

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**Perceptions and Experiences of New Zealand School Speech-Language Therapists
on Aided Language Input as an Augmentative and Alternative Communication
Intervention**

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Speech Language Therapy

at Massey University, Albany, New Zealand

Gail Therese Arriola-Bagayas

2021

Abstract

Speech-language therapists (SLT) play a key role in providing intervention for students with complex communication needs (CCN) who use augmentative and alternative communication (AAC). Aided language input is one approach to intervention that involves the communication partner modelling the use of the student's communication system during both natural and structured interactions. AAC intervention studies have explored the effects of aided language input on the language and communication skills of individuals who use AAC; many of these interventions involving communication partner instruction. However, there are only a few studies that explore the perceptions and experiences of SLTs on AAC in their clinical practice. Given the key role of SLTs in AAC intervention, and the importance of providing communication partner instruction, this research examined the perceptions and experiences of SLTs in New Zealand on aided language input as an AAC intervention in the school setting. The research participants were SLTs who currently work in school settings and who provide ongoing support to students with CCN who are using or learning to use AAC.

A convergent mixed methods research design was used in the study. Both quantitative and qualitative data were collected using an online survey with an option of being contacted to participate in a semi-structured interview. Interviews were conducted via Zoom and recorded for later transcription and analysis. The information from the survey and the interview were analysed separately and then integrated and reported together.

The findings suggested that SLTs strongly believe in the importance of aided language input as an AAC intervention. The SLTs described how they implement and support others to implement aided language input and which practices they feel are most effective. They also identified facilitators and barriers to effective implementation which are team members' attitudes, knowledge, skill levels, beliefs and perceptions, and other factors, for example, time, staffing, management support, SLT roles and caseload, AAC systems and funding. In the interview, SLTs identified the support they believe is needed to effectively implement aided language input. This included time, funding, management support and training and supervision. The study documented current practices and also informed best

practice for SLTs in school settings in the New Zealand context. Furthermore, it raised the importance of AAC education at university level and confirmed the need for collaboration and ongoing professional learning and development for SLTs and AAC team members.

Acknowledgements

To the speech-language therapists who took time out to share their experiences, thoughts and ideas in this research, my gratitude to all of you. This is for you and about you, and hopefully, I have captured your voices and was able to share it with respect. In particular, special thanks to the SLTs who participated in the interviews. Your candid and thoughtful insights brought such richness into this research.

I am grateful for the financial assistance from the Assistive Technology Alliance New Zealand (ATANZ) and the Massey University Pathways Scholarship. This support made it possible for me to finish this project.

To Liz Doell, who supported me as my second supervisor – your input enabled me to reflect more about connections in language learning and development. Thank you.

Sally Clendon, this has been a journey. I am immensely grateful for your expertise and knowledge. Most of all, thank you for your patience, as indeed, this took a long time. But, yes we did it, even with the pandemic and everything else in between! I would not have been able to get to this point without your continued encouragement and support.

To my parents and family – thank you! You have always been very positive, and this motivates me to carry on and move forward. My mom deserves a special mention here. She continues to inspire me and her support knows no bounds. As a teacher, she has inspired a lot of her students throughout her years of teaching, then and now. I am grateful for all that you do.

My daughters, Chloe and Jaden – you make each day brighter; thank you for keeping the light shining. I dedicate this to you.

Table of Contents

Abstract	ii
Acknowledgements	iv
Table of Contents	v
List of Tables and Figures	xi
List of Tables.....	xi
List of Figures	xi
Chapter 1: Introduction.....	1
Aided Language Input	1
Communication Partner Instruction	2
Role of Speech-Language Therapists in AAC Intervention.....	3
Rationale and Research Questions	4
Structure of the Thesis	5
Chapter 2: Literature Review	6
Theories of Language Development	6
Constructivist Theory	6
Social Learning Theory	7
Usage-Based Theory.....	7
Social Interactionist Approach	8
Transactional Model of Language Development	9
Language Intervention Strategies	10
Modelling	10
Scaffolding.....	11
Expansion	12
Recast.....	12
Focused Stimulation Approach to Language Intervention	13
Other strategies	13
Aided Language Input	14
Communication Partner Instruction	15
Communication Partner Instruction Models	16
Paucity of Research on SLTs' Perceptions and Experiences of AAC Intervention.....	20
Summary	21
Chapter 3: Research Methodology	22

Research Questions.....	22
Research Approach	22
Types of Mixed-Methods Research Design.....	23
Participants	23
Survey.....	24
Survey Methodology	24
Types of Survey Design	24
Survey Questionnaire Design	24
Survey Procedure	25
Survey Data Analysis	25
Interview	26
Interview Methodology.....	26
Interview Guide Design	27
Interview Procedure.....	27
Interview Data Analysis.....	28
Data Integration	29
Ethical Considerations.....	29
Informed Consent	29
Confidentiality.....	30
Chapter 4: Results	31
Participant Background Information.....	31
Professional Learning and Development	32
AAC Background and Experience	33
Aided Language Input in Clinical Practice	35
Importance of Aided Language Input	37
Evidence-Based	38
Language Learning and Development.....	39
Receptive and Expressive Language	39
Typical Language Development	39
Natural Interactions	40
AAC as a Means of Communication	40
Learning to Operate the AAC System.....	41
Use the System.....	41
Finding the Words on the System	41
Identifying Issues in the System.....	41

Supporting Communication Partners.....	41
Expectations of SLTs in Aided Language Input Implementation.....	42
Effects of Support Provided for Communication Partners	44
Changes in Observable Behaviour	45
Increase in use of AAC system	45
Interaction Skills.....	45
Ways of modelling.....	46
Confidence levels	46
Change in Thinking.....	46
Mindset change.....	46
Understanding.....	46
Importance.....	46
Change beyond the classroom	46
Implementation	47
Professional Development	47
Effects of Aided Language Input on Students	47
Interaction/Social Skills	47
Initiation of Interactions	47
Participation and Social Communication	48
Purposes of Communication	48
Academics	48
Literacy.....	48
Classroom Use.....	48
Observable Behaviour/Skills	49
Confidence Levels	49
Frustration Levels.....	49
Speech Skills	49
Facilitators.....	49
AAC Team Member Characteristics	49
Communication Partner Behaviour and Actions.....	49
Communication Partner Attitude.....	50
Student Attitude and Traits.....	52
SLT Attitudes	52
Understanding of AAC.....	52
Understanding the Reason for AAC	52
Understanding the Intervention	52

Knowledge of AAC.....	53
Time Involved	53
Implementation	53
Training and Learning.....	54
Staffing and Staff Needs.....	55
Training Needs	55
Number of Staff.....	55
Staff Support	55
Management Role.....	55
Management Support	55
Policies	56
Environment.....	57
Availability and Access to the AAC system.....	57
People in the Environment	57
Classroom Environment.....	58
Skill Level of Team Members	59
Communication Partners	59
Students	59
SLT Intervention	59
Role in Intervention.....	59
Intervention	60
AAC System and Use	60
AAC System	60
AAC Use	61
Barriers.....	61
AAC Team Member Characteristics	61
Communication Partner's Behaviour and Actions	61
Communication Partner Attitude.....	63
Student Attitudes and Traits	64
Understanding of Aided Language Input	64
Understanding of the Reason for AAC and Aided Language Input	65
Knowledge.....	65
Perceptions and Pre-Conceived Ideas.....	66
Time.....	67
Support and Referral from External Agencies.....	67
Training and Learning Time.....	67

Implementation	67
Staffing and Needs	68
Staff Issues	68
Staff Training	69
AAC Team Collaboration	69
Management	69
School and Home Environment	69
Classroom	70
Family Situation	70
Skill Level of Team Members	70
AAC Systems Skill	71
Intervention	71
SLT Role	71
AAC System	72
System	73
Trial Period	73
Equipment Issues	73
Implementation Issues	73
Funding Issue	74
Funding	74
Resources	75
Support Needed by SLTs	76
Caseload Reduction	76
Professional Development Opportunities	76
Supervision and Networking	77
Resourcing	77
University-Level Training	77
Management Support	78
Summary	78
Chapter 5: Discussion of Results	79
Perceptions on the Importance of Aided Language Input	79
Clinical Practices in Aided Language Input	81
Perceptions on the Effectiveness of Clinical Practices Implemented	83
Students	83
Communication Partners	84

Perceptions of Factors that Influence Success.....	85
Intrinsic Factors.....	86
Extrinsic Factors	87
Family Natural Environment	87
Education and Knowledge.....	88
Service Provision	90
Management Support	92
Summary	92
Chapter 6: Conclusion	94
Purpose and Rationale of the Study	94
Quality of Research	94
Credibility	94
Transferability	95
Confirmability.....	96
Limitations of the Study	96
Directions for Future Research	96
Implications for Practice and Service Delivery.....	97
Conclusion	99
References.....	100
Appendix A	109
Appendix B	111
Appendix C	113
Appendix D	121
Appendix E.....	122
Appendix F.....	123
Appendix G	124
Appendix H	125

List of Tables and Figures

List of Tables

Table 1: Number of Years of Work Experience	32
Table 2: Number of Years Work Experience in AAC.....	34
Table 3: Current Caseload	34
Table 4: Types of Support Provided to Communication Partners.....	37
Table 5: Importance of Aided Language Input	38
Table 6: Expectations of SLTs from Communication Partners	44
Table 7: Effects on Communication Partners.....	45
Table 8: Other Effects of Aided Language Input	47
Table 9: Facilitators to the Effective Provision of Aided Language Input	50
Table 10: Barriers to the Effective Provision of Aided Language Input	62
Table 11: Identified Support Needed by SLTs	76

List of Figures

Figure 1: AAC Professional Language and Development	33
Figure 2: AAC Systems Used	35
Figure 3: Competency Self-Rating	36
Figure 4: Importance of Aided Language Input.....	38

Chapter 1: Introduction

Augmentative and alternative communication (AAC) systems are forms of communication that are used to supplement or replace spoken communication (Binger & Kent-Walsh, 2010). These forms can range from use of gestures, signs or facial expressions, to pictures, visuals, switches that have voice output, tablets and computers that produce computer-generated speech. AAC serves to enable individuals who have complex communication needs (CCN) to be able to efficiently and effectively engage in activities across settings (Beukelman & Light 2020).

There is often asymmetry between the modalities of language input and output for individuals who use AAC; the language input that they receive is often spoken but the language output expected of them is their AAC system (Smith & Grove, 2003). For this reason, speech-language therapists (SLTs) recommend that communication partners use the individual's AAC system to support language development (Allen et al., 2017). Sennott et al. (2016) described that the early experiences of individuals who use AAC are significantly different from naturally speaking individuals in two ways: 1) that individuals with CCN rarely experience and observe adults using their communication system, and 2) they also have very limited opportunities to participate in a variety of interactions using their own communication system. It is this knowledge of the asymmetry between language input and output, as well as the differences in the communicative experiences between individuals who use AAC and those who communicate using spoken language, that reinforce the need to provide an intervention which involves modelling the use of an individual's AAC system.

Aided Language Input

Aided language input involves the communication partner modelling the use of an AAC system. Various terms are used in clinical practice and in the research literature. These are: System for Augmenting Language (Ronski & Sevcik, 1996), Aided Language Stimulation (Goossens' et al., 1992), Aided Language Modelling (Drager et al., 2006), Aided AAC Modelling (Binger & Light, 2007), and Natural Aided Language (Cafiero, 1998).

In a systematic review of studies on the involvement of children's communication partners in aided AAC interventions, Biggs et al. (2019) describe

three forms of aided language input that communication partners use depending on the goal of the intervention. In the first form, the main focus is on augmenting input whereby the communication partner uses their own voice while modelling the use of the AAC system with no expectation from the child to respond immediately to the interaction. In the second form, the models provided by the communication partner serve as direct prompts to encourage a response from the child. The final form involves the communication partner demonstrating and providing instructions usually to target particular vocabulary or grammatical forms.

Despite differences in terminology and goals of intervention, all of the approaches involve modelling the use of the individual's AAC system. In this report, aided language input refers to AAC intervention that primarily focuses on communication partners modelling student's AAC systems.

Communication Partner Instruction

Binger and Kent-Walsh (2010) narrate that an essential part of AAC intervention is working with communication partners and not just the individuals who use AAC themselves. Any interaction that involves the participants using speech and written words and other conventional means of communicating is, in itself, a complex process. An AAC system adds another dimension and more complexity to the interaction, which leads to the necessity of supporting communication partners to enable them to provide frequent and high-quality social interactions (Shire & Jones, 2015). Furthermore, Kent-Walsh and McNaughton (2005) explained that the success of a communication interaction depends not only on the communication skills of the individual who uses AAC but also on the skills of the communication partner.

Research suggests that communication partners demonstrate communicative behaviours that may not be supportive in developing the communication skills of the individual who uses AAC and may not be helpful in making the communication interaction a success. For example, they dominate communicative interactions, ask mainly yes/no questions, take the majority of the turns, provide limited opportunities for the individual who use AAC to initiate an interaction, frequently interrupt, do not give enough time or opportunity for the

individual who use AAC to respond to the conversation, or they tend to focus more on the technology rather than the message (Blackstone, 1999).

Communication partners may not be aware that these behaviours do not support the language development of the individuals who use AAC. It is important that communication partners are provided with appropriate training to improve awareness of their role in the development of the communication skills of individuals who use AAC. Dolly and Noble (2018) stressed the importance of communication partner instruction and training as a method of AAC intervention because the partners play a key role in developing the individual's use of the communication system. Individuals who use AAC need both implicit and explicit learning opportunities to be provided when using their AAC system (Smith, 2015). It is the role of the communication partner to provide these opportunities. Learning to use an AAC system is not an intuitive process and knowing how to facilitate interactions is not intuitive for most communication partners, therefore, including communication partner instruction in an AAC intervention will likely assist in the improvement of the communication skills of individuals who use AAC (Kent-Walsh et al., 2015).

Role of Speech-Language Therapists in AAC Intervention

SLTs are part of the multidisciplinary team and play an important role in providing AAC intervention. They are involved throughout the whole AAC process including screening, assessment, diagnosis and intervention (ASHA, n.d.). Intervention can be direct or indirect. Tegler et al. (2019) describe indirect intervention as targeting communication partners, with the SLT teaching them different communication strategies (e.g., responsive interaction strategies, pausing and waiting, milieu arrangements and open-ended questions) as well as coaching them how to implement aided language input.

The SLT is part of a team that aims to support the language development of an individual who uses AAC. In a survey by Bailey et al. (2006), SLTs are usually perceived as the informal team leader who encourages teachers to use and model a student's AAC system. They are also perceived by parents of children who use AAC as playing an important role in teaching their children how to use their AAC systems (McNaughton et al., 2008). The SLTs' involvement in the AAC process also

allow them to experience different scenarios to successful AAC use. In a school setting, the SLT together with the special education teacher, are able to identify facilitators to AAC use as well as experience first-hand the barriers to successful AAC implementation (Bailey et al., 2006).

Rationale and Research Questions

SLTs are clearly integral to the assessment and implementation of AAC intervention. A number of AAC intervention studies have demonstrated the impact of aided language input on the language and communication skills of children who use AAC (e.g., Binger & Light, 2007; Drager et al., 2006; Harris & Reichle, 2004; Kent-Walsh et al., 2010; Rosa-Lugo & Kent-Walsh, 2008). There are also studies that focus on communication partner instruction (e.g., Binger et al., 2008; Kent-Walsh et al., 2015; Rosa-Lugo & Kent-Walsh, 2008; Senner & Baud, 2017). However, there are only a few studies that explore the views and insights of SLTs and AAC in their clinical practice. De Bortoli et al. (2014) report that there is limited information on SLTs' experiences and perceptions on the implementation of communication intervention for students with multiple and severe disabilities. A study by Iacono and Cameron (2009) looked at how SLTs in Australia who work in an early intervention setting perceive and utilize AAC. Tegler et al. (2019) is the first study specifically on SLTs' perspective on aided language input wherein they examined the SLTs' perceptions and practices on communication partner training with speech generating devices in Sweden. Currently, there is a paucity of information related to the experiences and perceptions specific to SLTs in New Zealand. It is important to understand the New Zealand perspective as experiences, perceptions and practices of SLTs may vary across contexts.

Given the key role that SLTs play and the importance of providing communication partner instruction in AAC intervention, this research aims to examine the perceptions and experiences of SLTs in New Zealand on aided language input as an AAC intervention in a school setting by addressing the following research questions:

1. What is the importance of aided language input for SLTs as an AAC intervention?

2. What practices are implemented to support or facilitate aided language input?
3. How effective are these practices?
4. What factors influence success of these practices?

It is anticipated that the findings will document current practice, inform best practice, and identify relevant professional learning and development needs for SLTs in school settings in the New Zealand context. Furthermore, the findings may also provide guidance for AAC education at the university level.

Structure of the Thesis

This thesis is organised into six chapters. This first chapter has provided background to AAC and aided language input. It has also outlined the rationale of the study and the research questions. Chapter 2 provides a synopsis of the literature on language development, strategies used to support language development, and aided language input as an intervention including communication partner instruction. In Chapter 3, the research methodology is described together with the data collection and analysis procedures. The ethical considerations for the study are also discussed in the chapter. The results are analysed and presented in Chapter 4. Chapter 5 provides a discussion on the relevant and significant findings as they relate to the research questions and existing literature. Finally, the limitations of the study, implications and directions for future research are presented in Chapter 6.

Chapter 2: Literature Review

This chapter examines theories of language development and language intervention strategies in relation to aided language input. It explores the role of communication partners in augmentative and alternative communication (AAC) intervention and the communication partner instruction models to support them in implementing the intervention. The review also provides an overview of research related to aided language input and communication partner instruction.

Theories of Language Development

Von Tetzchner (2018) discussed current theoretical approaches to language development and its application to aided language development. He compared two major approaches – nativism and constructivism and concluded that the constructivist framework is more applicable and relevant to aided language development. It is based on this premise that the primary focus of the succeeding discussion is on the constructivist approach in language development as it applies to aided language input strategies. Constructivist theory suggests that there are no assumptions about innate knowledge of grammar, but instead language development is formed through the child's experiences in communicative situations with words and grammar emerging from the child's generalizations of both the adults' and their own language use (Von Tetzchner, 2018). There are a number of theoretical approaches to language that align with the constructivist theory.

Constructivist Theory

Jerome Bruner, a psychologist influenced by the works of Vygotsky, developed the Constructivist Theory. This theory stressed the importance of the social environment and the social nature of learning (Smidt, 2011) and emphasized the role of adult scaffolding in supporting a child's learning where the adult and child work together to construct meaning (Ellis Weismer et al., 2017).

Furthermore, Smidt (2011) reported that according to Bruner, for a child to be able to generate the rules of grammar, a history of social and conceptual experience would have occurred. These experiences happen during routine activities and in familiar settings which Bruner calls formats. Smidt (2011) described the formats as closely related to scaffolding, with the formats providing a linguistic version of scaffolding within a daily task. She also outlined that for good teaching

and scaffolding to be effective, it requires the sharing of attention, the child taking carefully reinforced steps, the adult leading the interaction and eventually handing the control of the interaction over to the child, and the adult also adjusting their expectations of the child while at the same time knowing the child's capacities.

Social Learning Theory

Social Learning Theory is based on the premise that learning occurs from interactions with others in a social context (Tadayon Nabavi, 2012). This is a theory by Albert Bandura who posits that humans learn by observing events, concepts and activities modelled by others (Ellis Weismer et al., 2017). Social learning theory is rooted in the basic concepts of traditional learning theories but is also reported to bridge the gap between behaviourist learning theories and cognitive learning theories (Tadayon Nabavi, 2012). This theory goes beyond the behaviour theories that focus on specific stimulus-response strategies. Bandura believes that behavioural reinforcement cannot account for all types of learning, so he added a social element to his theory asserting that individuals learn through observation and the observer acquires symbolic representation of the modelled activities (Bandura, 1971; Tadayon Nabavi, 2012).

Ellis Weismer et al. (2017) state that Social Learning Theory emphasizes the significant role of the interactive context in which language learning occurs. They discuss that modelling provides multiple opportunities for the child to observe language targets in the social context. The child's ability to learn is then dependent on observations and their engagement in authentic language experiences. Furthermore, they stress that in interventions based on this theory, the language targets are identified and modelled by the adult based on the child's current skill and then scaffolded to support the child to achieve the next skill level.

Usage-Based Theory

Tomasello (2003) introduced the usage-based theory of language acquisition wherein he stated that language structure emerges from language use, and that children build their language by relying on their cognitive skills. He further explained that children attend to and understand adult's intentions and can learn language by imitating the adult's intentional communicative actions. For joint attention to be meaningful, the child must understand the adult's communicative

intent as part of the interaction (Boster et al., 2017). Tomasello (2003) narrates that a child will learn to understand a symbol when they start to understand the communicative intent of the adult who is modelling or using the symbol within the natural context. He further states that a child can actively learn language from others in the environment.

Social Interactionist Approach

The social interactionist approach, influenced by the works of Lev Vygotsky, views social interaction as essential for the development of independent cognitive and linguistic function (Schneider & Watkins, 1996). The model explains how children develop their ways of behaving and thinking. It proposes that a child's learning and cognitive development depends upon their socializations and interaction with more knowledgeable persons (Pence Turnbull & Justice, 2012).

The concept of a zone of proximal development (ZPD) is the centre of Vygotsky's theory. ZPD is the distance between a child's current independent skill and the potential level the child can reach or is ready to learn with the support from a more capable adult (Paul et al., 2018). This theory stresses the importance of social interactions for children's language development (Pence Turnbull & Justice, 2012). This is reiterated by Von Tetzchner (2018) who stated that language does not develop just by exposure alone, but is learned through social interactions of a child with other competent peers and adults. He also reported that it is through these interactions that a child is scaffolded into language.

The interaction functions as the context for language learning (Bedrosian, 1997). Liboiron and Soto (2006) report that intervention for children who use AAC transpires in naturalistic and interactive environments which include spontaneous interactions through games, daily routines and activities. Language acquisition, then, is best facilitated by increasing children's participation in natural contexts (Bedrosian, 1997).

Justice (2006) reports that language interventions that are based on the social interactionist approach are defined by three parameters: 1) the communication goals and methods emphasize the function and social nature of communication, 2) there is a focus on the ZPD, specifically when identifying communication goals; and 3) scaffolding is used and considered an essential

ingredient to an effective intervention. This approach allows communication skills to develop through socially meaningful interactions between individuals.

Language scaffolding occurs in these interactions with the competent adult providing language input and support. The scaffolds are the nonverbal and verbal supports provided by the adult to help the child learn new skills that are more advanced than what they can do independently (Justice, 2006).

The responsiveness of an adult to a child's communicative attempt is important during these social interactions. Kaiser and Hampton (2017) state that the adult's responsiveness provides a framework in which models of new language can occur and that the learning of the language is driven by the social purpose of the communication. They further state that the adult plays a critical role in modelling language and that modelling in the context of the child's attention is sufficient to support the child in mapping their understanding of language.

Transactional Model of Language Development

This is a language model which is another interpretation of Social Learning Theory that stresses the importance of social interactions in language development. Fey et al. (2017) state that early social and communication development are facilitated by two-way, reciprocal interactions between children and adults in their own natural environment. They further describe this model as involving change over time as both the child and the environment changes. For example, once an adult recognizes communicative attempts and changes in communicative behaviour, they then repeat and expand the child's message using words. The adult responses are termed linguistic mapping and are reported to support the further development of a child's communication and vocabulary, which in turn creates and encourages more input from the adult. Ellis Weismer et al. (2017) agree that the reciprocal interactions between adult and child provide a natural and positive experience for the dyad.

The language development theories provide a theoretical framework that enable the understanding of how language is learned. The framework also gives credence to the support required for a child to develop language. Social interaction within a child's natural context is a common theme discussed in the different language development theories that falls under the constructivist approach.

Similarly, providing repeated language models and scaffolding to the next skill level are well supported by these theories. A child clearly needs to be immersed in a language rich environment to develop language. Not only do they need exposure to the language itself, but they also need the opportunity to use language in order for their own language skills to develop.

Language Intervention Strategies

What are the language techniques and strategies used when providing aided language input? Porter and Cameron (2007) reported that the same strategies and approaches observed to stimulate language development in children who use spoken language are used in aided language input, with the addition of the symbols or the AAC system.

Modelling

In the context of aided language input, modelling is when the adult or communication partner uses the AAC system or points to the symbol during the interaction. Goossens' et al. (1992) describe it initially as receptive input using the aided symbols because with modelling, the child is then able to see how symbols are used and combined to communicate during an activity or interaction. Similarly, with modelling, the communication partner provides an example of the target word or words using the symbol and thus provides an example of a novel and meaningful production using the child's AAC system (Dodd & Gorey, 2014). Smith (2015) narrates that interventions which include modelling on the individual's AAC system are effective due to the increased indirect opportunities to develop comprehension before putting emphasis on production. She further reports that modelling the use of the AAC system validates that the system is an acceptable and effective means of communication providing a powerful sociolinguistic message to the individual who uses AAC.

In a study by Binger and Light (2007), modelling was carried out using a child's AAC system while providing a grammatically correct spoken model during play activities. For example, during the pretend tea party, the teacher modelled the word "milk" or "more + milk" or "drink + milk" by pointing to the appropriate symbol in the communication board while also saying the word/s. The children in

the study demonstrated generalized use of symbol combinations to new play routines.

Biggs et al. (2018) discuss three functions of aided AAC modelling. First, modelling is used as augmented input to demonstrate that the device is an acceptable mode of communication and that it facilitates language mapping. They further discuss that modelling serves as a prompt with the goal that a child will eventually imitate the model. Finally, they state that modelling is also used when giving instructional demonstrations.

Scaffolding

Language scaffolding is the support provided by more competent communicators with the aim of promoting the individual's communicative autonomy to be able to engage in authentic communication (Von Tetzchner, 2018). Justice (2006) defines scaffolding as the support delivered by an individual to enable another individual to improve his current skill and performance. In addition, she states that it allows the individual to perform skills that are beyond his current independent skill but within the zone of proximal development (ZPD). Justice (2006) also describes ZPD as the area where learning is maximised and therefore is the primary target of intervention.

A study by Rosa-Lugo and Kent-Walsh (2008) investigated the effects of a parent instructional program on the communication skills of two children who use AAC, specifically on the increase in communicative turns and understanding of semantic concepts during storybook reading. Scaffolding strategies were used in the study which were taught to the parents as part of the program. Both children in the study demonstrated an increase in both communicative turns and novel semantic concepts.

Clarke et al. (2017) report the two primary purposes of scaffolding are to: 1) sustain a child's participation in a conversation and 2) create a linguistic environment that supports the acquisition and production of language through exposure to new and more complex language forms. Scaffolding procedures include recasts and expansion. Adult scaffolding of a child's language through the use of expansions and recasts are common strategies used in AAC mediated interactions (Machalicek et al., 2010; Soto et al., 2019).

Expansion. Paul et al. (2018) narrate that expanding a child's utterance involves taking what the child has said and increasing the utterance or adding grammatical markers. Expansion is also demonstrated when the conversational partner imitates the child's utterance and adds a word or phrase to make it more semantically and syntactically accurate (Dodd & Gorey, 2014). In aided language input, new word(s) are added using the child's AAC system to match his/her rate of learning or language level. For example, if the child communicates "car", the adult expands this by responding "cars" or "two cars" using the device to show that there is more than one car. In a study by Liboiron and Soto (2006), the teacher expanded the child's utterance to teach the correct tense using her device. The child initially said "jump, I think bunny jump". The teacher then talked about how they can change the word by navigating to the morphology folder which the child then activated. The exchange went on with the child saying "jumping" and then "I think bunny jumping".

Recast. Recasts are similar to expansions, but instead of expanding the utterance to make it more semantically or syntactically accurate, the child's utterance are expanded into a different type (Paul et al., 2018). Although varied disciplines and authors have used slightly different definitions of recast, they report similar features in that: a) they immediately follow the individual's utterance, b) they include elements of the individual's utterance, and c) they provide an improved and/or contrasting version of that utterance by changing one or more parts of the sentence but still maintaining the basic meaning (Clarke, et al., 2017). Recasts can be classified as either corrective or non-corrective. A corrective recast is when the adult reformulates the child's utterance into the correct form or structure, while a non-corrective recast is when the adult adds to, modifies or expands a correct utterance (Soto et al., 2019).

Recasting as a language strategy has been used with children who use an AAC system. Soto and Clarke (2017) investigated the effect of recasts on the expressive vocabulary and grammatical skills of children, aged 8-14 years old, who rely on AAC to communicate. They used video-recordings to record conversation-based intervention sessions. One example of the conversation where a recast was used had the teacher reformulating what the child said to an interrogative form.

Using his device, the child said “Boy” and the teacher replied “Boy what?” The child then replied “reading a book” to which the teacher then asked “Boy reading a book?” (Soto & Clarke, 2017).

In a different study, Binger et al. (2011) investigated the effects of AAC modelling and recasting on the use of grammatical morphemes. One participant used his device to say “He are eat.” The researcher replied by saying “Let’s try, he is eating” modelling it on the device as He + is + eat + -ing. Binger et al., (2011) reported that modelling and recasting are effective techniques to improve grammar. They further explained that with modelling, the adult is providing increased opportunities for communication and turn-taking. With recasts, the adult attends to what the child is expressing so they respond contingently, thereby building on the child’s message.

Focused Stimulation Approach to Language Intervention

The Focused Stimulation approach focuses on providing multiple models of a specific language goal or linguistic target (Paul et al., 2018). The models occur repeatedly within meaningful communicative contexts in which production of the target is encouraged in the natural setting where the same target is being modelled and used (Ellis Weismer et al., 2017). A variety of language techniques are used in this approach and Ellis Weismer et al. (2017) report that modelling and recasts are common techniques incorporated in Focused Stimulation. Other examples of techniques used are expansion, build-ups and breakdowns, forced choices, and demonstrating use of target (Paul et al., 2018).

Other strategies

There are other strategies applied in supporting the development of communication and language skills which are considered part of aided language input intervention. These include waiting, responding to and attributing meaning to any communicative behaviour or any communication attempt from the child, providing frequent opportunities to observe and practice communication using the child’s AAC system and implementing the intervention in a naturalistic context (Logan et al., 2017; Porter & Cameron, 2007). Implementing the intervention in a natural context is important as it supports the development of social competence (Logan et al., 2017).

Aided Language Input

Aided language input is an evidenced-based AAC intervention. Various studies have shown that providing aided language input enhances the receptive and expressive communication skills of individuals who use AAC and therefore communication partners should use this strategy (O'Neill et al., 2018). For example, studies on the use of aided language input by communication partners showed positive effects on symbol comprehension and production (Drager et al., 2006; Harris & Reichle, 2004), and on multi-symbol messages and generalized use of symbol combinations to new routines (Binger & Light, 2007). Other studies also showed an increase in communicative turns (Kent-Walsh et al., 2010; Rosa-Lugo & Kent-Walsh, 2008). There are different terms used for aided language input in clinical practice and in the research literature which are described in the succeeding discussion.

The System for Augmenting Language (SAL) developed by Ronski and Sevcik (1996) is an approach that considered communicative supports and experiences to enable an individual who use AAC, specifically speech-generating devices, to communicate effectively in everyday environments. They enumerated five integrated components when providing this intervention: the speech-output communication device which must be available for use in natural communicative environments; the use of symbols and printed words which are located above the symbol; the teaching occurs through natural communicative exchanges that encourage but do not require the child to produce symbols; the communicative partner models the use of the symbols or device and that they had training prior to the child's introduction to their device; and finally, there exists an ongoing resource and feedback mechanism.

Aided Language Stimulation is a modelling strategy used to augment both the input and output of aided communication (Goossens' et al., 1992). Goossens' et al. (1992) describe it as the process of providing an aided language model to the student using different AAC strategies. It is further described as a teaching strategy focusing more on receptive training in which the communication partner uses the visual symbols/language represented on the individual's device by pointing to or activating the symbols as he or she is communicating verbally with the user. The

intervention is conducted during routine activities in the classroom. It mimics the natural way that typically developing children learn and comprehend language.

Drager et al. (2006) used the strategy of augmenting a message by providing a model of expansion and implementing it in a natural context, in which a child was provided with a large number of models from adults and given many opportunities to communicate. The authors named their approach Aided Language Modelling because according to them, it did not follow one specific published technique. It involved the use of language boards to implement aided language intervention in highly motivating joint action routines with two preschool children on the autism spectrum. They describe the intervention as consisting of three components: (a) using an index finger to point to a referent in the environment and (b) sequentially pointing to a graphic symbol of the referent, while (c) simultaneously saying the word. The children in the study were engaged in interactive play activities led by an adult who was providing models of the AAC symbols during this naturalistic play.

Binger and Light (2007) used a similar intervention strategy, wherein they provided aided AAC models by pointing to two symbols in the child's AAC system while using a grammatically complete spoken model. The intervention also involved both the adult and the child engaging in play activities. They called the strategy used in their study Aided AAC modelling.

Natural Aided Language developed by Cafiero (1998) is an intervention that involved a communication team who was identified for the child on the autism spectrum. The team chose the vocabulary for a specific activity that was reinforcing to the child. A varied number of symbols were placed on the communication board which was based on the current skill of the child. The interventionist served as a natural model while using the language board in the child's environment. Multiple boards were placed around the room to be used by an interventionist during any incidental teaching moment that occurred, and specific protocols were used for collecting data on the child's progress.

Communication Partner Instruction

There are a number of studies that focused on communication partner instruction and its role in the development of the communication skills of individuals who use AAC. Binger et al. (2010) report that having knowledgeable and

skilled AAC team members is a key indicator of successful classrooms that have students using AAC. The evidence in the analysis of communication partner instruction showed that it improves the skills of the communication partner, provides a positive impact on the communication of an individual who uses AAC and that communication partner instruction is an effective AAC intervention strategy (Kent-Walsh et al., 2015). Marra and Micco (2019) report that training which includes strategy instruction, practice and feedback, helps both the individual who uses AAC and their communication partners increase the understanding of the system and how to use it in more naturalistic situations. This further supports the view that communication partner instruction is a key element in intervention planning for SLTs working with individuals who use AAC.

Communication Partner Instruction Models

Kent-Walsh and McNaughton (2005) developed an instructional model to use in communication partner instruction program called Improving Partner Applications of Augmentative Communication Techniques (ImPAACT). They proposed an eight-step strategic model with the steps as follows: 1) Pre-test and commitment to instructional program, 2) Strategy description, 3) Strategy demonstration, 4) Verbal practice of strategy steps, 5) Controlled practice feedback, 6) Advanced practice and feedback, 7) Post-test and commitment to long-term strategy use, and 8) Generalization. This was based on a teaching and learning strategy model proposed by Ellis et al. (1991). The ImPAACT model includes a three-pronged approach to communication partner instruction which involves 1) selecting appropriate skills to teach communication partners, 2) using effective instructional techniques, and 3) structuring communication partner intervention programs (Kent-Walsh & Binger, 2013).

The communication partner skills that are targeted when using the ImPAACT program are Aided AAC modelling, Expectant Delay, Wh-question asking, Verbal prompting, and contingent responding also described as a modified least-to-most prompting hierarchy (Kent-Walsh & Binger 2013). As not all communication partners are at the same skill level for all the above-mentioned target skills, Kent-Walsh and McNaughton (2005) used the strategy instruction method, which detailed the series of steps to be able to acquire the skill and

accomplish the task. There are five main instructional techniques used in the ImPAACT program. These are video review, modelling, role play, verbal rehearsal and coaching (Kent-Walsh & Binger, 2013). These techniques are all outlined across a series of instructional steps. Although the total instruction time can vary for individual sessions, Kent-Walsh and Binger (2013) report that the total time to complete the whole program can be anywhere between 1.5 – 5 hours of instruction time across 1-6 sessions.

To date, research studies implementing the ImPAACT program have used storybook reading as the context for communication. The communication partners in the studies were Latino parents (Binger et al., 2008; Rosa-Lugo & Kent-Walsh, 2008), Educational Assistants (Binger et al., 2010) and parents (Kent-Walsh et al., 2010). The results of the studies indicated increase in multi-symbol AAC turns (Binger et al., 2008; Binger et al., 2010), and increase in expressive vocabulary and communicative turns (Kent-Walsh et al., 2010; Rosa-Lugo & Kent-Walsh, 2008).

Using the 8-step instruction model of the ImPAACT program, Senner and Baud (2017) conducted a research study to train school staff in partner augmented input. In Step 4 – Verbal Practice of the Strategy Steps, the authors used a mnemonic that they developed to support the staff to remember each step. They call this SMO~~R~~RES, which stands for: **S**low rate, **M**odel, **R**espect and reflect, **R**epeat, **E**xpand and **S**top. Four staff were trained over five weeks in a classroom setting with a total of 8.5 hours training time. Snack time, reading and speech therapy were the three learning contexts included in the study. Similar to the model by Kent-Walsh and McNaughton (2005), the program also used video demonstration, rehearsal, role play and coaching. Results of the study showed an increase in staff utterances between pre-test and post-test across the different learning contexts (Senner & Baud, 2017).

Jones-Wohleber (2018) introduced Model as a MASTER PAL developed from the premise that AAC implementation is not intuitive and that communication is not compliance. Jones-Wohleber explains that the program is about supporting exemplar AAC communication partners to Model as a MASTER PAL, with the acronym to mean – **M**otivate, **A**cept Multiple Modalities, **S**tatements more than questions, **T**ime (wait time and time for growth), **E**ngage naturally, **R**esponse not

required and **P**resume competence, **A**ppropriate prompting, **L**et the child lead. The program consists of 11 modules with each module delivered with a time frame anywhere between 30 minutes to 2 hours. This training series is delivered over time and ongoing discussion and support occurs throughout the program. Jones-Wohleber has provided facilitator notes and guidelines, slides and resources, handouts, discussion prompts, links to videos, and activity suggestions for each module. The topics in the training series all relate to core vocabulary instructions and creating communication opportunities throughout the day. It also covers the concepts and strategies that the communication partners need to know to be able to implement AAC intervention effectively, for example, prompting hierarchy and child-led activities.

Douglas et al. (2012) developed communication interaction strategies that they used in a research study to teach paraeducators who are frequent communication partners of children with CCN in an early childhood setting. The strategies were developed using the ImPAACT model framework with IPLAN and MORE as the strategy steps. The mnemonic IPLAN stands for **I**dentify activities for communication, **P**rovide means for communication, **L**ocate and provide vocabulary, **A**rrange Environment, use **i**nteraction strategies. MORE stands for **M**odel AAC, provide **O**pportunities for communication, **R**espond to child's communication and **E**xtend communication. There are four training sessions identified. The contents of the training sessions included: Importance of communication, Description of IPLAN strategy, Description of MORE strategy, Review of both strategies, and then practice play sessions using both strategies. A total of 2 hours training time was reported. The training format included using the strategy instruction method to deliver the instructional activities, videos to demonstrate the steps, discussions or questions and planning with the paraeducators to implement the steps and then scenario to practice the application of each step. The training also included tests on the steps for each strategy and what each mnemonic stood for. The steps were all implemented during identified play activities between the child and the paraeducator. The results of the study showed that the paraeducators increased the number of communication opportunities they provided and that the children with complex

communication needs demonstrated an increase in the number of communicative turns during the play activity (Douglas et al., 2012).

The Center for Literacy and Disability Studies (2017) at the University of North Carolina at Chapel Hill developed an online communication partner instruction program called Project Core, which is based on the System for Augmenting Language (SAL) intervention approach. The program is aimed at teachers and offers them the training and resources to be able to provide communication instruction in their classroom for their students with complex communication needs. It uses the core vocabulary approach to AAC. It has 14 professional development modules which each takes 30-60 minutes to complete. The Project Core program is a three-tiered system for providing AAC intervention and is based on the multi-tiered System for Augmenting Language (mSAL). The first tier focuses on the classroom and the teacher who are provided with the materials to be able to implement the universal core vocabulary approach. The second tier engages the other school team members, including the SLT, to identify any additional vocabulary needed to further develop a student's communication skills. The third tier then uses the System for Augmenting Language which is the intervention developed by Ronski and Sevcik (1996) that involves the communication partner modelling the use of the AAC system in the student's natural environment.

In this program, the teachers lead the planning and implementation of the program and are supported by their classroom staff. They are taught how to model language every day and classroom staff are involved in different activities to engage students in new and planned interactions. Therapists and other related service providers also play an active role in the implementation of the program. SLTs support teachers in Tier I activities and direct interventions in the development of specialized (Tier II) and individualized vocabulary (Tier III). The coaches facilitate the delivery of the professional development modules and support the teachers in lesson planning and also help them engage in reflection and self-evaluation (Center for Literacy and Disability Studies, 2017). Geist et al. (2021) report that with access to Project Core training and resources, teachers

have the potential to develop their knowledge and skills to support students with significant cognitive disabilities learn to use aided AAC.

Paucity of Research on SLTs' Perceptions and Experiences of AAC Intervention

Aided language input is well documented in current research literature as evidence-based AAC intervention for individuals who use AAC. The literature also illustrates the importance of supporting communication partners in their role in AAC intervention. SLTs play a key role in implementing aided language input as well as supporting communication partners.

Despite the important role that SLTs play, there are limited studies that explore the views, insights and experiences of SLTs regarding the provision of AAC intervention. Bailey et al. (2006) examined the perspectives of six special education teachers and one SLT on device use of older students. Four major themes emerged from the study: student communicative competence, instructional benefits of AAC use, facilitators of AAC use, and barriers of AAC use. Iacono et al. (2009) studied SLT knowledge and perceptions on AAC intervention in an early childhood setting which documented evidence-based practices and barriers to the practices. De Bortoli et al. (2014) explored SLTs' perceptions and experiences of factors that influenced the implementation of communication interventions for students with multiple disabilities. These factors include SLTs' skills and experience, collaboration, professional development, government role and other societal factors. These studies on SLTs' perceptions and experiences addressed AAC intervention in general. Tegler et al. (2019), however, examined the perceptions and experiences of SLTs in Sweden specifically on communication partner instruction with speech-generating devices for communication partners of children with cerebral palsy. The study highlighted the importance of intervention, targeting goal setting and communication partner strategies.

Aside from Tegler et al. (2019), there is no other study that is specific to the SLTs' experiences on communication partner instruction. Currently, there is no research that examines the perceptions and experiences of SLTs on AAC and aided language input in a New Zealand context.

Summary

The language strategies used when providing language intervention are based on different theories of language acquisition and development. Since these strategies are successful in facilitating a child's language development, the literature also suggest that this should be the same strategies used when providing AAC intervention. Scaffolding, recasts, expansions and other language strategies are best implemented together with aided language input to improve the language skills of the AAC user.

Research studies exist on the effectiveness of aided language input as an AAC intervention, including studies on communication partner instruction. There are limited studies that explore the views and perceptions of SLTs in AAC intervention; with one study to-date that focuses on communication partner instruction. This study aims to address not only the gaps in research on SLTs' perceptions and experiences specific to aided language input as an AAC intervention, but will seek to provide a New Zealand focus as perceptions and experiences change depending on the context.

The next chapter outlines the methodology used in the study. It describes the research questions and provides the details on how participants are recruited. The procedures on data gathering and analysis are going to be discussed. The ethical considerations of the study will also be outlined.

Chapter 3: Research Methodology

This chapter discusses the research methods used in the study. It outlines the research questions and provides the rationale behind the method chosen. Furthermore, it details how participants in the study were recruited and how data was collected and then analysed. The ethical considerations of the study are also explored.

Research Questions

This research aimed to examine the perceptions and experiences of speech-language therapists (SLTs) in New Zealand on aided language input as an augmentative and alternative (AAC) intervention in a school setting by addressing the following research questions:

1. What is the importance of aided language input for SLTs as an AAC intervention?
2. What practices are implemented to support or facilitate aided language input?
3. How effective are these practices?
4. What factors influence success of these practices?

Research Approach

A mixed methods research design was chosen for this study. A survey was employed to collect both quantitative and qualitative forms of data. This was followed by a qualitative interview to provide additional information and contextual data based on their experiences. Bazeley (2018) explains that a mixed methods research design involves a collection of both qualitative and quantitative data related to the research question. With mixed methods research design, both types of data are analysed and integrated in the analysis (Creswell, 2015).

This design was chosen based on the core assumption that when a researcher combines statistical trends with personal experiences, perceptions and other stories, the collective strength provides a holistic view and a better understanding of the research focus than either form of data alone (Creswell, 2015). Punch and Oancea (2014) explain further that we often learn and understand more about a topic if we combine the strengths of both qualitative and quantitative data while compensating for the weaknesses of each method. The

quantitative data may not record the experiences of the participants in their own words and can only provide limited understanding of the participants' context, which the qualitative data can address as it not only captures the voice of the participants, but also allows for their experiences to be understood in context (Creswell, 2015).

Types of Mixed-Methods Research Design

There are three primary mixed-method research designs commonly found in health and social sciences. These are convergent mixed methods, explanatory sequential mixed methods, and exploratory sequential mixed methods (Creswell & Creswell, 2018). Creswell (2015) explain that convergent design involves collecting both quantitative and qualitative data, analysing both datasets and then merging the results to compare or validate one set of results with the other. He also defines explanatory sequential as first using quantitative methods before the qualitative methods to help explain the quantitative results in more detail. On the other hand, he states that the exploratory sequential design aims to explore the problem with qualitative methods and then use the findings to build a quantitative phase of the research.

The type of design used in this research was the convergent mixed methods design. There were two forms of data: survey and interview. The survey instrument and the interview guide were developed at the outset of the study and included similar questions. The survey data was not used to inform the interview guide. The interview allowed for more open ended narrative-type responses which added richness and context to the data.

Participants

The research participants were SLTs who work in schools in New Zealand with students who use or are learning to use AAC. They were recruited through the New Zealand Speech-Language Therapists' Association (NZSTA) and an email list group for SLTs working in special schools. An email containing the information about the study and a link to the survey was sent out to these organisations to distribute to SLTs.

At the end of the survey, the participants were given an option to participate in a one-on-one interview. There were 21 respondents who agreed to

participate in the interview. Based on the discussion with the research supervisor, six were chosen out of the 21 to represent SLTs across a variety of work settings. The participants who were selected for the interview were contacted via the email address they provided in the survey. The Participant Information Sheet (Appendix B) and Consent Form (Appendix E) were sent together with the email invitation.

Survey

Survey Methodology

In survey research, the researcher asks questions to capture and describe people's beliefs, attitudes, behaviours or characteristics (Ary et al., 2010; Creswell & Guetterman (2019). A survey is efficient without increasing time and cost as data can be collected from a larger number of people at a low cost (Check & Schutt, 2012). A survey was used in this study because it allowed the researcher to understand the current attitudes and perceptions of SLTs who work with students with complex communication needs (CCN) in a school setting.

Types of Survey Design. There are two types of survey design: cross-sectional and longitudinal (Punch & Oancea, 2014). A cross-sectional survey is when data is collected at one point in time from a population while a longitudinal survey is when data is collected over an extended period of time (Ary et al., 2010). A cross-sectional survey design was used in this study.

Survey Questionnaire Design

A survey questionnaire is a form used in survey designs that is developed by the researcher. Participants are asked to complete the questionnaire and return it to the researcher (Creswell & Guetterman, 2019). It gathers factual information such as personal background and demographics and also information on variables like attitudes, beliefs, experiences and opinions (Punch & Oancea, 2014).

The survey questionnaire for the current study (Appendix C) contained multiple choice questions, closed and open-ended questions and Likert Scales. Questions 1-9 gathered demographic data which included questions on the participants' educational background, work experience, work setting, training and professional development related to AAC and the AAC systems they have used. Using a Likert Scale, the participants were asked to rate their competency with using each system when providing aided language input. A Likert Scale was also

used for the participants to rate how important aided language input is in their clinical practice. The other questions were aimed at exploring their experiences related to aided language input in school settings.

The questions were developed following Creswell and Guetterman's (2019) guidelines which state that designing a survey for data collection should have a variety of questions that include personal, attitudinal, and behavioural questions, as well as closed and open-ended questions. Furthermore, these authors emphasize that good question construction entails clear language, with answer options that do not overlap and that the questions are applicable to the participants.

The questionnaire was pilot tested. This step is important to get feedback about the questions and whether or not they are clearly stated and understandable (Creswell & Guetterman, 2019). For the pilot survey, a copy of the questionnaire was sent to the CEO of TalkLink who is an expert in the field of AAC. TalkLink is an AAC assessment service that provides initial training and support to students who have learning support needs. As a result of the feedback provided, the researcher reworded some of the questions to capture more information relating to current AAC systems and professional learning and development opportunities.

Survey Procedure

The online survey was developed and distributed using the online Qualtrics platform. The participants were able to access the survey through the link provided on the Participant Information Sheet (Appendix B) or via email and social media. In this way, the online platform saved time in distributing the survey to the intended participants and was also easily accessible and convenient for them. Online surveys have the advantage of higher and more prompt returns, are easier and less expensive to administer and have the potential of reaching a wider population (Ary et al., 2010).

The participant information sheet indicated that the survey would take the participants approximately 20 minutes and that submission of responses implied their consent for the use of the data they provided.

Survey Data Analysis

The data from the survey was exported from Qualtrics into a Microsoft Word document which served as the master data file. Since the survey included

both closed (quantitative) and open-ended (qualitative) questions, different methods of data analysis were employed. The quantitative data obtained from the survey questionnaire was analysed using descriptive statistics. The information was reported mainly through frequencies and percentages with the additional use of graphs and tables for some of the data.

The qualitative data from the survey were analysed by reading the responses for each question, identifying any meaningful units of texts and coding these accordingly. These were then organised into themes. Some of the open-ended questions in the survey elicited a list of responses rather than a narrative. These responses were reported as categories and were not coded and organised into themes. The codes and themes were recorded in a Microsoft Excel spreadsheet. See Appendix H for a codebook sample.

The coding used for the narrative responses from the survey was an inductive or data-driven approach described by Gibbs (2018), which is a bottom-up approach where the researcher develops the codes as the data set is analyzed. Vogt et al. (2014) explain that the inductive approach begins with data gathering and then gradually moves to coding and categorizing the data. They further describe that this approach is predominantly employed by researchers to pursue research goals that are more descriptive in nature.

The coding was done in such a way that the themes that emerged from the data did not just rely on the common words that the respondents used but rather grouped in an analytical way to explain the data (Gibbs, 2018). For example, the responses to the questions about barriers which included words like “motivation”, “lacking confidence” or “resistant” were coded as “Communication Partner Attitudes”. This differentiated it from “limited motivation to interact” or “lack of attention” which was coded as “Student attitude or Traits”.

Interview

Interview Methodology

Alpi and Evans (2012) state that interviews are considered to be one of the most important data source when undertaking qualitative research. It allows the researcher to engage with research participants and gather a range of information that can include factual data, opinions, views and experiences (Atkins & Wallace,

2012). In addition, an interview is an effective approach for exploring the perceptions of people on specific situations and understanding their own constructions of reality (Punch & Oancea, 2014).

Gillham (2000) describes interviews as either formal, where the researcher uses a prepared questionnaire to guide the interview process or informal, which is similar to a spontaneous discussion. Roulston and Choi (2018) explain that the organisation of topics in the interview range from a structured interview in a tightly formatted standardised questionnaire to a semi-structured interview that is less-tightly formatted, wherein the sequence of questions can be participant-led. There is an opportunity to engage in dialogue during a semi-structured interview.

A semi-structured interview was chosen for this study. Atkins and Wallace (2012) state that semi-structured interviews are useful as a means of answering a wide range of research questions. The researcher has identified topics and guide questions (Roulston & Choi, 2018) and the questions are used to guide the conversation and are not structured like a formal test (Yin, 2014). This allows for flexibility to rephrase or rearrange the order of questions and assist the researcher to gather more information and ask follow-up questions or probes (Atkins & Wallace, 2012; Punch & Oancea, 2014; Roulston & Choi, 2018). The probes enable the researcher to clarify and check that they have understood what the participants have said (Atkins & Wallace, 2012).

Interview Guide Design

The interview questions (Appendix D) were developed and discussed thoroughly with the research supervisor, focusing on the types of questions and how to phrase and sequence the questions. The interview questions were also developed based on guidelines on good question construction (Creswell & Guetterman, 2019) and on phrasing, sequencing and the type of questions that allows for more open discussions (Atkins & Wallace, 2012; Roulston & Choi, 2018). The questions in the interview guide were mostly open-ended questions.

Interview Procedure

At the end of the survey questionnaire, the respondents were given the option to choose to participate in a one-on-one semi-structured interview. The interviews were done using the Zoom video conferencing platform and individual

links for the interview sent to each participant. Each interview started with introductions and a review of the research project. The participant was also informed about their rights. This included checking that the participant was willing for the interview to be digitally recorded using the same Zoom platform.

Online interviewing through videoconferencing has recently gained more attention as an alternative to in-person interviews in qualitative research due to its practical advantage, cost-effectiveness and logistical convenience (Irani, 2019). The online platform allowed the researcher to interview SLTs across New Zealand as it reduced the geographical constraints and travel costs related to in-person interviews. However, online interviewing also has its challenges including access to the internet, connectivity issues, and difficulties with reading body language and other non-verbal cues (Irani, 2019). Although they were minimal, connectivity issues happened during the interviews but did not affect the information gathered.

The semi-structured interview recordings were transcribed by an independent transcriber who signed a Transcriber's Confidentiality Agreement (see Appendix F). The transcripts were sent back to the interviewees to give them the opportunity to review, check, amend, delete or clarify their responses. After the review, they were asked to return back the transcript along with the Transcript Release Authority (Appendix G). No interviewee made changes to the content of the transcript.

Interview Data Analysis

The interview transcripts were uploaded to NVivo for data analysis and the codes from the survey were added to NVivo. The analysis of the interview data was driven by the codes that emerged from the survey data. The researcher reviewed each transcript several times to become familiar with the data. The meaningful units of text were identified, compared and assigned to existing codes. There were some texts that were not coded as it was not relevant to the research topic and some texts were assigned more than one code, when applicable. No new codes came up in the analysis of the interview data. The information from the interview provided more in-depth information on how the SLTs perceived and experienced AAC and aided language input in their particular contexts. Similar to the survey,

some questions also elicited a list of responses rather than a narrative. These were reported as categories and were not coded and organised into themes.

Data Integration

The information from the survey and the interview were analysed separately and then integrated and were reported together. Bazeley (2013) discussed connecting strategies in data analysis and integration which includes identifying patterns of association, and visualising and integrating relationships between concepts, categories or themes. The coded survey and interview data were visually displayed side by side with each theme compared, analysed and integrated. Joint displays provide a visual means to integrate research data since the visuals can support the researcher to sort through the information and create a narrative about the integrated results to enhance understanding (Guetterman et al., 2021). The survey findings were used to structure how the information was reported and the data from the interviews were woven in.

Ethical Considerations

A low-risk notification was submitted to the Human Ethics Committee of Massey University (Appendix A). Informed consent and confidentiality are the two main ethical issues to be considered.

Informed Consent

A detailed information sheet was given to the participants. This information sheet provided the participants with details about the project including the aim, research questions, procedures, participant's rights and contact details of the researcher. Completion and submission of the survey implied informed consent and was stated on the information sheet.

There was an additional statement informing participants that provision of contact details implied that consent was given for researcher to contact them directly with regards to participating in an interview. A separate consent form was provided for interviewees. This form included permission for the researcher to audio and/or video-record the interview for the purposes of transcribing and analysing the interview data. The participants were sent a copy of the transcript prior to data analysis and asked to confirm that the interview accurately represented their perceptions and experiences. See Appendix G.

Confidentiality

There were no personal and identifiable information used from the questionnaire and interviews. The survey was anonymous and the contact details of those who opted to participate in the interview were not linked to the survey responses. Participants were not identified on any of the records including interview transcripts, questionnaires, and presentation findings. All information gathered including consent forms and coded documents are stored securely on password protected computers which can only be accessed by the researcher and her supervisors. Information will be kept for 5 years following the completion of the final publication.

Chapter 4: Results

The aim of the research project was to examine the perceptions and experiences of speech-language therapists (SLTs) on aided language input as an augmentative and alternative (AAC) intervention in a school setting. As described in Chapter 3, a convergent mixed methods research design was used. A survey was employed to collect both quantitative and qualitative forms of data. This was followed by a qualitative interview to provide additional information and contextual data based on their experiences. The information from the survey and the interview were analysed separately and then integrated and are reported together. The survey findings have been used to structure how the information is presented and the data from the interviews has been woven in. Responses from the interviewees are identified in an alphanumeric format (e.g. SLT1). Some of the questions from both the survey and interview elicited a list of responses. These are reported as categories and were not coded, in comparison to the responses that were narrative and needed to be coded and organized into themes.

The results from the survey and interview are presented in the following sections: (1) Participant background information; (2) Professional learning and development; (3) AAC background and experience; (4) Aided language input in clinical practice; (5) Facilitators and (6) Barriers to aided language input.

Participant Background Information

There were 47 responses received at the end of the survey period. However, some of the participants did not respond to all of the questions. In this case, the data is reported as percentages to reflect the number of participants who responded to that question or where appropriate, n = is used to denote the number of responses received.

The-number of years that the participants had worked as an SLT ranged from those who had worked for less than 1 year to those who had worked for more than 15 years ($M=7.7$). Table 1 shows the number of years of work experience that each participant reported.

The participants reported a range of education levels. Most had completed either a Bachelor's with or without Honours ($n=23$) or Masters (Practice) degree ($n=$

16). Some had completed a Masters (Research) degree ($n=5$) or Postgraduate Certificate ($n=3$).

Table 1

Number of Years of Work Experience

Work Experience	Number of SLTs
Less than 1 year	8
1-3 years	2
3-5 years	8
5-10 years	11
10-15 years	12
15 years and above	6

In terms of work context, 29 work in a special school and 19 work in a mainstream setting or for the Ministry of Education. There were eight participants who work at TalkLink Trust, two who work in private practice, and four who work as contractors for Accident Compensation Corporation (ACC). There were three participants who work in multiple settings; each workplace these participants indicated has been reported.

Professional Learning and Development

The participants were asked to indicate the training they received in AAC as part of their university qualification. Furthermore, they were also asked to indicate the types of professional learning and development (PLD) they had undertaken related to AAC after finishing their university qualifications.

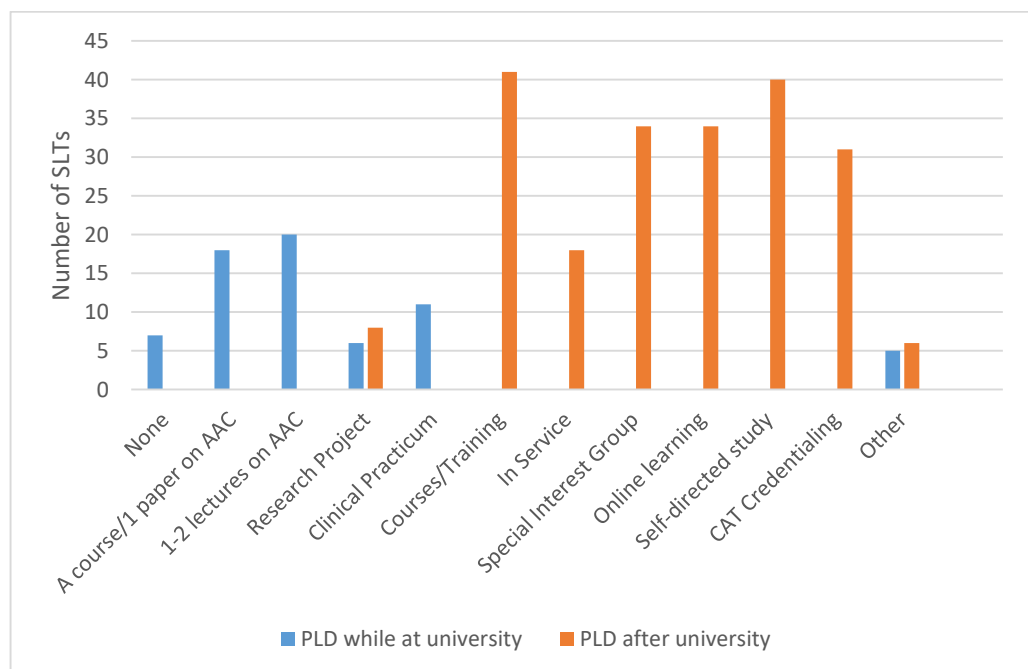
Figure 1 indicates what training the participants received related to AAC while still pursuing their SLT qualifying degree as well as the PLD they engaged in after completing their university qualification. While at university, attending one-two lectures was the most popular response ($n=20$), followed by a course or paper on AAC ($n=18$) and the required clinical practicum ($n=11$). There were also a few who were involved in a research project ($n=6$). Other participants ($n=5$) selected 'other' and added their own responses which included participating in Kiwi Chat camp, several different lectures across the four years of doing their degree, and

other related clinical practicum. There were also participants who reported that they did not have any training on AAC during the course of their degree ($n=7$).

After completing their university qualifications, all of the participants reported attending different types of PLD with most of them going to courses, trainings or workshops ($n=41$). Self-directed study was also frequently reported ($n=40$) followed by special interest groups ($n=34$) and online learning ($n=34$). Others undertook the credentialing process for Communication Assistive Technology Level 1 ($n=31$), which is a process done through the Ministry of Health, with supervision from TalkLink. Other forms of PLD they engaged in were in-services ($n=18$) and research projects ($n=8$). Some participants ($n=6$) selected 'other' and reported that they engaged in other PLD opportunities, such as attending an overseas conference, podcasts, working overseas and post graduate studies.

Figure 1

AAC Professional Learning and Development



AAC Background and Experience

The participants were also asked about the number of years of experience they had working with students who use AAC. Their AAC experience ranged from less than 1 year to more than 15 years ($M=6.2$). See Table 2 below.

Table 2*Number of Years Work Experience in AAC*

AAC work experience	Number of SLTs
Less than 1 year	10
1-3 years	4
3-5 years	11
5-10 years	10
10-15 years	7
15 years and above	5

In addition, the participants were asked to report their current AAC caseload. There were 22 who responded to this question and out of the 22, 18 provided exact numbers while the rest gave an approximation (e.g. 60+, 80+ and variable) or a percentage (approximately 80%). The responses with fixed numbers were grouped into a range and responses were counted for each range as shown in Table 3.

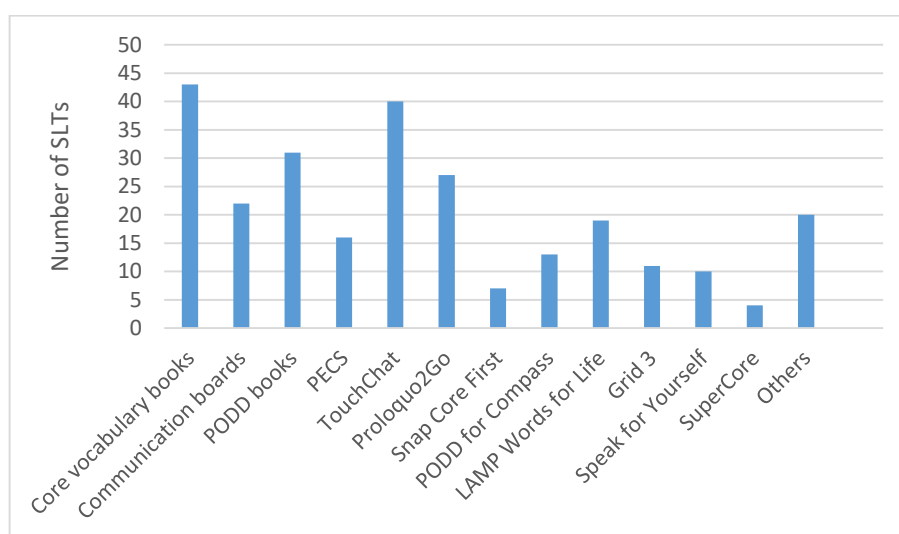
Table 3*Current AAC Caseload*

Caseload Range	Number of SLTs
1-10	5
11-30	7
31-50	4
51-70	2

A variety of AAC systems are used by SLTs with students on their caseloads as depicted in Figure 2. During the time of the survey, the Pragmatic Organisation Dynamic Display (PODD) Compass app was still a separate application on the iPad and at that time, the PODD vocabulary in Snap + Core was not yet available. Therefore, the PODD compass app reported here is still the previous version that is not in Snap + Core.

Figure 2

AAC Systems Used



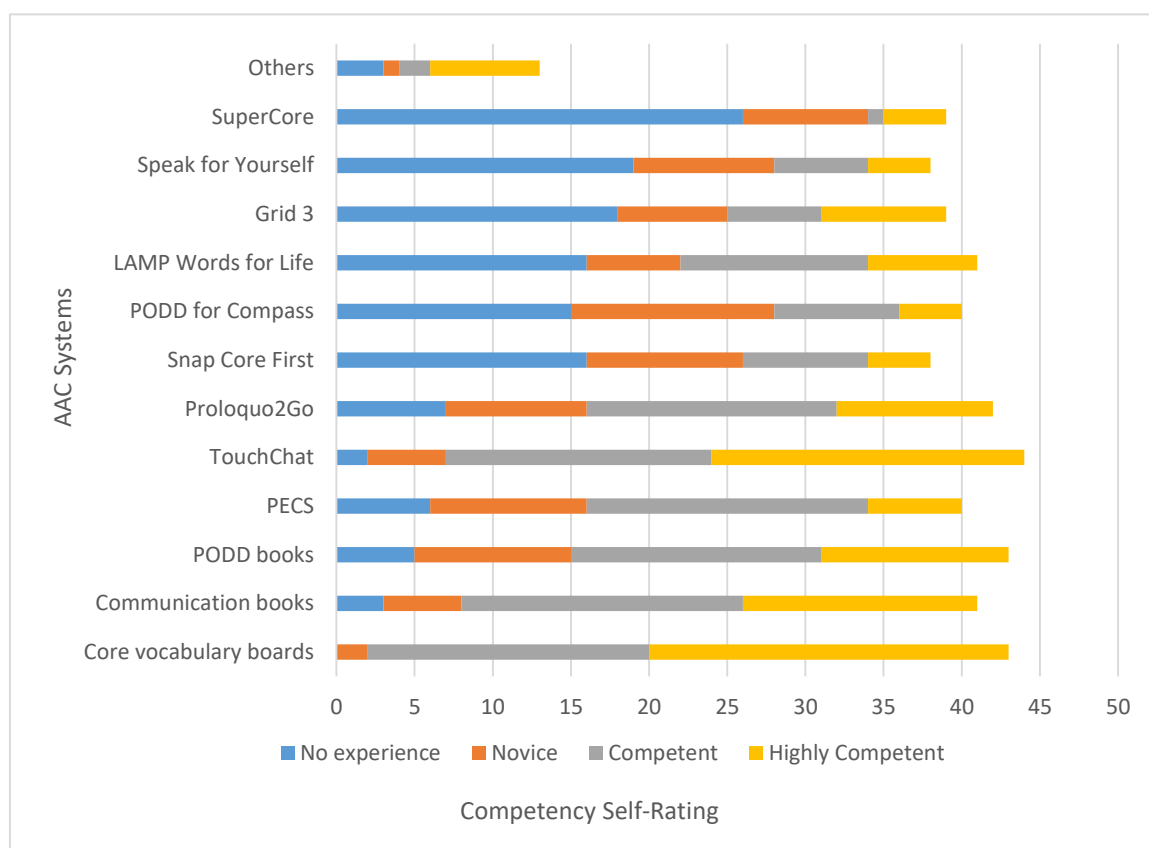
In connection with the AAC systems, the participants were asked to report on how competent they feel using the system when providing aided language input and their ratings are shown in Figure 3. The following were the most common systems that SLTs reported feeling highly competent with: core vocabulary board (53%), TouchChat (45%), communication books (36%), PODD books (28%) and Proloquo2Go (24%). On the other hand, the top 5 systems that SLTs reported as having no experience with are: SuperCore (68%), Speak For Yourself (50%), Grid 3 (46%), Snap Core First (42%) and LAMP Words for Life (39%).

Aided Language Input in Clinical Practice

This section presents the perceptions and experiences of SLTs on aided language input. This includes how they provide the intervention and who they work with when implementing it. In addition, their experiences and views on its importance and what their expectations are from communication partners are also explored.

In the survey, the SLTs were asked to identify how they provided aided language input in their clinical practice. They were also asked who they work with, aside from the students, when implementing aided language input. The SLTs indicated that they provide aided language input as direct intervention with students in a 1:1 setting ($n=35$), in small groups ($n=26$) or in the classroom ($n=32$).

Figure 3
Competency Self-Rating



There were also SLTs ($n=36$) who reported providing service in a consultative model. Some SLTs ($n=6$) reported other means of implementing aided language input, for example, working alongside families after visuals are provided and teaching about the intervention by running courses and workshops.

Aside from the student, they indicated supporting other family members and school staff when implementing aided language input. They reported working with teachers ($n=40$), classroom staff ($n=38$) and other school staff ($n=31$). They also reported supporting parents and caregivers ($n=39$) and peers ($n=26$). In addition, some ($n=11$) reported working with other communication partners which included therapists, siblings, community respite care, support workers and caregivers.

Furthermore, the SLTs were asked how they support the different communication partners when implementing aided language input and to describe what this support looks like. Table 4 shows the different types of support they reported and examples of what it looks like in their clinical practice. The majority

($n=41$) stated that they deliver training which can be formal training sessions about AAC topics, workshops, or operational training on the device that a student has been funded for. Other common types of support included coaching, modelling, providing resources, being in class and video modelling.

Table 4

Types of Support Provided to Communication Partners

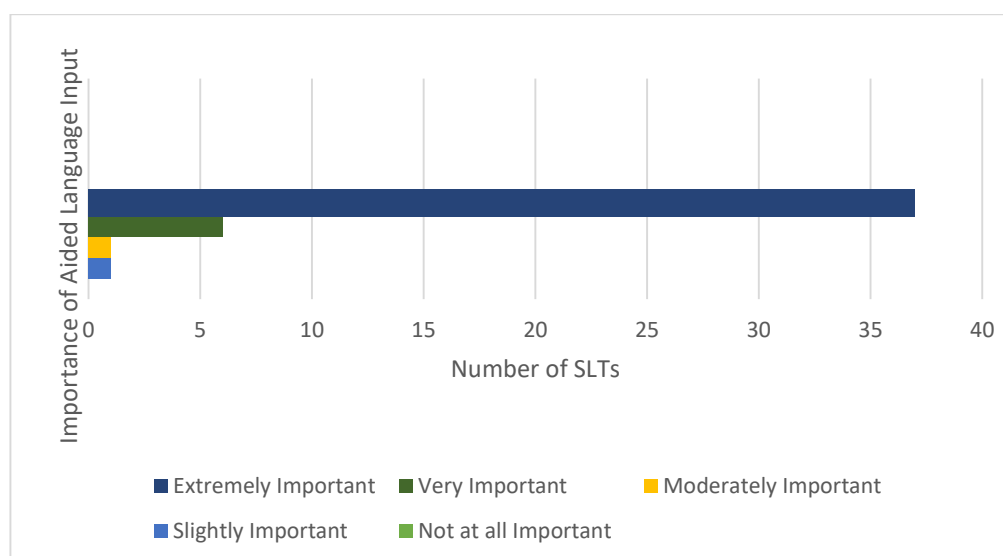
Support provided	<i>n</i>	Examples of what support looks like
Training	41	<ul style="list-style-type: none"> • Workshops, demonstrations • How to use the device, app and editing • Formal training sessions • In-service training
Coaching	26	<ul style="list-style-type: none"> • Coaching with parents and school staff • Coaching during interactions
Modelling	21	<ul style="list-style-type: none"> • Modelling and practice in session • Modelling following up with discussion
Resources	14	<ul style="list-style-type: none"> • Providing quick guides and charts with advice and tips • Teachers are supplied with a resource pack full of activities
In class	8	<ul style="list-style-type: none"> • Come in once a week and run a class group • Use of AAC systems in classrooms with staff observing
Video modelling	5	<ul style="list-style-type: none"> • I video myself working with the student • Watching videos of them working with the student and giving feedback

Importance of Aided Language Input

In the survey, the SLTs were asked to rate the importance of aided language input in their practice. Not everybody responded to this question, however, all of the participants who did respond ($n=45$) indicated that aided language input was important in their practice. As shown in Figure 4, the majority of the SLTs ($n=37$) felt that it is extremely important. Others felt that it is very important ($n=6$), moderately important ($n=1$) and slightly important ($n=1$). No one indicated that aided language input was not important.

Figure 4

Importance of Aided Language Input



In the survey and interviews, the SLTs were also asked to explain their response regarding the importance of aided language input. Their responses were coded and grouped into themes as depicted in Table 5.

Table 5

Importance of Aided Language Input

Theme	Codes
Evidence based	<ul style="list-style-type: none">• Research• Best practice
Supports language learning and development	<ul style="list-style-type: none">• Receptive and expressive language• Typical language development• Natural interactions• AAC as a means of communication
Learning to operate the AAC system	<ul style="list-style-type: none">• Use the system• Finding words• Identifying issues in the system
Supporting communication partners	<ul style="list-style-type: none">• Supporting communication partners

Evidence-Based. Three SLTs indicated that aided language input is based on research which has shown that it supports how a student can learn and use AAC in

their everyday lives. One SLT stated that aided language input is “supported by a high level of research as achieving best outcomes for language use”. Another one indicated that aided language is important because “research demonstrates that it is an important teaching strategy”, and it is best practice to support students who use AAC to learn to use their communication system. In the interview, SLT2 stated that it is important to discuss with communication partners that this strategy is supported by research and to include the ‘how’ and ‘why’ of the strategy in the discussion.

Language Learning and Development. Several SLTs ($n=17$) shared their views on how aided language input as a strategy is important as it supports a child’s language learning and development. They discussed its importance as it relates to receptive and expressive language, typical language development, and natural interactions.

Receptive and Expressive Language. In the survey, three SLTs stated the importance of supporting a child’s understanding of language (receptive) and not just solely working on their expressive language. They believed that this is the same for students who use AAC, with SLTs stating that “children are more likely to learn language receptively through AAC and begin to use AAC tools expressively” and that they “need visuals to support communication for both receptive and expressive language”.

SLT2 explained this further in the interview, as she highlighted the importance of supporting receptive language especially for students with processing difficulties through the use of AAC and other visuals. “It helps processing and speed of processing and it helps them understand changes of routines”. Despite its importance, this skill is quite often overlooked. Again, SLT2 stated “I believe it really supports oral language develop especially comprehension which is often the hidden area that families don’t see”.

Typical Language Development. Some SLTs ($n=7$) described that learning an AAC system is similar to how language is typically learned. Children need to see and hear a language being used in order to acquire that language. One SLT indicated that AAC is similar to learning another language and stated that “To really learn it

well you need to be immersed in it. You need to hear it being spoken around you all the time.”

Another SLT stressed the importance of language input and language output with one asserting that “aided language input is critical because it ensures that the language input is in the same mode as their anticipated language output”. Another SLT also stated that it is “important for AAC to be modelled as it is for speech to be modelled. It is a language for the student to learn and a lot of learning happens during modelling.”

Natural Interactions. There were four SLTs who shared that to support language development, learning needs to occur during natural and daily interactions. Using AAC and providing aided language input during natural interactions not only provides a model to the students, but “also shows acceptance of AAC as a valued way to communicate”. The SLTs stated that “the best way to learn is when talking together” and “modelling aided AAC during natural interactions is essential”. It also helps with learning new vocabulary while modelling it on the AAC system as the interaction occurs. SLT6 described in the interview how important aided language input is in a classroom environment:

Children aren’t going to learn to use a device or core board unless they’re seeing other people using it themselves. And I think you know we want a child to be included in their centre and their school, we don’t want them to be doing something that’s completely different to what everybody else is doing. So if other kids and if other adults are using that device you know it’s making that device part of their classroom and it sort of, yeah it makes it easier for that child to be engaged with it and to speak with it.

AAC as a Means of Communication. An SLT explained that the auditory input from the modelling provided by the communication partner enables the student who uses AAC to associate meaning to the symbols for communication. Another SLT reported that in addition to using the AAC in a natural setting, aided language input supports a student’s understanding of the “true power of the words” that they can use to communicate. This idea was reinforced by another SLT who stated that aided language input supports the development of a student’s understanding that the AAC systems is a means to communicate.

Learning to Operate the AAC System. Aided language input was raised as an important element in achieving operational competence. To be able to use any system, it is important that children who use AAC learn the system itself by learning how to use it and how to find the words that one needs to communicate. Some SLTs ($n=12$) reported that the students need to understand the system, how to use it and understand how to navigate it so that they can effectively use the tool to support their expressive language.

Use the System. Some SLTs ($n=8$) stated that they do not expect a student to automatically know how to use an AAC system. One SLT explained that “we need to teach language on an AAC system, you can't just expect clients to magically figure out how to use AAC without modelling.” Through aided language input, students can learn how to use their system because they see it being used by classroom staff to communicate and they can see and learn how the system works. An SLT indicated that it is important for teams to understand that the student will have difficulty learning to use the AAC system unless they see it being used by others to communicate. This is further supported by another SLT who stated that aided language input is an effective way to model language in different contexts in which the AAC system can be used. Another SLT also reported that seeing others model or use AAC is a primary way that the student can learn to use and speak with their device.

Finding the Words on the System. An SLT stated that aided language input is an effective way to model language and find where the words are on the student's AAC system. Another SLT added that modelling the use of the system in different classroom activities is not only helpful to learn where the words are but can also support with learning the meaning of the words.

Identifying Issues in the System. In addition to learning how to use the system, an SLT narrated that aided language input can also support the team and the student to identify any issues in the system when it arises. This can then be addressed by the team as they learn to use and navigate the system.

Supporting Communication Partners. Some SLTs ($n=15$) identified their role in providing aided language input as part of AAC intervention. This role is two-pronged with the SLT implementing aided language input as an AAC intervention

and also supporting the communication partners to enable them to provide aided language input.

Of the 15 who identified the SLTs' role in AAC intervention, there were 9 who discussed their specific role in supporting communication partners. One SLT reported that in this role, aided language input is one of the strategies that they talk about often with teachers, support staff and families. Another one indicated that they also coach the teaching team while stressing the importance of this intervention. One SLT shared that supporting the communication partners is important because "It moves work away from the students and more on the team who should be the ones actively engaging the student and immersing them in the language of AAC." Another one also acknowledged that "the class team knows it is important but needs lots of repetition, practice, modelling from us and encouragement to continue using it with our students."

Others also described aided language input as "integral part of culture in our classrooms", and that it is an "integral part of the language modelling strategy that I encourage teachers and families to do so". For this reason, they felt that teaching teams need lots of training and encouragement to provide aided language input so they can become confident in doing it.

In the survey, one SLT raised a point when it comes to the importance of aided language input:

Aided language is so important but I have learnt that it is one part of the puzzle. It is not enough to be modelling. There is so much more about presuming competence, long term outcomes and how to be a responsive communication partner that has to go alongside the discussion.

Furthermore, she discussed the importance of "what it is we are modelling (core vs. fringe), how we model (self-talk, parallel talk, attributing meaning), and when we model (practice across activities in the day, explicit practice).

Expectations of SLTs in Aided Language Input Implementation

In the survey, the SLTs shared their expectations for communication partners when implementing aided language input. There were some SLTs ($n=15$) who indicated that they expected communication partners to set goals for themselves as a strategy to make the implementation more manageable. Other

SLTs ($n=10$) expected them to try and give it a go. Table 6 outlines their expectations grouped into similar categories with examples of responses provided for each category.

The interviewees also discussed their expectations in more detail. There were three SLTs in the interview who stated that communication partners should be willing to give it a go and that it is okay to make a mistake and ask for help.

I think the expectation is that actually just give it a go and that it's okay to make mistakes, bearing in mind that I often have to model making a mistake myself probably, which I do generally anyway, but actually it's okay, because I think people want the perfectionist model when they first do it. I had to be the person to model that it's okay as well. (SLT4)

Another SLT added what she expected from parents and teachers at the initial stage of the intervention:

Where it's the adult communication partners like the parents and the teachers, my initial expectations are just that they are going to use it. And I make that very clear to them, that I don't want them to expect anything of the child with this to begin with. (SLT6)

Similar to what was shared in the surveys, goal setting was also discussed in the interviews, specifically on identifying small and achievable goals. Two SLTs reported that setting up achievable goals makes it manageable for the communication partners.

Again, repetitive pathway that you're just going to choose one or two pathways for them to look at on the device rather than using the whole thing and I think that makes so that's it's manageable for the adult and it's manageable for the child and really it's about teaching the adult how to use it. (SLT2)

SLT 5 shared examples of what goals to set and how it can be incorporated in different activities:

So you know we'll set some goals and sometimes the goals will be quite specific that you know we want so and so to maybe share news every day of the week. Across home and school, or that they're going to use you know certain target core words throughout the day.

In the interview, SLT5 also reinforced the expectation that the AAC system is consistently available and that the student always has access to it. They felt that the expectation of even just carrying it around and making it available and charged (for high-tech systems) is a good start to implementing the use of the system.

Table 6

Expectations of SLTs from Communication Partners

Expectations of SLTs	<i>n</i>	Example Response
Set achievable goals	15	<ul style="list-style-type: none"> • To choose one word/concept that can be modelled a number of times throughout the day • Select 1-2 words on the AAC tool when communicating with the child
Give it a go/try	10	<ul style="list-style-type: none"> • Be willing to give it a try • Try to use it throughout the day in different situations
Prepared to put time in	6	<ul style="list-style-type: none"> • To be prepared to put the time in and not expect a magic wand to be waved and the child will be “fixed”
Understanding (AAC, student/client)	6	<ul style="list-style-type: none"> • To understand the importance of aided language input to language development for the AAC user
Make system available	5	<ul style="list-style-type: none"> • To ensure this is available for the student as much as possible • Carry the system and have it on hand for use wherever they go with the student
Exploration	4	<ul style="list-style-type: none"> • Explore the vocabulary themselves during unstructured opportunities • Take the time to familiarize themselves with the system
Ask for help; communicate with SLT	3	<ul style="list-style-type: none"> • To contact me if they need help as otherwise I assume it is going great
Acceptance	2	<ul style="list-style-type: none"> • Accept AAC as a mode of communication • To keep an open mind

Effects of Support Provided for Communication Partners

The SLTs were also asked how the support they provide to communication partners in the implementation of aided language input affected how the communication partners interacted with students who use AAC. The responses

were coded and then grouped into themes. There were three major themes related to the changes the SLTs observed from communication partners, as shown in Table 7.

Table 7

Effects on Communication Partners

Theme	Codes
Changes in Observable Behaviour	<ul style="list-style-type: none"> • Increase in use of AAC system • Interaction skills • Ways of modelling • Confidence levels
Change in Thinking	<ul style="list-style-type: none"> • Mind set change • Understanding • Importance
Change Beyond the Classroom	<ul style="list-style-type: none"> • Implementation • Professional development

Changes in Observable Behaviour.

Increase in use of AAC system. Some SLTs ($n=7$) reported that they noticed the communication partner using it more in the classroom when interacting with students. Another SLT indicated that peers were more accepting of the device and showed that they wanted to use it more with the student and with each other. One SLT noted that there was an increase in the use of AAC because of the increased exposure that the students were now getting which has also increased their understanding of what was being said to them and around them. Similarly, an SLT reported that the staff now provided more opportunities for students to communicate using their system.

Interaction Skills. An SLT observed that the staff used the system to converse with the student in a natural way rather than a “tell me” approach. Another SLT reported a change in the staff in that they used AAC more as a way of interacting with the student rather than always just expecting the student to be the one to use it or rather than them just giving the student directives. In addition, an SLT described that staff who use aided language input had increased their wait or pause time, which allowed the student to respond during the interaction.

Ways of modelling. A few SLTs ($n=3$) reported that the staff tended to slow down their speech when talking and using the system and also reduced their length of utterances. The change in wait time or pausing as reported by another SLT is another change observed in the way the staff model the use of the device. Another SLT noted that staff are also able to model more “independently and correctly” and are also able pass on their learned skills to new staff in the classroom.

Confidence levels. Some SLTs ($n=10$) observed changes in the staff’s confidence levels. They reported the change in confidence levels in using the device across different activities in the classroom and when interacting with students. One SLT described that she noticed a marked improvement in the staff’s comfort levels when using the system especially as they become more familiar with it.

Change in Thinking. Some SLTs ($n=11$) also noticed a difference in how the staff now think about AAC and aided language input.

Mindset change. One SLT reported that teachers and teacher aides are now “moving from a mindset of expecting students to use a device and focusing more on aided input and pauses to allow the student to interact”. This shifts the focus more on the interaction between the student and staff.

Understanding. A few SLTs ($n=5$) also reported an increase in the understanding of the reasons for AAC as well as how AAC is used. An SLT further explained that the staff were then more likely to use the system if they understand the reasons for using AAC and for aided language input.

Importance. One SLT reported that staff who see the benefit, realized the importance of aided language input and are more motivated to implement it. A different observation reported by one SLT was that the support provided in the implementation of aided language input has also made the staff realize the importance of everyone needing to use it and not just the student. Furthermore, two SLTs stated that supporting staff in implementing aided language input has not only increased the staff’s understanding and realization on its importance but has also led them realizing the importance that they too need to support the student.

Change beyond the classroom. Another observed change that the SLTs reported was on how the staff are now doing something new or have introduced something new in their settings.

Implementation. Two SLTs reported two different changes in how the staff are implementing the intervention. One reported that she has noticed that the staff now have a fresh perspective on how AAC can be implemented in school and how it can be done in a manageable way. The other one reported that with the support provided in aided language input, a whole school-wide use of AAC has been implemented.

Professional Development. One SLT conveyed that the team is now engaged in ongoing open discussion and team meetings, with a focus on finding ways to address barriers to a successful implementation. Another SLT stated that it has been easier to implement the system as the support the SLTs provided would have hopefully informed the staff's own learning and practice.

Effects of Aided Language Input on Students

The SLTs were also asked to identify how aided language input affected the communication skills of their students by choosing from a list and then adding their own information if they needed to. They were asked to choose all the responses that were applicable to them. Most of the SLTs ($n=40$) reported that the students were able to effectively communicate their needs and preferences. This was followed by improved vocabulary ($n=35$), increase in the number of words used in phrases and sentences ($n=32$), improved receptive skills ($n=32$) and can use the AAC system for different purposes ($n=31$). The SLTs added further information on how aided language input has affected other areas of the students' skills in the 'others' section of the question. These responses were coded and grouped into themes, as shown in Table 8.

Interaction/Social Skills. Some SLTs ($n=13$) indicated improvement on interaction or social skills as one of the changes they have observed with students when aided language input was implemented.

Initiation of Interactions. There were four SLTs who reported an increase in the student's initiation of an interaction using their system. One SLT added that a student now accessed the device and initiated interactions more confidently.

Table 8*Other Effects of Aided Language Input*

Theme	Codes
Interaction/Social Skills	<ul style="list-style-type: none"> • Initiation of interactions • Participation and social communication • Purposes of communication
Academics	<ul style="list-style-type: none"> • Literacy • Classroom use
Observable Behaviour/Skills	<ul style="list-style-type: none"> • Confidence levels • Frustration levels • Speech skills

Participation and Social Communication. Six SLTs reported that students have shown an increase in their participation in social situations. Specifically, one SLT observed an increase in participation in class and in the whole school and wider community. Others reported an improvement in the students' social and functional communication skill including increased spontaneous interactions. With aided language input, one SLT noted that the student has more access to a variety of communication partners.

Purposes of Communication. Another observed change was increase in the different purposes that the students were communicating. The SLTs ($n=3$) reported that students now share their ideas and opinions, give more information and make comments.

Academics. The changes that the SLTs identified included a change in the student's skills in the classroom.

Literacy. There were two SLTs who reported an improvement in the student's literacy skills with one SLT who noticed progress in their creative writing too. In addition, another SLT reported increased engagement during language rich activities, such as shared reading.

Classroom Use. One SLT observed that aided language input has supported a student's access to the curriculum and has enabled the student to demonstrate his knowledge in the classroom. Another SLT also observed how the use of visuals in

the classroom with aided language input has helped the student with following basic routines.

Observable Behaviour/Skills. The SLTs also reported changes on the students' behaviour in the classroom.

Confidence Levels. Some SLTs ($n=5$) reported changes in students' confidence levels. They reported an improvement in their confidence with using the AAC system and in interacting with others too.

Frustration Levels. Some SLTs ($n=4$) reported a decrease in behaviours that were due to their frustrations in not being able to effectively communicate. One SLT explained that the observed improvement in wellbeing was due to the student being less frustrated and the feeling that their messages were valued.

Speech Skills. There were four SLTs who reported an improvement in the student's speech skills. They reported an improvement in clarity and rate of communication which also helped improve speech intelligibility. Furthermore, one SLT reported that the intervention has helped the student acquire spoken words.

Facilitators

The SLTs were asked in the survey and interview what they perceive as factors that serve as facilitators to the effective provision of aided language input. The responses to the survey were coded and then grouped into themes (see Table 9). This framework was also used to code the responses to the same question discussed during the interview.

AAC Team Member Characteristics

In the survey, the majority of the SLTs ($n=46$) identified different behaviours, attitudes and characteristics which they had observed in AAC team members that they felt helped with the implementation of aided language input. The AAC team members in this discussion include the communication partner, the student and the SLT.

Communication Partner Behaviour and Actions. Three SLTs reported that implementing aided language input was more effective when the communication partners took the time to use the system, were consistent in implementing and making the system available and were also observant.

Table 9*Facilitators to the Effective Provision of Aided Language Input*

Theme	Codes
AAC team member characteristics	<ul style="list-style-type: none"> • Communication partner behaviour and actions • Communication partner attitude • Student attitude and traits • SLT attitude
Understanding of AAC	<ul style="list-style-type: none"> • Understanding the reason for AAC • Understanding the intervention • Knowledge of AAC
Time involved	<ul style="list-style-type: none"> • Implementation • Training and learning
Staffing and staff needs	<ul style="list-style-type: none"> • Training needs • Number of staff • Staff support
Management role	<ul style="list-style-type: none"> • Management support • Policies
Environment	<ul style="list-style-type: none"> • Availability and access to the AAC system • People in the environment • Classroom environment
Skill level of Team Members	<ul style="list-style-type: none"> • Communication Partner skills • Student skills
SLT intervention	<ul style="list-style-type: none"> • Role in intervention • Intervention
AAC system and use	<ul style="list-style-type: none"> • AAC system • AAC use

Communication Partner Attitude. Several SLTs ($n=36$) indicated that the attitude of the communication partner is another important facilitator. Examples of the attitudes they perceived as facilitators were: open-mindedness, motivated, positive attitude, passionate about supporting communication, confident, feeling ok with making mistakes, enthusiastic and supportive. In the interviews, two SLTs shared their experiences to show how important the attitudes of the communication partners are.

I think attitude's probably the biggest one, having an open attitude to learning something new and something different. For example, a lot of the teacher aides I've worked with have used a lot of sign language, like

Makaton sign, and so changing to something visual is quite a big deal. And so having an open attitude where they're open to learning and open to asking questions is definitely a facilitator. (SLT1)

In addition, SLT5 discussed the importance of a communication partner's motivation and perseverance as illustrated here with reference to parents/caregivers:

They've got that self-motivation to keep going with it. Even if things aren't maybe working brilliantly at school they're the ones chipping away at home, and then they can show schools some examples of this is what we're doing, and this is what's working well. And sometimes that can work to get schools motivated to do things. But it really yeah it comes down to that motivation and that internal drive. (SLT5)

Other SLTs ($n=5$) mentioned the communication partner's attitude towards the student can also affect how successful the implementation of aided language input is going to be. They reported that it is a key factor if communication partners "believe that student has potential" and that they "believe the client can make progress and learn". In addition, they felt that communication partners "who understand that the AAC is a student's voice" and "are motivated for their student to have a voice" facilitate the success of the intervention. It also helped if they were seeing success with the student, not just with the student using the AAC system, but also success with attending to models.

There were four SLTs who indicated the attitude of the communication partners specifically towards the system and the intervention as facilitators. They found that "having an interest in AAC" and "being comfortable and open to using new tech" has been one of the key factors to successful implementation. They reported that it was also helpful when the communication partners showed "willingness to learn about new strategies or use the new system" and were "comfortable with modelling".

Other SLTs ($n=4$) also believed that the communication partner's attitude concerning team work was important. They reported success when there was a "whole collaborative team approach with an engaged team and whānau" who are all "involved in the decision making process regarding AAC". The classroom team

who “see value in the strategy” and are “willing to build it in their class planning” also contributed to the success of the intervention.

The attitude of the peers was also mentioned in the survey. One SLT stated that peers who are curious and keen to use the AAC system with the student can also have an impact on the successful implementation of aided language input.

Student Attitude and Traits. The student themselves and their attitudes and traits towards AAC were also identified as facilitators by some SLTs ($n=4$). The student’s motivation and engagement towards communication partners were perceived as important. An SLT indicated that starting the use of AAC at an early age helped facilitate the success of aided communication. Reduced incidents of behaviour difficulties in the classroom were also reported to be a facilitator.

SLT Attitudes. One SLT identified confidence as an important attitude for an SLT to have when it comes to being able to effectively implement aided language input.

Understanding of AAC

Another identified facilitator to effective aided language input implementation is understanding AAC and aided language input. It includes understanding of the why or the reasoning behind the use of AAC, understanding the intervention, and having knowledge of AAC as a concept.

Understanding the Reason for AAC. Three SLTs reported that understanding the reason for using AAC facilitates success. As one SLT stated “understanding and linking rationale to make sure people really understand the reason why we are doing it” enables success of the intervention at the very start. It is not only the understanding of why we are using it that is important but it is also important for the students to “understand that the system is for talking”.

Understanding the Intervention. During the implementation of aided language input, the SLTs ($n=4$) conveyed the importance of also understanding what the intervention is. The communication partners need to “understand the teachable moment and go for quality of interaction”. They reported that it is important for communication partners to understand how the system is used during the intervention. It was stressed that it is essential for the adults to understand that they may not see instant results. This was reiterated by another SLT who stated that

“it will take time for the students to use the system independently” and that the communication partners need to understand this.

SLT6 shared that video recording the staff while they are implementing the intervention and then discussing what happened facilitated understanding:

So they do find it quite helpful and we do tend to write down you know points of what went well, and a point or two of like what are you working on at the moment. Just doing that with them. I think it's yeah also just helpful where it fits in with the team's goals or the IP goals for that particular child that's quite useful.

Knowledge of AAC. There were two SLTs who stated that knowledge about AAC is an important facilitator. They felt that engaging in self-directed learning about AAC and its implementation supports that knowledge. SLTs also need to support this learning for communication partners with SLT6 raising the point that “it's important to make sure that there's follow up so that we can keep saying that to really embed that message.”

Time Involved

Time is considered important which includes both the time involved in implementation and in training or learning.

Implementation. Some SLTs ($n=4$) described that unrushed classroom routines, staff having time and the teacher aides also having the time to provide aided language input 1:1 while the teacher is working with others facilitates success of the intervention.

Teams who have a bit more time because schools top up teacher aide hours or schools allow teachers to take more release time or whatever, I don't know how they'd get more time, but they seem to have more time, that's definitely a facilitator. (SLT1)

SLT1 further added that it is helpful for the team “just having that space to practice and talk to other team members about questions and being able to have that time to collaborate with other people on the team”.

One SLT also stated that it helps if they too have time to be in the classroom more frequently to work with the students and staff. The intervention cannot be rushed and results are not always automatic. As SLT5 narrated:

So I think you've got to really look at the big picture but, also be putting it out there that until we are getting that modelling and getting that wider use of it, that putting a device in place isn't magic. Nobody mysteriously starts communicating if they have a device there. So yeah it's getting that information along, getting that buy in from the team and the management team that support them. But also being realistic like in a classroom particularly you know you've got 30 kids running around. The opportunities for modelling you've just got to pick carefully how that's going to start. And once you've got the seed and they can see the benefit of what's happening, then we can grow it from there.

Training and Learning. Some SLTs ($n=7$) stated that time for training facilitates success of the intervention. They indicated that it is important that 1) teachers and teacher aides have enough release time to attend training, 2) SLTs and other professionals have time to provide training, and 3) the provision of training time is made available for staff. The importance of having time, not just to provide the intervention, but also time to support the communication partners was discussed during the interview.

Sometimes it can be a case of just a little bit more training and support from us...and coaching for them to feel comfortable and confident to do it. (SLT5)
SLT6 also discussed the importance of time spent with the teachers and classroom staff for coaching and ongoing discussions:

I think it is helpful to have time with the teachers outside of their teaching time to just go through some of the principles behind AAC and aided language input. I think that's really helpful but I think that alone does not really make change. I think it's very helpful to have individual time with the teachers, with children actually practicing using it and me coaching them through it, and modelling and actually doing the video feedback has been quite helpful. And a lot of teachers have commented on that when I've done they felt it's quite useful even though they hate seeing themselves on video, we all do. But they find it useful to see it in action and to see you know for themselves how they are facilitating the interaction.

Staffing and Staff Needs

The meeting of staff training needs, having the appropriate number of staff and providing staff support are perceived to contribute to the success of the intervention.

Training Needs. A few SLTs ($n=3$) reported that training and other forms of professional development is important for the staff to be able to learn about the intervention and how to implement it. One SLT stated that when it comes to training, “If teaching staff had better training around universal strategies for supporting children to develop their communication skills, more specialist areas like aided language input would be a lot easier to implement”.

Number of Staff. One SLT pointed out that it is important to have enough staff to work with students who have complex communication needs. Three SLTs (SLT4, SLT5 and SLT6) also mentioned staffing during the interviews. They indicated that due to the complexity of the students’ educational, communication, physical and medical needs, staff in the classroom already have a lot to attend to. This makes it even more important that there is enough staff to work with students to address their different needs, including supporting them with their language and communication development.

Staff Support. Some SLTs ($n=4$) reported that the provision of support for staff was found to be an effective facilitator. They indicated that it is important that the staff are guided and supported by good Individual Education Plans, there is access to regular ongoing support by SLT, and that the SLTs can engage in close and intensive work, not only with the student, but also with the communication partners in various settings.

Management Role

The support from management and the presence of policies from management on AAC are believed to be crucial to the effectiveness when implementing this intervention.

Management Support. Some SLTs ($n=8$) discussed the importance of support from the school management team. Examples of what they found as effective facilitators are: management support and backing; school management being on board with AAC and keen to put the intervention into action; principals

and senior leaders in schools valuing AAC by providing time for training; and a supportive school management team including but not limited to the Principal and Special Education Needs Coordinator (SENCO). An SLT indicated that if management is on board, this not only helps with allocating funding for training and extra support but also with validating the approach and setting expectations for the team. This is confirmed by another SLT who indicated that the support at school management level also means that there is support for training and implementation on AAC and aided language input. SLT3 and SLT5 both reiterated the importance of management support and SLT5 further explained:

The schools that I've seen who've been really successful at implementing, modelling are the ones where it comes as a whole school approach. It has to come from the top down. It has to come from senior leadership to see this as a valid and valued thing. That doesn't just sit with the speech therapist at our school, or the external speech therapists that come into our school. It's something that we do as a school and provide this for all of our students. Whether they do or they don't need AAC specifically, it's something we do across the board. Those are the ones that I've seen it work really well at, and that's in the special school and that's also in mainstream settings.

Policies. Four SLTs indicated that there should be a policy coming from management to support success of AAC implementation and training. They mentioned policies related to AAC training, having a whole school wrap around idea on AAC, and establishing a philosophy on the use of AAC in special schools. An SLT stated that "I would love to see more special schools and units integrate it more fully especially units as part of their key approach to support comprehension and decrease behaviours and that this needs to be led by the principals". SLT2 stated that the policies need to be embedded in the whole school system. She described her experience:

What I see sometimes when I'm at special schools now is that maybe one teacher does know how to use it and prioritise it and has a real belief in using the system but then perhaps they move classes and the next teacher perhaps hasn't got a focus and that shows it's not embedded within the

school system and I think that's a shame, it has to be embedded and put in as part of school goals so that it's a priority for all the children in the school.

Environment

The environment around which the student is in plays a crucial part in his/her learning and communication development. The availability and access to the system, the people in the environment and the classroom environment were identified as facilitators to the success of aided language input as an intervention.

Availability and Access to the AAC system. Some SLTs ($n=6$) shared their experiences on what practices they have observed that facilitated success of the intervention. These involved making sure AAC is everywhere; having low tech copies on walls and desks, large group modelling boards and playground AAC boards; and AAC is always being available in the classroom. One SLT reasoned that "when it's easy access it is easy to model". SLT5 shared an experience on how important availability and access is:

There's a school I'm working with down here at the moment, and they've only got two AAC users in their whole school. But they've got core boards in every classroom and they're getting some core boards printed out you know in the playground. And all the teachers have been to a training session with us. And there's just this general expectation from the principal and the SENCO that this is what we do.

People in the Environment. The people in the student's environment also facilitate the success of learning and using the AAC system. Four SLTs identified what they have seen people in the environment are doing that has facilitated the success of the intervention. These included staff wearing chat boards on lanyards, staff wanting to normalize it and encourage their students to talk to each other using multiple modalities, peer training by teaching all students about AAC and peers using a version of the AAC system.

In the interview, two SLTs reported that having a network of students who use AAC in the environment can help facilitate success of the intervention.

The other thing that's made it successful is if, and this is particularly thinking about my mainstream school kids or my home-schooled kids, if they're the only one in their school who uses AAC, watch some videos of other people

or go and meet some other kids who use AAC either at Kiwi Chat day or I was trying to organise little meetups with other kids. I think that's been quite cool that people don't feel so isolated. It's easier at a special school because hopefully lots of people are using AAC and you see it all around the school and there's someone in your class who's probably using another AAC system. But if you're the only one at your school it can be quite isolating. So, just trying to build some more networks, I guess. (SLT1)

The support network is also helpful for parents, as SLT5 explained:

You know like if parents get a good support network or they link into some Facebook groups or you know community support systems, and they've got that self-motivation to keep going with it.

The people in the students' environment are not limited to teachers, teacher aides and immediate family members. They can include school administration staff, school caretakers and even other therapists or professionals at school.

But also what's interesting when I've come to this school also has been interesting around other therapists actually modelling, so their OTs have their own systems. So, a lot of OTs when I started actually had their own PODD that they'd take to classes, that they would reinforce SLT work by doing a similar thing and physios as well, and also the senior management team's also been doing it also. So, there's been quite a lot of interest. I think it was, again, established from one of the schools when they merged. It was quite an ingrained pattern. That would be communication partners across the board. And, of course, their families can be extended family, so some family's grandparents take the kids on, so not only the mother and the father, but it's the grandma. (SLT4)

Classroom Environment. Some SLTs ($n=3$) conveyed that having clear classroom routines support the implementation of aided language input. They stated that if the environment in the class is calm and unrushed then this can provide an environment that is more conducive to learning. The classroom culture is also believed to be a facilitator especially if it supports and "values the process more than the product".

Skill Level of Team Members

The skills of the communication partners as well as that of the students are identified as facilitators to success when implementing the intervention.

Communication Partners. One SLT noticed that communication partners who are able to identify motivating and meaningful situations for communication facilitated success. Another SLT reported that communication partners support a successful interaction with the student if they paused, waited or gave time for the student to respond.

Students. Some SLTs ($n=3$) stated that a student's attention, linguistic and word-finding skills can facilitate the effectiveness of the intervention. One SLT reported that a student who shows competence can also be a facilitator.

SLT Intervention

The SLTs considered themselves as facilitators to the success of implementing aided language input. They see themselves as such, both in their role in the intervention and their involvement in the intervention process itself.

Role in Intervention. The following roles were discussed by some of the SLTs ($n=5$) as helping facilitate success: direct intervention and not just working in a consultative role; providing ongoing support to class teams; being able to highlight success; giving evidence based research links to videos of successful users; building rapport and sharing their knowledge; and providing encouragement and repetition.

I think part of it was that we were just in there more you know and more consistently and more regularly and on their backs and the communication channels were really open around how they were feeling about it and how they were using it and we dedicated a fair bit of time to those two classes for that time and that had a positive impact on their modelling, using the systems. (SLT3)

Another specific classroom example shared during the interview stressed the importance of seeing success in small things when providing intervention:

If I know a student likes their food, I might do yummy/yucky on a core board, and they may likely to watch and go, "Wow. Okay, those words are really funny," and that really good situation where the kid starts pointing and they go, "Yummy," and you're like, oh, okay this word means I can have

a laugh. And then the staff member goes, “Wow, that’s actually really simple.” So, I think it’s the practice of actually seeing its success quickly as opposed to something that might take a term. (SLT4)

Intervention. Other SLTs ($n=3$) reflected on what they did when delivering aided language input as an intervention that they felt made it a success. One SLT reported that being in the class to show how to use the system in natural and explicit learning contexts was a facilitator. The other two SLTs also reported that being with the student and the communication partners to show them how it can be integrated in real life and being able to also teach peers and siblings definitely supported the intervention.

In providing intervention, SLTs gave examples during the interview of how they were able to implement it successfully:

I think breaking it down into really small steps. So, talking about what is modelling and watching some videos and doing some practice as just the adults so that just the adults feel like they’ve had some practice just by themselves before they have to perform with the student... And then because the goals are set in a sequence, it doesn’t matter who the staff are working with that student on that particular day or what home are doing because everyone’s like, okay, it’s week one, so everyone’s on week one, we all know what we’re doing. So, I think that’s definitely helped to make it a bit more successful. (SLT1)

SLT3 also shared her thoughts on how intervention and being there to support the teacher helped the staff in the classroom:

I do find that sort of focusing on one word a week can help. It can’t just be something that I send out and say this is the word of the week, it then has to be backed up with me modelling that and focusing on that throughout that week, that sort of presence thing and being there to kind of support that.

AAC System and Use

In the survey, some SLTs ($n=7$) shared how the AAC system can facilitate success when implementing aided language input.

AAC System. Two SLTs pointed out that a comprehensive AAC system facilitates the effectiveness of aided language input implementation. The system

should be made available and accessible. It can be helpful if communication partners are familiar with the system or possibly have access to their own system to support their learning too.

AAC Use. Three SLTs felt that it helps if all students in the class are using the same AAC system. They understand that this may not always be the case in the classroom setting, however, they feel that it is just easier if the students use the same system so the staff then become more proficient and therefore the students are exposed to higher level of modelling from staff and peers. Another SLT added that it also helps if the same AAC system is made available for the student at all times. This can possibly lead to student success with the system, which one other SLT pointed can mean that the communication partners also get that feeling of success which can be rewarding.

Barriers

The SLTs were also asked what factors they perceived as barriers to the effective provision of aided language input. The responses were again coded and then grouped in themes. This question was also asked during the interview process and the responses were aligned with the codes and themes from the survey. The coding framework is depicted in Table 10.

AAC Team Member Characteristics

The SLTs ($n=34$) indicated different characteristics of the team members that hinder the effectiveness of implementing aided language input. These characteristics relate to the communication partner's behaviour and actions, their attitudes and the student's attitude and traits.

Communication Partner's Behaviour and Actions. Two SLTs shared that what they have seen and experienced as a barrier involved the communication partner frequently putting the system away and not making the system a priority. Another SLT reported that minimal engagement from team members and variable involvement were also considered as barriers. In contrast, one SLT reported that teachers were engaged but easily became frustrated when the student was not using the system after only a few instances of modelling, which can be a barrier, especially if the teacher then hesitates to continue with the intervention. Another

barrier identified by one SLT was the lack of student agency, which involved providing students with meaningful and relevant learning activities.

Table 10

Barriers to the Effective Provision of Aided Language Input

Theme	Codes
AAC team member characteristics	<ul style="list-style-type: none"> • Communication partner behaviour and actions • Communication partner attitude • Student attitude and traits
Understanding of aided language input	<ul style="list-style-type: none"> • Understanding the reason for AAC and aided language input • Knowledge of AAC • Perceptions and pre-conceived ideas
Time	<ul style="list-style-type: none"> • Referrals/Support from External Agencies • Training and learning time • Implementation
Staffing and staff needs	<ul style="list-style-type: none"> • Staff issues • Staff training • AAC team collaboration
Management Environment	<ul style="list-style-type: none"> • Management • Classroom • Family Situation
Skill level of Team Members	<ul style="list-style-type: none"> • AAC systems skill • Intervention
SLT role	<ul style="list-style-type: none"> • SLT role
AAC System	<ul style="list-style-type: none"> • System • Trial period • Equipment Issues • Implementation Issues
Funding issue	<ul style="list-style-type: none"> • Funding • Resources

A specific example provided by SLT6 showed how actions of communication partners can sometimes be perceived as a barrier to the success of the intervention.

We thought we'd introduce a core board and we, you know, we talked about it. And I thought I'd made it all very, very clear and two weeks later I went back in and it turned out the mum had decided in order to teach the

child... she removed all the fringes from the core board and stuck them up on the wardrobe in the house. So then that child didn't really have access to those fringes outside of that one particular room. So then actually that was quite a barrier to overcome.

Communication Partner Attitude. Several SLTs ($n=27$) identified attitudes of communication partners as barriers to aided language input. They noticed that communication partners who are impatient, resistant or those who lack confidence tend to become a barrier to implementing the intervention successfully. Similarly, they report that a teaching team who is not motivated and a key support worker who is not on board can also be barriers as can reluctance and resistance engaging in modelling strategies.

As there is a lot going on in both the home and classroom environment, communication partners can feel overwhelmed. One SLT reported that physical care and safety become more of a priority as opposed to giving equal priority to allowing a student to have a voice. Attitudes towards these priorities in the classroom made it more challenging to implement communication intervention strategies.

There may be some communication partners who also have a negative attitude towards AAC and SLTs felt that this can become difficult to address. Staff tend to resist using the system because they felt it was too hard. "Technophobia and fear of not doing it right can prevent people from giving aided language input a go." The communication partners were also reported to be uncomfortable with the AAC system and hesitant to use it with the students. SLT3 narrated:

There is sort of an attitude around AAC being an extra or a layer on top of what they're trying to achieve during their day-to-day activities and schedule rather than it being embedded within those.

SLT5 talked about biases of communication partners and how it can affect the intervention because "they can't shelve them while they're working with the student, that's going to play out in that relationship and that interaction."

The communication partner's attitude towards the student is a factor that the SLTs also pointed out. One SLT stated that not presuming the student's potential is a barrier. Another one conveyed that teaching staff who either

overestimate a student's language ability or underestimate the potential of the students for learning language affects the intervention. "The attitude of the entire team who don't believe in what the student can learn or achieve" was considered a barrier. The issues on attitude were discussed further during the interview with SLT3 reiterating that a lack of belief in a student's capability can be a barrier.

SLT3 also discussed that sometimes the attitude of staff towards their own SLT in comparison to someone outside of the organisation can play a part in their attitude towards AAC.

I think when an outsider comes in to the school and provides some education or training, it's often considered more deeply than when the therapists from within the school provide that training.

Student Attitudes and Traits. There were also some SLTs ($n=3$) who identified attitudes and traits from students that they perceive as barriers. These were lack of engagement or attention to modelling, limited motivation to interact with others, and behavioural difficulties in the classroom.

A student may also have his own routines and specific way of learning which can initially be perceived as a barrier.

So then that child didn't really have access to those fringes outside of that one particular room. And then when I said no actually we kind of need to put these back on the core board. The child had autism and found it very, very difficult the fact that he'd had them on his wardrobe and they were no longer on his wardrobe and were on the core board he did not like that.

(SLT6)

Understanding of Aided Language Input

Some SLTs ($n=25$) indicated that the lack of understanding on aided language input is a barrier to the effective implementation of the intervention. They explained that not everyone in the team may have a good understanding of the reasoning behind aided language input and of the intervention itself. Furthermore, they reported that the knowledge on AAC may also be limited and that team members tend to have their own perceptions and pre-conceived ideas about AAC and aided language input.

Understanding of the Reason for AAC and Aided Language Input. A few SLTs ($n=8$) shared that limited understanding and recognition of the value or importance of AAC tools and strategies is a barrier to the intervention. Other barriers they identified were the lack of understanding and clarity of the reason and purpose of the tool. One SLT reported that there is a misunderstanding on the language in and language out model while another SLT also reported a misunderstanding of the importance of immersion, which involves the student being provided with models and opportunities to communicate throughout the day.

Another SLT reported that there are staff who do not view AAC as a valid means of communication, which makes the implementation of the intervention challenging. One SLT also noticed that staff find it hard during the intervention if a student has visual difficulties because the staff feel that it is hard to understand how visual and auditory prompting can be useful.

Knowledge. There were three SLTs who reported that the teachers and other staff in the classroom have limited background knowledge about AAC. Another SLT added that the staff may also have limited knowledge about aided language input and its implementation which make staff reluctant to practice it. An SLT also stated that staff may have “limited experience and training around speech and language communication needs and this has a huge impact on their ability to support students”. Another one indicated that AAC is highly specialised and becomes a barrier because it is often “left in the hands of those who are untrained”.

A discussion during the interview reinforced the issue of misunderstanding and lack of knowledge as a barrier.

I think the schools and centres we’re working in, they’re not all super familiar with core boards. Or they’re only vaguely familiar with core boards so it kind of feels like we’re at the stage where we’re just building up a basic understanding of AAC here.

I think people really have negative connotations associated with the core boards, they’re like what’s this thing, we were just given it, we don’t know what to do with it. So it’s sort of yeah trying to show them actually this can be a really good thing.

I think part of the reason why historically schools have, and kindys have not liked the core boards and had issues with them, is because they've not understood that you know it's not going to make a difference right away. And I think that's partly our fault for not making that clear enough. And not explaining that and not reminding them of that when things are going tricky and they're not, they're not seeing a difference. (SLT6)

Perceptions and Pre-Conceived Ideas. Some SLTs ($n=8$) also indicated that staff and family members may have some pre-conceived ideas about AAC and aided language input that make implementation difficult. Examples include:

- it will take lots of time and is difficult to integrate in a busy environment
- seeing communication learning as happening only during a specific time of the day
- belief that AAC will stop the student from talking
- belief that the student doesn't need AAC as they know what the student wants
- fixed ideas around what communication should look like
- it is hard or cumbersome
- families and teachers thinking it's a replacement for language, oral language without knowing the research and understanding the background.
- perception that if you give them a picture they will magically communicate

Perceptions are difficult to address which SLTs continuously try to work on as described by SLT4:

The communication partner's saying the tool's heavy. It's in the way. I can't programme it. I can't add a symbol if it's a high-tech one. So, I guess I'm saying it's almost these perceptions or barriers that it's sometimes not necessarily the tool, but it's more the person finding it tricky to get their head around it. And often it's the philosophy, their perception of communication and what it is. So, I think if they've made their mind up that they don't want the kid to ask to go outside and then I'm not going to show

them that because I don't want them to go outside, or I don't want to teach them to say no because they're going to say no all day. So, it's sometimes that. It's the perceptions or the beliefs that they have around it.

Time

When identifying facilitators to success, SLTs stressed the importance of time, consequently, the lack of time is for them a barrier to the effective implementation of aided language input.

Support and Referral from External Agencies. One SLT identified the limited contact time with specialists from TalkLink and the Ministry of Education as a barrier. This was explained further by another SLT who stated that "TalkLink are fantastic in knowledge but slow to respond as their caseload is too high".

Training and Learning Time. There were SLTs ($n=7$) who discussed the lack of time in relation to training and learning. They reported that there is limited time for SLTs to provide training and similarly, there is limited time for staff and families to attend training or to receive support in another way. Others may be able to attend training, but there may also be the lack of time for staff to learn the systems while in the classroom. Time to meet as a team may also be limited which makes implementation and follow-up difficult. When it comes to professional development and learning, there might be staff who are keen to attend, but they may not have available release time to attend these events.

Implementation. There are numerous issues identified by the SLTs ($n=14$) that are related to the time limitations when implementing the intervention. These time limitations were related to classroom schedules, time with the students, training and implementation time with examples of responses as follows:

- SLT not able to visit regularly; intermittent visits to provide the needed intervention
- limited time to model and use
- not having enough time to work through issues with people before giving them systems so it ends up not being used
- time constraints in a busy classroom
- staff and SLT not having enough time with students

- limited time for staff to learn and practice (access to system for support people is limited)
- parents who are time poor due to socio-economic challenges

Based on their experiences, four SLTs during the interview reported how time is a significant barrier to being able to effectively implement aided language input. They felt that there is just not enough time to work with teachers and students. “If I just had one class and could be in there all day, every day, then it would be amazing”. (SLT3)

In a similar way, they felt that effective implementation was hindered by time constraints in a very busy classroom.

I think time is the huge one, yeah, absolutely, because there’s so much to do in a day, especially all of the school kids who’ve got really complex physical needs, like all of the medical stuff like feeding and toileting and personal cares and making sure that they’ve had their physio, stretching and time in the standing frame and all of that kind of thing, it just physically takes so much time to do all of those things. And then having time to actually implement an AAC system on top of all of that, I understand how teams and families struggle. (SLT1)

Staffing and Needs

The barriers related to staffing included topics on staff issues, staff training, and AAC team collaboration.

Staff Issues. The following staffing issues were identified by some SLTs ($n=4$) as barriers to effectively implementing aided language input: very high staff turnover, health difficulties with teaching team, teaching and support staff often changing classes. SLT5 provided a specific example of an experience on staffing changes.

There will be certain cases where you’ve got one team member, like a really motivated teacher aide or SENCO, or specialist teacher who gets it and who does it. And that works for a time but it seems to be more short term because once that person cycles out, gets a new job or the student moves then it all falls over.

Staff Training. Teacher aides are paid for the time they are in the classroom, and with staffing limitations, one SLT reported that it is seldom that teacher aides are able to stay after school to attend training. This was explained further by SLT3:

It's quite hard to access the teaching assistants, that's something we really struggle with, the teachers there is obviously an expectation around them being available outside of school hours, that teaching assistants to try and grab them you have to... they get taken out of class and that's... they're in high demand so every now and again we can kind of swing it so we get half the teacher aides while the other half look after the students and then another day we swap but that doesn't happen very often because it's quite hard to organise, so it's much more on the fly in the class or just outside the classroom, quick chats, they would love to know more but there's just, it's very hard to kind of get them.

SLT1 shared that teachers may not be given release time to be able to attend training. In addition, it is also difficult to get all the team members together for training and coaching.

AAC Team Collaboration. Some SLTs ($n=3$) reported that the ability to work with a whole team can be difficult, especially if it is a huge team. There may be competing roles and responsibilities, as well as competing demands on what is required in the daily routine of the students. SLT2 explained why a huge team can be a barrier in AAC implementation:

Because not everyone is using it and they might all be using it in different ways and perhaps a variety of people who are quite confident in using it but they're using it for different purposes.

Management

Two SLTs stated that the lack of management support when it comes to time, staffing and funding are barriers to the success of the intervention. It is perceived that there should be a general "culture" in the school that supports AAC for aided language input to be successful.

School and Home Environment

The environment that a student is in includes both the school and home environment and for some students, the respite care environment.

Classroom. Some SLTs ($n=4$) described that the classroom environment can be a barrier. They indicated that a chaotic classroom environment and a classroom with lots of distractions both for staff and students affected how effectively they were able to implement the intervention. Other barriers they identified were the lack of resources in the classroom, the AAC systems that are shut in the cupboard and the number of students in the classroom with different needs. Classroom events, activities and changes to routine also affected the implementation of aided language input.

People's aided language input ability varies depending on where they are and what's happened on the day. The other thing I've realised recently, often those day school classes, but often those trickier classes, the aided language input would be really low on a Monday and were really high on a Tuesday. So, I think with experience that I've realised actually it varies and so my expectations need to adapt to what's happening. Is that communication partner off sick, so therefore that reliever actually doesn't even know what a core board is? (SLT4)

Family Situation. There were four SLTs who shared how the family environment and situation can be a barrier. They indicated that socio-economic status of families can affect the provision of the intervention due to competing priorities. Cultural differences, English as a second language, and educational backgrounds of families were also perceived as barriers. Sometimes, there is just too much going on in a family that the AAC intervention is not going to be a priority.

I think for parents it's often a barrier where there's other things going on in their lives. So when there are times where I think actually this family needs some sort of support worker, or they need to have their housing sorted. Or it's something completely out of the realm of what I can help with. But we can't really implement a core board because that's just not going to work. They've got too much on their mind. (SLT6)

Skill Level of Team Members

There are barriers identified that are specific to the skills of communication partners when it comes to the AAC system and also on how they provide the intervention.

AAC Systems Skill. One SLT reported that communication partners may not always have the appropriate technological skill to use high-tech communication systems. Another barrier that was identified was on the number of different AAC systems the staff needed to learn. SLT3 discussed:

Different communication systems within one class can be challenging for teachers, can be a real barrier for them, so you've got one student that's using a high tech device that often gets not looked at, so we definitely have more success with the kind of the school-wide blanket model and individualised ones and then yeah people complain if they're different to each other and they can't find things that they can on others and things like that, so that's definitely been a barrier.

Intervention. Some SLTs ($n=7$) found that the following behaviours and communication skills they have observed from communication partners were barriers to providing effective intervention: adults directing the communication exchange as opposed to responding to and building on the student exchange; focusing on output and staff using AAC mainly to ask questions; adults being the director, helper or timekeeper; too much prompting; wrong levels of prompting; not pausing and waiting for a response; not providing explicit instruction; and, teams who are only focused on getting the student to speak verbally rather communicate in any method. It is because of these barriers that one SLT indicated the importance of supporting the communication partners with how to interact with the student in a natural context when using their AAC systems.

SLT Role

There were two SLTs who discussed what they consider as an SLT's role that can be a barrier. A consultative role can be limiting and was reported as a barrier. SLTs who provide an assessment service indicated that this role does not allow them much time to focus on implementation. In the interview, SLTs explained why a consultative role is more of a barrier, and for some even went on to further discuss how they managed to address this issue.

I wasn't providing a very good service because I couldn't work alongside the families and schools enough to help them understand how to use the augmentative communication system. (SLT2)

SLT6 went on further to share how she addressed the consultative type of service delivery:

I would like to be able to do more one to one interventions for a lot of these kids. But that's not the way we're funded or allowed to work really. I have done some things like I had two preschool children who were using core boards, both mothers expressed an interest in meeting other children who used core boards. So I set up a little paired group, that I did a number of sessions with both of those boys. So I did some more sort of paired therapy that was a bit more intensive than what I would usually do.

Being new to the role is difficult and SLTs also felt that this can initially be a hindrance to the success of the intervention. SLT6 shared:

For me I'm not super experienced with core boards so you know. With AAC generally I try my best but you know I'm probably a barrier myself.

There are students who, because of how they are funded, may also have another SLT from a different organisation aside from the school SLT. The roles of both SLTs may differ, mainly because of the funding. This can sometimes be an issue which eventually may become a barrier, as SLT2 explained:

I don't know whether this is too political but I know that in special schools they have speech therapists who are there to support the kids but they actually can't do an awful lot with many of the kids because they're so over-worked themselves and I find it frustrating when I'm funded to be able to come and help therapists in special schools...that schools don't always want me in to help the kid and I understand why because they've got their own therapists and they want to be able to manage that in their own system but when they don't have enough time to spend, surely it would be good just to work together for the benefit of the child and not let's get politics out of it and make it working for the kid the right way.

AAC System

The AAC system and which system to use can often be confusing and can also be difficult to learn. One SLT reported that "quite often adults get caught up on what tool they want to use" and suggested that "it is best to do a SETT framework to determine what is the best tool". There are also certain issues that may arise

when implementing AAC that can be a barrier to a successful implementation of the intervention.

System. Some SLTs ($n=7$) reported that AAC systems themselves can be a barrier when they have insufficient vocabulary, are poorly organised, have symbols that are hard to understand, lag, are too slow for conversational demands and do not reflect New Zealand vocabulary and accents. SLT3 identified that the complexity of the system or the perception of complexity is also another barrier. SLT6 added that the size of the core vocabulary board especially if it is too big for the child to carry around may affect how often it is going to be used.

Trial Period. During the assessment and trial period, one SLT shared that there is a tendency for getting a wrong AAC system for the student because the trial period is too short. SLT2 added that others may have difficulty getting access to AAC devices to trial.

Equipment Issues. SLT2 also narrated that when the student already has an AAC system in place, the breakdown of the equipment and the occasions where there is limited support when the equipment breaks down is also a barrier. It is even more of a barrier for those who live in rural areas as they report that support can be limited or it can take a while due to their location.

Implementation Issues. When a student already has a system in place, issues do come up and some SLTs ($n=8$) identified what they think can hinder the success of the intervention. One SLT reported that having multiple AAC systems in the class can be a barrier because it takes time and effort to manage especially for the class teacher. SLT4 pointed out that:

Groups are very tricky. I think that's the other thing I want to chat, modelling within a group versus a one-on-one. If everyone has a different system... that's the other thing, do you have one system and everyone knows it, or do you have four systems, and everyone half knows it?

Another SLT noted that the use of core boards without training and support from the SLT is also a barrier. Two other SLTs added that because of limited training and knowledge, staff wanted to change the AAC system and just use very few symbols in one page. Supporting families and staff in implementation especially with the high-tech systems can be challenging, and one SLT reported that it is

difficult when the individual lives in an area far from the main cities since support is infrequent or slow due to distance.

Funding Issue

There are two aspects of funding which serve as a barrier – the funding itself and the resources needed to effectively implement aided language input.

Funding. Two SLTs considered the issues around funding when getting an AAC system in place for students and reported that a limited funding is a barrier for them. SLT5 added and shared her experience in the classroom:

So trying to talk to them about modelling on one child's device when they've got you know, 50 kids plus also 10 of those 50 are kind of high needs but don't get any kind of funding through Ministry of Education.

Access to TalkLink was also identified as a barrier during the interview, and SLT 6 explained:

Part of the barrier is actual access to a device itself, or a core board itself, because the waitlist for TalkLink to get a device is so long. Not saying anything negative about them, they're fantastic but they've not had their funding increased in so long as we know. So that's a big barrier.

Furthermore, SLT2 discussed the barriers related to dealing with different funding agencies:

Talk Link have got a contract with ACC which means they have to provide support quickly but when you're under...it could be six months or a year before you've got access to that support and that's not acceptable, so I would say TalkLink need more funding in order to help them get their wait times less so that you can access them better for non-ACC contracted students.

The constraints related to funding affect how the SLTs are able to provide their service.

Because we're not contracted to do any of that work you know particularly for paediatric clients, we would be expecting that that sort of support would either come from the Ministry of Education SLT, or a special school SLT. Or early intervention SLT whatever kind of service they've got for that...But we don't have a therapy contract to provide an ongoing intervention. (SLT5)

In contrast, SLT4 who has a different funding type, reported how she felt that she was able to provide more for the families she worked with:

You know that's something I've also learnt is that a lot of Speech Therapists are based in schools and don't have the wonderful opportunity that I get of working alongside families because when...there is more funding available, so I can work both at home and in schools and help everybody.

Resources. Some SLTs ($n=4$) added that the limited funding and the time and effort needed to make resources are barriers too. They felt that funding limitations related to resources or even just the lack of resources is a barrier for them to be able to effectively implement the intervention. This was described and discussed in detail during the interview.

Probably making up the resources...We're in the dilemma at the moment of you have a core board and then who's going to make the personalised one, who's going to get the funding for it, who's going to do the application for it? So, I think it's the making of the provision of the resource. (SLT4)

SLT5 also shared her experience with requesting for funding of AAC resources:

So even trying to get them you know you blow up a core board that still costs money you know somebody has to pay for that. And that's not so easy to get funding through the EMS process. So it's some of that resourcing stuff and that's what I mean like if you've got a, got a principal or the senior leadership team that sees value in that, then they're going to spend the money to get those things hooked up so that it's then facilitated in classrooms.

In addition, SLT6 discussed the time and money involved with making communication boards for students:

We didn't have access to pre-printed core boards for quite a while so we had to spend. I think we estimated it was four to six hours to make a core board ourselves. Which is not a good use of SLT time. Now we've got some pre-printed ones which is good but now my barrier is I don't have a board maker template of the fringe.

Support Needed by SLTs

During the interview, the SLTs ($n=6$) were asked a follow-up question on what support they would need in their practice to be able to effectively implement aided language input. Table 11 lists the support needed as identified by the SLTs in the interview.

Table 11

Identified Support Needed by SLTs

Support	<i>n</i>
Caseload reduction	3
PD opportunities	3
Supervision and networking	3
Resourcing	2
University-level training	2
Management support	1

Caseload Reduction

Time was a major factor discussed by the SLTs both during the survey and then in the interviews, with the lack of time considered as a barrier. In response to this, SLT1 conveyed that a lesser caseload would mean more time to spend with the student and the rest of the team and even to get “a bit more coaching” done. SLT3 added that even though capability is there, the SLTs are just spread too thin and they just need more time to do their job effectively.

If we could actually have more people on the ground and not have such high caseloads, and not have our therapists burning out to the point where they leave the profession...I’ve just seen it so much over the years where we’ve got wonderful therapists and we train them and, and the workload just gets too much. (SLT5)

Professional Development Opportunities

The SLTs ($n=3$) indicated that AAC training and professional development opportunities are all critical to support the SLTs in effectively providing the intervention. They reported feeling well supported with the opportunities offered

by TalkLink, including the CAT-Level 1 training, Creating Communication Opportunities training and the KiwiChat Camp.

Supervision and Networking

SLT1 and SLT2 reported that having supervision helps their practice as they get the chance to discuss and brainstorm ideas especially with “tricky clients and cases”. SLT2 added that it is also beneficial to have supervision outside of the profession, for example, occupational therapists, wherein they can look at switching and access.

Networking with other SLTs can provide a good support for the profession as these can be avenues to discuss strategies and added that TalkLink and the special school meetings are good support networks. (SLT4)

Resourcing

Creating resources and getting them sorted and organised takes time. Similarly, updating and editing devices also take time. These are tasks that SLTs do, that they feel they need more support with because of time and funding limitations. SLT4 conveyed that resourcing issues like this is a good conversation to have with management adding that repeated creations of communication boards may not be the best use of the SLT’s wage and time.

Another perspective taken by SLT6 was on the capability of teachers to actually have the resource in terms of time to participate in training and coaching.

University-Level Training

SLT2 reported that there needs to be more AAC training at University level as she felt that the new graduates are not so knowledgeable with AAC and AAC systems. SLT5 stated that the basics are not as covered as much as it should be and reported that most of the University learning experiences related to AAC would be dependent on their clinical placements, and those placements would need to be at TalkLink, a special school or with a Ministry of Education therapist with an interest in AAC. She added that there has to be a dedicated AAC course in undergraduate and postgraduate training, similar to how there is a course on phonology, child language disorders and dysphagia and further stated that Massey University appears to be the only one who does this best. “It’s a skill we build over time. But we don’t actually train our therapists to know how to do this.” (SLT5)

Management Support

As lack of management support is identified as one of the barriers, one SLT suggested that it should be best practice that the support for AAC from management is formalised through policies or including it in the school's philosophy.

Summary

The information collected from both the survey and the interviews were integrated and the results presented in this chapter as outlined in the convergent mixed methods research design. The findings suggested that SLTs strongly believe in the importance of aided language input as an AAC intervention. They discussed what the intervention looked like in their specific clinical practices while identifying what practices they felt were effective. Furthermore, they identified facilitators and barriers to effectively implementing aided language input. These were mostly related to the team members' attitudes, knowledge, skill levels, beliefs and perceptions. Other factors they identified as either facilitators or barriers were time, staffing, management support, SLT roles and caseload, AAC systems and funding. Finally, the SLTs in the interviews also shared what support they believe is needed for SLTs to effectively implement aided language input which were related to time, funding, management support and training and supervision.

Chapter 5: Discussion of Results

This study explored the perceptions and experiences of New Zealand school speech-language therapists (SLTs) on aided language input as an augmentative and alternative communication (AAC) intervention. Specifically, it addressed the following research questions:

1. What is the importance of aided language input for SLTs as an AAC intervention?
2. What practices are implemented to support or facilitate aided language input?
3. How effective are these practices?
4. What factors influence success of these practices?

The significant findings from the results are discussed in this chapter, with reference to the existing literature. The discussion is linked to the research questions and is organised as follows: 1) Perceptions on the importance of aided language input, 2) Clinical practices in aided language input, 3) Perceptions on the effectiveness of clinical practices implemented, and 4) Perceptions of factors that influence success.

Perceptions on the Importance of Aided Language Input

The study inquired about the SLTs' perceptions of the importance of aided language input in their practice. All the SLTs who responded to the question in the survey ($n=45$), agreed that aided language is important in their practice, although at varying levels of agreement. Of the 45 SLTs, 82% reported that it is extremely important for them. In both the survey and the interviews, the predominant reason that SLTs shared to explain why aided language input is important in their practice is because it supports both language learning and development and it is how the student learns to use the system.

The SLTs felt that aided language input is an effective intervention for students with complex communication needs (CCN). They reported that it supports a student's understanding of language (receptive) which then enables them to also develop their use of language (expressive). This aligns with Goossens' et al.'s (1992) strategy which focused initially using aided language input to support receptive language. Furthermore, O'Neill et al.'s (2018) meta-analysis reinforced this by

showing that aided language input enhances both the receptive and expressive communication skills of individuals who use AAC.

In the current study, SLTs described how learning an AAC system is similar to learning spoken language. Goossens' et al. (1992) reported that the strategy of aided language stimulation mimics the natural way that typically developing children learn and comprehend language. Therefore, in order to learn how to use AAC, children need to see and hear it being used.

The SLTs in this study also added that the learning process is most effective when it occurs in natural contexts and during meaningful interactions. This is supported in the language development literature. Von Tetzchner (2018) conveys that language development is formed through a child's experiences in different communicative situations. He proposes the constructivist framework as the approach that is most relevant to aided language development. Different theories of language development that fall under this approach include the Social Interactionist Approach by Leo Vygotsky (Schneider & Watkins, 1996), Constructivist Theory by Jerome Bruner (Ellis Weismer et al., 2017), Social Learning Theory (Bandura, 1971), Transactional Model of Language Development (Fey et al., 2017), and Usage-Based Theory (Tomasello, 2003). These different theories highlight the importance of social interactions and natural contexts in language learning and development.

Research in AAC supports the use of natural interactions as a context for language intervention. In Drager et al. (2006), aided language input showed positive effects on symbol comprehension during play activities. Binger & Light (2007) reported generalized use of symbol combinations to new routines in a study that involved an adult and a child engaged in play activities. Liboiron and Soto (2006) highlighted shared storybook reading as an ideal context for meaningful interactions in language intervention while at the same time addressing the language difficulties identified for children with CCN. The findings in their study suggested that shared storybook reading creates a language-rich interactive environment for the child to support their language and literacy needs. It fosters their narrative development, which can enable children who use AAC to have the opportunity to tell their own stories. Storybook reading contexts also improve

parent-child interaction patterns, and facilitates turn-taking in children who use AAC (Kent-Walsh et al., 2010). Furthermore, storybook reading is recognized as a context for providing aided language input as it offers an authentic setting for facilitating the language, literacy and communication skills of children with CCN who use AAC (Clendon et al., 2014).

The SLTs' beliefs about the importance of aided language input as an intervention and their reasons behind these beliefs are supported strongly by literature and a large body of research. This includes literature on language learning and development, as well as research on the effectiveness of aided language input.

Clinical Practices in Aided Language Input

The current study explored how SLTs provide aided language input intervention, who they support and what this support looks like in their practice. In this study, the SLTs reported that they provide both direct student-focused intervention and indirect interventions focusing on the student's communication partners, which are mostly classroom staff and, for some, the student's parents and/or caregivers. The direct intervention is with the student in 1:1 activities, in small groups or with the whole class. It is during these times that the SLTs may lead the activity and provide aided language input using the AAC system of the student or for a group activity, using the system(s) that are used overall in the class. Others also reported sitting with students in the class, modelling the use of their system, while the teacher leads the activity. It is important to note that even though they are providing direct intervention, because it is in a classroom setting, they are also providing modelling and teaching opportunities for the classroom staff.

The SLTs also described their role in providing indirect intervention. Tegler et al. (2019) explain indirect intervention as targeting communication partners, with the intervention separated into 'what to teach' and 'how to teach'. In the current study, a high number of SLTs ($n=41$) reported that they provided training and workshops on AAC and aided language input. This aligns with what Tegler et al. (2019) describes as the 'what to teach' wherein SLTs teach communication partners about the concepts of AAC and aided language input. Furthermore, SLTs in this study also indicated that they support communication partners through coaching ($n=26$) and video modelling ($n=21$). They also provided written tips, guides and

instructions on the use of the AAC system. In addition, SLTs also modelled the use of the device with the student, while at the same time providing the models of what aided language input is to the classroom staff. These supports align with what Tegler et al. (2019) describe as the 'how to teach' the instructional approaches that SLTs use to make sure that communication partners learn the strategies, for example, verbal or written instructions, feedback, modelling and role play.

Research has shown that communication partner instruction is important for students with CCN who use or are learning to use AAC to communicate. Communication partner instruction is an important part of AAC intervention because the partners play a key role in developing the communication skills of the individuals who use AAC (Dolly & Noble, 2018; Kent-Walsh et al., 2015). In addition, Beukelman and Light (2020) state that communication partners need training to enable them to develop their own skills needed to support individuals with CCN.

Various studies on communication partner instruction (e.g., Douglas et al., 2012; Kent-Walsh & Binger, 2013; Kent-Walsh et al., 2010; Rosa-Lugo & Kent-Walsh, 2008; Senner & Baud, 2017) also involve a coaching component which includes ongoing feedback, role playing and video modelling. The clinical practice of providing ongoing coaching aligns with current literature on adult learning needs. Kent-Walsh and McNaughton (2005) stated that in-service and other traditional training formats are not sufficient to develop the skills and expertise of communication partners to enable them to provide long-term support for individuals who use AAC. Communication partners need more than just the theory and information from training and in-service provided in the traditional formats. Joyce and Showers (1980) discussed that training can only be effective if it includes theory, demonstration, practice, feedback and coaching for application. In a subsequent report, Showers and Joyce (1996) indicated that only about 10% of participants who attend in-service training implement what they learn when they are back to their work environment. A different report by Birman et al. (2000) stated that professional development attended by teachers which included active learning and coaching showed an increase in their knowledge and skills, as well as the increased ability to put those skills into classroom practice. Ongoing coaching can assist with not just understanding the intervention but also in using it in

everyday classroom contexts. Marra and Micco (2019) reported strategy instruction, including practice and feedback should be part of the communication partner instruction as this helps to increase understanding of the AAC system and how to use it in more naturalistic situations.

The coaching, ongoing feedback and video modelling described by the SLTs in this study align with the literature suggesting the importance of coaching, practice and feedback (Birman et al., 2000; Joyce & Showers, 1980; Marra & Micco, 2019). Similarly, the training, workshops they provided and the in-class modelling reflects the importance of strategy instruction (Marra & Micco, 2019) and the explicit teaching of concepts (Tegler et al., 2019).

Perceptions on the Effectiveness of Clinical Practices Implemented

The SLTs reported on how the implementation of aided language input in their practice has affected the students they work with. They also described how their support has influenced the communication partners when implementing the intervention.

Students

Aided language input is supported by a significant body of research which has shown the effectiveness of this intervention on the development of the language and communication skills of individuals who use AAC (e.g., Binger & Light, 2007; Drager et al., 2006; Harris & Reichle, 2004; Kent-Walsh et al., 2010; Rosa-Lugo & Kent-Walsh, 2008). In the current study, the SLTs shared that the students demonstrated improvements in their vocabulary, receptive skills and their ability to effectively communicate their needs and preferences. They also observed an increase in the students' utterance length and in the use of the AAC system for different purposes. In addition, they also reported improvements in the students' social communication and interaction skills, academics and other observable factors such as confidence and frustration levels. Some also noted progress in the students' use of speech and their intelligibility.

The reported effects on students' skills can be linked to the various studies on aided language input and its effect on an individual's communication skills. O'Neill et al. (2018) and Lynch et al. (2018) described different studies that showed the effectiveness of modelling or aided language input on the language and

communication skills of individuals who use AAC. For example, the studies indicated improvements on symbol comprehension and production, semantic concepts, use of symbol combinations (Binger & Light, 2007; Drager et al., 2006; Harris & Reichle, 2004; Rosa-Lugo & Kent-Walsh, 2008) and increase in communicative turns and utterance lengths (Kent-Walsh et al., 2010; Liboiron & Soto, 2006; Rosa-Lugo & Kent-Walsh, 2008). These studies mainly report positive effects on an individual's vocabulary and syntax, which align with the changes observed by the SLTs in this study.

The increase in use of AAC for different communicative purposes also echoes the results in Binger and Light's (2007) study which reported generalized use of symbols to new routines. However, aside from the studies which resulted in increase in communicative turns and generalising to new routines, there appears to be limited studies on the effects of aided language input as an AAC intervention on social communication and interaction skills. SLTs in the current study shared that with aided language input, they observed improvements in the student's social communication and interaction skills. Furthermore, research that relates to the SLTs' perceptions on improvements with academic skills, speech skills, increase in confidence levels and decrease in frustrations as reported in this study, also seem to be limited. However, Beukelman and Light (2020) report that there is a growing body of research evidence that shows AAC as increasing participation, decreasing frustration and problem behaviours among other positive benefits on communication and language development. They also report that there is evidence that AAC intervention does not inhibit development of speech skills.

Communication Partners

In this current study, the SLTs discussed how their support in the implementation of aided language input affected the communication partners. This included improvements on how the communication partners provide the intervention (e.g., increased use of AAC in interactions and in different contexts) which the SLTs attributed to the communication partners' improved understanding of AAC and aided language input. The SLTs perceived that the changes appeared to enable communication partners to implement new practices.

The SLTs also shared their observations on perceived changes in the communication partner's understanding of AAC and increased confidence and use of AAC in a variety of contexts. This reflects Marra and Micco's (2019) research in which the authors implemented an 8-stage strategy instructional protocol for teaching aided language modelling with a parent-adolescent dyad as participants. The results reported an increase in confidence, knowledge of strategies to support the individual who uses AAC, and in understanding of the use of the device (Marra & Micco, 2019). Senner and Baud (2017) used an 8-step instruction model to train classroom staff on partner augmented input strategy, which is the term they use to describe the modelling strategy for teaching AAC use. They reported an increase in modelling using the student's speech generating devices in different contexts. Another study by Senner et al. (2019) described an improvement in the parents' abilities to provide augmented input using the strategies they were taught (e.g. slow rate, model). This support is what the SLTs in this study observed as changes in the way the communication partners' model and interact with the students after learning to implement aided language input.

Kent-Walsh et al.'s (2015) analysis of the effectiveness of communication partner instruction indicated that aided language input not only positively impacts on the communications skills of individual who uses AAC, but also improves the skills of the communication partner. These reported improvements on the skills of both the individual who uses AAC and their communication partner were echoed by the experiences and observations shared by the SLTs in this study.

Perceptions of Factors that Influence Success

The SLTs discussed what factors they perceived as facilitators and barriers to effectively implementing aided language input. The facilitators and barriers they reported were usually in opposite ends of a continuum, as it was dependent on whether the factor discussed was present or absent. For example, understanding AAC was identified as a facilitator. Conversely, limited understanding of AAC was identified as a barrier. The SLTs identified factors that were either intrinsic or extrinsic; with intrinsic being the factors inherent to the student and extrinsic as those factors that involved the communication partners, team members, the environment, and other external influences.

Intrinsic Factors

The intrinsic factors included the students' attitudes, traits, behaviours, knowledge and skills related to AAC. Noteworthy in this study is the SLTs perception of these intrinsic factors that could either facilitate or hinder the effective implementation of the intervention. Factors like attention, motivation, limited behavioural issues in the classroom, confidence, engagement, linguistic skills, competence and word-finding skills are examples of perceived facilitators to successful outcomes of the intervention; and the absence or partial presence of these factors were considered as barriers.

These findings are similar to the psychosocial factors Light and McNaughton (2014) identified that impact the communicative competence of an individual who uses AAC. Light (1989) identified four interrelated domains of communicative competence which are linguistic, operational, social and strategic skills. Light subsequently added in 2003, psychosocial factors which includes motivation, attitude, confidence and resilience and categorised them as intrinsic factors that play a role in becoming competent communicators (Light & McNaughton, 2014).

Moorcroft et al. (2019) conducted a systematic review of barriers and facilitators to the provision and use of low-tech AAC systems. They reported that personal factors such as attitude, personality, skills and behaviour of an individual with CCN influence the success of their use of AAC, which aligns with the facilitators and barriers identified by SLTs in this study.

In this current study, SLTs shared that students "who show competence" and who have linguistic and word-finding skills helped facilitate the effective implementation of the intervention. This again aligns with Moorcroft et al.'s (2019) findings that revealed that inadequate literacy skills prevented individuals who use AAC from generating messages. They added that slow progress in learning to use the system was reported by SLTs and teachers as a barrier to continued use.

However, literature also suggest that a child does not need to have certain skills to be able to benefit from AAC (Ronski & Sevcik, 2005). The current evidence also suggests that there are no prerequisites to AAC and there are a number of options available to start the intervention (Beukelman & Light, 2020). Ronski and Sevcik (2005) argue that individuals are unable to demonstrate cognitive abilities if

they have no means to communicate, therefore, it is difficult to expect any evidence of a skill before providing AAC services. It is acknowledged that basic skills are important to develop language, and in fact, as Light and McNaughton (2014) report, linguistic, operational, social, and strategic skills are important to achieve communicative competence. However, they also stress the importance of providing intervention that develops communicative competence through instruction in these four domains. They further add that intervention should also address the different psychosocial factors in order for the individual to communicate effectively and to persevere despite obstacles. Ronski and Sevcik (2005) emphasize that developing language skills through AAC is critical if we expect an individual to make functional gains in becoming a competent communicator. Instead of expecting the skill and requiring specific skills before provision of service, or in some instances, not going ahead with the intervention due to the perception of an absence of skills, the student then needs to be supported to learn these skills.

Extrinsic Factors

The SLTs in this study also reported a number of external factors that can influence the success of the implementation. For example, the attitudes, level of knowledge and skill that communicator partners have; the environment; systems and policies; service delivery; and management support were mentioned. Light and McNaughton (2014) also recognised environmental or extrinsic factors as facilitators or barriers. This includes the skill, attitude and knowledge of communication partners, and policy and practice related to AAC. Other research in AAC reported similar extrinsic factors impacting AAC success. Examples of these are systems, services, policies, technology, natural environment, human-made changes (Moorcroft et al., 2019) and attitudes, knowledge and skills of the communication partners (Baxter et al., 2012).

Family Natural Environment. Some of the barriers identified in this study relate to family situations and practices, home language and traditions. These perceived barriers highlight potential issues relating to cultural responsiveness. Soto (2012) states that professionals need to make a continuous effort to understand their own cultural values and how it influences their practice, and more importantly, they also need to be aware and understand the family's culture and

values as it relates to AAC. In addition, she indicates that outcomes of AAC intervention is affected by family dynamics and their communication style, and given that language develops in meaningful interactions with family members and significant others, it is critical that families are engaged and involved in the AAC process. Other families may also be experiencing challenges in their lives that can affect how they respond to the introduction of AAC for their family member. The parents of children with CCN and other disabilities take on different roles and responsibilities (Parette & Angelo, 1996). The outcome of the intervention will depend on how this can fit into the family considering the whole family dynamic. The only way to ensure a successful outcome with AAC intervention is to find ways to work with the family and listen to them in order to gain understanding of their priorities, concerns and where they might be coming from (Beukelman & Light, 2020).

Education and Knowledge. Light and McNaughton (2014) state that individuals who use AAC need support to communicate successfully and in order for the communication partners to provide that needed support, they require knowledge in AAC systems and the appropriate communication strategies. Bailey et al. (2006) report that training and education regarding AAC may not have been part of the University curriculum for many professionals who play a key role in AAC, teachers and SLTs included. The barriers that impact successful AAC implementation as perceived by teachers include lack of training, inadequate assessment, limited opportunities and inconsistent implementation (Andzik et al., 2019).

The current research literature aligns with what SLTs in this study discussed regarding knowledge and understanding of AAC and aided language input and how it can either facilitate or hinder successful implementation. The need for training and further professional learning and development (PLD) to acquire knowledge and understanding of AAC in order to provide appropriate support for the student, applies to the SLT, the teachers and staff and all the other professionals involved with supporting the student.

The SLTs in this study acknowledged this, and also reported that there are gaps to this needed training and PLD, starting from university level, with either SLT

or teacher training, and also including training in the workplace. Currently, there are three universities in New Zealand offering Speech and Language Therapy courses. Of the three Universities, only Massey University offers a full semester AAC course. When asked what support SLTs would need to be effective in their AAC practice, SLT5 stated “I think one thing that would really help is having dedicated AAC courses in undergrad, and in postgrad training”.

The findings in this study related to the need for training and professional development also intertwine with time and funding issues. SLTs reported various PLD opportunities post-university qualifications and felt supported with being able to avail of these opportunities. However, this is not always the case for teachers, and especially not for teacher aides, which can be attributed to time and funding constraints.

In 2019, a new pay equity scheme for teacher aides was introduced, which provides teacher aides with easier access to PLD (Ministry of Education, 2021). The funding covers not only the course fees, but also the time to attend the course, when required. This addresses the issue raised by the SLTs in this study about the difficulty with training opportunities for teacher aides after their school-work hours due to limited funding.

It is interesting to note that the grading for teacher aides according to the pay equity matrix, does not include additional responsibilities related to staff supporting students with AAC systems, except for a mention of Braille, signs and Makaton. It specifies the grading related to additional support in terms of behavioural, physiotherapy and occupational therapy programmes. However, there is no specific mention in the matrix about the additional skills that staff need in order to support students with AAC systems. This is disappointing given staff who support students with CCN and use AAC to communicate require further knowledge and skills to enable the student to effectively participate in different contexts throughout the day. They have a critical role in supporting vocabulary selection, possible technical troubleshooting, adapting materials and activities, using evidence-based instruction to teach new skills to the student, supporting information exchange and adapting instruction (Beukelman & Light, 2020).

Service Provision. Another finding in this study related to the factors that can influence successful outcome is regarding service delivery, either through direct and indirect intervention. SLTs reported that due to a high caseload, they feel that they do not have enough time to work with the students as often as needed (direct) or to support the staff through coaching and training so that staff can continue to provide the intervention effectively in the classroom (indirect). Other SLTs whose service delivery model is more consultative reported that they felt it important to also work with the students and not just have consultative sessions with staff and parents. Moorcroft et al. (2019) in their Australian-based research, stated that the consultative model was considered challenging as there was not enough teaching involved and sometimes resulted in needing more funding for direct therapy.

The type of service delivery model described by the SLTs in this current study depended on their work setting or the service provider. Each provider may have different funding systems for their services which impacts SLT service provision. This can also be affected by prioritizations and waiting lists. Moorcroft et al. (2019) indicate that waitlists, prioritization systems and service access vary across organizations, which can affect provision and use of AAC systems. Beukelman and Light (2020) describes this either as a policy or practice barrier. They define policy barrier as those barriers that limit participation because of official written laws, standards or regulations, while practice barriers are those practices that are in place in schools, work settings or communities that restrict their communication and participation.

SLTs who work in special schools may also have different experiences related to issues with time, funding and policies. One SLT raised the importance of policies and identified it as a facilitator when policies are in place to support AAC and cover funding provisions for training and resource-making. SLTs in special schools provide both direct and indirect intervention; although issues were also identified due to the limited time available to be in the classrooms more, as well as the time to support the classroom staff. SLT3 stated that there is capability but the SLTs are just spread too thin. This can affect the quality of AAC service provision.

Despite these issues and constraints, AAC service provisions can be addressed by reflecting back on the purpose of the intervention. McNaughton et al.

(2019) suggest person-centred planning to emphasize the importance of the individual who uses AAC, from assessment to intervention, and recognizing that individual as the one with the central role in all planning and decision-making activities. They further state that:

The determination of needed supports is an individualized process that may include assisting people with complex communication needs in obtaining needed services; developing the knowledge, skills, and attitudes of AAC professionals; providing instruction for the person with complex communication needs, as well as communication partners and advocates; and developing communication supports in society (including community partners and healthcare professionals. (p. 2)

With funding and policy constraints, SLTs may not always be able to provide the most effective service that enable the student to be communicatively competent and to participate effectively in the environment. Despite these constraints, and reflecting on the importance of AAC intervention for the students, SLTs developed innovative ways to support the students and their communication partners. SLT4 used the TouchChat Chat Editor and modelled it on the big screen to support the classroom with group modelling as opposed to using it on an iPad. Another SLT felt that her students would benefit from more intensive intervention but was limited with her work setting's service delivery model. However, she set-up a group therapy activity involving the children with their parents which she felt provided the needed intervention for the child and support for the communication partner at the same time.

Other innovative ways of providing intervention reported by SLTs also involved having mini projects in classrooms related to focusing on certain target words each week for staff to model. They then supplied the teachers with a resource pack full of activities related to the target word/s for the classroom staff to use throughout the week and parents were also informed through a newsletter. To encourage generalisation to the home setting, one SLT runs a monthly AAC parent group. Another SLT thought of developing a project wherein a book could be chosen and then the activity adapted to model the target language or grammatical elements that the teacher is planning to teach for a period of time.

Management Support. Finally, another key finding is the level of management support which is a factor that can either serve as a facilitator or barrier to the effective implementation of aided language input. In a school setting, management support is critical for the development of the knowledge and skills of the student, classroom staff, SLT and other professionals involved (Andzik et al., 2019; Bailey et al., 2006; Moorcroft et al., 2019). The SLTs in this study suggest that a whole-school approach is ideal to achieve positive outcomes in intervention, but is only possible with management support.

Management support also links with issues related to time, funding and policies. The development of skills and knowledge of both student and staff through training and other PLD events is achievable with management funding and support. Aside from management support for training, Moorcroft et al. (2019) reported that the making of resources is labour intensive and often done by the school staff or SLTs outside of work hours. They added that additional funding is required to support the staff with the production of these resources. SLT4 described what it can be like in a school setting when faced with issues on funding and resource making:

Probably making up the resources, making of the resources. We're in the dilemma at the moment of you have a core board and then who's going to make the personalised one, who's going to get the funding for it, who's going to do the application for it?

The funding and policies around work time comes from mandates from school management. The services and systems related to the provision of AAC, including training, PLD and resources, would be dependent on these mandates, and so would the successful outcome of the intervention.

Summary

This chapter discussed the perceptions and experiences of New Zealand school SLTs on aided language input as an AAC intervention. It included a discussion on why SLTs felt aided language input is important in their clinical practice. Furthermore, this chapter also addressed what clinical practices in aided language input were implemented by SLTs and what effect the practices had on the students and their communication partners. Finally, the factors that contributed or hindered the success of the practices in aided language input were explored.

The final chapter concludes this study with a brief summary of the purpose, rationale and quality of the research, a discussion of the limitations, and implications and directions for future research. The implications on clinical practice for SLTs who provide AAC intervention in schools will also be discussed.

Chapter 6: Conclusion

The final chapter summarises the purpose and rationale of the study including a discussion on how the rigor of the research methodology was ensured. This is followed by the limitations of the study as well as directions for future research. A discussion on the implications to the speech-language therapist's (SLT) clinical practice is also going to be explored in this chapter. Finally, a conclusion of the study is presented.

Purpose and Rationale of the Study

The study explored the perceptions and experiences of New Zealand school SLTs on aided language input as an intervention. Currently, there is a paucity of research that investigates the SLTs' experiences on aided language input and considering that they play a key role in augmentative and alternative communication (AAC) intervention, it was important to get their views and experiences of their own practice. The study expected to capture current practice, including factors that can serve either as facilitators or barriers to positive outcomes of the intervention. It was anticipated that the findings will inform best practice, as well as identify practice needs for SLTs in school settings.

The research study has filled the gap in the current literature by including the SLTs and their experiences in the AAC narrative. More importantly, it has reinforced the current research literature on the importance of aided language input as an intervention and the value of including and supporting communication partners, but this time from the SLTs perspective.

Quality of Research

There are different strategies available to the researcher to ensure the quality of both quantitative and qualitative research. The trustworthiness measures are undertaken to ensure that the research is credible, transferrable and confirmable (Mills, 2014). The following section is a discussion of the measures that were undertaken to ensure quality of the research methodology.

Credibility

The truth value or credibility of the research findings is strengthened depending on how well the researcher has established confidence in the findings based on the design, the participants and the context (Ary et al., 2010).

Triangulation is one strategy to ensure credibility. In data triangulation, the researcher uses different methods of collecting data with the aim of investigating if the data collected using one procedure is confirmed by the data collected using another procedure (Ary et al., 2010). In this research, a survey questionnaire and an in-depth semi-structured interview with participants chosen from the survey was used. The information from both data sources ensured that the researcher found support in the data collected in more than just one source. This means that findings from the in-depth and more contextual data gathered from the interviews supported the information from the survey.

Low-inference descriptors, defined as verbatim or direct quotations that help the reader understand the participant's world and the context of what is discussed, is another strategy to ensure credibility (Ary et al., 2010). The data from the interview and some of the responses from open-ended questions in the survey were very descriptive and experiential that it was important that the researcher included them as direct quotes when presenting the data results. The rich descriptors aided in conveying the context and since it used the actual words of the participants, it helps the readers understand the setting and the experience the participants were describing.

Transferability

Transferability refer to the degree to which a phenomenon or the findings in one study can be applied to other contexts (Ary et al., 2010; Yin, 2014). It is the responsibility of the researcher to provide detailed descriptions of the participants and the context of the research to allow other researchers to compare and extrapolate to a different setting or population (Ary et al., 2010). The aim of this research was to explore the SLTs perceptions and experiences on aided language input as an intervention. The research participants were clearly defined as SLTs who work in New Zealand schools and who support students who use or are learning to use AAC. The key demographics were also presented in the study. The data collection procedures were outlined in detail in the research methodology. These were done to provide other researchers with enough information to be able make judgments and comparisons to other contexts.

Confirmability

Confirmability is the idea of neutrality and that the research is objective and free of bias, with reflexivity identified as one of the strategies used to enhance confirmability (Ary et al., 2010). According to Ary et al. (2010), reflexivity involves self-reflection to identify one's own biases and acknowledging these biases and partiality throughout the research process. As an AAC practitioner and SLT working in a special school, I was aware of my biases towards AAC and aided language input coming in to do this research. Ongoing discussion occurred with my supervisor to ensure that the findings presented were from the survey and interview data and were not from my own perceptions and experiences.

Limitations of the Study

It is important to acknowledge that despite the efforts to ensure a robust methodological approach, there are certain limitations to this study. These includes the procedure on how the participants were recruited and who participated based on their own interest in the field.

The recruitment of the participants was done through an email sent out to the New Zealand Speech-Language Therapists' Association and through the special schools' email list. This process may have limited the number of SLTs who saw the recruitment information, especially if they are not NZSTA members nor in the special schools' email list. Possible other avenues of recruitment as well as more time to recruit can be explored if needed to replicate this study

There is a possibility that the study might have encouraged only the SLTs who are familiar and are already passionate about AAC and aided language input to participate. At the onset, the participants may have a bias for AAC and aided language input as an intervention. It is important to acknowledge this, as the SLTs' biases for AAC and aided language input may have impacted the findings of the study with information that mostly favours the intervention.

Directions for Future Research

This study was limited to SLTs who work with students in schools. Therefore, the results may not be generalised to the overall population of SLTs in New Zealand who also provide AAC intervention in other settings, for example, community settings, work places and respite care. Furthermore, this study focused on school-

aged children, between the ages of 5-21 years old, with a few SLTs who support children in a pre-school setting, which would be the ages between 3-5 years old. So the experiences described in the study is limited only to this identified age group. This could warrant a further study to include other settings, as well as the adult population, both in and outside New Zealand. McNaughton et al. (2019) suggested that it is critical for researchers to build capacity in AAC research to improve practice and policies.

The current study has also highlighted other possible areas for future research. A study on the effects of aided language input on social communication skills may expand the current research literature and provide more insights on changes to a broader range of communication skills. The whole school approach to AAC also warrants further investigation. A recent thesis study published in Australia investigated this approach to AAC for students with multiple disabilities and CCN (Harper, 2020). A similar study in a New Zealand context would further inform best practices in the AAC field.

Implications for Practice and Service Delivery

This study indicated key factors that serve either as a facilitator or barrier to the successful implementation of aided language input. Knowledge and awareness of these factors can help inform current practices and identify training needs to find ways of further improving AAC service provision. The research study also provided a greater understanding of current SLT practice in New Zealand specific to AAC.

The importance of collaboration and management support was highlighted in this study. For SLTs, it is critical in their practice to acknowledge that the success of the intervention is not solely their responsibility but involves the whole team's input and support. This includes the student as the centre of the decision-making process, parents/caregivers, classroom staff and other communication partners. Collaboration also means working closely with other professionals (e.g. occupational therapists, physiotherapists) who are involved with the student, and whose knowledge and expertise are valuable. Furthermore, inter-agency collaboration is not to be underestimated, especially if there are other agencies who are involved with the student. It is equally important for the school team, including the SLT, to have the support needed from management to be able to

effectively implement the intervention, which includes training and coaching, as well as ensuring an environment that welcomes collaboration. SLTs need to advocate for themselves and the profession to achieve support not only at management level but also from government agencies (e.g., Ministry of Education).

In this study, SLTs shared different language strategies they used when implementing aided language input intervention, which are based on language development theories. They described using language strategies in natural interactions which were implemented together with aided language input to improve a child's language and use of AAC. Zangari (2016) suggest that in order to maximize language learning, SLTs must develop a mind-set of "language-first". She stated that in planning therapy for individuals who use AAC, language should come first and that in order to accelerate language learning, SLTs need to increase their focus on language intervention. Furthermore, she suggested that to help AAC learners become more linguistically competent, SLTs need to provide support for the development of grammar, narrative language and a more extensive vocabulary. This implies the importance for SLTs to continue to focus on language intervention in supporting the student and their communication partners, while using augmentative and alternative means of communication. Regardless of the means of communication the child is using, because the goal is to learn and develop language, the focus for the SLT in their clinical practice, and together with the rest of the AAC team members, should be on language intervention.

The importance of education and training related to AAC has been raised, specifically on AAC training for SLTs and teachers at qualifying level. Lack of training at undergraduate level and then as an ongoing professional development has continued to be raised as barriers to successful implementation of AAC intervention (e.g., Andzik et al., 2019; McNaughton et al., 2019; Moorcroft et al., 2019). The SLT, together with the communication partners, are at the forefront when it comes to supporting an individual who is learning to communicate using an AAC system. There is a clear need for improved training for AAC professionals to have basic knowledge and understanding about AAC systems and aided language input and then to have awareness of what they do not know so they can reach out to request assistance from experts of the field (McNaughton et al., 2008). In the New Zealand

context, dedicated AAC coursework for SLTs is merited at the undergraduate level, to support and improve clinical practice.

SLTs in this study also discussed differences in their service delivery depending on the provider or their employers and how this affects their practice. Service delivery provisions were also reported to affect SLTs' caseload which then impacts their clinical practices. These highlight the importance, at management level, of investigating service delivery models and how to address differences in service provision due to funding. It may help address the disparity with services received by individuals who use AAC in New Zealand and assist in improving SLTs' clinical practice.

Conclusion

The study examined the perceptions and experiences of school SLTs in New Zealand on aided language input as an intervention. SLTs believe in the importance of aided language input as an AAC intervention and the reasons they identified were aligned with current literature on language development and AAC. Similarly, their current practices including the innovative ways they have introduced when implementing the intervention are also supported by a large body of research. These practices were perceived to improve the communication skills of the students and their communication partners. They identified different factors that facilitated positive outcomes in their practice. However, they acknowledged that there are still a number of barriers to the effective implementation of aided language input. Most of these barriers highlight the importance of collaboration and shared responsibility to enable students who use AAC to fully and effectively participate in interactions across a variety of environments.

References

- Allen, A. A., Schlosser, R. W., Brock, K. L., & Shane, H. C. (2017). The effectiveness of aided augmented input techniques for persons with developmental disabilities: A systematic review. *Augmentative and Alternative Communication*, 33, 149–159.
- Alpi, K.M., & Evans, J.J. (2019). Distinguishing case study as a research method from case reports as a publication style. *Journal of the Medical Library Association*, 107(1). 1-5.
- American Speech-Language Hearing Association. (n.d.). *Augmentative and alternative communication (Practice portal)*. <https://www.asha.org/practice-portal/professional-issues/augmentative-and-alternative-communication>
- Andzik, N. R., Chung, Y. C., Doneski-Nicol, J., Dollahide, C. T. (2019). AAC services in schools: A special educator's perspective. *International Journal of Developmental Disabilities*, 65(2), 89–97. <https://doi.org/10.1080/20473869.2017.1368909>
- Ary, D., Jacobs, L.C., Razavieh, A., & Sorensen, C. (2010). *Introduction to research in education* (8th ed.). Thomson Wadsworth.
- Atkins, L., & Wallace, S. (2012). *Qualitative research in education*. Sage. <https://www.doi.org/10.4135/9781473957602>
- Bailey, R.L., Stoner, J.B., Parette, H.P. & Angell, M.E. (2006). AAC team perceptions: Augmentative and alternative communication device use. *Education and Training in Developmental Disabilities*, 41(2), 139-154.
- Bandura, A. (1971). *Social learning theory*. General Learning Press.
- Baxter, S., Enderby, P., Evans, P., & Judge, S. (2012). Barriers and facilitators to the use of high-technology augmentative and alternative communication devices: a systematic review and qualitative synthesis. *International Journal of Language and Communication Disorders*, 47(2), 115–129. <https://doi.org/10.1111/j.1460-6984.2011.00090.x>
- Bazeley, P. (2013). *Qualitative data analysis: Practical Strategies*. Sage.
- Bazeley, P. (2018). *Integrating analyses in mixed methods research*. Sage.
- Bedrosian, J.L. (1997). Language acquisition in young AAC system users: Issues and directions for future research. *Augmentative and Alternative Communication*, 13(3), 179-185.
- Beukelman, D., & Light, J. (2020). *Augmentative and alternative communication: Supporting children and adults with complex communication needs* (5th ed.). Paul H. Brookes.

- Biggs, E.E., Carter, E.W., & Gilson, C.B. (2018). Systematic review of interventions involving aided AAC modelling for children with complex communication needs. *American Journal on Intellectual and Developmental Disabilities*, 123(5), 443-473.
- Biggs, E. E., Carter, E. W., & Gilson, C. B. (2019). A scoping review of the involvement of children's communication partners in aided augmentative and alternative communication modelling interventions. *American Journal of Speech-Language Pathology*, 28, 743–758. https://doi.org/10.1044/2018_AJSLT-18-0024
- Binger, C., & Kent-Walsh, J. (2010). *What every speech-language pathologist/audiologist should know about augmentative and alternative communication*. Allyn & Bacon.
- Binger, C., Kent-Walsh, J., Berens, J., Del Campo, S., & Rivera, D. (2008). Teaching Latino parents to support the multi-symbol message production of their children who require AAC. *Augmentative and Alternative Communication*, 24, 323-338.
- Binger, C., Kent-Walsh, J. Ewing, C., & Taylor, S. (2010). Teaching educational assistants to facilitate multisymbol message productions of young students who require augmentative and alternative communication. *American Journal of Speech-Language Pathology*, 19, 108-120.
- Binger, C., & Light, J. (2007). The effect of aided AAC modelling on the expression of multi-symbol messages by preschoolers who use AAC. *Augmentative and Alternative Communication*, 23, 30–43.
- Binger, C., Maguire-Marshall, M., & Kent-Walsh, J. (2011). Using aided AAC models, recasts and contrastive targets to teach grammatical morphemes to children who use AAC. *Journal of Speech, Language and Hearing Research*, 54, 160-176.
- Birman, B. F., Desimone, L., Porter, A. C., & Garet, M. S. (2000). Designing professional development that works. *Educational Leadership*, 57, 28-33.
- Blackstone, S. (1999). Clinical news: Communication partners. *Augmentative Communication News*, 12(1), 1-3.
- Boster, J.B., Benigno, J.P. McCarthy, J.W. (2017). New car, same principles: Using language development theories to drive the design of supportive augmentative and alternative communication interfaces. *Perspectives of the ASHA Special Interest Group*, 2(2), 40-54.
- Cafiero, J. (1998). Communication power for individuals with autism. *Focus on Autism and Other Developmental Disabilities*, 13, 113–121.
- Check, J., & Schutt, R. K. (2012). *Research methods in education*. Sage.

- Clarke, M.T., Soto, G., & Nelson, K. (2017). Language learning, recasts, and interaction involving AAC: Background and potential for intervention. *Augmentative and Alternative Communication*, 33(1), 42-50.
- Clendon, S., Erickson, K., van Rensburg, R. J., & Amm, J. (2014). Shared storybook reading - An authentic context for developing literacy, language, and communication skills. *Perspectives on Augmentative and Alternative Communication*, 23(4), 182-191.
- Creswell, J.W. (2015). *A concise introduction to mixed methods research*. Sage.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches*. (5th ed.). Sage.
- Creswell, J.W., & Guetterman, T.C. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. (6th ed.). Pearson.
- De Bortoli, T., Arthur-Kelly, M., Mathisen, B., & Balandin, S. (2014). Speech-language pathologists' perceptions of implementing communication intervention with students with multiple and severe disabilities. *Augmentative and alternative communication*, 30(1), 55–70. <https://doi.org/10.3109/07434618.2014.881916>
- Dodd, J.L., & Gorey, M. (2014). AAC intervention as an immersion model. *Communication Disorders Quarterly*, 35(2), 103-107.
- Dolly, A., & Noble, E. (2018). Lámh Signs Combined – Investigating a Whole School Approach to Augmentative and Alternative Communication (AAC) Intervention Through Research in Practice. *REACH Journal of Special Needs Education in Ireland*, 31.1, 53-68.
- Douglas, S.N., Light, J., & McNaughton, D.B. (2012). Teaching paraeducators to support the communication of young children with complex communication needs. *Topics in Early Childhood Special Education*, 33, 91-101.
- Drager, K. D., Postal, V.J., Carrolus, L., Castellano, M., Gagliano, C., & Glynn, J. (2006). The effect of aided language modelling on symbol comprehension and production in two preschoolers with autism. *American Journal of Speech-Language Pathology*, 15, 112.
- Ellis, E.S., Deshler, D.D., Lenz, B.K., Schumaker, J.B., & Clark, F.L. (1991). An instructional model for teaching learning strategies. *Focus on Exceptional Children*, 23(6), 1-24.
- Ellis Weismer, S., Venker, C.E., & Robertson, S. (2017). Focused stimulation approach to language intervention. In R.J. McCauley, M.E. Fey & R.B. Gillam (Eds.), *Treatment of language disorders in children* (pp. 121-152). Paul H. Brookes.

- Fey, M.E., Warren, S.F., Bredin-Oja, S.L., & Yoder, P.J. (2017). In R.J. McCauley, M.E. Fey & R.B. Gillam (Eds.), *Treatment of language disorders in children* (pp. 57-86). Paul H. Brookes.
- Gibbs, G.R. (2018). *Analyzing qualitative data*. Sage.
- Gillham, B. (2000). *Case study research methods*. Continuum.
- Goossens', C., Crain, S. S., & Elder, P. (1992). *Engineering the preschool environment for interactive symbolic communication 18 months to 5 years developmentally*. Southeast Augmentative Communication Publications.
- Guetterman, T., Fàbregues, S., & Sakakibara, R. (2021). Visuals in joint displays to represent integration in mixed methods research: A methodological review. *Methods in Psychology*, 5. <https://doi.org/10.1016/j.metip.2021.100080>
- Harper, Liesl (2020). *Whole school approach to language immersion using augmentative and alternative communication for students with multiple disabilities and complex communication needs*. Master of Philosophy thesis, Queensland University of Technology.
- Harris, M.D., & Reichle, J. (2004). The impact of Aided Language Stimulation on symbol comprehension and production in children with moderate cognitive disabilities. *American Journal of Speech-Language Pathology*, 13, 155–167.
- Iacono, T., & Cameron, M. (2009). Australian speech-language pathologists' perceptions and experiences of augmentative and alternative communication in early childhood intervention. *Augmentative and Alternative Communication*, 25(4), 236–249. <https://doi.org/10.3109/07434610903322151>
- Irani, E. (2019). The use of videoconferencing for qualitative interviewing: Opportunities, challenges, and considerations. *Clinical Nursing Research*, 28(1), 3–8. <https://doi.org/10.1177/1054773818803170>
- Joyce, B. R., & Showers, B. (1980). Improving inservice training: The message of research. *Educational Leadership*, 37, 379-385.
- Jones-Wohleber, T. (2018). *Model as a MASTER PAL: Supporting exemplar communication partners*. <http://bit.ly/ModelasMASTERPALtrainingmodule>
- Justice, L.M. (2006). *Communication sciences and disorders: An Introduction* (1st ed.). Pearson Prentice Hall.
- Kaiser, A.P. & Hampton, L.H. (2017). Enhanced milieu teaching. In R.J. McCauley, M.E. Fey & R.B. Gillam (Eds.), *Treatment of language disorders in children* (pp. 87-120). Paul H. Brookes.

- Kent-Walsh, J. & Binger, C. (2013). Fundamentals of the ImPAACT Program. *Perspectives on Augmentative and Alternative Communication*, 22(1), 51-58.
- Kent-Walsh, J., Binger, C., & Hasham, Z. (2010). Effects of parent instruction on the symbolic communication of children using augmentative and alternative communication during storybook reading. *American Journal of Speech-Language Pathology*, 19, 97–107.
- Kent-Walsh, J., & McNaughton, D. (2005). Communication partner instruction in AAC: Present practices and future directions. *Augmentative and Alternative Communication*, 21, 195–204.
- Kent-Walsh, J., Murza, K. A., Malani, M. D., & Binger, C. (2015). Effects of communication partner instruction on the communication of individuals using AAC: A Meta-Analysis. *Augmentative and Alternative Communication*, 31(4), 271-284.
- Liboiron, N., & Soto, G. (2006). Shared storybook reading with a student who uses alternative and augmentative communication: A description of scaffolding practices. *Child Language Teaching and Therapy*, 22(1), 69-95.
- Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication. *Augmentative and Alternative Communication*, 5, 137–144.
- Light, J., & McNaughton, D. (2014). Communicative competence for individuals who require augmentative and alternative communication: A new definition for a new era of communication?. *Augmentative and Alternative Communication*, 30(1), 1–18. <https://doi.org/10.3109/07434618.2014.885080>
- Logan, K., Iacono, T., & Trembath, D. (2017). A systematic review of research into aided AAC to increase social-communication functions in children with autism spectrum disorder. *Augmentative and Alternative Communication*, 33(1), 51-64.
- Lynch, Y., McCleary, M., & Smith, M. (2018). Instructional strategies used in direct AAC interventions with children to support graphic symbol learning: A systematic review. *Child Language Teaching and Therapy*, 34(1), 23–36. <https://doi.org/10.1177/0265659018755524>
- Machalicek, W., Sanford, A., Lang, R., Rispoli, M., Molfenter, N., & Mbeseha, M.K. (2010). Literacy interventions for students with physical and developmental disabilities who use aided AAC devices: A systematic review. *Journal of Developmental and Physical Disabilities*, 22, 219-240.

- Marra, L.J., & Micco, K. (2019). Communication partner training to increase interactive communication using augmentative and alternative communication: A Case Study. *Perspectives of the ASHA Special Interest Groups*, 4(4), 584-592.
https://doi.org/10.1044/2019_PERS-SIG2-2018-0012
- McNaughton, D., Light, J., Beukelman, D. R., Klein, C., Nieder, D., & Nazareth, G. (2019). Building capacity in AAC: A person-centred approach to supporting participation by people with complex communication needs. *Augmentative and Alternative Communication*, 35(1), 56–68. <https://doi.org/10.1080/07434618.2018.1556731>
- McNaughton, D., Rackensperger, T., Benedek-Wood, E., Krezman, C., Williams, M. B., & Light, J. (2008). "A child needs to be given a chance to succeed": parents of individuals who use AAC describe the benefits and challenges of learning AAC technologies. *Augmentative and Alternative Communication*, 24(1), 43–55.
<https://doi.org/10.1080/07434610701421007>
- Mills, G. E. (2014). *Action research: A guide for the teacher researcher* (5th ed.). Pearson.
- Ministry of Education. (2021, May 10). *Pay equity work matrix*.
<https://www.education.govt.nz/school/people-and-employment/pay-equity/teacher-aide-pay-equity-claim/the-work-matrix/>
- Moorcroft, A., Scarinci, N., & Meyer, C. (2019). A systematic review of the barriers and facilitators to the provision and use of low-tech and unaided AAC systems for people with complex communication needs and their families. *Disability and Rehabilitation. Assistive Technology*, 14(7), 710–731.
<https://doi.org/10.1080/17483107.2018.1499135>
- O'Neill, T., Light, J. & Pope, L. (2018). Effects of interventions that include aided augmentative and alternative communication. Input on the communication of individuals with complex communication needs: A meta-analysis. *Journal of Speech, Language and Hearing Research*, 61, 1743-1765.
- Parette, H. P., & Angelo, D. H. (1996). Augmentative and alternative communication impact on families: Trends and future directions. *The Journal of Special Education*, 30(1), 77–98. <https://doi.org/10.1177/002246699603000105>
- Paul, R., Norbury, C., & Gosse, C. (2018). *Language disorders from infancy through adolescence: Listening, speaking, reading writing and communicating* (5th ed.). Elsevier.
- Pence Turnbull, K.L., & Justice, L. (2012). *Language development from theory to practice*. Pearson.

- Porter, G., & Cameron, M. (2007). *CHAT-Now manual: Children's aided language tools*. Communication Resource Centre-Scope.
- Punch, K.F., & Oancea, A. (2014). *Introduction to research methods in education*. Sage.
- Romski, M. A., & Sevcik, R. A. (1996). *Breaking the speech barrier: Language development through augmented means*. Brookes.
- Romski, M., & Sevcik, R. A. (2005). Augmentative communication and early intervention: Myths and realities. *Infants & Young Children*, 18(3), 174–185. <https://doi.org/10.1097/00001163-200507000-00002>
- Romski, M., Sevcik, R. A., Adamson, L. B., Cheslock, M., Smith, A., Barker, R. M., & Bakeman, R. (2010). Randomized comparison of augmented and nonaugmented language interventions for toddlers with developmental delays and their parents. *Journal of Speech, Language, and Hearing Research*, 53(2), 350–364. [https://doi.org/10.1044/1092-4388\(2009/08-0156\)](https://doi.org/10.1044/1092-4388(2009/08-0156))
- Rosa-Lugo, L.I., & Kent-Walsh, J. (2008). Effects of parent instruction on communicative turns of Latino children using augmentative and alternative communication during storybook reading. *Communication Disorders Quarterly*, 30, 49–61.
- Roulston, K., & Choi, M., (2018). Qualitative interviews. In U. Flick (Ed.), *The SAGE handbook of qualitative data collection* (pp. 233-249). Sage. <https://www.doi.org/10.4135/9781526416070.n15>
- Schneider, P., & Watkins, R.V. (1996). Applying Vygotskian developmental theory to language intervention. *Language, Speech, and Hearing Services in Schools*, 27, 157-170.
- Senner, J. E. & Baud, M. R. (2017). The Use of an Eight-Step Instructional Model to Train School staff in Partner-Augmented Input. *Communication Disorders Quarterly*, 38(2), 89-95.
- Senner, J. E., Post, K. A., Baud, M. R., Patterson, B., Bolin, B., Lopez, J. & Williams, E. (2019). Effects of parent instruction in partner-augmented input on parent and child speech generating device use. *Technology and Disability*, 31, 27-38.
- Sennott, S.C., Light, J.C., & McNaughton, D. (2016). AAC modelling intervention research review. *Research and Practice for Persons with Severe Disabilities*, 41, 101–115.
- Shire, S.Y., & Jones, N. (2015). Supporting the Communication Partners of Students Using Augmentative and Alternative Communication (AAC) Systems: A Systematic Review. *Communication Disorders Quarterly*, 45, 1712-1724.

- Showers, B., & Joyce, B. (1996). The evolution of peer coaching. *Improving Professional Practice*, 53, 12–16.
- Smidt, S. (2011). *Introducing Bruner: A guide for practitioners and students in early years education*. (1st ed.). Routledge.
- Smith, M. (2015). Language development of individuals who require aided communication: Reflections on state of the science and future research directions. *Augmentative and Alternative Communication*, 31(3), 215-233.
- Smith, M.M., & Grove, N.C. (2003). Asymmetry in input and output for individuals who use AAC. In J. Light, D. Beukelman & J. Reichle (Eds.), *Communicative competence for individuals who use AAC*. (pp. 163-195). Paul H. Brookes.
- Soto, G. (2012). Training partners in AAC in culturally diverse families. *Perspectives on Alternative and Augmentative Communication*, 21(4), 144-150.
<https://doi.org/10.1044/aac21.4.144>
- Soto, G., & Clarke, M.T. (2017). Effects of a conversation-based intervention on the linguistic skills of children with motor speech disorders who use augmentative and alternative communication. *Journal of Speech, Language and Hearing Research*, 60, 1980-1998.
- Soto, G., Clarke, M.T., Nelson, K., Starowicz, R., & Savaldi-Harussi, G. (2019). Recast type, repair, and acquisition in AAC mediated interaction. *Journal of Child Language*, 1-15.
- Tadayon Nabavi, R. (2012). *Bandura's social learning theory and social cognitive theory*.
https://www.researchgate.net/publication/267750204_Bandura's_Social_Learning_Theory_Social_Cognitive_Learning_Theory
- Tegler, H., Pless, M., Blom Johansson, M., & Sonnander, K. (2019). Speech and language pathologists' perceptions and practises of communication partner training to support children's communication with high-tech speech generating devices. *Disability and rehabilitation. Assistive technology*, 14(6), 581–589.
<https://doi.org/10.1080/17483107.2018.1475515>
- Tomasello, M. (2003). *Constructing a language: A usage based theory of language acquisition*. Harvard University Press.
- University of North Carolina at Chapel Hill, The Center for Literacy and Disability Studies (2017). *Project Core: School or program administrator guide*. <http://www.project-core.com/school-guidance-2/>

- Vogt, W. P., Vogt, E. R., Gardner, D. C., & Haefele, L. M. (2014). *Selecting the right analyses for your data: Quantitative, qualitative, and mixed methods*. The Guilford Press.
- Von Tetzchner, S. (2018). Introduction to the special issue on aided language processes, development, and use: An international perspective. *Augmentative and Alternative Communication*, 34(1), 1-15.
- Yin, R.K. (2014). *Case study research design and methods* (5th ed.). Sage.
- Zangari, C. (2016). Looking back to move forward: 25 years of thinking about AAC and language. *Perspectives of the ASHA Special Interest Group*, 1(4), 144-152.

Appendix A

Ethics Notification



Date: 20 August 2020

Dear Gail Arriola-Bagayas

Re: Ethics Notification - 4000023198 - Perceptions and experiences of New Zealand school speech-language therapists on aided language input as an augmentative and alternative communication intervention

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please contact a Research Ethics Administrator.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research."

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director - Ethics, telephone 06 3569099 ext 85271, email humanethics@massey.ac.nz."

Please note, if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to complete the application form again, answering "yes" to the publication question to provide more information for one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand T 06 350 5573; 06 350 5575 F 06 355 7973
E humanethics@massey.ac.nz W <http://humanethics.massey.ac.nz>

Human Ethics Low Risk notification



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

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand **T** 06 350 5573; 06 350 5575 **F** 06 355 7973
E humanethics@massey.ac.nz **W** <http://humanethics.massey.ac.nz>

Appendix B

Participant Information Sheet



Perceptions and Experiences of New Zealand School Speech Language Therapists on Aided Language Input as an Augmentative and Alternative Communication Intervention

Information Sheet

My name is Gail Arriola-Bagayas and I am a student in the Master in Speech Language Therapy programme at Massey University. I am inviting you to participate in a research project that aims to explore the perceptions and experiences of speech-language therapists (SLTs) in New Zealand schools on aided language input as an augmentative and alternative communication (AAC) intervention. The project will capture current practice, including facilitators and barriers. It is anticipated that the findings will inform best practice, as well as identify relevant professional learning and development needs for SLTs in school settings.

This project is being supervised by Dr Sally Clendon and Dr Elizabeth Doell from Massey University's Speech and Language Therapy programme. The participants are being recruited through the New Zealand Speech Language Therapists' Association, NZ Special School SLT email list, and relevant social media networks. We are specifically recruiting SLTs who support students in schools on the learning and use of their AAC systems.

Project Procedures:

The research project will involve participating in an anonymous online survey with an option of being contacted to participate in a semi-structured interview. Your contact details will not be linked to survey responses. The survey will take approximately 20-30 minutes to complete and the interview, should you choose to participate, will take about 40 minutes.

The survey data will provide information on the demographics, educational background, work settings, professional development, service delivery and experiences of SLTs working in schools with students with complex communication needs who use or are learning to use AAC.

The purpose of the interview is to gain a deeper insight into key findings arising from the survey. Interviews will be conducted either face-to-face or via Zoom. Interviews will be audio and/or video-recorded for later transcription and analysis. You will be sent a copy of the transcript prior to analysis for verification that it accurately represents your perceptions and experiences.

Data Management:

No identifying information will be collected from survey participants. Confidentiality of interview participants will be protected through the use of ID numbers and/or pseudonyms, and consent forms will be stored separately from other research data.

When the project is finished, the results will be presented in my thesis report. The results may be also be presented at conferences or published in journal articles. However, the

information will not include any identifying information, for example, names of SLTs involved or any identifying information related to a particular experience.

Your Rights:

Completion and return of the survey implies consent, and provision of contact details will imply that you consent to me contacting you directly with regards to participating in an interview. A consent form will be provided to you if you choose to participate in the interview.

In following ethical procedures for research, I reassure you that you are under no obligation to consent to participate in this study. If you choose to participate, you have the right to:

- decline to answer any particular question;
- ask any questions about the research project at any time during participation;
- ask for the recording device to be turned off at any time during the interview;
- review the transcript of the interview;
- ask for any part of the interview to be erased/excluded from the data set any time prior to signing the transcript release form;
- withdraw from the research project any time prior to signing the transcript release form;
- provide information on the understanding that your name will not be used;
- request access to a summary of the research project findings when it is concluded.



Survey Link

If you are interested in being involved in this project, you can complete the anonymous online survey by following this link:

https://massey.au1.qualtrics.com/jfe/form/SV_6PdsJzwsn1WwOAR

Contact Information:

Thank you for taking the time to consider my request. Should you have any questions about the study, please contact:

Gail Arriola-Bagayas 	Sally Clendon 
--	--

Low Risk Notification:

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Prof. Craig Johnson, Director, Research Ethics, telephone 06 356 9099 x 85271, email humanethics@massey.ac.nz

Appendix C

Online Survey

10/1/21, 3:56 PM

Qualtrics Survey Software



Default Question Block

Perceptions and Experiences of New Zealand School Speech Language Therapists on Aided Language Input as an Augmentative and Alternative Communication Intervention

Aided Language Input/Stimulation is described as a strategy used in AAC intervention that includes a communication partner modeling aided AAC as they speak while engaging in a naturalistic interaction with the AAC learner (Sennott, Light, & McNaughton, 2016)

This survey is anonymous. Completion of the survey implies consent. At the end of the survey, respondents will be asked if they are willing to participate in an interview and will be asked for contact details if they agree. The contact information provided will not be linked to the responses provided in this survey.

Number of years work experience as SLT

- ☐ Less than 1 year
- ☐ 1 to 2 years
- ☐ 3 to 5 years
- ☐ 5 to 10 years
- ☐ 10 to 15 years
- ☐ 15 years and above

Level of SLT qualification

- ☐ Bachelors degree (with or without Honours)
- ☐ Masters - Practice
- ☐ Masters - Research
- ☐ PhD

☐ Other - please specify

Numbers of years work experience with children who use AAC

- ☐ Less than 1 year
- ☐ 1 to 2 years
- ☐ 3 to 5 years
- ☐ 5 to 10 years
- ☐ 10 to 15 years
- ☐ 15 years and above

**What training did you receive in AAC as part of your University qualification?
(Choose all that apply)**

- ☐ None
- ☐ A course/1 paper on AAC
- ☐ 1- 2 lectures on AAC
- ☐ Research Project
- ☐ Clinical Practicum
- ☐ Other - please specify

**What professional learning and development in AAC have you engaged in
since completing your University qualification (Choose all that apply)**

- ☐ None
- ☐ Courses / Training Workshop
- ☐ In-service
- ☐ Special Interest Group
- ☐ Online learning
- ☐ Self-directed study
- ☐ Research Project

- ☐ Communication Assistive Technology (CAT) Credentialing
- ☐ Other - please specify

Work Setting

- ☐ Special School
- ☐ Mainstream School
- ☐ TalkLink Trust
- ☐ Private Practice
- ☐ Other - please specify

Current AAC caseload**What AAC systems do you use with your students on your caseload? (Choose all that apply)**

- ☐ Core Vocabulary Boards
- ☐ Communication Books
- ☐ Pragmatic Organisation Dynamic Display (PODD) books
- ☐ Picture Exchange Communication System
- ☐ TouchChat
- ☐ Proloquo2Go
- ☐ Snap Core First
- ☐ PODD for Compass
- ☐ LAMP Words for Life
- ☐ Grid 3
- ☐ Speak For Yourself
- ☐ SuperCore

☐ Other - please specify

☐ Other - please specify

☐ Other - please specify

Aided Language Input is described as the practice of the communication partner modeling aided AAC while they speak during naturalistic interactions.

Is Aided Language Input important in your clinical practice?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Importance of Aided Language Input in clinical practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please explain your response to the above question

How competent do you feel using the above AAC systems when providing aided language input?

	No Experience	Novice	Competent	Highly Competent
Core Vocabulary Boards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication Books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PODD Books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	No Experience	Novice	Competent	Highly Competent
Picture Exchange Communication System	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TouchChat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proloquo2Go	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snap Core First	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PODD for Compass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LAMP Words for Life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grid 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speak For Yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SuperCore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other - please specify				
<div></div>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other - please specify				
<div></div>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other - please specify				
<div></div>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How do you provide aided input in practice? Choose all that apply.

- ☐ Direct support: One on One
- ☐ Direct support: Small group
- ☐ Direct support: Classroom
- ☐ Consultative Support
- ☐ Other - please specify

Aside from the student, who else do you work with when implementing aided language input? Choose all that apply

- ☐ No one else; I only support the student
- ☐ Parents, caregivers
- ☐ Teachers
- ☐ Classroom staff
- ☐ School staff
- ☐ Peers
- ☐ Others - please specify

How do you support these individuals or groups to implement aided language input? Describe what this support looks like (e.g., training, coaching, other ways you provide support)

How has the support you provide to implement aided language input affected the way these individuals and groups interact with students who use AAC?

How has aided language input affected the communication skills of students who use AAC? Choose all that apply

- ☐ Able to communicate their needs and preferences
- ☐ Can use the AAC system for different purposes
- ☐ Improved vocabulary
- ☐ Increases number of words used in phrases/sentences

☐ Improved receptive skills☐ Others - please list

What are your expectations for communication partners of AAC users when you first introduce them to aided language input?



What factors serve as facilitators to the effective provision of aided language input to students who use AAC?



What factors serve as barriers to the effective provision of aided language input to students who use AAC?



Please add any other comment or information you may have about your experiences and perceptions about aided language input.



Would you be willing to participate in an interview on this topic?

- ☐ Yes
- ☐ No

Powered by Qualtrics

Appendix D

Semi-structured Interview Guide Questions

Interview Questions.

1. Describe your workplace setting and AAC caseload (number, general types of AAC systems)
2. Describe your competence and confidence with AAC.
3. As an SLT what is your role in providing AAC intervention?
4. Describe the importance of aided language input as part of AAC intervention
5. Outline how you implement aided language input.
 - a. Direct and/or indirect support
 - b. Who are the key communication partners?
 - c. Tell me or describe what training looks like in your own practice. (*probe* – frequency and approach)
 - d. Tell me or describe what coaching looks like in your own practice. (*probe* – frequency and approach)
 - e. Initial expectations for communication partners – do you feel that this has been met? What factors helped or did not help? What support is needed to improve if expectations were not met?
 - f. What practices did you implement that facilitated aided language input? (OR) What practices can you implement to facilitate aided language input? – probe for examples; what helped?
 - g. What do you think are the barriers to implementing and practising aided language input? How can these barriers be best addressed?
6. What support do SLTs need to be able to effectively implement aided language input?
7. Is there anything else you would like to discuss about implementing aided language input in your practice?

Appendix E

Interview Consent Form



MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MĀTAURANGA

Perceptions and experiences of New Zealand school speech language therapists on aided language input as an augmentative and alternative communication intervention

Participant Consent Form - Interviews

I have read the Information Sheet attached and I understand the information included. 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 time.

1. I agree to the interview being sound and/or video recorded.
2. I agree to participate in this study under the conditions set out in the Information Sheet.

Declaration by Participant:

I, _____, hereby consent to take part in this study.

Signature: _____ Date: _____

Appendix F

Transcriber Confidentiality Agreement



Perceptions and experiences of New Zealand school speech language therapists on aided language input as an augmentative and alternative communication intervention

Transcriber's Confidentiality Agreement

I, _____, agree to transcribe the recordings provided to me.

I agree to keep confidential all the information provided to me.

I will not make any copies of the transcripts or keep any record of them, other than those required for the project.

Signature: _____ Date: _____

Appendix G

Transcript Release Authority



Perceptions and experiences of New Zealand school speech language therapists on aided language input as an augmentative and alternative communication intervention

Authority for the Release of Transcripts

I confirm that I have had the opportunity to read and amend the transcript of the interview(s)
conducted with me.

I agree that the edited transcript and extracts from this may be used in reports and publications
arising from the research.

Signature: _____ Date: _____

Full Name - printed _____

Appendix H

Sample of Codebook (Barriers)

THEMES	CODES	DEFINITION	RESPONSES
AAC Team member characteristics	Communication Partner behaviour and actions	Overt behaviours and actions by communication partners	Consistent
			taking time to use
			good observers of change and progress
			parents and staff on board and use the systems
			having AAC available
	Communication Partner attitude	Related to thinking or feeling about something shown by CP or as observed by SLTs	believe that student has potential
			comfortable and open to using new tech
			teams who have an interest in AAC
			open-mindedness
			willingness to learn about new strategies
			whole collaborative team approach
			motivated
			positive attitude
			open communication
			passionate about supporting communication
			engaged teaching team and whanau
			willingness and openness of parents to use the system
			parents feel confident
			feel ok with making mistakes
			motivated teaching team
			enthusiastic adults
			supportive family and staff
			positive attitude
			willingness to experiment with alternative ways of communication
			ongoing support and monitoring
			comfortable with modelling
			believe the client can make progress and learn
			teams are motivated for their student to have a voice
			peers or siblings who are keen to use AAC with them
			open mind set
			understanding that the AAC is student's voice
			engagement with AAC by teachers and parents
			staff willing to build it in their class planning
			teachers/TA who see the value of the strategy
			buy in from whanau, caregivers and teachers
			involvement in decision making process re AAC
			open school, teachers, parents
			curious peers
			buy in and taking lead from class teacher
			team members feeling confident to give ALS a go
			seeing success with student - doesn't have to be with AAC but even attending to models
	Student attitude and traits	Related to thinking or feeling about something as shown by the student or observed by SLT	motivated and engaged in communicating
			start using AAC at a young age
			motivated and engaged
	SLT attitude and traits	Related to what SLTs are thinking or feeling about something	limited number of behavioural difficulties in class
			feel confident
Understanding	Why / reason	Understand the reasoning behind AAC	understanding and linking rational to make sure people really understand the reason why we are doing it
			understanding why they are using it
			students beginning to understand that the system is for talking
	Intervention	Understanding of the intervention and it's strategies	understand the teachable moment and go for quality of interaction
			understanding how the system is used
			adults understanding that they may not see instant results of their modelling
Time	knowledge	Concepts and knowledge about AAC and intervention	will take time for the students to use the system independently
			engage in self-directed learning about AAC and implementation
			knowledge of staff
	Implementation	Time factors related to implementation	unrushed classroom routines
			time to provide aided language input
			TA available to provide aided lang input 1:1 while teacher is working with others
	Training / learning	Time factors related to training and learning	SLT - time in the classroom
			sufficient teacher /TA release time
			time to give training in AAC tools and aided language input (SLT)
			lots of training time available
			release time for school staff to attend trainings
			time to implement and do training
			staff having time to attend training
			SLTs having time to spend providing training

THEMES	CODES	DEFINITION	RESPONSES
Staffing and needs	Training		training for whole team and whanau training
		Related to staff training	If teaching staff had better training around universal strategies for supporting children to develop their communication skills, more specialist areas liked aided language input would be a lot easier to implement
	Number of staff	Related to staffing numbers and duties	enough staff
			regular support
	Support	Related to help and support provided for staff	open approach to support students, supported by good IEPs access to regular ongoing support by SLT
Management			close and intensive work with the client and the potential CPs in various settings
			Management / teacher support for use of AAC
			management support and backing
			school management being on board
			management support
	Support	Related to support from management with regards to AAC	Principals and senior leaders in schools valuing AAC by providing time for training supportive school management teams - principal, SENCO, etc having management on board - helps with allocating funding, training and extra supports but also with validating the approach and setting expectations for the team Support at school management level for training and implementation re AAC and aided language input
			Policies and time given to training in AAC
			whole school wrap around
			understanding and philosophy of AAC in special schools
			I would love to see more special schools and units integrate it more fully esp units as part of their key approach to support comprehension and decrease behaviours... --> this needs to be led by the principals
Environment			making sure AAC is everywhere
			having low tech copies on walls and desks
			large group modelling boards
			playground AAC boards
			when it's easy access it is easy to model
			AAC is out in the classroom with the student
			staff wearing chat boards on lanyards
			we want to normalize it and encourage our students to talk to each other using multiple modalities
			peer training - we teach all students about AAC
			peers using a version of the AAC system
			clear classroom routines
			classroom culture valuing the process over the product
			pausing
			skilled communication partners
			identifying meaningful / motivating situations for communication
Skill			attention
			users who can show competence
			linguistic skill
			word-finding skill
			not working in consultative role
SLT			providing ongoing support to class teams
			SLT to highlight success
			giving evidence based research links to videos of successful users
			building rapport
			sharing the knowledge they need, encouragement, patience and repetition
			seeing SLT use the systems in natural and explicit learning contexts with students in class
			teaching peers and siblings
			showing how it needs to be integrated into real life
			comprehensive system
			AAC system always being with / accessible to the AAC user
AAC systems			all students in the class using the same AAC system
			having the same AAC system available at all times
			easier if you have a class of students who all use the same system - staff become more proficient much quicker and therefore students are exposed to higher level of modelling from staff and their peers
			family engagement with system (???)
			student success with system so that CPs get rewarded
			people around the student being familiar with the system, possibly having access to their own system