research. This is often linked to compensatory arrangements (Kumarasamy et al., 2024), which is hypothesised to be the case in this study. This authenticity issue resulted in a revision of the ethics process to support greater certainty in participant authenticity.

Online interviews and focus groups were utilised to collect data within the study. This supported quality of research by allowing a wider regional spread of participants, supporting scheduling to include participants and supporting confidentiality for whānau participants.

In coding the data, NVivo14 software (Lumivero, 2023) was used. This allowed participant data to be easily ascribed to codes and collated to subthemes, whilst still maintaining a richness to the data, through use of participant quotes. Thematic analysis was undertaken using the six phrases described by Braun and Clark (2022). Familiarisation with the data was obtained by reading and transcription processes. Coding data included description and interpretive codes and were captured in an initial codebook. The generation of subthemes and themes were supported by use of successive code books, with journaled changes and including given feedback. Rationales for changes were documented and

rationalised with support from supervision and discussion with the kaitohutohu. Naming of themes has also been supported by the kaitohutohu.

Trustworthiness measures were addressed using the ‘Big-Tent’ criteria for qualitative research (Tracy, 2010). These criteria are discussed in detail in the methods chapter. They included supported resonance through participants reading the results and agreeing to the resonance with the data they provided and with the research question. The credibility of the results is enhanced using participant quotes, reflexivity and ethical considerations.

Reflexivity in qualitative research is required, and it must be acknowledged (Whitaker & Atkinson, 2021). To support reflexivity, the researcher has provided a position statement and, where appropriate, acknowledged a position in result interpretation. Reflexivity has been monitored through supervision and journalling.

Ethical considerations of informed consent and confidentiality in the research were addressed firstly using university ethics approval processes. Subsequently ethics approval was obtained through Ministry of Education Ethics Committee for inclusion of their staff.

Informed consent was obtained through use of written information sheets and verbal reiteration at the beginning of the research interaction online. Consent forms were obtained for included participants, and transcript release obtained for participants who engaged in interviews.

Confidentiality of participants was woven into the research design with all whānau participants individually interviewed to enable confidentiality to occur. In focus groups, the limits to confidentiality were described in the information sheet and reiterated verbally before beginning the focus group. In the written results, each participant was randomly assigned a number within their participant group to support confidentiality. Acknowledgements were given to people supporting the research, in any way, only if they chose for their name to be included.

Direction for Future Research

As a multifaceted study, there are many areas for future research indicated. It is now 20 years since the Sutherland et al. (2005) AAC population study in Aotearoa New Zealand.

Quantitatively, understanding the population of SGD users in Aotearoa and, in particular, autistic children using SGDs, would provide a baseline against which changes over time could be measured. A mixed method approach could also provide information about lived experience of autistic individuals with SGDs and the related outcomes.

With research pointing towards the positive impact of SGDs, increasing certainty in this regard is important. We need to know who benefits, how, and in what circumstances. This will then support wider community awareness programmes and the debunking of myths.

The theme of Aotearoa New Zealand Considerations which arose in this research, supports further SGD research in this county. International studies may be integrated as appropriate, but there are some aspects that need to emanate from Aotearoa New Zealand itself. This needs to include tangata te whenua (indigenous people of this land), and te reo Māori speakers.

The results indicate that selection and introduction of SGDs does not fall entirely within the realm of speech-language therapists (SLTs), although they play an integral role. Research to support the most effective team decision making may be vital as technology and practice evolves.

The use of the Bioecological Model to map the subthemes from the study supports a team selecting and introducing an SGD to be aware of considerations in several areas. Further research could expand on the importance and impacts of factors found within the process of selection and introduction in this study. The model could be trialled using a multiple case study design with a team supporting the selection and introduction of an SGD for an autistic child to support the validity of the factors in practice.

Implications for Practice

This study indicates a wide range of considerations impacting the selection and introduction of an SGD in Aotearoa New Zealand. The Bioecological Model has been used to map this into the influencing systems around an autistic child. The resulting model supports teams, considering selecting and introducing SGDs, to think beyond the individual skills of a child and include other considerations which may support or be a barrier in the process.

Selection teams need to be aware of Macrosystem influences such as policy, practice and cultural perspectives. Linked to the Macrosystem, ongoing work to build awareness of people who cannot rely on speech alone to be heard and understood and use AAC and SGDs is vitally important. Conversely, details matter. The results indicate that individual child considerations and the details of the SGD system, physical appearance and accessories are paramount to success.

Finding supporting documents and frameworks to support decision making is difficult and many need adaptations to support selection for preschool autistic children. Using the Bioecological Model may go some way to supporting decision making.

Throughout the results, a wide variety of professionals supporting autistic children were either explicitly or implicitly linked to the selection and introduction of SGDs. It included professionals making ASD diagnoses, those supporting sensory and behaviour needs, those educating children and those supporting the wellbeing of whānau. Information about SGDs, and clarification of professional roles in supporting communication with SGDs, could result in wider support of SGD use.

A recent systematic review has concluded: “It is clear from the reviewed studies that SGDs, combined with evidence-based practices, can increase children's verbal language and social communication utterances” (Weili et al., 2024, p. 252). In this study, it was clear that there is still a misconception about this relationship. Further work to interpret research and support more readily accessible information for team members and the wider community may support awareness and support for SGD use.

An area for further work indicated was information and awareness of those people who use SGDs and other AAC in the community. Participants spoke of community initiatives to place low-tech boards in playgrounds specifically, and the potential impact of this increasing awareness of the need for AAC support. One participant (Whānau P1) introduced the idea to support this awareness early by placing AAC in the rooms where preschool health checks are done. This could perhaps be extended to community places with

technology capabilities, such as libraries and museums and school communal areas, to include SGDs.

There may also be a case for specifically outlining for the community and, perhaps education personnel the different uses of screens for viewing, education use or communication to reduce barriers of perceptions.

In a time where SGDs are becoming more affordable, information and support needs to extend to enable whānau who may have the means to purchase an SGD themselves to understand considerations in the decision-making process.

It is apparent in this study that Aotearoa New Zealand has a strong identity as a country and continued development to support the uniqueness of the culture, language and identity within SGDs is paramount. Although research and projects have started in this area, there is still a paucity of resources to support teams at present, and a need for continuing development.

Final Thoughts from this Researcher

At the beginning of this thesis, literature and current models supporting the practice of selecting and introducing an SGD for preschool autistic children were questioned. The literature review indicated that this is an ever expanding and developing area of work, with contrasting views and research; there is still much to be studied and understood. Allocation of an SGD based solely on an individual deficit model does not support effective practice. Over a short history, there have been significant changes in technology. Changes in practice, neurodiverse affirming, whānau focused, inclusive and culturally sensitive influences are shaping thoughts and actions. There is an explosion of literature in these fields and much to be celebrated.

Participants in this study have contributed their thoughts to the considerations that need to be included in the selection and introduction of an SGD for a preschool autistic child in Aotearoa New Zealand. The results indicate a large group of involved people whose roles influence decisions.

Autistic children themselves are a heterogenous group and understanding their communication and the projected path of development is not yet clear. There are whānau considerations which will be unique for each child and a wider group of people, communities and systems who will view SGDs through their own lens.

In the past, the selection of SGDs has been driven by SLTs. However, expanding information from SGD users themselves, a drive for neurodiversity enhancing and family-centred practice will change the SLT role. In a time where SLT roles are evolving and technology is more available, perhaps work with SGDs will also "move away from a traditional referral model to one of easy access to expertise" (Gascoigne, 2024, p. 201). However, one person or groups cannot do this alone, there are multiple roles and systems influencing decisions and expectations. In the future, perhaps we will achieve a situation where SGDs for preschool autistic children in Aotearoa New Zealand are available, no matter the language spoken or cultural group to which the child belongs where appropriate. SGDs are supported by the wider community and selected and introduced with processes that have clear decision-making. The research systems and monetary considerations will support younger children requiring access to SGDs and we will no longer be in a place where "it's not usual for preschoolers to have access to high tech devices." (SLT P9).

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Appendices

Appendix A: Advertisement for Participants for Focus Groups

Are you interested...

- In supporting communication of young autistic children?
- Using technology to communicate Speech Generating Devices -SGDs ?
- Supporting a framework for use when selecting a device in Aotearoa?

If you are:

- **A person who could support from a Māori perpective (focus group 1)**
- **A Speech language Therapist with an interest in SGDs (focus group 2)**
- **A person who supports young autistic children through their work. e.g. Teacher, allied health professional, support worker (focus group 3)**
- Could spare 90 minutes in March/April 24

Please get in contact for more information
Cheryl.Palmer.1@uni.massey.ac.nz

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

This project has been reviewed and approved by the Massey University Human Ethics Ohu Matatika 1. Application OM1 23/41. If you have any concerns about the conduct of the research, please contact the Chairperson, Massey University Humas Ethics Ohu Matakia 1, email humanethics1@massey.ac.nz.

Kia ora, I'm Cheryl Palmer

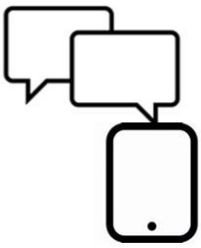
I am a Speech language Therapist and masters student.

My research is aiming to develop a framework, for use in our country, when choosing a device for a young autistic child.

I would love to hear what you think is important in this process.

Appendix B: Advertisement for Autistic Individuals or Whānau

Seeking Autistic individuals or their whānau



Are you interested…

- In supporting communication of young autistic children?
- Using technology to communicate through Speech Generating Devices -SGDs ?
- Supporting a framework for use when selecting a device in Aotearoa?

If you are:

- An autistic person or their whānau
- Are over 16 years of age
- Are familiar with Speech Generating Devices
- Could spare 45 minutes in March or April for an online interview

Please contact me :

Cheryl.Palmer.1@uni.massey.ac.nz

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Kia ora, I'm Cheryl Palmer

I am a Speech language

Therapist and masters student.

My research is aiming to develop a framework, for use in our country, when choosing a device for a young autistic child.

I would love to hear what you think is important in this process.

Appendix C: Information Sheet and Consent for Focus Group

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UNIVERSITY OF NEW ZEALAND

A framework to support the selection of Speech Generating Devices for young Autistic children in Aotearoa New Zealand.

INFORMATION SHEET – FOCUS GROUPS

Tēnā koe, Ko Cheryl Palmer tōku ingoa, Hello, I am Cheryl Palmer. The purpose of this letter is to invite you to be part of my research project.

I am a currently undertaking a research project as part of my Master of Speech and Language Therapy degree in Massey University's Institute of Education. **The focus of my project is to develop a framework to support the selection of speech generating devices (talkers) for autistic children who are not yet at school.** My project is being supervised by Associate Professor Sally Clendon and Dr. Elizabeth Doell.

You may know me as a speech-language therapist with the Ministry of Education. Participating or not participating in this project will not affect any services that you receive from me in this role.

Why am I being asked to take part?
For this research, I will be asking for information **from four groups of participants with relevant expertise:**

1. **Participants with Kaupapa Māori perspectives;**
2. **Speech-language therapists with expertise in SGDs and/or communication supports for autistic children;**
3. **Other people (e.g., kaiako, early intervention teachers) who support autistic children in the early years,**
4. Those with lived experience or whānau of autistic children. Information from this group will be gathered through interviews - A separate information sheet is available. Please note that you may choose to attend both an interview and a focus group if appropriate.

Participants from the first three groups will be invited to participate in focus groups. This is an information sheet for those groups. If you would like to take part in a focus group, please read on.

What is this research about?
In recent years, advances have allowed everyday technology to be used as speech generating devices (SGDs) or 'talkers' by people who do not (yet) speak or need support in this area. Concurrently, research to support autistic individuals has intensified and early intervention is recommended. SGDs are now used by many autistic individuals including children.

In Aotearoa, assessments to determine a suitable device are typically supported by a speech-language therapist. Frameworks to support these assessments often originate overseas and are

designed to support assessment of a wide range of individuals who need support for communication.

This research aims to develop a framework to support assessment of SGDs for young autistic children in Aotearoa. Through integration of recent research in this field, with data from focus groups and interviews, the research aims to produce a framework which is current and relevant in Aotearoa.

What will I be asked to do?
Focus group interviews will be 90 minutes in duration and are anticipated to be held on an online video conferencing platform such as 'zoom'. The interview will be recorded. There will be a maximum of 6 participants in a focus group who will converse on topics related to the research questions. All opinions are valid. All focus group participants will be asked to maintain confidentiality about what is discussed by other participants. This will be explained fully at the start of the group. The focus group with Kaupapa Māori perspectives will be supported by a Kaitohutohu.

What benefits will the research bring?
The developed framework will be available for use and further research. You will receive a $25 grocery voucher as a koha for your time and effort.

What will happen to the data?
The interview and focus group data will be used for developing the framework, as described above. Transcription will be done by myself, so that the data remains confidential. Data will be safely stored on my Massey OneDrive password protected computer and signed consent forms will be securely archived by my supervisors. Data will be kept for 5 years following the end of data collection.

No names or other identifying details of individuals or employers will be used in the project report. Findings may also be used in presentations and publications arising from the research.

You may choose to be named as a contributor in the framework document.

What rights do I have?
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline or not contribute to answering any question including the ethnicity question on consent form
- Withdraw from the study up until the focus group meeting.
- Ask any questions about the study at any time during participation.
- Provide information on the understanding that your name will not be used. You may choose to be named as a contributor to the project but the information you give will not be able to be identified.
- Be given access to a summary of the project findings when it is concluded.

What can I do if participating causes an emotional response?
For all participants Te Whata Ora counselling support is available on Free call or text 1737 any time for support from a trained counsellor.

How do I choose to be involved?
If you agree to take part in my research project, can you please complete the attached consent form and return it to me via email at Cheryl.Palmer1@uni.massey.ac.nz.If you have any concerns about the process of gathering the focus group data, you can contact my supervisor(s).

Student Researcher	Supervisor 1	Supervisor 2
Cheryl Palmer Student Speech and Language Therapy Institute of Education Massey University Cheryl.Palmer.1@uni.massey.ac.nz	Sally Clendon Associate Professor Speech and Language Therapy Institute of Education Massey University +6492136537 S.Clendon@massey.ac.nz	Dr Elizabeth Doell Senior Lecturer Speech and Language Therapy Institute of Education Massey University +64292136531 E.H.Doell@massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Ohu Matatika 1. Application OM1 23/41. If you have any concerns about the conduct of the research, please contact the Chairperson, Massey University Human Ethics Ohu Matakia 1, email humanethics1@massey.ac.nz.

Thank you for considering this request.

Ngā mihi

C. Palmer
Cheryl Palmer
Student ID: [redacted]
Cheryl.Palmer.1@uni.massey.ac.nz

Appendix D: Information Sheet for Interview

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

A framework to support the selection of Speech Generating Devices for young Autistic children in Aotearoa New Zealand.

INFORMATION SHEET – INTERVIEW

Tēnā koe, Ko Cheryl Palmer tōku ingoa, Hello, I am Cheryl Palmer. The purpose of this letter is to invite you to be part of my research project.

I am a currently undertaking a research project as part of my Master of Speech and Language Therapy degree in Massey University's Institute of Education. The focus of my project is to develop a framework to support the selection of speech generating devices (talkers) for autistic children who are not yet at school. My project is being supervised by Associate Professor Sally Clendon and Dr. Elizabeth Doell.

You may know me as a speech-language therapist with the Ministry of Education. Participating or not participating in this project will not affect any services that you receive from me in this role.

What is this research about?
In recent years, advances have allowed everyday technology to be used as speech generating devices (SGDs) or 'talkers' by people who do not (yet) speak or need support in this area. Concurrently, research to support autistic individuals has intensified and early intervention is recommended. SGDs are now used by many autistic individuals including children.

In Aotearoa, assessments to determine a suitable device are typically supported by a speech-language therapist. Frameworks to support these assessments often originate overseas and are designed to support assessment of a wide range of individuals who need support for communication.

This research aims to develop a framework to support assessment of SGDs for young autistic children in Aotearoa. Through integration of recent research in this field with data from focus groups and interviews, the research aims to produce a framework which is current and relevant in Aotearoa.

Why am I being asked to take part?
For this research, I will be asking for information from four groups of adult participants (16 years or older) with relevant experience and residing in New Zealand:

1. Participants with Kaupapa Māori perspectives;
2. Speech-language therapists with expertise in SGDs and/or communication supports for autistic children;

3. Other people (e.g., kaiako, early intervention teachers) who support autistic children in the early years,
4. **Those with lived experience or whānau of autistic children.** *(*An autistic individual or whānau member of an autistic child who has experience of speech generative devices).

This is the information sheet for interviews. There is a separate sheet for focus groups.

Please note: You may choose to attend an interview and a focus group if you identify with one of the focus groups as well as the interview group.

What do I need to know about the interview?
The interview will be conducted online and will take about 45 minutes. If you agree to participate, you will need to have your camera turned on. The interview will be video recorded and transcribed by myself. You will then receive a copy of the transcript to read and sign release for its use in the project.

What benefits will the research bring?
The developed framework will be available for use and further research. You will receive a $25 grocery voucher as a koha for your time and effort. This will be sent to you via postal mail.

What will happen to the data?
The interview and focus group data will be used to develop the framework, as described above. Transcription will be done by myself, so that the data remains confidential. Data will be safely stored on my Massey OneDrive which is password protected. Date will be kept for 5 years from the end of data collection. Signed consent forms will be securely archived by my course lecturers.

No names or other identifying details of individuals or employers will be used in the project report. Findings may also be used in presentations and publications arising from the research.

You may choose to be named as a contributor in the framework document.

What rights do I have?
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Ask any questions about the study at any time during participation including the ethnicity question on the consent form.
- Bring a support person if you would like to do so.
- Have the main interview questions prior to the interview.
- Decline to answer any interview question.
- Ask for the recorder to be turned off at any time during the interview.
- Cease the interview if you feel any discomfort.
- Review the transcript from the interview.
- Withdraw from the study up until the transcript release form is signed.
- Provide information on the understanding that your name will not be used. You may choose to be names as a contributor to the project but the information you give will not be able to be identified.
- Be given access to a summary of the project findings when it is concluded.

If you agree to take part in my research project, can you please complete the attached consent form and return it to me via email at Cheryl.Palmer.1@uni.massey.ac.nz.

If you have any concerns about the process of gathering the interview data, you can contact my supervisors.

Student Researcher	Supervisor 1	Supervisor 2
Cheryl Palmer Student Speech and Language Therapy Institute of Education Massey University Cheryl.Palmer.1@uni.massey.ac.nz	Sally Clendon Associate Professor in Speech and Language Therapy. Speech and Language Therapy Institute of Education Massey University +6492136537 S.Clendon@massey.ac.nz	Dr Elizabeth Doell Senior Lecturer in Speech Language Therapy Speech and Language Therapy Institute of Education Massey University +64292136531 E.H.Doell@massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Ohu Matatika 1. Application OM1 23/41. If you have any concerns about the conduct of this research, please contact the Chairperson, Massey University Human Ethics Ohu Matatika 1, email humanethics1@massey.ac.nz

Thank you for considering this request.

Ngā mihi

C.Palmer
Cheryl Palmer
Student ID: [redacted]
Cheryl.Palmer.1@uni.massey.ac.nz

Appendix E: Easy to Read Information and Consent

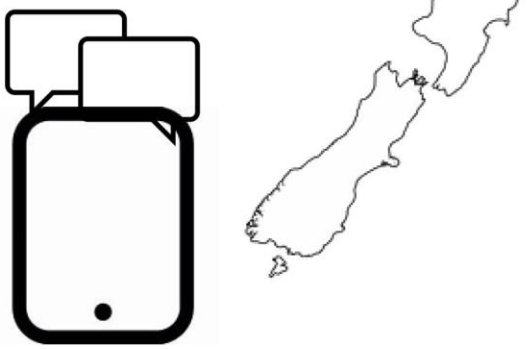
INFORMATION AND CONSENT FORM FOR INTERVIEW

For Autistic individuals or their whānau.

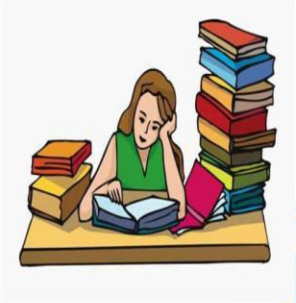
Do you live in Aotearoa New Zealand?

Are you 16 years or older?

Do you have experience speech generating devices (talkers)?



Kia ora and hello, I am Cheryl Palmer
I am a student at Massey University.



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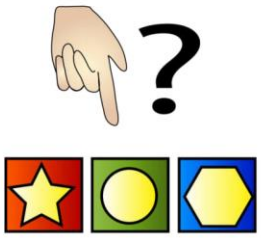
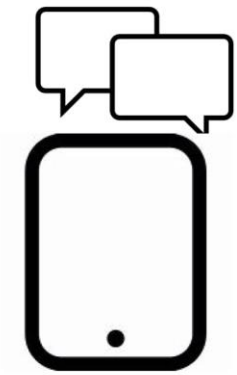
UNIVERSITY OF NEW ZEALAND

I am asking people about what is important in choosing a talker for an autistic child?





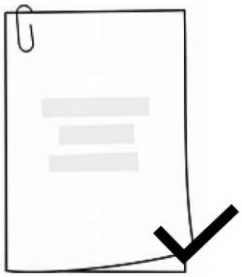
We will meet for about 45 mins. We can meet face to face or online. The meeting will be recorded.

You can choose not to answer a question.

You can ask for the recording to stop.

You can bring a support person if you want.

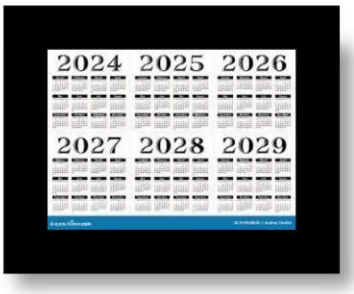
I will type up our meeting notes. You can read them and say they are okay to use.



You can ask questions at any time.

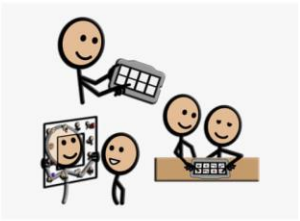
You can pull out of the study until you say yes to the notes.

Your data will be on my locked computer.



It will be held for 5 years.

All other services will stay the same.



I am asking you to tell me your ethnicity. You don't have to say.

You will receive a $25 grocery voucher.

If you would like to take part, please answer the next questions and sign.

I want to take part.

You can record our meeting.

Please put my name on your study.

I will tell you my ethnicity.

My Ethnicity is

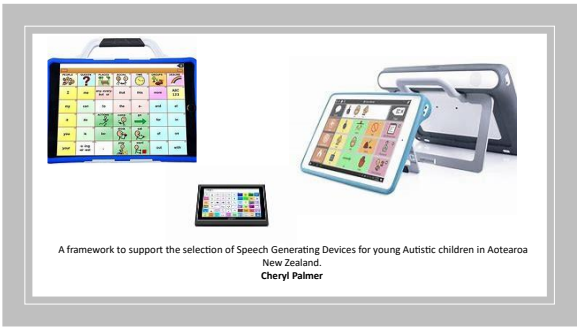
My iwi (if appropriate)

Please sign your name

_____

- *"This project has been reviewed and approved by the Massey University Human Ethics Ohu Matatika 1, Application OM1 23/41. If you have any concerns about the conduct of this research, please contact the Chairperson, Massey University Human Ethics Ohu Matatika 1, email humanethics1@massey.ac.nz."*

Appendix F: Focus Group Hui Process



Preparation
(Slide). *A collage of Speech Generating Devices (SGDs). will be shown on the welcome screen for the online hui.*

Opening
(Used for focus groups where researcher opens hui. For Kaupapa Māori focus group Kaitohutohu will lead opening process until slide 4).
" E ngā mana, e ngā reo, e ngā Iwi, e rau rangatira mā. Tēnā, koutou katoa"
(All peoples of the world, all speakers, all the chiefly peoples here, all groups. Greeting to you all).
"Nau mai, haere mai, piki mai. Kia ora i hui mai tātou katoa "
(Welcome, to you all. Greetings to all gathered here).

(Slide). " Me inoi tatou"

Whakataka tō hau ki te uru,
Whakataka tō hau ki te tonga.
Kia makinakina ki uta,
Kia mataratara ki tai.
E hi ake ana te ata kura
he tio, he huka, he hauhu*nga*.
Hau*m*i e! Hui e! Taiki e!

The wind swings to the west,
then turns to the south, settles down.
Making it prickly cold inland
Making it piercingly cold at sea.
The glowing morning will rise
on ice, on snow, on frost.
Join! Gather! Intertwine!

" Thanks to you all for joining our hui today. At this time, I offer any of you the opportunity to offer karakia if you would like " (wait).
Thanks for karakia if given.

(Slide). Researcher's Mihimihi
Read Mihimihi
" I look forwards to hearing about you. Before we do that, I need to ensure I run through some
information and your consent".

Part 2: Information and consent check
Cover these points.
Due to concerns around participant authenticity and potential use of AI, it is a requirement of the study that participants' cameras are turned on. If your camera remains off, I will need to end the interview or remove you from the focus group".

- Time 90 minutes
- Videotaped
- Rights and responsibilities

  - Named in final document.
  - Participants must reside in New Zealand.
  - The grocery voucher will be sent via postal mail.
- Do not have to answer / all questions
- All opinions are valid.
- Terminology ' Takiwātanga' / autistic children/ Speech generating devices
- As per consent form, once we start the group, you will not be able to withdraw.
- Questions

Part 3: Introductions
Q1). please introduce yourself and reflect briefly on a situation where you have been involved with SGDs?
My research is investigating the information we should be considering when we consider using an SGD/ Talker for a young autistic child in Aotearoa. These are the areas we will be discussing.

From your experience, what information do you think is important to consider:

Part 4: Questions
Q2 Aotearoa Context
- When we think specifically choosing a device in Aotearoa?

Q3: When we think about a child who will use an SGD, what places and contexts do we need to consider?
Sub questions if not addressed:
Q3a What might we need to consider about the community the child lives in?
3b What might we need to consider about the where the child lives?
3c What might we need to consider about the context of the child's day to day life?

Part 5 : Child Factors
Q4 What needs to be considered when you think about selecting an SGD for a young autistic child?
Q5 Does age matter?
Q6 What do we need to consider - about the child's language and communication?
Q6b - about the child's learning?
Q6c - about the child's physical skills?
Q6d - about their sensory skills?

Part 6:Tools
Q7 What are the features of communication apps or devices that are important to consider for young autistic children?

Part 7: Benefits and Considerations
Q8 What do you think might be the potential benefits of young children having an SGD?
Q9 What concerns do you have when you think about a young autistic child using an SGD?

Part 8: Closing
*(For Kaupapa Māori focus group – Kaitohutohu will take over at *).*
"At this point, I will draw our hui to a close. I would like to extend my thanks to you all for your participation and sharing your wisdom and experience.
My next job is to transcribe the discussions from today and collate the themes which will support the development of the framework.
At the conclusion, I will be in contact to offer you a summary from the project. (*).
I will close the hui, as we opened, with inoi.

Appendix G: Interview Hui Process

(Slide). *A collage of Speech Generating Devices (SGDs). will be shown on the welcome screen for the online hui.*

Opening
Kiaora, Nau mai, haere mai. Hello and welcome (name). I'm Cheryl and it is lovely to see you. Thank you so much for your time today.
Is there a particular way you like to start a meeting? Give time for a karakia
At the beginning of the interview/focus group, the student researcher will state: "Due to concerns around participant authenticity and potential use of AI, it is a requirement of the study that participants' cameras are turned on. If your camera remains off, I will need to end the interview or remove you from the focus group".
Thanks, if given/ if not "I'll start us with a traditional karakia"

(Slide). " Me karakia tatou"

Whakataka tō hau ki te uru,	The wind swings to the west,
Whakataka tō hau ki te tong*a*.	then turns to the south, settles down.
Kia makinakina ki uta,	Making it prickly cold inland
Kia mataratara ki tai.	Making it piercingly cold at sea.
E hi ake ana te ata kura	The glowing morning will rise
he tio, he huka, he hauhu*nga*.	on ice, on snow, on frost.
Hau*m*i e! Hui e! Taiki e!	Join! Gather! Intertwine!

Part 2: Information and consent check
Cover these points

- 45 minutes
- Videotaped
- Rights and responsibilities
- Named in final document
- Do not have to answer / all questions
- All opinions are valid
- Terminology ' Takiwātanga' and autistic children
- After the interview I will write it up and send to you to check and sign.
- Questions

Part 3: Introductions
Show Mihimihi or respond with introduction. **Starting Question**
Can you tell me about how you have been involved with SGDs?

Part 4 : Aotearoa Context

Q3: When we think about a child who will use an SGD, what places and contexts do we need to consider?
Sub questions if not addressed:
Q3a What might we need to consider about the community the child lives in?
3b What might we need to consider about the where the child lives?
3c What might we need to consider about the context of the child's day to day life?

Part 5 : Child Factors
Q4 What needs to be considered when you think about selecting an SGD for a young autistic child?
Q5 Does age matter?
Q6 What do we need to consider - about the child's language and communication?
Q6b - about the child's learning?
Q6c - about the child's physical skills?
Q6d - about their sensory skills?

Part 6:Tools
Q7 What are the features of communication apps or devices that are important to consider for young autistic children?

Part 7: Benefits and Considerations
Q8 What do you think might be the potential benefits of young children having an SGD?
Q9 What concerns do you have when you think about a young autistic child using an SGD?

Part 8: Closing
"At this point, I will draw our hui to a close. I would like to extend my thanks to you for your participation and sharing your wisdom and experience.
My next job is to transcribe the discussions from today. I will then send this to you to check and sign the release so I can use the information.
At the conclusion of the project, I will be in contact to offer you a summary from the project.
" Would you like to close our meeting?" (wait and respond).

Appendix H: Codebook

Theme	Sub Theme	Code/ Subcode	Description	Example	Voices heard
Aotearoa Considerations			Data reflects a cultural need or consideration specifically for Aotearoa	*There isn't anything that is currently culturally appropriate or developed specifically for the Indigenous population. Even introducing an AAC device is a very westernized concept.*	**All**
	Biculturalism Te Reo Māori		Talks about biculturalism or Te Reo Māori requirements	*So, taking I know in Aotearoa, we have that biculturalism, and we have that set up, but within that we also have the unique makeup of our country.* *This is really cool that this is something unique to Aotearoa If there are use of Te Reo Māori words.*	All
	Multiculturalism		Talks about reflecting multiculturalism	*Chinese New Year. My relatives who work in Kohanga for example like that they build it into the curriculum because Taniwha is our term for the Dragon.*	Education Whānau
		Other Language Options	Taks about SGDs being able to be in more than one language or having different language options	*There are people who speak languages other than English as their first language, so regardless of it being specifically to New Zealand, I guess if you had a different language, you'd need to be able to use your talker in that language, and maybe some talkers for some people would need to be bilingual.*	Māori Whānau SLTs
	Aotearoa Vocabulary and Icons		Talks about Aotearoa having different language or words then elsewhere	*In New Zealand, we've got a lot of, you know, slang or just we say weird things all the time.*	All
		Aotearoa Iconicity	Talks about icons being acceptable in Aotearoa	*Or like, even if there were things on there that was just like Kiwiana.*	Māori Whānau's

Theme	Sub Theme	Code/ Subcode	Description	Example	Voices heard
Autistic Child Considerations	Other Diagnoses		Talks about considering other diagnoses	*The youngest one also has Global Developmental Delay.*	Whānau Education
	Sensory issues		Talks about differences in sensory inputs or preferences of an individual	*I find it more challenging, a lot of the time for a device to be successful because there might not be a baseline understanding around things like sensory differences.*	All groups
	Motor Skills and Motor Planning		Talks about motor planning in relation to SGD	*I do think about motor pattern strengths. I think that's something that we've seen with some systems that having and you know things in the same way with a distinct motor pattern.*	Education SLT Whānau
	Communication		Talks about the communication skills, needs or communication system of an autistic child	*Communication is varied and wide and complex.*	All
		Language learning	Talks about language learning or ways of language learning	*Is that you are providing opportunities for rich language modelling and access to language systems that will narrow the gap between them and their peers,* *OK, it's not gold standard practice, but it is something.* *Just the whole concept of core vocabulary.*	All
		Gestalt Language Learning	Talks specifically about gestalt language processing	*I'm my other two points about that was just around Gestalt language learning and considerations around that, especially in those early years.*	SLTs
		Multimodal Communication	The SGD is part of an overall communication system	*We have some clients who are completely verbal, but under some sensory settings they need a talker.*	
	Child's Preference		Related to the child's preference or choice in selecting an SGD	*What is their preference, what is their preference in terms of a device or something to support them in this space.*	Education Māori
		Use of Technology as a Preference	Talks about ability of child with technology	*We watch them being able to navigate YouTube from a very, very young age, but yet we won't get them… talkers.*	SLT Education

	Motivation	The child needs to be motivated or interested or features thar would support this within the system.	*What's motivating and engaging?* *None of it was something he was interested in doing. It was awful.*	All
	Child may have own agenda	Talks about child 'doing their own thing 'as a characteristic	*Ah yet, but I know that that's, you know, can as a characteristic of autism that they like to be do with their own thing and kind of be a little bit for the close.*	Whānau' Māori
Changing Needs Across time		Talks about immediate need / longer term needs or changing needs with the user	*If he grows comfortable with its use because you know if something in that device were to change or that programme not be available anymore.*	SLT Māori Whānau
	Changing App	Talks about changing apps with need (or not).	*But she also was really clearly very capable little girl. And so, we needed to give her more than single words or phrases. And so, we kind of played around with the layout then and as it was, she ended up going on to LAMP.*	SLT Whānau SLT).

Theme	Sub Theme	Code/ Subcode	Description	Example	Voices heard
SGD System Considerations	Individualisation		Talks about an SGD needing to be altered to suit the needs of an individual.	*Options to accommodate the individual so customised to their needs.* *It would be lovely to make it more tailor made.* *Personally, I'd love to make them tailor made for each kid, cause each kid's very different.*	All
		Display	Talks about layout or number of items per page	*It's, yeah, depending on what like, I wouldn't choose his grid size for a preschooler.*	SLT Whānau and Māori (the SLTS).
		Dynamic display	Talks about the display changing or dynamic display	*You know, kids at that age where we've gone for something where the screen doesn't change quite so much or where we've customized the display.*	SLT Māori (SLT).
		Needs keyboard or literacy	Talks about the need for links to literacy or having a keyboard	*I mean this would not apply for that very little group, but those children are, I mean, sometimes maybe those hyperlexic kids where literacy is a potential.*	SLT Māori Whānau (SLTs).
		Icons or pictures visual aspects – not specifically Aotearoa based.	Talks about the look of icons/ pictures	*But I think visually cause our children are visual those that have the ability to see. Familiar visual environmental landscape.* *If they are they cartoon or the character-based ones that they do are representative of that, that child and their whānau.*	All
		Contemporary Icons	Talks about icons needing updating or being for now	*I really one thing I wish about LAMP is I really wish I could keep everything the same about LAMP but just update the symbols so they don't look like that from the 1990s because that would just make it so much easier to sell to parents.*	Whānau SLTS
		Music, audio video	Talks about the need for audio, music, video on	*Does this child need audio clips, video clips.*	SLT Whānau

			device to support motivation.		
		Personalisation	Talks about being able to add or amend personal elements in an SGD	*I think I think being I mean all of the systems do it, but it's I think it's quite important for families to be able to add their own words in and I think that is particularly important for the autistic population, who might have very specific interests, which might not be in the device already, but it's very important to have in there.*	SLT Educators Māori
		Simplification	Talks about being able to make a system simpler	*Or is there certain bits that we can, you know, turn on and off to make it easier to use?*	All
		Cognitive load	Information talks about the cognitive load or amount to learn or process	*Need something that where the cognitive load is going to be as little as possible during their life.*	All groups
		Amount of things On a screen	Talks about layout or number of items per page	*It's, yeah, depending on what like, I wouldn't choose his grid size for a preschooler.*	SLT Whānau (SLT). Māori (SLT).
	Practical Considerations for Child's use				All
		Waterproofing	Talks about device being resistant to water	*So, I don't think you'll ever find a device that you can freely run under the tap, but um, if water play is huge, then really thinking about what features do we need to consider that will enable that to be used around water at least?*	SLT Māori
		Robust	Talks about durability or being robust.	*Yeah.Yeah, incredibly robust.* *And the and as you say are there, are they gonna be protected enough to be dropped.*	All
		Control Settings and device only as a talker	Talks about having device locked from editing by child or locked to being a communication tool	*And this group of children, more than any other children I've ever worked with, are the absolute masters of getting into the settings and ruining everything. I have never known anything like it.*	SLT Whānau
		Accessories	Talks about accessories not	*And probably things like if it's got, you know, the ability to have a stand. So, you know the whānau can all be around it*.	SLT Māori

			listed specifically below		
		Keyguard		*And in those cases, sometimes the keyguard can be helpful, and so if thinking about that as well, I think are important considerations, particularly for the little ones.*	SLT Māori
		Related to Portability		*I don't know how it works like if it's strapped or you know how it how it is, but yeah, I would probably be worried that he would lose it.* *Yeah. Other thing was the practical use of having an iPad or something like they were really big.*	SLT Māori
	Voice		Talks about the voice on the device	*You know, like the voice.*	All
		Māori voice	Talks about the need specifically for Māori voice	*Māori voice speaking English and Māori.*	Whānau SLT Educators
		Congruence of Voice with user	Talks about the match of the voice with the user	*I'd want my voice to match me.*	Whānau SLT
		Volume		*The volume, especially in that loud kind of kindy settings.*	SLTs Educators
		Voice factors as sensory consideration	Talks about the tone or volume of voice being a sensory issue	P*ace and tone because (daughter). has high sensory and sound as well. So certain pitch and a person's voice she doesn't appreciate.*	Whānau
	SGD Practicalities of concern to team				All
		Systems for losing of breaking device	Talks about losing device, breaking it or insurance	*What if he breaks it? Who's responsible for it? Who has the insurance on it? They were my concerns.* *Uh, I would say just physically, he's super umm, I mean, I don't know if that's much of an issue, but he's a super active kid.*	All
		Ownership	Talks about who owns device	*So, I wanted to know who owns this, who owns this iPad now? If we were to get one? Is it owned by Ministry of Education? Is it owned by the school?*	Whānau
		Internet Considerations	Talks about an online environment having risks	*My understanding was that this would only have that one app on it wouldn't be connected to the Internet, so that in itself didn't concern me like him having it didn't worry me at all.* *Rural internet*	Whānau Educators

Theme	Sub Theme	Code/ Subcode	Description	Example	Voices heard
Whānau considerations			Talks about whānau factors impact decisions (not otherwise specified).	*Um, but then also like it depends what family you get like for one family. I might not have to consider a lot because they think that the talker is the best thing since sliced bread, but then for another family who's on that journey of, potentially grief or acceptance and things like that, I might be thinking of a lot.*	All groups
	Whānau composition		Talks about members of a whānau	*But the couple of times that I have had someone bring another family member along, I found that that's worked really well.*	Māori SLTs Educators
	Whānau involvement		Aspects of whānau being involved in process	*None of it worked for us. None of it was something I wanted to do.*	All
		Whānau Acceptance or buy in	Talks about the acceptance to try or introduce an SGDs	*Yeah, I think parent buy in might be the biggest barrier.*	All
		Whānau want child to talk	Links SGDS with children with verbal speech	*They're still waiting for their son who's going to talk.* *The biggest thing that comes across is I want them to speak. So, it is giving them a voice.*	SLTs Whānau Educators
		Whānau choice	Talks about the role of whānau choice	*You know, parents will come with a very set idea of what they think is the right thing. Because ultimately it said that's their choice.*	SLT Whānau
		Whānau Confidence and Skills	Talks about skill or confident in choice or selection	*You've got to have parent who or caregivers who are techno cool.* *Thinking as well 'cause, they're gonna be the ones doing all the problem solving if their things are not working, not going right with it.*	All
		Whānau stress or capacity	Talks about stress or difficulty for family	*It just seemed like so much to put on my end. Maybe I was in a bad space or something that most parents of autistic children are in a stressed-out bad space. So yeah.*	SLT
		SGDs are a visual marker of disability	Information talks about the impact of	*So, when your family is the odd one out because your child is carrying a device that speaks.*	

			SDGs as showing disability		
Theme	**Sub Theme**	**Code/ Subcode**	**Description**	**Example**	**Voices heard**
Team considerations			Talks about the opinions, strategies, commitment competence or feelings of team supporting child	*The biggest part for me is if this is what we're going to work on. It has to be collaborative approach.*	All
	Awareness of SGDs and their benefits		Data talks about the benefits of an SGD	*But that's just a way that really works quite well for him to communicate when he's feeling like he can't have a verbal conversation.*	All
		Behaviour or frustration reduction	Talks about SGD having a possible link with reducing frustration	*People aren't bringing up communication as an issue at that point that it's like it's just firefighting crisis.* *I think a reduction in distressed or potentially harmful behaviour is a benefit.*	All
		Empowerment and inclusion	Talks about empowerment, child advocation for themselves or an example that links to this	*But also empower them to be able to communicate about what they wanna communicate about when they wanna communicate about with whoever they want to communicate about with it.* *Makes their lives well. They should have a quality of life just like we do.* *So, it gives them a sense of, you know, even self-esteem and empowerment and their learning journey. Yeah*	
		Peers	Data indicates peers as partners or SGD as a benefit with children.	*Yeah, really handy in social situations with other children,*	All
		SGDs supporting speech	Notes SGDs support verbal communication	*I mean research is really clear that the benefits are huge in terms of communication development, but I think the most obvious potential benefit is that they are much more likely to develop spoken language.*	SLT Māori

Communication Partner Strategies	Partner needs to Ensure Meaningful Communication Opportunities	Data talks about an opportunity for an individual to communicate	*So that's ensuring that it's ensuring that the child's home environment is creating is creating practise opportunities that so here and there.*	All
	Use for different communication goals or functions.	Data talks about why a child uses communication	*Then the days that his talker has come home, it's allowed me to see what they have been capturing at school, like the areas he enjoys, the room, the rooms that he goes to.*	Education Whānau SLTs
	Within social interactions	Talks about using an SGD within interaction or social interaction more generally	*I think if we think of the foundation of communication as learning to interact with other people, but also learning to enjoy it, that's uh, I reckon that's probably a big part of the buy in too. If they can learn that if I do this thing in this person does that thing that's actually quite fun or I want more of that.*	SLT Māori Education
Team Feeling, Opinions and Teamwork			*Oh, I was just gonna say it just depends what else is going on and whether a, is communication the priority for this person or does like does the family want to work on something else that's not communication.*	All
	SGDs can be overwhelming	Talks about feelings of overwhelming, needing to simplify, overload with a device from a team member	*She said to me XX, how do we peel this back? I'm just overwhelmed with having to go through the pages and then trying to keep my child engaged, but also model and demonstrate the language - and I hear her like I totally hear her.*	SLT Whānau Education
	Education and whānau consistency and teamwork	Talks about the need for consistency needed or linkages between education setting and family	*And so, the link between home and the learning setting. But it needs to be stronger for our children.*	Whānau Education
Available Support		Talks about the practical aspects of support for a Talker	*So, I think that's probably the case. Someone else who already knew how to work it be the person using it.*	All
	Technical support Within team	Talks about technical aspects of support	*Especially when something does go wrong, so it's like, well, then, who do they go to, who can use it and fix it and show them.*	SLT Whānau Education

	Amount of adult Support	Information relates to the amount of adult support available	*They actually need a whole lot of adult scaffolding to be successful within AAC device.*	SLTs
	Differences in support for autistic children's teams	Supporting a team around an autistic child is different than other groups	*Whereas for child, for autistic children and for some autistic children, they are going to need a high level of communication partner input and support for their whole life.* *To keep that AAC, umm, work being used?*	Māori SLTs Whānau
	SLT competence and confidence	Talks or alludes to the confidence or skills of the SLT	*I think there's just a confidence for practitioners working with that age group around that this is, and this is valid and something that we can consider.*	SLT Māori (SLT).
	Abandonment	Talks about devices being abandoned	*And once you've handed it over and that's the I reckon that's where it kind of falls apart. Or I've seen it fall apart quite a bit.*	SLTs

Theme	Sub Theme	Code/ Subcode	Description	Example	Voices heard
Selection and Introduction Considerations			Data includes process considerations not specified in subcodes	*There's no way you can cover those 3 environments, and so generally I try to focus on home again with that vein of them being the consistently, the consistent place.*	All groups
	Contexts to Consider		Data includes a context in which the SGD will be used (below expanded from this).	*That could come along with him.* *Those would be the times and the places that that would be really helpful because that's when that's kind of I guess where you get where I as a parent get stuck with my child, where there's not really an answer or a resolution that we can come to.*	All groups
		Car		*In the car.*	SLT
		Community places		*Yeah, mainly in public outings and that sort of those are the places.* *Yeah, public outings and socialising with other children and those would be the places*	All groups
		Education		*Like creche, I know he gets. I know he, you know he can be super antisocial because he just likes his own little world.*	All group
		Home		*Anywhere the child goes and so the home.*	Education SLTs Education
		Marae		*At the marae.*	Māori
		Medical		*Any hospital or clinic appointments.*	SLT
		Peers		*Yeah, really handy in social situations with other children.*	All
		Religious		*Wider community places like churches.*	Education SLT
		Whānau other than parents	Includes siblings, grandparents, and events	*So, when we go to family gatherings and things like that.* *Brother and if they ever have little kerfuffle or whatever.* *Yeah. And they often have a day with Nana,*	All
		Outside		*He plays football.* *With a lot of tamariki a lot of the learning is in the environment. It's about working in te Ao turoa it's about working in ngahere, at the moana.*	Māori Whānau SLT
	Timing of SGD Selection		Talks about factors influencing the timing of a device being introduced with whānau	*And then all of a sudden, the speech therapist is throwing a communication system in front of them, and they have an even considered that their child won't learn to speak.*	SLT

	Age or timing of introduction	Talks about the age or the timing of introduction of an SGD to an autistic child	*Yeah, around this 4-5 age that would be such a big thing.* *I think definitely. Introducing the device early.*	All groups
	Diagnosis	***Refers to the age or timing of autistic diagnosis***	*Some of them are only just starting to get diagnosed around three, 3 1/2.*	SLT Whānau
Decision process considerations			*And we tried three different programmes and I just, yeah, I just didn't like it.*	Whānau SLT Māori
Wider Influences				All
	Monetary considerations	Talks about finding or expense in relation SGDs	*New Zealand has quite a unique funding mode.*	All
	Screen time	Data includes the amount of time that a child spends on a screen	*I'm really scared about screens. I have to say screen time for me as a massive concern at the moment, I mean, there's so much research coming out showing that it's it actually altering children's brains and it's irreversible.*	All
	Educational and Intervention Philosophy	Talks about ethos/ related to curriculum, learning or intervening philosophy and/ or impacts on practice	*So, I think there's always gonna be different like early years centres and schools and stuff, which I'll run with a particular ethos, which potentially isn't as helpful.* *And I don't think that's necessarily specific too Aotearoa.*	SLT Māori
	Using Neurodiverse Affirming practices	References/ interpreted as being about neurodiversity	*I think that. It's just the ability of giving them another way of communicating, you know, because they are not neurotypical.*	***All***
	Community Awareness	Data includes information about awareness of the community	*I'm in what I have noticed in the parks that they're starting to put up the.* *The AAC boards across the country and to a building that awareness.*	Whānau Māori SLT
	Current situation	Talks about what is currently found	*It's only really just starting to become more use well.* *It's not even becoming more usual. It's not usual for preschoolers to have access to high tech devices.*	***SLT***

Appendix I: Massey University Ethics Approval and Revision Approval

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

7/11/2023

Dear: Cheryl Palmer

Re: Ethics Application - OM1 23/41 - A framework to support the selection of Speech Generating Devices for young Autistic children in Aotearoa New Zealand.

Thank you for the above application that was considered by the Massey University Human Ethics Committee:

at their meeting held on

On behalf of the Committee I am pleased to advise you that the ethics of your application are approved.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Professor Craig Johnson
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Appendix J : Focus Group Consent Form

A framework to support the selection of Speech Generating Devices for young Autistic children in Aotearoa New Zealand.

PARTICIPANT CONSENT FORM – FOCUS GROUP

I have read and understood the Information Sheet, or I have had it read to me in my first language. I have had the details of the study explained to me. Any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study until the focus group meeting is held.

- I understand that I have an obligation to respect the privacy of the other members of the group by not disclosing any personal information that they share during our discussion.
- I understand that all the information I provide will be kept confidential to the extent permitted by law, and the names of all people in the study will be kept confidential by the researcher.

Note 1: Participants in this study have the option to be named as a contributor to the final framework document. In this case your name will be published only within acknowledgement section. Note 2: There are limits on confidentiality as there are no formal sanctions on other group

yes no

If yes

Please publish my name as
(Title e.g. Mrs)
(Name)
(Iwi if appropriate)

Signature: Date:

participants from disclosing your involvement, identity or what you say to others in the focus group. There are risks in taking part in focus group research (e.g. another person disclosing your participation in the group) and taking part assumes that you are willing to assume those risks.

I hereby consent to take part in this study

- I agree to participate in the focus group under the conditions set out in the Information Sheet.
- I would like my name published as a contributor in the framework (please circle one)

Full Name – printed

Appendix K : Interview Consent Form

A framework to support the selection of Speech Generating Devices for young Autistic children in Aotearoa New Zealand.

PARTICIPANT CONSENT FORM: INTERVIEWS

I have read and understood the Information Sheet, or I have had it read to me in my first language. I have had the details of the study explained to me. Any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study at any point until the transcript of your interview is approved.

- I agree to participate in this study under the conditions set out in the Information Sheet.
- I agree to the interview being video recorded.

Please amend the below so they read as

- I wish/do not wish to have my transcript returned to me.
- I would like my name published as a contributor in the framework (please circle one)

yes no

If yes

Please publish my name as
(Title e.g. Mrs)
(Name)
(iwi if appropriate)

I hereby consent to take part in this study.

Signature: _____ Date: _____