



# **Development and evaluation of an augmentative and alternative communication training for caregivers of young children in a low-income rural context of South Africa**

by

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*Yehova muthu u tou vha mini Vhone vha tshi muelwa, Vha mu ambadza Vhugala havho na Lunako. {Lord who am I that you are mindful of, You have crowned me with Your glory and honour}. Excerpts from Psalm 8:4*

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## Abstract

**Background:** Training caregivers of young children with complex communication needs to implement augmentative and alternative communication methods has resulted in various communication gains for children. Such training may be a feasible, effective and socially valid way of improving children's communication outcomes in contexts where access to rehabilitation professionals and resources is limited.

**Method:** This study employed an exploratory sequential mixed method design to develop and evaluate a programme aimed at training Vhavenda caregivers of children living in low-income contexts to implement augmentative and alternative communication strategies with their children aged 2-6 years living with complex communication needs. In the exploratory phase, a scoping review of the literature as well as interviews with cultural stakeholders generated data that informed program design undertaken during the development phase. The development phase also comprised an expert review and pilot study to further refine the programme. The evaluation phase entailed testing the effects of the programme on three caregiver and two child variables by means of a single case multiple probe design across three caregiver-child dyads. The social validity of the programme was also evaluated.

**Results:** Medium to strong effects of the intervention on the five variables were established but were not maintained three weeks post intervention. Social validity of the programme was found to be high.

**Conclusion:** The caregivers were able to implement the strategies taught during the guided practice phase, attesting to the effectiveness of the intervention. The fact that skills were not maintained post intervention may point to a need for a longer period of support in order to firmly establish the behaviours.

*Keywords:* Augmentative and Alternative Communication (AAC); aided language input; augmented language output; caregiver training; child; communicative turns; complex communication needs, contingent responding; cultural stakeholder; modelling; offering communication opportunities; social validity.





## **PROBLEM STATEMENT AND RATIONALE**

### **1.1 Introduction**

This chapter provides an outline of the problem that is addressed in this study, the rationale for the study and the significance of this study. Furthermore, this chapter provides definitions of the terms and a list of abbreviations used in the thesis. In addition to that, an outline of the chapters is provided.

### **1.2 Problem statement and rationale**

Children with complex communication needs (CCN) present with significant speech, language and communication difficulties. They encounter challenges, such as the inability to express their needs and wants, express their emotions, make requests, protest and have social interaction with the people around them (Beukelman & Light, 2020; Drager & Holyfield, 2016; Drager, Light, & McNaughton, 2010). They also typically face various challenges that can have life-long detrimental effects. Their communication challenges may result in difficulties forming basic social relationships within their family and within their communities; and they may experience restrictions and/or limitations when participating in activities related to community living and family life. Furthermore, due to their limited communication skills, children with CCN of school-going age are often denied the opportunity to participate in educational settings, including mainstream and special education (Human Rights Watch, 2015; Light & McNaughton, 2015). There is a strong evidence base that children with CCN can benefit from augmentative and alternative communication (AAC), as a method of improving various communication skills as a basis for more active participation in all spheres of life ( Beukelman & Light, 2020; Crowe et al., 2022; Light & Drager, 2007; Ronski et al., 2015; Ronski & Sevcik, 1997) .

This project was conceived during my work supervising final year speech-language therapy and audiology (SLP&A) students at rural public hospitals in Limpopo and the North-West provinces. As a speech-language therapist (SLP), an observation was made of the services rendered through the public health system to preschool-aged children living with CCN and their families; and I caught sight of the need to develop new models of delivering AAC intervention to



this population. I then decided to target Vhavenda caregivers and their children living in the Vhembe district in Limpopo as I originate from there and this was in line with observations made and motivated by the proverb that says: “*Charity begins at home*”.

In the North West and Limpopo provinces, as in the rest of South Africa, children with CCN, whose caregivers cannot afford private healthcare, receive pediatric rehabilitation services free of charge through the public healthcare system (Rowe & Moodley, 2013). In my observations, the services offered to these children and families are extremely limited and also not always appropriate. This is due to a number of factors that have also been noted in the literature globally. Many of these factors are specific to the South African public health context, while others are observed more widely. The factors include (a) the limited number of professionals trained in AAC, specifically in low and middle income countries (LMICs) and also in the South African context (Dada, Kathard, et al., 2017; Dada, Murphy, et al., 2017; Fuller et al., 2009; Pillay et al., 2020); (b) limited or no access to AAC materials and resources in LMICs including South Africa (Fuller et al., 2009; Gona et al., 2013; McAllister et al., 2013; Tönsing et al., 2018; Van Niekerk et al., 2017); (c) high caseloads in the South African public health system leading to SLPs’ infrequent contact with service recipients (Saloojee et al., 2006), thus, children and caregivers typically attend therapy only once a month or once every second month; (d) inaccessibility of service locations to rural populations in South Africa due to distance and transport fees and/or availability (Grut et al., 2012; Kathard et al., 2011; McKenzie & Müller, 2006; Ned et al., 2017; Thomas, 2016; Uys, 2009); (e) service delivery models in the South African public health system that emphasise individual one-on-one therapy with limited caregiver involvement (Samuels et al., 2012); and (f) lack of access to SLP services (including AAC services) that are contextually and linguistically appropriate and culturally sensitive in the South African health system due to the mismatch between SLPs’ language and culture (mostly first language Afrikaans and English speaking whereas families speak an African language) (Barratt et al., 2012; Dada et al., 2017; Kathard et al., 2011; Romski et al., 2018; Rowe & Moodley, 2013; Tönsing et al., 2018; van Dulm & Southwood, 2013). It became clear that there is a great need to offer more appropriate AAC intervention services to children with CCN and their families.



Training caregivers to implement AAC with their children with CCN in home and community contexts has been shown to be an effective way to improve child communication outcomes (Gona et al., 2013; Granlund et al., 2008; Thunberg et al., 2009). An increasing number of studies over the past few years have shown that caregivers trained in AAC implementation can successfully facilitate the use of AAC with their children, resulting in, for example, more frequent communicative turns (Kent-Walsh, Binger, & Malani, 2010a; Nunes & Hanline, 2007; Rosa-Lugo & Kent-Walsh, 2008), increased requesting using AAC (Gevarter et al., 2021; Suberman et al., 2020), and using AAC to express multi-symbol messages during story book reading (Binger et al., 2008). Training caregivers to implement AAC is also congruent with a paradigm shift in pediatric rehabilitation services that suggests there is a need to facilitate change in real-life contexts, and to focus on the transactional process of interaction (King et al., 2018). The Transactional Model of Development that was initially developed by Sameroff and Chandler in 1975, which was subsequently highlighted in Sameroff and Fiese (2000), emphasizes the aforementioned paradigm shift, and will form a conceptual cornerstone of this study. This model views child development as a product of the constant transactions between the child and the experiences provided by the family and the context (Sameroff, 2013, 2017; Sameroff & MacKenzie, 2003). Caregiver-mediated communication interventions acknowledge this concept and are grounded on it. These interventions have become more popular in the past 20 years have been used in the field of AAC (Kent-Walsh et al., 2015; Smith & Hustad, 2015).

The implementation of AAC in LMICs with diverse cultural and linguistic groups has received increasing attention in the past few years (Muttiah et al., 2015). However, experimentally controlled studies that document the effect of caregiver training in these contexts are missing. The aim of this study was therefore to develop and evaluate a culturally and linguistically appropriate AAC caregiver training programme designed for Vhavenda caregivers of young children living with CCN. This programme will enhance the current service delivery model for children living in rural areas by using a caregiver-mediated AAC intervention approach.

### **1.3 Terminology**

The following terms are used frequently in this study and therefore defined.



### ***1.3.1 Augmentative and alternative communication (AAC)***

This refers to the communication methods that are used to augment and/or replace speech for individuals with CCN (Beukelman & Light, 2020; Bornman & Tönsing, 2016). Children with CCN typically require AAC to express themselves, while some may need AAC to also augment comprehension of the spoken language in addition to augmenting their expressive language (Beukelman & Light, 2020; Ronski et al., 2015; Sennott et al., 2016)

### ***1.3.2 Caregiver***

This describes a parent or someone other than the parent who is taking care of the child and who is responsible for carrying out care-giving tasks on a daily basis (Department of Justice: Children's Act 38 of 2005).

### ***1.3.3 Caregiver-mediated communication interventions***

These are therapeutic approaches that involve the training of caregivers (including parents) to adapt their communication style in order to be responsive to their children with CCN.

### ***1.3.4 Caregiver training***

Intervention where caregivers (including parents) acquire parenting skills (Kaminski et al., 2008). It aims at giving parents or helping them build relationships with their children.

### ***1.3.5 Communicative turn***

A communicative turn is taken when the child transmits a message that is directed towards the caregiver, for example when the child vocalizes in response to the caregiver; or uses eye gaze towards an activity or object and then to the caregiver; or uses gestures to respond to the caregiver; or touches or leans towards the caregiver or smiles at the caregiver (Kent-Walsh et al., 2010; Muttiah et al., 2018; Rosa-Lugo & Kent-Walsh, 2008).



### ***1.3.6 Child using augmented output***

The number of times a child independently points to a picture on the communication board. The child can point to the symbols on the communication board in various ways such as pointing using their hands or fingers or using their caregiver's hand instead (Romski et al., 2010).

### ***1.3.7 Contingent responding***

A contingent response entails any action from the caregiver (verbal or nonverbal) that indicates that the caregiver has taken note of the child's communication act and has either understood it and responds promptly and appropriately to it verbally or non-verbally, or, alternatively, seeks clarification if the caregiver has not understood it (Broberg et.al, 2012). The caregiver can make a comment in response to the child's communicative attempt or communicative actions, ask the child questions, direct a question to the child for clarity if the caregiver does not understand what the child wants, or the caregiver can comply with the child's request for action or for an item (Broberg et al., 2012; Shire et al., 2016; Yoder & Warren, 1999).

### ***1.3.8 Cultural stakeholder***

They are defined as persons who have knowledge about the culture of Vhavenda regarding beliefs about communication disability, parent child interactions as well as those who have experienced the culture through the lenses of their communities. This was custom conceptualised for this study.

### ***1.3.9 Modelling aided language input***

This occurs when a communication partner points to a specific graphic symbol on the communication board while at the same time saying the word or phrase which the symbol represents (Borgestig et al., 2017; Dada & Alant, 2009; Dada et al., 2019; Jonsson et al., 2011).

### ***1.3.10. Offering communication opportunities***

Communication opportunities have been defined as situations where the communication partner intervenes purposefully to require and ensure a communication response from the



individual with CCN. The communication partner creates an opportunity for the individual with CCN to respond appropriately and communicate what they need (Sigafos, 1999).

### ***1.3.11. Social validity***

This is the degree to which the goals, procedures, and outcomes of a specific intervention (in this study a training programme) are regarded as acceptable, appropriate and valuable by stakeholders (i.e., recipients of interventions and also indirect stakeholders) (Snodgrass et al., 2022).

### ***1.3.12. Training program***

A structured approach to training that can include the use of manuals, role playing, video vignettes and homework (Kaminski et al., 2008).

### ***1.3.13. Vhavenda***

They are an ethnic group in South Africa living mostly near the South African-Zimbabwean border. They speak Tshivenda as a first language which is one of South Africa's eleven official languages.

## **1.4. Abbreviations**

AAC	:	Augmentative and alternative communication
app	:	Application
ASD	:	Autism Spectrum Disorder
CAQDAS	:	Computer Assisted Qualitative Data Analysis Software
CCD	:	Caregiver-child dyad
CCN	:	Complex communication needs
CCT	:	Child communicative turns
CgTP	:	Caregiver training programme
CR	:	Contingent responding
CuAO	:	Child using augmented output
DD	:	Developmental disabilities



CP	:	Cerebral palsy
DV	:	Dependent variable
FCI	:	Family centred intervention
HPCSA	:	Health Professions Council of South Africa
ID	:	Intellectual disabilities
IOA	:	Inter-observer agreement
IV	:	Independent variable
LMICs	:	Low- and-middle income countries
MACS	:	Manual ability classification system
MALI	:	Modelling aided language input
Mini MACS	:	Mini manual ability classification system
NAP	:	Non-overlap of all pairs
OCO	:	Offering communicative opportunities
PCS	:	Picture communication symbols
PMLD	:	Profound and multiple learning difficulties
PND	:	Percentage of non-overlapping data
RA	:	Research assistant
RCTs	:	Randomized control trials
SCED	:	Single Case Experimental Design
SMC	:	Synthesized member checking
SLP	:	Speech-language therapist (this also includes those with dual registration - Speech-Language Therapist and Audiologist. In South Africa, dual qualification and registration was common until relatively recently when speech therapy and audiology programmes were separated).
VFCS	:	Visual function classification system

### 1.5. Models for developing interventions

This study was conceptualised using a phase-based research model for developing interventions. The design and development (D&D) model by Thomas and Rothman (1994) was applied in this study and discussed in detail in Chapter 6 (Development phase). The study was



further guided by the steps in intervention research as outlined by Fraser and Galinsky (2010) wherein their steps were routed in the D&D model. The steps in intervention research include: (a) developing a problem and program theories; (b) designing program materials and measures; (c) confirming and refining program components using efficacy tests; (d) testing the effectiveness of the program in different settings; and (e) disseminating the program findings and materials.

## 1.6. Outline of chapters

This thesis is presented in 10 chapters. *Chapter 1* provides the problem statement and rationale for conducting this study. Furthermore, definitions of terms used in the study and abbreviations are also outlined in this chapter.

*Chapter 2* provides the literature review and conceptual framework of the study. This chapter discusses research findings on the significance of the theories in child language and communication development; the challenges that children with CCN experience; the significance of AAC for children living with CCN; caregiver training in AAC; culturally and linguistically appropriate AAC; AAC intervention services in the South African context and a discussion of the conceptual framework.

An overview of the methodology of the three-phased study is presented in *Chapter 3* commencing with the aims, study paradigm, and overall design used. This study made use of an exploratory sequential mixed method design with three phases. The overview of the research designs for the exploratory phase (Phase 1), development phase (Phase 2) and the evaluation phase (Phase 3) is highlighted, although they are discussed fully in the chapters that follow.

*Chapter 4* outlines the first sub-study of Phase 1, during which a scoping review of studies focused on AAC caregiver training was undertaken. This chapter outlines the aims, sub aims, methodology and the results of the review. Furthermore, the alignment of the caregiver training approaches with characteristics of effective parent training is discussed. To conclude this chapter, implications of the scoping review for the development phase are discussed.

The second sub-study of Phase 1 comprised of interviews with cultural stakeholders and these are discussed in *Chapter 5*. The cultural stakeholder interviews were done to identify the cultural practices of Vhavenda with regards to caregiver-child communication interaction, as well as their beliefs about children with a communication disability; and to determine





acceptability of the proposed programme strategies for the target population. The aim, sub-aims, methods and results are discussed, as well as the implications of the results for the development phase.

The development phase of this study is presented in *Chapter 6* where the design, development, expert review and piloting of the custom-made caregiver training programme and associated materials will be discussed. The discussion includes the aims, sub-aims, theoretical underpinnings for the development of the programme, and input from the exploratory phase towards development of the custom-made caregiver training programme. The content of the programme, the training materials developed, as well as all materials developed to measure the effect of the programme are described. Changes made after the expert review and the pilot investigation are also described.

*Chapter 7* outlines the methodology of the evaluation phase of this study with regards to the aims, sub-aims, and stages of the phase as well as the design used. The operational definitions of the dependent variables are provided. Thereafter, the chapter highlights sampling, selection and description of the participants. The additional materials (not described in Chapter 6) and procedures used to deliver the caregiver training programme are also discussed. Furthermore, the procedures for collecting data on the five dependent variables during baseline, intervention and maintenance probes are discussed. The data analysis procedures are explained. Factors influencing the validity and reliability of the research are described, and ethical considerations are discussed.

The results of the evaluation phase are described in *Chapter 8*. The results are presented according to the sub-aims for this phase of the study. The effect of the training programme on five dependent variables (three caregiver variables and two child variables) for each of the caregiver-child dyads is presented using a graph. Visual analysis of each dependent variable is described according to changes within conditions and across conditions in trend, level and stability or variability. Effect sizes are provided (non-overlap of all pairs) with accompanying confidence intervals.

The discussion of the results will be presented in *Chapter 9*. The effects of the caregiver training are discussed according to the caregiver and child variables and then compared to other



studies that measured these variables. The possible reasons for the differences and similarities are also discussed.

In *Chapter 10*, which is the conclusion, a summary of results is provided and their clinical implications are discussed. The strengths and limitations of the study are also discussed. The chapter ends with recommendations for future research.

### **1.7. Summary**

This chapter provided an outline of the problem that is addressed in this study, the rationale for the study and the significance of this study. Definitions of frequently-used terms were given, as well as a list of abbreviations used in the thesis. In addition to that, an outline of each chapter was provided.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter provides a review of literature that is relevant to the current study. First, theories on language and communication development are reviewed, and Vygotsky's sociocultural theory is highlighted as a theoretical cornerstone of the study. The literature on children with CCN, AAC for children with CCN, and caregiver training to improve communication of children with CCN is reviewed next. Thereafter, the notion of culturally and linguistically appropriate AAC is introduced, followed by a description of AAC intervention services in the South African context. Lastly, the conceptual framework of this study is introduced.

#### 2.2 Language and communication development

Communication is central to our human existence and has been described as “the essence of human life” (Light, 1997, p. 61). According to the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001), communication is one of the nine major life areas that form part of regular and necessary activities in which humans participate. A major achievement of childhood is the acquisition of communication skills, including the acquisition of language. Within the first few years of life, children's communication skills change as pre-intentional behaviours (e.g., reflexive crying) become intentional, and as the child learns to use more conventional symbolic behaviours, that culminate in the use of a sophisticated abstract conventional code (language) that enables the exchange of decontextualized novel meanings with their communication partners (Bates et al., 1979; Rowland & Fried-Oken, 2010). As a point of departure, it would be an oversight not to acknowledge the significance of theories pertaining to typical language and communication development as they underscore the importance of relationships that exist between individuals and context and how this relationship influences communication and language learning. Thus, the theories that form the foundation for this research stem from the fields of language and psychology.



It is apparent in the theories that will be discussed that the caregiver-child relationship is interactional wherein there is co-construction of meaning and influences between both parties that are bi-directional in nature. These interactions form the basis for cognitive, emotional and language development. The theories that inform language development include nativism (Chomsky, 1975), constructivism (Piaget, 1964; 1972), behaviourism (Skinner, 1985; Watson, 1924), Vygotsky's (1962) language acquisition theory and sociocultural theory, as well as the transactional model (Sameroff & Fiese, 2000) of development.

The nativist perspective (Chomsky, 1975) entails the view that children are born with the ability to learn language as the features of language and grammar are innate. Though language is said to have universal features and/or parameters that are abstract, it is believed that these features cannot be transferred from an adult to a child through imitation and communication. Contrary to this theory, the constructivists are of the belief that cognition precedes language development (Piaget, 1964; 1972). They believe that language is a manifestation of an individual's emotional and cognitive abilities to talk about the world, others and self. They argue that the linguistic rules based on nativism are complicated and abstract, thus, they aim to give clarity to the structure of the sentence and do not take into consideration the meaning and role the adult in transferring the language features. Therefore, Piaget and his colleagues in (1962) put emphasis of the role of cognition in language development rather than the innateness of one's ability to learn language. Piaget and colleagues saw language as an outcome of the interplay of the child's interaction with the environment; the interaction between cognitive perceptual abilities and language experience. What an individual learns about language is determined by what they have learned in the environment. A child is seen an active learner in the environment, who creates complex intellectual structures in order to problem solve independently.

Behaviourists (Skinner, 1985; Watson, 1924) agree to a certain extent with the constructivists regarding the role of the environment in changing behaviour, as speaking a language is viewed as a skill-like behaviour. Children learn language from their experiences with the environment. The behaviourists emphasize that there is a stimuli-response relationship that exists; thus, the child reacts to a stimulus in the environment, and this response is then conditioned by reinforcement. When the child initiates some form of communication, the adult is



bound to respond and vice versa. When there is a response, the stimuli can be deduced; and given the stimuli, the response can be predicted.

With all these differing views from the different schools of thought, it can be concluded that neither innate language abilities of the child nor environmental exposure alone can explain language development; both aspects play a role as does cognition and thought. This is also reflected in Vygotsky's sociocultural perspective (1962) wherein he posits that language development (and human development in general) is a socially and culturally mediated process (Renner, 2003). More knowledgeable members of the community interact with the developing child, and scaffold the acquisition of culturally valued skills, and the development of language and cognition, by modelling the 'ideal form' (mature form) of a behaviour to the child. As the child's abilities and skills change, the more knowledgeable partner (parent, sibling, or other) adjusts their behaviour to foster increasing independence (e.g., a toddler who can walk will not be constantly carried any more).

The range of vocabulary development is dependent on the social contexts and language resources available for the child in their culture. Children belong to a culture; regardless of where it takes place and how it unfolds, interaction is always a social and cultural process. Thus, the child's sociocultural experiences occur through language and lead to thought development.

The child's zone of proximal development plays a vital role in their learning. Learning is achieved through the help of others. The child has the potential to problem solve while guided by others. The competent partner plays a significant role in the child's learning and helping them achieve their full potential. Therefore, language is social and dependent on the context.

This view aligns with transactional model (Sameroff, 2000) of development, as child development is viewed as a product of the dynamic continuous interactions between the child and the experiences provided by the family and the context. This model embeds a child in an environment of social relationship with the expectation that this will amplify and minimize certain of the child's characteristics. The experiences provided by the environment are not viewed as independent of the child. The child could be a strong determinant of their current experiences; however, developmental outcomes cannot be attributed without an analysis of the effects of the environment on the child. Sameroff and Chandler (1975) mention that children with high-risk births end up with later developmental problems, not because of the biological



damage to the brain but because of the negative effects these children have on their caregivers. How the child behaves is seen as a function of how the environment reacts, rather than as a function of what is intrinsic to the child.

The responses from the environment therefore facilitate the child's development. Caregiver responsiveness is reported to take on different forms in different cultures; however, it has been observed in a variety of Eastern, Western, and African cultures. Researchers have noted cross-cultural 'universal' aspects but also culture-specific manifestations (Tamis-Lemonda et al., 2014). Caregiver responsivity (or caregiver contingent responding) has been investigated as a possible influencing factor on child language and communication development (Tamis-Lemonda et al., 2001; 2014). In European American families, maternal responsiveness has been found to predict the child's learning of new words and promote communication. Specifically, maternal responsiveness has been found to predict the vocabulary; diversity of communication skills and other language skills in children who use speech for communication (Tamis-Lemonda et al., 2001). Thus, children of extremely responsive mothers develop language and communication earlier than those of minimally responsive parents. Tamis-Lemonda et al. (2014) theorise that responsiveness fosters a young child's understanding of the intentionality of communication interactions as their behaviour is responded to and treated as meaningful by others. The temporal continuity, contingency, informative nature and multimodality of contingent responses are further believed to scaffold vocabulary acquisition.

Care must be taken in applying such findings across cultures. It would be amiss to assume that caregiver responsivity is identical in form and has identical purposes across cultures; likewise, it would be amiss to assume it has no role to play in some cultures. In this regard, Morelli, Quinn et al. (2018) observed that, across cultures, the mother may not necessarily be the person who primarily talks to the child, as peers, siblings and other competent members of the culture may fulfil this function. Likewise, these authors note that maternal responsivity may take on non-verbal forms and achieve the primary purpose of socialising the child into a relational sense of self (i.e., to help the child see themselves as part of a community and be cognizant to the roles and expectations of themselves in this community) rather than teaching the child vocabulary. It is of vital importance to respect and acknowledge such cultural differences, especially when some form of support or intervention is to be provided to families of children



with communication disabilities (Morelli, Bard et al., 2018). It is far too easy to assume Western-centric models of service delivery that annihilate valuable cultural child rearing conventions by replacing them with culturally-incongruent but ostentatiously ‘better’ ways of interacting with children. A deep and respectful engagement with cultural stakeholders, acknowledging their competence and the legitimacy of culturally-rooted child rearing practices is necessary to avoid culturally-incongruent forms of service delivery (Morelli, Bard, et al., 2018; Morelli, Quinn, et al., 2018).

This is in line with the eco-cultural theory that alleges that the family is responsible for socially constructing the child’s activity settings so as to accommodate the needs of children within the family environment (Bernheimer et al., 1990). Furthermore, the theory posits that family members are more likely to implement and sustain interventions that fit into their daily routines and those that yield positive outcomes for the family as a whole, as well as those that are in line with the parent’s objectives and beliefs. The components of the eco-cultural theory are necessary to incorporate in intervention planning because it increases the “contextual fit”, meaning that interventions for young children should fit into their daily routines and that of the family and be incorporated therein (Brookman-Frazer, 2004). Interventionists need to build on the strengths of the family and what the family is already doing rather than bringing in new concepts and forcing them onto families because these new concepts might not build on their strengths and what they know. The concepts might not be culturally appropriate and contextually relevant. This might lead to interventions not being accepted by the families they are intended for.

### **2.3 Children with complex communication needs**

Speech, language and communication are fundamental to participation, development and well-being (McCormack et al., 2009). When speech, language and/or communication are impaired, reading, writing, education, employment and forming social relationships are affected negatively. Children with CCN present with significant speech, language and communication difficulties. These communication difficulties are typically concomitant with congenital neurodevelopmental disorders such as autism spectrum disorders (ASD), cerebral palsy (CP), multiple and severe disabilities and cognitive impairments, but may also be caused by acquired



disorders such as traumatic brain injury (Communication Matters UK Glossary, 2017). Children living with CCN encounter challenges such as the inability to express needs and wants, express their emotions, make requests, protest and have social interactions with people around them (Beukelman & Light, 2020; Drager et al., 2010). They also encounter various challenges that can have lifelong detrimental effects. Their communication challenges may result in difficulties forming basic social relationships within their family and within their communities; put them at risk for abuse; and they typically experience restrictions and/or limitations when participating in activities related to community living and family life (Light & McNaughton, 2015).

Furthermore, due to their limited communication skills, children living with CCN who are of school-going age are often denied the opportunity to participate in educational settings, including mainstream and special education (Human Rights Watch, 2015; Light & McNaughton, 2015; McCormack et al., 2009), resulting in limited opportunities to find employment as adults (Light & McNaughton, 2015).

Viewed through the lens of sociocultural theory (Vygotsky, 1962), the reaction by the environment to children with CCN can result in additional impairments in social functioning. For example, the creation of special environments leads to social segregation because the child is regarded as different (Renner, 2003). This has a more detrimental effect on the mental development of the child than the disability itself. For this reason, Vygotsky advocated for normal treatment and social contact for children with disabilities. Thus, always putting the individual before the impairment. As a result, impairment becomes a normal state for that person.

When children living with CCN are treated differently from other children, the typical process of enculturation is affected and this affects mastery of cultural tools, higher mental functions and cultural forms of behaviour. The psychological development may also follow a different course from the typical one, as opposed to following the typical path at a slower pace. Therefore, the consequences of the impairment are influenced by attitudes and adaptations made by the social environment.

In line with transactional theory, child and caregiver behaviour influence each other over time. A child who communicates less and does not initiate or respond to communication from the caregiver, will often induce less responsive behaviour from the caregiver. A study by Slonims et al., (2006) for example, showed that 8-week-old infants with Down syndrome were less





communicative than infants without disabilities, yet their mothers were as responsive as mothers of infants without disabilities. However, their mothers were significantly less responsive when the infants were 20 weeks of age. This demonstrates the bidirectional influence of the child on the caregiver and vice versa, and that the reaction from the environment can lead to less than optimal developmental conditions for a child with CCN.

On the other hand, the effects of impairment on functioning can also be minimised by constructive reactions from the environment (Renner, 2003). The theory suggests that there is a relationship that exists between personal traits and development of mental abilities of children; and their relationship with significant others (in this case, the parent or caregiver). When a child with disabilities interacts with a competent member of a particular culture, who could be an older child or an adult, the social environment affords the child with a developed model of culturally-valued skills and abilities.

For the optimization of development and overcoming disability, it is essential to create developmental side-tracks of enculturation. This includes substituting functions by other functions, thus preparing collateral pathways which open new possibilities of development for the child with disabilities. For children living with CCN, their communication and language side-tracks can therefore be created by employing the use AAC.

#### **2.4 AAC for children with CCN**

There is a great deal of stress and frustration encountered by the child and caregiver where there is miscommunication and communication breakdown. To mitigate for the miscommunication and effects they have on communication, AAC intervention should be employed as it influences communication development of children living with CCN and developmental disabilities (DD) (Branson & Demchak, 2009).

AAC refers to the communication methods that are used to augment and/or replace speech for individuals living with CCN (Beukelman & Light, 2020; Bornman & Tönsing, 2016). Thus, AAC offers children living with CCN a different or additional way of communicating and thus supports communication and language development (Ronski et al., 2015). The United Nations Convention on the Rights of Persons with Disabilities (Convention on the rights of the child, 2006). Children's Charter states that communication is important for all children and that



they have the right to communicate using their own preferred means of communication, which includes AAC. AAC provides access to wider vocabulary and language (Pennington et al., 2018). It has also been reported to improve turn-taking skills, commenting, mean length of utterance, phonological awareness, reading and writing skills (Light & McNaughton, 2012). Additionally, AAC has been reported to reduce challenging behaviour in children who experience frustration due to their inability to communicate (Beukelman & Light, 2020; Light & McNaughton, 2012). In a recent mega-review, Crowe et al. (2022) identified 84 systematic reviews, literature reviews and meta-analyses summarizing the effects of AAC interventions for children with DD and intellectual disabilities (ID) on their receptive and expressive communication. On the basis of the results from these records, various AAC interventions (e.g., Picture Exchange Communication System, high-tech AAC, and aided AAC modelling) have been found to effectively improve children's communication skills. Branson and Demchak (2009) systematically reviewed the evidence base of AAC for use with infants and toddlers with disabilities. Positive effects in the areas of functional communication skills, challenging behaviour, speech production, receptive and expressive language skills were highlighted. Light and Drager (2007) also reported that improvement can be seen when multi-modal forms of communication are used. The fundamental goal of AAC intervention is for children to live happy and fulfilled lives; for children to realize their full potential in communication and participate fully in their communities, educational and social contexts (Light & McNaughton, 2015; Soto & Yu, 2014).

Children living with CCN typically require AAC to express themselves while some may additionally need AAC to also augment comprehension of spoken language (Ronski et al., 2015; Sennott et al., 2016). AAC can be categorized into aided (uses external devices) and unaided systems (utilizes the body of the individual only). Both aided and unaided systems can increase access to a variety of communication partners and contexts. Aided systems, and particularly those with voice output (i.e., speech generating devices (SGDs) typically allow more easily for communication with unfamiliar partners, whereas unaided systems require use with partners who are familiar with that mode. Unaided systems require the person who uses AAC to remember how to form the symbols (i.e. signs) accurately (Bornman & Tönsing, 2016). Aided systems, on the other hand, require that an aid (e.g., communication board, SGD) be available for use, and this is not always practical or possible in all situations and contexts. The main principle of using



AAC is that it should always be multimodal, and include both aided and unaided systems for each individual, in order to have communication methods available for a variety of partners and contexts.

At the same time, care needs to be taken to build on and encourage existing communication methods. Since communication is a ‘two-way street,’ communication partners significantly contribute to the success or failure of joint interactions (Naraian, 2010). A close collaboration between familiar communication partners is needed, as familiar partners are often able to identify existing communication skills accurately. Conversely, frequent communication partners such as caregivers may also need assistance in identifying, interpreting and responding consistently to the child’s communication attempts in order for them to create communication opportunities (Douglas et al., 2017; Gona et al., 2013; Ogletree et al., 2011; Sigafos, 1999). Caregivers are typically amongst the first and most important communication partners of young children (Kaiser & Roberts, 2013).

## **2.5 Caregiver training to improve communication of children using or in need of AAC**

As discussed in Section 2.2, the environment plays an important role in language and communication development of the child. The family or extended family in particular provides an important environment for language and communication development of the young child. A child continues to search for connections between the reactions of the environment and their own actions as well as events in the environment. Communication development with alternative means also needs to be supported by the environment (Renner, 2003).

Congruent with the paradigm shifts from professional-led, clinic-based early intervention services to family-centred intervention (FCI) (Dunst, 2002), AAC intervention programs for young children have also recognized the importance of a family-centred approach (Granlund et al., 2008; K Mandak & Light, 2018). Family-centred intervention focuses on building the capacity of caregivers and interaction partners to provide for the needs and support the development of their children (Dunst et al., 2014). It is also grounded in the belief that, when afforded appropriate and customized support from interventionists, caregivers and interaction partners of children with disabilities have the capacity needed for stimulating their child’s



development (Dunst et al., 2014; Ingber & Dromi, 2010; Maluleke et al., 2021). As noted before, who these caregivers and interaction partners are, may differ between cultures.

Teaching caregivers and interaction partners to include language-enhancing strategies in daily routines may offer children learning opportunities in their natural environment and daily routines, thereby allowing for authentic learning experiences and greater generalization of children's language skills (Bornman et al., 2020; Ann P Kaiser & Roberts, 2011). Furthermore, interventions that are conducted in a family-centred manner may result in benefits for caregivers, such as reduced stress and anxiety, better psychological welfare, increased caregiver knowledge, as well as improved self-efficacy and proficiency in carrying out intervention (Bailey et al., 2012; Carnes, 2012; King et al., 2017). A further benefit of focusing on caregivers is that caregiver-child interactions can improve, which positively impacts the family's quality of life (King & Chiarello, 2014).

Caregiver-mediated communication interventions acknowledge the transactional nature of caregiver-child interactions. These interventions, which have become more popular in the past 20 years, have been used in the field of AAC (Kent-Walsh, Murza, Malani, & Binger, 2015; Smith & Hustad, 2015). Caregiver-mediated AAC interventions are founded on the assumption that caregivers and partners who interact frequently with the child should play a central role in the intervention of young children, as they are present in the contexts within which the children live, interact, learn, and play (Granlund et al., 2008). They are also essential communication partners for young children (Ferm et al., 2011). While the primary female caregiver often plays a prominent role in this regard in Western culture, peers, siblings and the extended family and community may play a more prominent role in some non-Western cultures (Geiger & Alant, 2005; Morelli, Quinn et al., 2018). Several programs aimed at training caregivers to implement AAC strategies with their children with complex communication needs have been developed and reported in the literature (Adamson et al., 2010; Ferm et al., 2011; Kent-Walsh & Binger, 2015), and two reviews have been published on communication partner training programmes.

Kent-Walsh, Murza, Malani and Binger (2015) conducted a meta-analysis aimed at determining the overall effects of partner instruction on the communication of people who use AAC; and whether the outcomes were influenced by any moderating variables that relate to the participants, intervention and outcome characteristics. Of the studies included in the meta-



analysis, seven involved training caregivers as communication partners. Studies that employed experimental designs such as randomized controlled trials (RCTs), quasi-experimental and single-case experimental designs were included. The authors concluded that there is strong evidence for the effectiveness of communication-partner instruction on improvements in the communication of the person using AAC, with the strongest evidence being for children under the age of 12 years.

A systematic review by Shire and Jones (2015) included four additional studies on caregiver training (Cafiero, 1995; Chang, 2009; Iacono et al., 1998; Ronski et al., 2010). This review included experimental group designs, and not only single-case experimental designs (SCEDs). In addition, the authors also included grey literature (e.g., unpublished dissertations). Mixed results were reported for caregiver and child outcomes (i.e., the mean length of utterances, communication turns, caregiver utterances, total caregiver turns, the implementation of strategies, caregiver-child communication, and the frequency of use of the strategies and skills). The effect sizes ranged from small to large.

Subsequent to these reviews, a number of additional studies have been conducted on the effects of training caregivers to support AAC implementation for their children (e.g., Alsayedhassan et al., 2020; Douglas et al., 2017; 2021; Suberman & Cividini-Motta, 2020; Timpe et al., 2021; Treszl et al., 2022). As part of the exploratory phase of this study, a scoping review of studies reporting on the effect of training programmes aimed at training caregivers of children to implement AAC was undertaken, and a detailed summary of these studies is provided in Chapter 4.

Training programmes that have aimed to assist caregivers to scaffold language and communication development of their children have targeted a number of caregiver behaviours, including contingent responding (as discussed under Section 2.2), providing appropriate language models, and encouraging children to take communicative turns by prompting and environmental arrangements. Roberts and Kaiser, (2011) conducted a meta-analysis on parent-implemented language interventions and found that responsiveness was taught in 10 of 18 studies, and also measured as a parental outcome in seven studies. Providing general or specific language models was taught in 15 studies, and measured as an outcome in five studies. Creation



of communication opportunities through, for example, environmental arrangement, was reported in two studies.

Contingent responding (as discussed under Section 2.2) describes any action from the caregiver (verbal or nonverbal) that indicates that the caregiver has taken note of the child's communication act and has either understood it and responds appropriately to it verbally or non-verbally, or, alternatively, seeks clarification if the caregiver has not understood it (Broberg et al., 2012; Shire et al., 2016; Yoder & Warren, 1999). As noted in Section 2.2, caregiver responsiveness manifests in different forms in various cultures, but has been found to be present across cultures, and can scaffold communication development as the child comes to understand the intentionality of communication behaviours and also learns to map the meaning of words by the caregiver's contingent responses. As will be seen from the scoping review (Chapter 4), responsiveness has also been targeted in AAC-focused caregiver training.

Modelling of general and specific language targets provides children with an example of the communication behaviours they are expected to produce, in line with Vygotsky's sociocultural theory (1962). Children who use speech to communicate are typically exposed to speech on a continuous basis, and, in European American families, have been reported to hear approximately 26 million words between birth and age 4 (Hart & Risley, 1995). It has been proposed that children using AAC should also be exposed to models of AAC use by their partners (Allen et al., 2017; Sennott et al., 2016). Specifically, partners should pair their spoken language models with AAC. Such modelling (also called augmented input or aided language input – the latter in case of modelling an aided system) may have a number of benefits for children learning to use AAC. Firstly, such models can strengthen the receptive language foundation as the augmentation of speech by another mode can strengthen the salience of the message meaning (Allen et al., 2017, Dada, Flores, et al., 2017; Dada, Murphy, et al., 2017). Secondly, such modelling reduces the input-output asymmetry that children using AAC typically experience, where they hear spoken language but are expected to express themselves in an alternative modality (Sennott et al., 2016). When adults provide language models using AAC to demonstrate the use thereof, children may imitate these models and also learn to use the system (Allen et al., 2017). Finally, when using the child's AAC system, (specifically aided systems with limited vocabulary options), partners may identify shortcomings of the system and learn to



overcome them (Allen et al., 2017). Therefore, the systematic integration of AAC into the social environment by partners also emphasises the acceptability of these methods and contributes the creation of a communication environment that supports and promotes these methods.

Creating communication opportunities through, for example, environmental arrangements form an integral part of milieu teaching strategies, a partner-implemented communication intervention strategy that has been found effective for children with a variety of language and communication disorders, including those in need of AAC (Kaiser et al., 2001; Kaiser & Wright, 2013; Yoder & Warren, 2002; Yoder & Stone, 2006). Environmental arrangements entail setting up the environment in such a way that children are enticed to communicate, for example, by offering them choices or making a desired item visible, but inaccessible without help. While responsivity and modelling may be observed in the inactions between children without disabilities and their more competent partners, environmental arrangements are arguably more purposeful strategies that may be helpful when children do not acquire communication adequately through routine interactions.

## **2.6 Culturally and linguistically responsive AAC service provision**

Like other fields of allied health, the field of AAC has its roots in Western scientific models and values (Muttiah, Gormley et al., 2022; Pillay & Kathard, 2018; Tönsing & Soto, 2020). An increasing number of authors and researchers have critiqued the limited acknowledgement of a Western and Anglo-centric bias in the field. For example, authors have reported limited cognizance of bilingualism and limited recognition of the home language in AAC interventions (Stone, 2019; Soto & Yu, 2014; Tönsing & Soto, 2020; Tönsing et al., 2018; 2019). Thus, interventions are still carried out in one language instead of recognising multilingualism (Tönsing & Soto, 2020). Furthermore, there is still a paucity in research which then affects availability of evidence based interventions for multilingual children. Furthermore, carrying interventions in one language might neglect the sociolinguistics in multilingual families (Soto & Yu, 2014; Tönsing & Soto, 2022).

Also, the way in which AAC interventions are conceptualised and implemented does not always respect cultural customs and values around communication (Dada et al., 2017; Kulkarni & Parmar, 2017). Most of the aided AAC systems available do not cater for the multilingual and





multicultural context of South Africa. The common picture-based communication symbols do not cater for some of the commonly used words found in South Africa such as a symbol for “pap” (maize porridge), thus making the symbols not congruent with the context of South Africa (Dada et al., 2013). Furthermore, most SGDs do not allow the AAC user to use different languages or have an option for a different language on their system. This then poses difficulties as most South Africans to switch between languages as they move from one context to another. Most of the text to speech aided AAC devices do not cater for most of South Africa’s indigenous languages. It is of significance that AAC intervention in the South African context should be multilingual, because the population is diverse, languages and the contexts are multilingual (Mccord & Soto, 2004; Tönsing & Soto, 2020; Van Niekerk & Tönsing, 2015). Where culture is concerned, the majority of the therapist in the public healthcare system that serves majority of the South African population (Rowe & Moodley, 2013) come from cultural backgrounds the differ significantly to the population they serve. Thus, it is important for the therapists to exercise cultural humility (Chang, Simon et al., 2010; Kirby, Spencer et al., 2022; Wright, 2019).

To counteract this bias, authors have called for increased respectful and deep engagement with persons from diverse language and cultural backgrounds who require AAC, as well as their families and stakeholders to bring about more respectful, appropriate and meaningful AAC research and intervention. Qualitative, descriptive and collaborative, participatory methodologies have been called for in an effort to form respectful partnerships and develop appropriate AAC resources and models of service delivery that promote agency and respect indigenous knowledge (Amery et al., 2020; Dada et al., 2022; Kulkarni & Parmar, 2017; Stone, 2019).

With regards to young children in need of AAC from diverse backgrounds, engagements with caregivers and other stakeholders can foster an understanding of caregivers’ lived reality of caring for a child with CCN, as well as typical interaction patterns between children and caregivers, expectations of interventions, views about AAC systems and strategies, and possible implementation barriers (Gona et al., 2013; Muttiah, Seneviratne, et al., 2022; Pickl, 2011). These aspects are crucial to consider in AAC interventions for young children from diverse backgrounds.





## 2.7 Provision of AAC services in the South African context

South Africa has two healthcare systems; namely the public and private. The public sector functions on the district health system approach that emphasises primary healthcare (Rowe & Moodley, 2013). Sixty eight percent of South Africa's population relies on the public healthcare sector and only 16% on the private healthcare sector. Consequently, children with DD and CCN aged 0 - 6 years receive rehabilitation services through the public healthcare system as the majority of families cannot afford private healthcare (McKenzie & Müller, 2006; Rosenbaum et al., 2011; Saloojee et al., 2006). Speech-language pathology services are scant in South Africa and this can be viewed by the results of the World Bank report of 2013 as reported by McAlister and colleagues. The speech-language therapist (SLP) to client ratio was 1:8000 in the 2013 report and the number has since risen to 1:2-4 million clients as compared to 1:2400/2500 in developed countries such as United Kingdom, United States of America, Canada, etc. (Crowley, Baigorri, Ntim, Bukari, Oseibagyina, et al., 2013; McAllister et al., 2013; Popich et al., 2007). In agreement with the World Bank report, Pillay et al.,(2020) profiled the South African SLP workforce. They found that between 2002 and 2017 there were about 2613 therapists registered in South Africa: some as SLPs ( $n=1086$ ) and some as both SLPs and audiologists (dual registration) ( $n=1527$ ). The demographics showed that the majority of the practitioners were white, followed by Indians and blacks and most are independent practitioners practicing in the private sector. This then contributes to the challenges experienced in the public healthcare sector. These challenges include, but are not limited to, high caseload; limited resources; and the linguistic and cultural diversity of the population.

There are factors contributing to the high caseloads and these include: (1) communication rehabilitation services are primarily available in regional and tertiary hospitals that are located in the cities, far from rural areas where they are also needed (Kathard et al., 2011; McKenzie & Müller, 2006; Uys, 2009); (2) limited resources and speech-language pathology professionals in relation to the population in need of the services (Pascoe et al., 2013); and (3) South Africa is a linguistically and culturally diverse country; however, the majority of professionals trained in AAC are first language English and Afrikaans speakers and do not speak the first language of their clients, thus linguistic and cultural sensitivity might be compromised during service



delivery and might lead to low interest in using AAC (Dada, Murphy, et al., 2017; van Dulm & Southwood, 2013).

South Africa is a multilingual country and has diverse cultures, thus it is described as “*a rainbow nation*” coined by the late Archbishop Desmond Tutu in 1994. The diversity in language and culture poses challenges in offering rehabilitation services, specifically Speech-Language therapy and AAC intervention. Providing any form of rehabilitation services in LMICs appears to be a challenge because they are largely constituted by rural areas, and poor performing economies in LMICs lead to scarcity of resources, materials, AAC technology and limited healthcare services (Wylie et al., 2013; World Bank, 2012). Some of the challenges related to AAC provision children with CCN are faced with in LMICs are as a result of: (1) limited number of professionals who are trained in AAC in developing countries (Fuller et al., 2009); (2) limited or no access to AAC materials and resources (Fuller et al., 2009; Gona et al., 2013; Wylie et al., 2013); (3) lack of awareness and knowledge of AAC by people living in rural communities (Fuller et al., 2009); (4) limited training available for caregivers in AAC (Fuller et al., 2009; Gona et al., 2013; Muttiah et al., 2015); and (5) limited or lack of access to quality AAC service provision that are contextually fit, linguistically and culturally sensitive (Barrett & Marshall, 2013; Bunning, Gona, Odera-Mung’Ala, Newton, et al., 2014; Fuller et al., 2009; McAllister et al., 2013; Muttiah, 2016; Pickl, 2011).

In order to overcome these challenges in AAC intervention, implementation and service provision in South Africa for children with CCN, researchers have advocated for a paradigm shift from child-centred interventions to caregiver mediated interventions (Popich et al., 2007). Caregiver-mediated interventions have proven to be effective because caregiver involvement has been reported to be indispensable to the success of most AAC interventions (Gona et al., 2013; Balton, 2004). Balton (2004) reports on 16-week caregiver training intervention called the parent-child programme that is implemented at Chris Hani Baragwaneth Academic Hospital. Caregivers bring their children when they go for training. This programme teaches caregivers of children who are at risk of and those who have been diagnosed with communication disabilities some skills. The skills include, but are but not limited to communication, communication facilitation techniques, child development and needs, play, early literacy, having fun with movement, eating healthy, attention-deficit hyperactivity disorder (ADHD) and self-esteem.



Caregivers who participated in the study reported that their children showed increased communicative attempts, vocabulary, listening, concentration and play creativity. Caregivers reported that they saw improvement in their own effective communication with their children regarding, providing communication opportunities, play, reading, parent child interaction and that their relationship with their child improved as they became knowledgeable about their child's disabilities and impairments. Although not aimed at AAC in particular, this report suggests the potential for caregiver-mediated communication intervention through a public health avenue in South Africa.

In an attempt to improve services for caregivers, options such as caregiver education or training have been recommended (Popich et al., 2007). It empowers the caregiver in such a way that they feel they are no longer constantly dependent on the healthcare professional and that they do not feel isolated anymore. They become empowered to problem solve and meet the needs of their children. It is important to realize that professionals will continue to play a consultative role with the trained caregivers (Popich et al., 2007).

For this reason, training caregivers to carry out interventions in low-income rural contexts could be a solution to challenges related to access to services; and this form of intervention would meet the basic needs of caregivers at a community level (Mandak, O'Neill, et al., 2017; Hamblin & Koul, 2004). By the same token, caregiver involvement is important for the success of interventions in contexts where the child lives, interacts, learns and plays (Granlund et al., 2008). They also provide healthy, nurturing and stimulating environments for children (Child Gauge, 2013) and most importantly they are the most essential communication partners for young children (Ferm et al., 2011). Correspondingly, parents and/or caregivers are reported to be their children's first teachers (Kaiser & Hancock, 2004). Additionally, involving caregivers and the family in interventions may be effective because they spend most of their time with the children and interact with them in a variety of contexts, which will help with generalization of skills. Caregivers are able to provide communication, participation and interaction opportunities for the child (Granlund et al., 2008; Marshall & Goldbart, 2008). Interventions that occur throughout the day of the child and within their families are reported to be less stressful and have better results on communication development (Kashinath et al., 2006). When caregiver training is provided in a systematic way, it has the possibility of alleviating the burden within the South



African healthcare system in terms of rehabilitation for young children with DD and CCN. In addition, teaching caregivers to implement AAC strategies within the child's natural context could increase the likelihood that such support will be maintained outside of therapy sessions, which could result in positive communication outcomes for the children.

Vhavenda are an ethnic group of people residing predominantly in the Vhembe district of the Limpopo Province in South Africa and they speak Tshivenda and its different geographical dialects. They are descendants of various clans. The Vhavenda ethnic has a variety of cultures stemming from Africa. Their economy is dependent on farming, manufacturing and mining. People residing in Vhembe district are serviced by one regional hospital, six district hospitals, one specialised psychiatric hospital, eight community health centers, 112 primary healthcare clinics and 22 mobile clinics. Due to the district being predominantly rural, patients typically have to travel distances of more than 5km by foot to access services either at a district hospital, community healthcare centre, primary healthcare centre or mobile clinics that go into the deep rural communities. There is a surge of undocumented and documented nationals from neighbouring South African Development Community (SADC) countries such as Mozambique and Zimbabwe who share the same strained public healthcare system in Vhembe.

## 2.8 Conceptual framework

The main aim of this study is to develop and evaluate the effectiveness of a caregiver training programme designed to train Vhavenda caregivers of children aged 2-6 years with CCN to implement AAC in a low-income rural context in South Africa. It is hypothesized that caregiver training on various skills will improve the caregiver variables and the concomitant child variables.

The study is grounded on the transactional model of development (Sameroff & Fiese, 2000), proposing that there is a bi-directional influence between the caregiver and the child that shapes their communication interaction, which then influences communication development of the child. It is also informed by Vygotsky's sociocultural theory, which purports that communication development is socially and culturally-mediated through interaction with more knowledgeable partners. This theory also emphasises the need to create side tracks to speech for a child living with CCN by enlisting the use of AAC for communication. Children living with

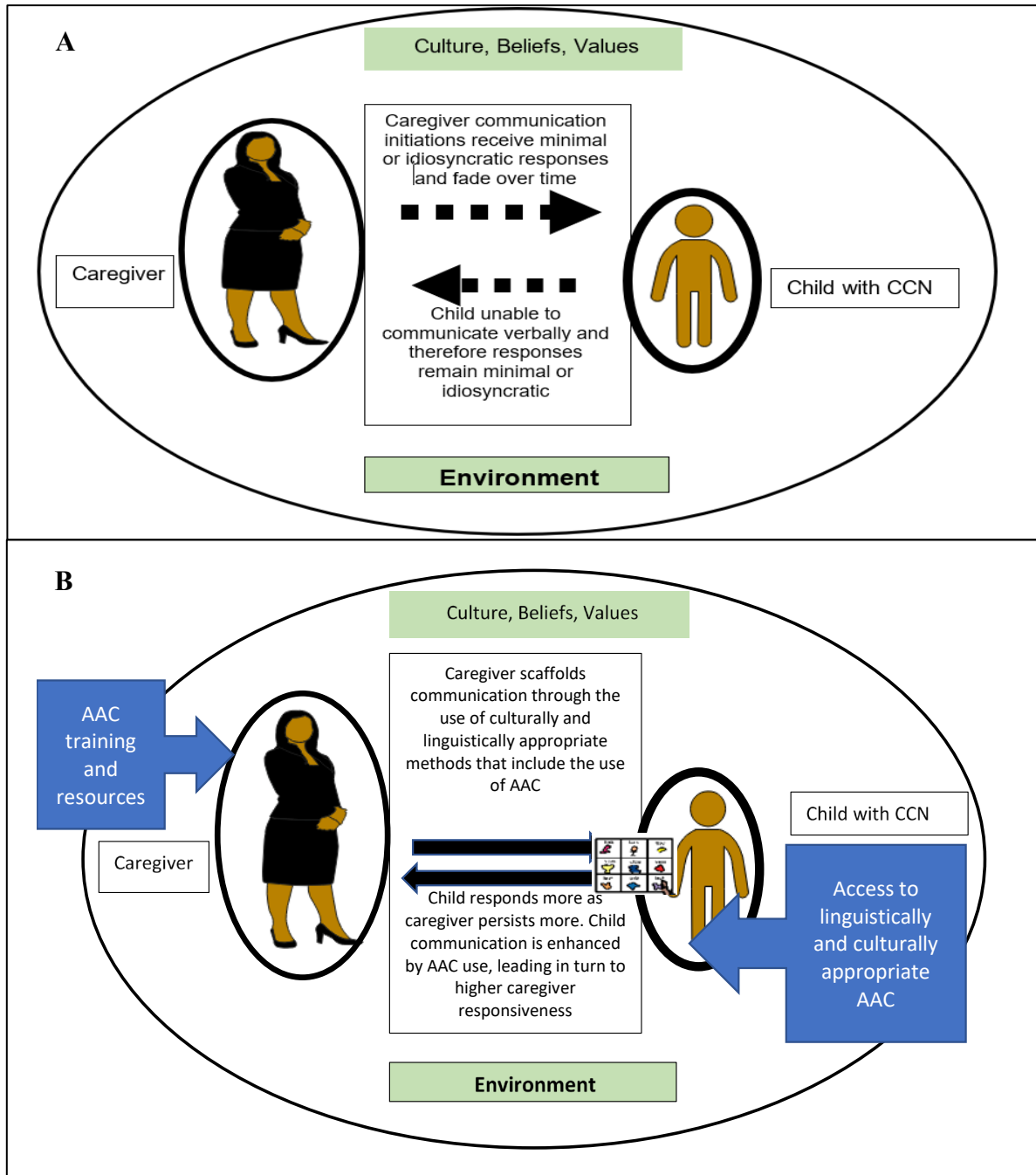


CCN require competent adult models who will demonstrate and show them the use of AAC. This brings to light the significance of training caregivers to model the use of AAC so that they can fulfil their role as competent models for the child. The transactions between the child and caregiver open up avenues of possibility for interventions to facilitate development of children.

In order to ensure that training is linguistically and culturally relevant, input from cultural stakeholders will be sought prior to the development of the training programme. In this way, the programme can be developed in line with the beliefs, values and cultural conventions around caregiver-child interactions. Figure 2.1 illustrates how the caregiver training programme is expected to change the interactions between caregivers and children with CCN. Frame A shows that the caregiver initiations and responses (arrow from caregiver to child) fade over time, due to minimal responses and initiations from the child (arrow from child to caregiver). This results in a negative cycle that results in less and less interactions between caregiver and child. In Frame B, the introduction of intervention strengthens the caregiver's ability to respond contingently and to initiate appropriately (arrow from caregiver to child), in spite of limited child skills. Also, the introduction of AAC offers the child more understandable means of responding and initiating (arrow from child to caregiver). This results in a virtuous cycle where interactions increase over time.

**Figure 2.1**

*Conceptual Framework*



Summary



This literature review commenced with an overview of language and communication development, with specific emphasis on the theories that have attempted to explain the phenomena. The role of the transactions between the child and the environment (and specifically more knowledgeable partners such as caregivers) was discussed. The challenges that children living with CCN encounter as a result of limited or lack of speech and language skills were described, and the role that AAC can play in improving communication and language skills was explained. The rationale for training communication partners and specifically caregivers in supporting the use of AAC was also discussed, and background was provided as to why training may focus on responsiveness, modelling and the creation of communication opportunities. The potential application of caregiver training in the South African context was reviewed, and the need to ensure cultural and linguistically appropriate intervention methods was explored. Lastly, the conceptual framework underlying the study was briefly summarised and illustrated in Figure 2.1.



## CHAPTER 3

### METHODOLOGY

#### 3.1 Introduction

This brief chapter provides an overview of the methods that were used in this study. The chapter commences with the aims and sub-aims of the study. Thereafter, the paradigmatic grounding of the study is explained, followed by a description of the study design. An overview of the study phases is provided. Lastly, ethical clearance and the general ethical principles that will be adhered to in this study are described in this chapter.

#### 3.2 Aims of the study

##### 3.2.1 *Main aim of the study*

The main aim of this study was to develop and evaluate the effectiveness of a programme designed to train Vhavenda caregivers of children aged 2-6 years with CCN in a low-income rural context in South Africa to implement AAC.

##### 3.2.2 *Sub-aims*

In order to achieve the main aim of the study, the following sub-aims were formulated:

- (i). To scope the literature on programmes aimed at training caregivers of young children with CCN to implement AACs for the benefit of their children, in order to identify and describe the participants in the training programmes, the training context, content, instructional methods, materials, scheduling and delivery format, as well as the outcomes and measures used to evaluate these. This information guided the development of the CgTP (Phase 2);
- (ii). To identify the cultural practices and beliefs of Vhavenda with regards to caregiver-child communication interactions and children with communication disabilities, while also eliciting stakeholder opinions about the proposed training. This information ensured cultural congruity of the CgTP;





- (iii). To develop a culturally- and contextually-appropriate CgTP designed to support caregivers of children with CCN aged 2-6 years in Vhembe district, Venda, to implement AAC;
- (iv). To implement and evaluate the effectiveness of the CgTP designed to support caregivers of children aged 2-6 years with CCN living in the Vhembe district, Venda, to implement AAC.

### 3.3 Research paradigm

The paradigm informing the methodology of this study was pragmatism (Feilzer, 2010). Pragmatists focus primarily on the utility of the study rather than on aiming to represent reality or truth. Determining what is useful requires reflection on aspects such as the aim of the study, the intended beneficiaries, and the researcher's own values and the influence this has on the study (Feilzer, 2010). This study aimed to develop and evaluate a programme designed to train Vhavenda caregivers of children aged 2-6 years with CCN in a low-income rural context of South Africa to implement AAC. The intended beneficiaries of the study were therefore the caregivers and their children. The researcher herself is a Muvenda originally from Vhembe district. She also trained as an SLP (Speech-language pathologist and Audiologist). She embraces communication as a human right for all (CRPD, 2006) and believes in communication being made available and optimal for all individuals. Although her background, experience and values may have biased her towards interpreting the programme as effective, she employed various methods in all phases to limit bias, such as joint coding and member checking following stakeholder interviews and obtaining independent ratings of procedural fidelity as well as reliability of the measurement in Phase 3.

Pragmatists accept that reality is a mixture of objective and subjective experiences, and do not privilege one view of reality over another (Dewey, 1925; Rorty, 1999). For this reason, pragmatic research typically consists of a combination of qualitative and quantitative approaches, as both are deemed useful and, indeed, essential, to arrive at knowledge that is relevant and useful (Feilzer, 2010). In line with this, the current study made use of a mixed methods design.



### 3.4 Research design

This study employed a three-phase exploratory sequential mixed method design in order to achieve the main aim. This implies that both qualitative and quantitative data were collected and analysed to achieve the main aim of the study. This research design was chosen as data collected in one phase informed the next phase (Creswell, 2014; Creswell & Plano Clark, 2018). Qualitative data was obtained from the exploratory phase (Phase 1), which informed the development phase (Phase 2). The developed programme was then tested using a quantitative design during the evaluation phase (Phase 3). Mixed methods allowed the researcher to collect qualitative and quantitative data as appropriate for the specific phase of the project. Using qualitative methods during the exploratory phase allowed the exploration of the topic from the literature and from the stakeholders' point of view. This phase was necessary as limited knowledge was available about an appropriate and effective AAC training programme for caregivers of children with CCN living in a rural South African Vhavenda community, and qualitative methods offered the opportunity to explore findings from the literature and also stakeholder beliefs and opinions in a flexible manner. The findings from this phase informed the next phase, programme design, during which expert feedback was obtained through an open-ended questionnaire (qualitative approach), and a pilot study (A-B design; quantitative approach) was furthermore used to refine the training programme and procedures. Lastly, during the evaluation phase, a SCED was used to evaluate the effects of the programme on five variables that could be quantified through frequency counts. A quantitative experimental design allowed the researchers to draw conclusions about the effectiveness of the training programme to change the frequency of certain child and caregiver behaviours. A questionnaire with both closed and open-ended questions (qualitative and quantitative) was used to evaluate the social validity of the training programme. The use of primarily qualitative methods in the first two phases enabled the researcher to develop a training programme that was informed by the literature as well as by stakeholder input, strengthening the potential for the programme to be both effective and socially valid. The primarily quantitative methods used in the third phase allowed for an evaluation of the effectiveness and social validity of the programme.

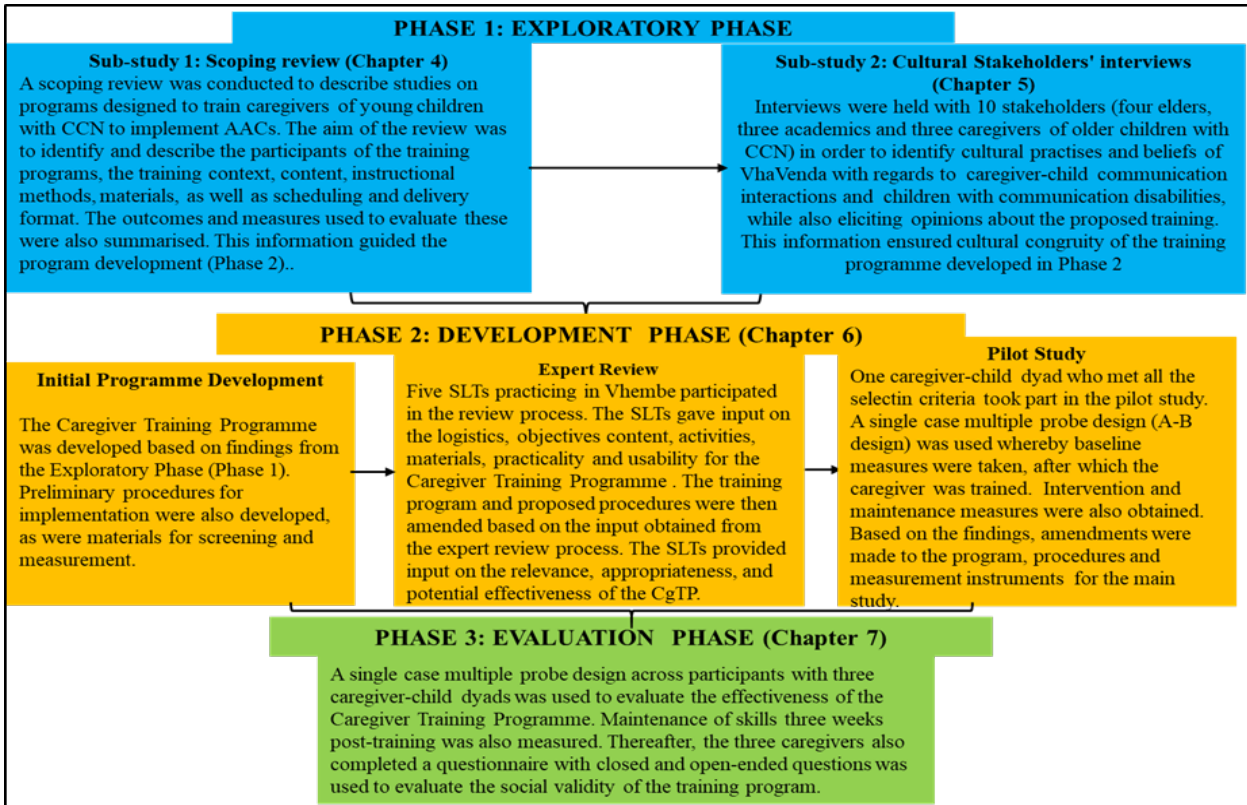


The strength of the chosen design included, first of all, the judicious combination of both qualitative and quantitative approaches, resulting in a more effective and socially-valid training programme than would have been possible by using only qualitative or only quantitative approaches. Secondly, the phases built logically onto each other, with a clear progression from one phase to the next. Lastly, stakeholder voices were able to be included prior to the programme design, during programme design, and also after the application of the programme, thus strengthening the utility and social validity of the program (Feilzer, 2010).

Some challenges with conducting a sequential mixed methods study include the amount of time it takes to conduct such a project with multiple phases (Creswell & Plano Clark, 2018). Furthermore, the researcher needs to be competent in conducting, analysing and reporting data using qualitative and quantitative methods (Schoonenboom & Johnson, 2017). In order to ensure her own competence, the researcher attended trainings and workshops on qualitative research methods and data analysis. The researcher also watched YouTube videos on mixed methods that were presented by the authors in the field.

### **3.5 Phases of the study**

The study employed a three-phase mixed methods exploratory design. Each phase informed the following phase. Before commencement, approval for the whole study was obtained from the Research Ethics Committee of the Faculty of Humanities (Appendix A), then the Department of Health Limpopo (Appendix B1), District Health Vhembe (B2) and the hospitals in Vhembe that offer Speech-language therapy services (B3). The methods, results and discussion of each phase will be provided in more detail in Chapters 4 and 5 (Phase 1), Chapter 6 (Phase 2) as well as Chapters 7 and 8 (Phase 3). Figure 3.1. illustrates the overview of the three phases and their aims.

**Figure 3.1***Overview of the Phases***3.6 Summary**

This chapter stipulated the aims of the study and explained the research paradigm that frames the study. The design was then explained. Lastly, a brief overview was provided of the three phases of this study, namely the exploratory phase with two data sources (a scoping review and expert interviews), the development phase wherein the caregiver training programme was developed, and lastly, the evaluation phase, whereby the caregiver training programme was implemented, and its effects evaluated. **CHAPTER 4**

**PHASE 1.1: SCOPING REVIEW OF CAREGIVER TRAINING PROGRAMMES**



#### **4.1. Introduction**

The scoping review was the first research conducted as part of the exploratory phase. This chapter discusses the rationale for the review, the aims of the review, methods, results and implications for the development phase.

#### **4.2. Rationale**

As discussed in Section 2.5, there is a strong theoretical and empirical basis for training caregivers to scaffold the emerging communication skills of their children, including children who require or use AAC. The current study proposed to develop and evaluate such a training programme, and for this reason it was important to systematically search the literature to identify existing programmes that could inform the development of the current programme. A scoping review was therefore conducted to identify studies on AAC caregiver trainings and to descriptively summarise various characteristics about the programmes and outcomes measured. A scoping review, rather than a systematic review, was chosen because the aim was to identify various characteristics of the programmes and the outcome measures, rather than summarising overall effectiveness. A second reason for choosing a scoping review was that the researcher did not want to limit the results to only experimentally-controlled studies. Doing so would have resulted in excluding studies reporting on programmes that may as yet have only emerging evidence of effectiveness, or studies that qualitatively described the implementation of such training programmes. While systematic reviews and meta-analyses are helpful and necessary to summarize the effectiveness of evidence (as determined by rigorous experimental methodologies), the inclusion of other types of methodologies and designs in a review could broaden the understanding of emerging interventions that have not yet been experimentally verified. This may include studies that emanate from practice, as well as studies that attempt to implement interventions in real-world and previously under-researched contexts. Because interventions performed in real-world contexts are complex and transactional, they may lack experimental rigor and control (internal validity) but conversely carry higher external or ecological validity (Kent-Walsh & Binger, 2018).



### **4.3 Aims**

#### **4.3.1 Main aim**

A scoping review was conducted to describe the nature of training programmes designed for caregivers of young children with CCN in AAC interventions.

#### **4.3.2 Sub-aims**

In order to achieve the main aim, the following sub-aims were addressed:

- (i) To describe the participants (caregivers and children);
- (ii) To describe the training conducted (delivery format, content, and instructional strategies);
- (iii) To describe the outcomes targeted and measures used to evaluate the outcomes; and
- (iv) To describe procedures used to enhance social validity of the programme before and during implementation and measures used to assess social validity post training

### **4.4 Methods**

The scoping review employed Arksey and O'Malley's (2005) framework. This framework outlines the process as (a) identifying the research question, (b) searching for relevant studies, (c) selecting studies, (d) charting the data, (e) collating, summarizing, and reporting the results, and (f) consulting with stakeholders to inform or validate review findings. The last step was addressed in a limited way in Phase 1.2 (see Chapter 5).

#### **4.4.1 Protocol**

A review protocol was developed at the beginning of the review, and was guided by the PRISMA guidelines for scoping reviews (Tricco et al., 2016). This protocol specified the title of the review, the rationale and specific research questions, the search strategy for the identification of relevant studies, and the inclusion and exclusion criteria. The process for screening was specified. The data extraction strategy was clarified and a data extraction table was created. Various subject experts with a background in speech-language pathology and/or AAC gave input on the protocol.



#### 4.4.1 Search terms

Search terms pertained to the population of interest (parents of children who required AAC) and the intervention of interest (parent training programmes that trained parents on AAC implementation). No search terms specifying outcomes were added, as studies were not to be selected on outcomes; any outcome was acceptable for inclusion. Information specialists were consulted to assist with the refining of search terms, and pilot searches were then conducted. The following search terms applied to this review and were tailored for each of the twelve databases: parent OR caregiver AND child\* OR youth OR adolescent AND complex communication needs OR CCN OR little or no speech OR little or no functional speech OR LNFS OR severe disabilit\* OR developmental delays AND training OR education AND augmentative and alternative communication OR AAC. The search strategy per database and hits obtained from the search terms are summarised in Appendix C1.

#### 4.4.2 Selection criteria

Studies were selected according to the following criteria outlined in Table 4.1.

**Table 4.1**

*Inclusion and Exclusion Criteria for Studies*

Criteria	Inclusion	Exclusion
Population	<ul style="list-style-type: none"> <li>Caregivers or parents of children with CCN</li> <li>At least one child in the study had to have CCN (and results for this child-caregiver dyad had to be reported separately)</li> <li>Children in the studies had to be aged between 0-18 years.</li> </ul>	<ul style="list-style-type: none"> <li>Studies where persons other than parents/caregivers are trained, e.g., teachers, therapists</li> <li>Studies exclusively addressing training of children living with severe sensory impairments (i.e. uncorrected hearing and visual impairments; dual sensory impairments, deafness, blindness and etc.).</li> <li>Children over the age of 19 years</li> </ul>
Intervention	<ul style="list-style-type: none"> <li>Parent or caregiver is trained on any aspect of AAC/AAC implementation with their child living with CCN. This could include the implementation of any aided or unaided form of AAC.</li> </ul>	<ul style="list-style-type: none"> <li>Studies that train parents on skills other than AAC implementation, such as behavior management or supporting their children's speech production</li> </ul>
Outcome	<ul style="list-style-type: none"> <li>Studies had to report on a primary empirical outcome related to the training. The nature of the outcome was not limited and could include caregiver</li> </ul>	<ul style="list-style-type: none"> <li>Studies that did not include a primary empirical outcome related to the training were excluded.</li> </ul>





Criteria	Inclusion	Exclusion
Date of publication	<p>perceptions, caregiver behaviour, and/or child behavior.</p> <ul style="list-style-type: none"> <li>January 1998 to June 2019</li> </ul>	<ul style="list-style-type: none"> <li>Studies before 1996 and studies after June 2019.</li> </ul>
Language	<ul style="list-style-type: none"> <li>Studies published in English or with an English option if published in another language.</li> </ul>	<ul style="list-style-type: none"> <li>Non-English articles</li> </ul>
Study/ research design	<ul style="list-style-type: none"> <li>Empirical studies (i.e., studies collecting primary data from participants rather than reviewing other studies) using any design were included</li> </ul>	<ul style="list-style-type: none"> <li>Literature reviews of any nature (systematic, scoping etc.) and theory papers were excluded.</li> </ul>
Publication type	<ul style="list-style-type: none"> <li>Include grey literature and peer reviewed articles</li> </ul>	<ul style="list-style-type: none"> <li>No studies will be excluded based on the type of publication.</li> </ul>

#### 4.4.3 Data Sources

Twelve electronic databases were searched for peer-reviewed and grey literature. These databases included: Academic Search Complete, Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, PsycINFO, PsycARTICLES Scopus, ERIC, Family and Society studies, Health Source: Nursing/Academic Edition, Africa wide, Humanities source and Social, work abstracts. Each database search was limited by the date (January 1998 to June 2019) and language (studies had to be published in English). No limitations were placed on study designs. Hand searches, as well as forward citations on Google Scholar<sup>TM</sup>, were conducted. The researcher asked the following questions when selecting studies in forward citations and hand searches: (a) Does it involve caregiver training? (b) Were AAC strategies implemented by the caregiver? (c) Was the study published between 1998 and 2019? (d) Was it published in English?

#### 4.4.4 Study selection

Studies were exported from EBSCOhost via a Research Information Systems (RIS) link, and the link was then uploaded onto Rayyan QCRI. Rayyan is a cloud-based web and mobile application for systematic reviews that is designed for title, abstract and full text screening that uses semi automation and allows collaboration between authors (Ouzzani et al., 2016). The inclusion and exclusion criteria for this review (as provided in Table 4.1) were captured onto Rayyan QCRI App and also onto a Microsoft Excel ® 2016 spreadsheet.





The aforementioned inclusion and exclusions criteria were used to select studies at title level, abstract and full text level on Rayyan QCRI. Duplicates were removed after the RIS downloads were uploaded on Rayyan QCRI. The researcher screened studies at title level and selected studies for inclusion. The researcher and supervisors then screened the abstracts independently. A consensus approach was used to resolve conflicts between the two reviewers. This process was then also used to assess studies independently at full text level.

#### **4.4.5 Data Extraction**

Data extraction was carried out on a Microsoft<sup>TM</sup>Excel 2019 document that was designed according to the research sub-questions. The first version was designed by the researcher. The researcher and supervisor then extracted data independently on the first 10 studies, and thereafter held a meeting to compare the extraction. Discrepancies were discussed and resolved, and the data extraction table was jointly amended. Thereafter, the first and second author independently extracted data from all 17 studies using the revised Excel document. Descriptive information about each study was extracted (e.g., authors, year of publication, design, and country in which the study was conducted). Further data extraction was guided by the sub-questions. This included the population (e.g., number of caregiver participants, their age and level of education, mean age of child[ren], diagnosis of the child[ren], children's previous exposure to AAC), followed by the intervention (i.e., delivery format, content, and instructional strategies), outcomes (dependent variables and measures, results), as well as procedures to enhance and also measure social validity. The data extracted by the two reviewers was compared, and percentage of agreement was calculated. It amounted to 92.8%. Disagreements were discussed and resolved by consensus. The assistance of the co-supervisor was enlisted on one occasion when the first two reviewers did not manage to reach consensus.

### **4.5 Results**

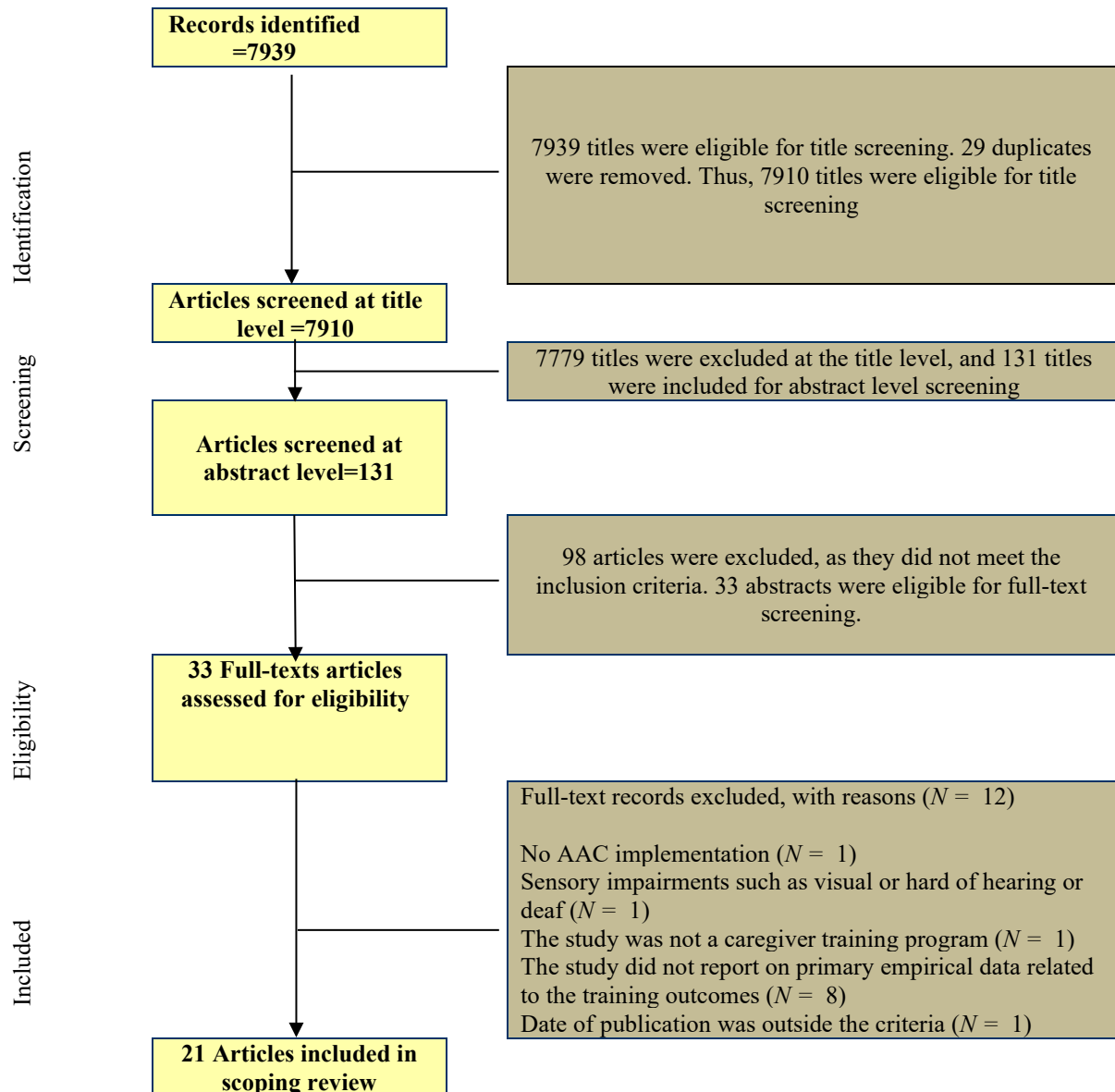
Figure 4.1 shows an outline of the study selection process as well as the number of records at each stage of the process in accordance with the Preferred Reporting Items for



Systematic Review and Meta-Analyses (PRISMA) statement (Moher, Liberati, Tetzlaff, Altman & The PRISMA Group, 2009).

**Figure 4.1**

*Study Selection PRISMA (2009) Flowchart.*





A total of 7939 titles were exported to Rayyan via an RIS link for title screening. Twenty-nine duplicates were found and removed. A total of 7910 titles were screened and 7779 were excluded. Both reviewers then independently assessed the 131 abstracts with 97% inter-rater agreement (agreements divided by the sum of agreements and disagreements). The remaining 3% where disagreements existed were discussed and consensus was reached. A total of 98 abstracts were excluded, because they did not report on primary empirical data related to the training outcomes, focused on the wrong population as the paper did not report on parent training or did not focus on AAC-strategies. Thirty-three studies were assessed independently by both reviewers at full text level. Reviewers agreed on 96% ( $n = 32$ ) and only disagreed on one study. After consensus was reached by the reviewers, 21 studies were included for data extraction at full text. A total of 12 studies were excluded. The reasons for exclusion were as follows: the study did not address AAC implementation ( $n = 1$ ); the study included only children with hearing impairments ( $n = 1$ ); the study did not report on a parent training programme ( $n = 1$ ); the study did report on primary empirical data related to the training outcomes and /or detail contents of training ( $n = 8$ ); and the date of publication was outside the criteria ( $n = 1$ ). A summary of the studies included is presented in Appendix C2.

#### **4.5.1 Descriptive information**

Of the 21 studies included, 12 were published in the time period 2010 to 2019 and the other 9 studies between 2000 and 2009. The majority of the studies were conducted in the United States of America ( $n = 14$ ), while three were conducted in Sweden (Broberg et al., 2012; Ferm et al., 2011; Jonsson et al., 2011), two in Kenya (Bunning, Gona, Newton, Hartley, et al., 2014; Gona et al., 2013) and one each in Australia (Tait et al., 2004) and South Africa (Bornman et al., 2001).

Study designs included quantitative experimental designs, namely quasi-experimental designs ( $n = 4$ ), randomized control trial ( $n = 2$ ), as well as SCEDs ( $n = 6$ ). Five mixed method studies were found, including studies that employed a combination of focus groups and SCEDs ( $n = 3$ ); a combination of a survey with qualitative interviews ( $n = 1$ ) and a combination of a



survey and a case study ( $n = 1$ ). There were three studies that employed a case report and one study that used a case series design.

## 4.5.2 *Participants*

### 4.5.2.1 *Caregivers*

Across the 21 studies, 380 caregivers were mentioned as having received training. However, these may not have been unique individuals, since more than one study at times reported on the same group of training participants (e.g., Ronski et al., 2010; Ronski et al., 2011). Mothers were mentioned 267 times, and fathers (including one adoptive father) were mentioned 80 times. One grandmother was mentioned. In the remaining studies, caregivers were described as parents ( $n = 18$ ) or as caregivers ( $n = 14$ ). Caregiver age was reported on in 14 studies and ranged from 26 to 44 years ( $M = 36.2$  years). In the 16 studies that specified caregivers' highest educational level, post-high school qualifications were reported 295 times, and high school education 58 times.

In 14 studies, the caregivers' home language was English and no mention was made of other languages being spoken in the home. Three of the 21 studies reported on caregivers who spoke primarily Swedish, with additional languages (i.e., Kurdish, Polish, Finnish, Tigrinya, Russian, Arabic Turkish, Wolof, and Serbian) being spoken occasionally by some caregivers. The three studies conducted on the African continent reported Afrikaans, Kiswahili, Giriyaama, and Conyi as the home languages. Rosa-Lugo et al. (2008) reported on caregivers who were able to read Spanish and/or English; however, no detailed description was given of the specific languages used in the study.

### 4.5.2.2 *Children*

There were 296 children mentioned in the studies. The mean age of the children was 56 months (i.e., 4 years, 8 months) with a range of 16 months to 12 years. They had a variety of diagnoses, which included various neurodevelopmental disorders (ASD, CP, Down syndrome and ID), other syndromes and genetic syndromes. Exposure to AAC before the caregiver training was reported for 54 of the children and included prior exposure to the use of manual signs, objects, Picture Communication Symbols (PCS), the Picture-Exchange Communication



System (PECS), photographs, and SGDs. No prior AAC exposure was reported for 18 of the children and it was unknown for the remaining children reported on in the 21 studies.

### 4.5.3 Training

#### 4.5.3.1 Delivery

The number of training sessions across the studies ranged from 2 to 24 sessions, with one study not reporting the number of sessions. Frequency of training was not always clearly described, but ranged from about twice per week to once per month. Not all studies reported on total training time; however, from the studies that reported this, total time ranged from 75 minutes to 16 hours. Trainers consisted mainly of members of the research teams with the main authors and research assistants acting as interventionists. A total of six studies reported on results of group training strategy; however, three of these studies were based on one programme (Broberg et al., 2012; Ferm et al., 2011; Jonsson et al., 2011) and the other two studies (Ronski et al., 2010; Ronski et al., 2011) were based on another training. Group training was conducted in central meeting places, laboratories and/or clinics, while individual training happened in the homes of the participants. Homes were used for follow-up measurements too. Face-to-face delivery was reported in most of the studies ( $n = 19$ ). Other formats included online delivery ( $n = 1$ ) (Douglas et al., 2017), and self-study by parents followed by support from the SLPs who regularly supported them and their children ( $n = 1$ ) (Calculator, 2016).

#### 4.5.3.2 Content

Parents were trained to implement aided AAC, unaided AAC and, in some instances, both (multi-modal AAC). Table 4.2 shows the frequencies of the AAC systems and the symbols that were reported in the studies.

**Table 4.2**

*AAC Systems and Symbols Used Across the Studies*

AAC systems	Description	Number of reporting articles
Unaided signs	Manual signs	5
	Prelinguistic behaviours (e.g., natural gestures, facial expressions)	1



<b>AAC systems</b>	<b>Description</b>	<b>Number of reporting articles</b>
Aided symbols	Enhanced natural gestures	1
	Objects	2
	Photographs	3
	Pictures and images (including clipart, scanned images or images not otherwise specified)	7
	PCS	9
	Minspeak	1
	Dynasyms	1
	Bliss	1
	Widgit/Rebus	1
	Graphic symbols (not otherwise specified)	2
	Aided systems/displays	SDGs
Communication boards		8
Picture cards		5
Object displays		2
Placemat		1
PECS Book		1

The most common unaided AAC strategy employed was manual signs, while the most frequently used aided AAC systems were SGDs. Aided symbols widely used on the displays for the SGDs, communication boards, and picture cards were picture communication symbols. Other systems included object displays.

Caregivers were taught to model augmented input strategies (i.e., caregiver augments his/her speech with aided or unaided AAC symbols) in 15 of studies. In 11 studies caregivers were taught to prompt the use of AAC (augmented output strategies). Caregivers were also often taught to ensure that the child had an alternative method of expressing him-/herself ( $n = 15$ ) through provision of communication opportunities. Other milieu teaching strategies (such as asking questions, expectant delay, environmental arrangement, mands, contingent responding etc.) were taught to caregivers in 20 studies. In three studies caregivers were additionally taught to be responsive to their children (responsivity training).

Daily routines such as play ( $n = 6$ ), snack time ( $n = 5$ ), book reading ( $n = 6$ ), leisure activities ( $n = 4$ ), educational activities ( $n = 1$ ), caregiver led activities ( $n = 1$ ), daily activities ( $n = 5$ ) and researcher chosen activities ( $n = 6$ ) were used as settings in which caregivers implemented the interventions.



#### 4.5.3.3 *Instructional strategies*

The (Kent-Walsh and McNaughton (2005) instructional protocol was used in a few studies in the review; however, it is evidence-based and includes fundamental elements for training various communication partners. In the current review, caregivers were the communication partners that the researcher focused on. The original protocol includes eight steps; however, this study will use six of the eight steps:

- (i) Pre-test and commitment to instructional programme - the researcher obtains formal commitment to complete instruction.
- (ii) Strategy description - the researcher describes the strategy, its components and steps required to remember implementation of the strategy.
- (iii) Strategy demonstration - the researcher models the use of the targeted strategy as well as the components and skills needed to carry out the strategy.
- (iv) Verbal practice of strategy steps – caregivers practice the strategy steps verbally. They name and describe the steps of the strategy as outlined in the mnemonic.
- (v) Controlled practice feedback - multiple opportunities for practice of targeted strategy in a controlled environment are provided to the participants.
- (vi) Advanced practice and feedback - the participants get to practice the strategies in a natural environment, where the instructor gradually fades prompts.
- (vii) Post-test and commitment to long-term strategy use - researchers document and review the participants’ mastery of the strategy and compare the results to baseline.
- (viii) Generalisation of targeted strategy – trainer supports the learning of how to generalize the use of targeted strategy.

The four commonly-used instructional strategies included in more than half of the studies included live strategy demonstration/modelling, strategy description, written materials and guided practice sessions with the child, followed by feedback from the trainer as shown in Table 4.3. Two strategies (self-reflection questionnaire and commitment to strategy) were each only used once.

**Table 4.3**

*Frequency of Instructional Strategies (in Descending Order of Frequency)*

<b>Instructional strategy</b>	<b>Frequency</b>	<b>Studies by number<sup>a</sup></b>
Live strategy demonstrations or modelling	14	1-2, 6-7,9,11, 13-19, 21
Strategy descriptions	13	1,3-8,9-12,14, 17
Written materials	13	1, 3-5,8,10-12,14-16,18,21
Guided practice sessions with own child, including feedback	13	1,6-8, 11-17,19,20
Behavioural rehearsal or role-play with feedback	8	1,9,11-14,17
Homework	7	2-7, 18
Videotaping of caregiver-child interactions with feedback	7	3-5,17,18,21,19
Video demonstrations of strategy	6	1, 10,11,14,17,18
Answering individual caregiver's questions	5	10,12,14-16
Workbooks	4	3-5,8
Telephonic discussion	4	1,11,17,19
Verbal rehearsals	3	1,11,17
Lectures	3	3-5
Group discussions	3	3-5
Tests, quizzes and/or assignments with automated or instructor feedback	2	8,10
Self-reflection questionnaires	1	10
Commitment to strategy statement/ questionnaire	1	10

<sup>a</sup> Numbering as per Appendix C2

#### **4.5.4 Outcomes**

Of the studies reviewed, 15 reported outcomes related to both the caregiver and the child, while five only reported on caregiver outcomes. One study only reported on child outcomes.

##### *4.5.4.1 Caregiver outcomes*

Caregiver behaviour was evaluated in 13 studies. In these studies, caregiver behaviour was observed, and then either qualitatively described ( $n = 1$ ) or counted/classified ( $n = 12$ ), the latter typically according to study-specific definitions and parameters. In one instance,





caregiver behaviour was measured according to the Responsive Augmentative and Alternative Communication Style (RAACS) scale Version 2 (Broberg et al., 2012). In most studies, the behaviour evaluated was directly linked to the behaviour trained, and entailed the use of augmented input, output, and general milieu teaching strategies.

Caregiver perceptions and experiences as a primary outcome were measured in seven studies. In three of these, their perceptions about the caregiver training programme (effectiveness, acceptability, most and least valued aspects, etc.) were measured by means of predominantly quantitative questionnaires and rating scales (Calculator, 2016; Ferm et al., 2011; Starble et al., 2005). In one study, caregivers' perceptions of the communication boards introduced during training were specifically evaluated, using a questionnaire as well as by means of interviews (Jonsson et al., 2011). The study by Gona et al., (2013) used qualitative interviews to describe caregivers' experiences of caring for a child with a severe communication disability, and their experience of the caregiver training programme. Lastly, two studies elicited caregiver perceptions about child communication skills (Bunning et al., 2014; Calculator, 2016).

#### 4.5.4.2 *Child outcomes*

Child outcomes were measured in a total of 17 studies. In 14 studies, all focused on expressive communication skills, the outcomes were measured via observations/recordings of behaviour. Three studies reported child outcomes based on caregiver rating. The 14 studies making use of observations/recordings reported on expressive communication outcomes related to pragmatics skills, morpho-syntactic skills, semantics, as well as combinations of two or three of these outcomes. A total of 13 studies reported on pragmatic outcomes, such as frequency of turn taking, or frequency of initiation, while four studies reported on semantic outcomes, including the use of a unique vocabulary, the number of semantic concepts expressed, and vocabulary gains; and three studies reported on morpho-syntactic outcomes, including the use of multi-symbol messages, the correct use of pronouns, and the mean length of utterance. Improvements in child communication behaviours were reported in all the studies. Furthermore,



one study reported a decrease in challenging behaviours once the intervention had been implemented (Olive et al., 2008).

Three studies reported on child outcomes through caregiver-completed rating scales. The caregivers reported an increase in the child's competence in communication-related body functions, body structures, and activities (Bunning et al., 2014). They also reported on increased successful and unprompted use of enhanced natural gestures and decreases in challenging behaviour (Calculator, 2016). Caregivers who had received AAC-related training perceived their children's communication as having become more successful, and they reported fewer difficulties in their child's communication compared to caregivers who had been trained merely to support their child's spoken communication (Ronski et al., 2011).

#### ***4.5.5 Social validity: Caregiver input into programme and evaluation of social validity post-training***

In three studies, focus groups were used before the training programme was implemented to ensure cultural appropriateness. In the studies by Binger et al. (2008) and Kent-Walsh et al. (2010), focus groups were held with Latino culture experts, including one caregiver per focus group. In the study by Rosa-Lugo and Kent-Walsh (2008), a focus group was held with three African-American culture experts.

In eight studies, the authors reported that caregivers made choices about and/or gave input on the training prior to its commencement. These included materials used (e.g., books), the activities during which caregivers applied their newly acquired skills, the vocabulary, the type of AAC, and the communication functions targeted. In two other studies, the content of the training programme reported on was developed in consultation with caregivers from the target culture to ensure cultural and social acceptability (Bunning, Gona, Newton, et al., 2014).

Apart from the seven studies that elicited caregiver perceptions about the training or the change in their children's communication skills post-training as (one of) the primary outcomes (see Section 4.5.4.2), another six studies evaluated social validity post-training as an additional secondary outcome. In all six studies, questionnaires were used with primarily closed-ended questions (rating scales). In two of the studies, spouses of the participating caregivers watched



and compared pre- and post-training videos of caregiver-child interactions, and blindly rated in which videos the child communicated better (Binger et al., 2008; Kent-Walsh et al., 2010).

#### **4.6 Implications for the development phase**

The results of this scoping review had several implications for the development of the caregiver training programme intended to train caregivers to implement AAC with their children with CCN in their natural environments. The scoping review highlighted significant elements of caregiver training approaches with regards to the participants, the training, and the outcomes measured.

The scoping review strengthened the importance of evidence-based practice when developing interventions by looking at the research evidence aspect of it. Caregiver input was sought before and/or after the training in most of the studies. This highlights that consumer perspectives in designing evidence-based interventions cannot be neglected when designing programmes (Fulcher-Rood et al., 2020; Schlosser & Raghavendra, 2004). Instructional strategies that were frequently used included: live demonstrations and modelling, descriptions of strategies, inclusion of manuals or written materials, provision of practice sessions with feedback, role-play or behavioural rehearsal, homework and video-taping of caregiver child interactions. These strategies can be implemented and entrenched to adhere to principles of adult learning. This will inform the strategies to be used by the researcher when training caregivers to improve communication and interaction with their children. Data on the logistics of training was extracted. This data informs the frequency of training, number of sessions and how long the sessions should take. This will guide how the training session should be designed with respect to the number of sessions and the length of the sessions. Data extracted on demographic information of the caregiver and child will guide the researcher to develop training content that will help caregivers of diverse educational levels and ages from different contexts, as the studies were implemented in low and high income countries. Additionally, the studies covered a wide range of diagnoses and ages of the children, so this means that the



strategies and focus of the training can be utilized for various populations. Results pertaining to the focus of training included the type of AAC systems and symbols used. Both aided and unaided AAC was used; however, the use of picture communication symbols was reflected significantly.

#### **4.7 Summary**

In this chapter, a scoping review was undertaken that aimed to describe the nature of training programmes designed for caregivers of young children with CCN to implement AAC interventions. The rationale for the review was described, followed by the aims and sub aims. The method was described, including the protocol, search terms, data sources, study selection process as well as the data extraction. The results pertaining to the population, the training, and the outcomes were described. The implications for the development phase were given.



## CHAPTER 5

### PHASE 1.2: CULTURAL STAKEHOLDERS INTERVIEWS

#### 5.1. Introduction

The cultural stakeholder interviews were done to identify the cultural practices of Vhavenda with regards to caregiver-child communication interaction, as well as their beliefs about children with a communication disability; and to determine acceptability of the proposed program strategies for the target population. The aim, sub-aims, participants, pilot investigation and the outcomes thereof, materials and instruments used, data collection procedures, data analysis procedures, findings, and implications for the development phase are discussed.

#### 5.2. Aim of Phase 1.2

##### 5.2.1 *Main aim of Phase 1.2*

The aim of the interviews was to identify cultural practices and beliefs of Vhavenda pertaining to caregiver-child communication and interaction with children with a communication disability, and to obtain their opinions about various aspects of the proposed training.

##### 5.2.2 *Sub-aims of Phase 1.2*

In order to achieve the main aim, the following sub-aims were formulated:

- (i) To determine the cultural conventions of typical caregiver-child communication interactions, such as typical partners, activities during which communication is common, and content of interaction, amongst others;
- (ii) To determine the cultural beliefs of the Vhavenda about communication disorders, help-seeking practices and interactions of caregivers with children with communication disorders;
- (iii) To determine acceptability of the proposed programme strategies and considerations for a culturally-appropriate caregiver training programme to be developed in Phase 2.

#### 5.3. Design

A qualitative phenomenological design was used to collect data. This approach was used as it explores the perspectives of those who have experienced the phenomenon (Neubauer et al., 2019). Thus, various cultural stakeholders were recruited to participate in



this study so as to explore their perspectives of the Vhavenda culture pertaining to cultural practices and beliefs of Vhavenda concerning caregiver-child communication interaction, children with a communication disability, and their opinions about various aspects of the proposed training.

#### **5.4. Participants**

Approval for the whole study was obtained from the Research Ethics Committee of the Faculty of Humanities, the Department of Health Limpopo, Vhembe district health and the hospitals prior to the recruitment of participants. The approval letters can be found in Appendices A and B.

##### **5.4.1 Sampling**

Non-probability purposive sampling with an additional element of snowball sampling was used to select cultural stakeholders. The researcher purposefully chose participants whom she knew to be knowledgeable on the subject of cultural and traditional practices of Vhavenda, and/or who had experience in raising a child with a communication disability in the Vhavenda cultural context. The researcher contacted two elders and two academics, as well as three caregivers. She received additional referrals from these participants to other participants.

##### **5.4.2 Recruitment**

The participants for this phase were recruited via phone calls and emails. Participants who had no access to email addresses were phoned to find out if they would be interested in participating in the research. Upon indication of interest, the participants were requested to indicate their preferred communication platforms. The researcher sent the participants the information letter in PDF format (Appendix D1) via WhatsApp™ and/or email containing the link to the consent form (which was drawn up using Google forms see Appendix D3-D4). The researcher kept a call logbook for phone calls.

##### **5.4.3 Selection criteria**

Participants had to meet a number of selection criteria, summarised in Table 5.1 with justifications and measures that were used.

**Table 5.1***Selection Criteria*

<b>Criterion and description</b>	<b>Justification</b>	<b>Measure</b>
Participants should be 18 years or older.	They should be able to provide consent legally.	Only adults were recruited.
Participants should speak Tshivenda as their home language.	The aim of the interviews was to gain understanding that enabled the researcher to develop a culturally-sensitive training programme. The participants had to be from a Vhavenda cultural background. Home language was used as a proxy measure.	Targeted recruitment ensured that only Tshivenda speakers were recruited
They should currently reside or originate from the Vhembe district.	It was important that participants had knowledge of the context in which the study was situated. These could be individuals who originated from or were currently residing in Vhembe. The hospitals from which the participants of the evaluation phase study were recruited are situated in the Vhembe district of Limpopo.	This was verified during the phone calls with participants.
Participants should have access to a cellular phone and/or a smartphone with access to WhatsApp™ or Multimedia Messaging Service (MMS).	Interviews were conducted via the telephone. Information (video clips and examples of communication boards) sent via WhatsApp™ or MMS so that the participants had context when the strategies that were envisioned for the programme were explained.	This was clear during recruitment as these methods were used to recruit participants.
Participants should be knowledgeable about Vhavenda cultural traditions and customs. Participants should therefore belong to one of the following groups: <ul style="list-style-type: none"> <li>Elders with knowledge on tradition and culture of the Vhavenda people;</li> <li>Academics with knowledge about tradition and culture of Vhavenda people, employed at or affiliated with an institution of higher learning in South Africa;</li> <li>Caregivers of a child with CCN 8 years or older; who has received or is still receiving speech-language therapy.</li> </ul>	Participants from each of these groups were recruited as these persons were expected to be knowledgeable on the subject of Vhavenda traditions and cultures, and/or had experience in raising a child with a communication disability in the Vhavenda cultural context. The reason for including only caregivers of slightly older children is that they likely had a greater wealth of experience of raising a child with a communication disability, resulting in a wealth of knowledge.	Targeted recruitment ensured that only persons belonging to these groups were included in the study.

**5.4.4 Descriptive criteria**

A total of 11 participants consented to participating in the main interview; however, only 10 were interviewed. One participant had network issues and could not engage in the interview. Biographical data was collected at the beginning of the interview phone call.

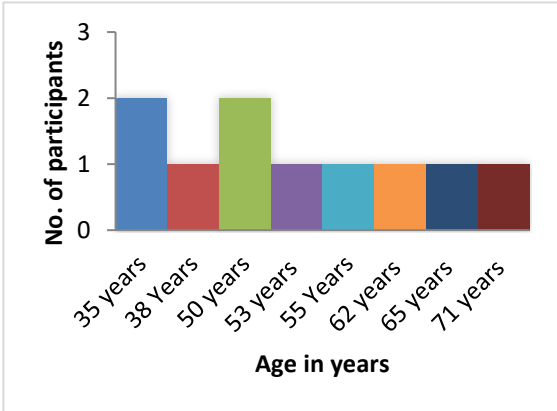
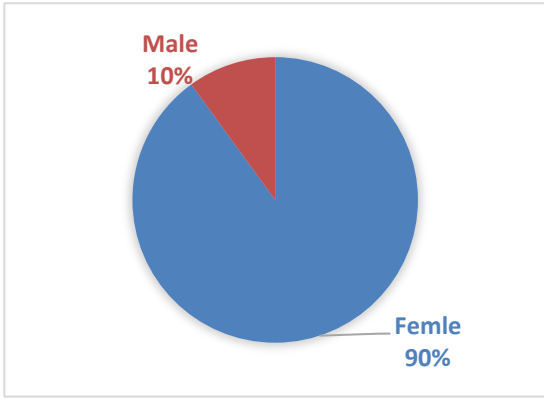
Participants are described according to their age, gender, language, residence, smartphone



accessibility, interests or knowledge about culture and traditions, occupation and the group they belong to (elders, academics or caregivers). Table 5.2 below shows the variables and description. The cultural expertise of elders and academics is also described. The age, diagnosis, and intervention history of the child with CCN (who is cared for by the caregiver) is also described.

**Table 5.2**

*Description of Participants (N = 10)*

Participant Variables	Graphic portrayal																		
<p><b>Age</b></p> <p>The ages of the participants ranged from 35 to 71 years, with a mean age of 51.4 years. Of the 10 participants, two were aged 50 years and 35 years respectively. One each were 38 years old, 53 years old, 55 years old, 62 years old, 65 years old with the oldest one being 71 years old.</p>	 <p>A bar chart titled 'Graphic portrayal' showing the number of participants for each age group. The y-axis is labeled 'No. of participants' and ranges from 0 to 3. The x-axis is labeled 'Age in years' and lists the ages: 35 Years, 38 Years, 50 Years, 53 Years, 55 Years, 62 Years, 65 years, and 71 years. The bars represent the following counts: 35 Years (2), 38 Years (1), 50 Years (2), 53 Years (1), 55 Years (1), 62 Years (1), 65 years (1), and 71 years (1).</p> <table border="1"> <thead> <tr> <th>Age in years</th> <th>No. of participants</th> </tr> </thead> <tbody> <tr><td>35 Years</td><td>2</td></tr> <tr><td>38 Years</td><td>1</td></tr> <tr><td>50 Years</td><td>2</td></tr> <tr><td>53 Years</td><td>1</td></tr> <tr><td>55 Years</td><td>1</td></tr> <tr><td>62 Years</td><td>1</td></tr> <tr><td>65 years</td><td>1</td></tr> <tr><td>71 years</td><td>1</td></tr> </tbody> </table>	Age in years	No. of participants	35 Years	2	38 Years	1	50 Years	2	53 Years	1	55 Years	1	62 Years	1	65 years	1	71 years	1
Age in years	No. of participants																		
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53 Years	1																		
55 Years	1																		
62 Years	1																		
65 years	1																		
71 years	1																		
<p><b>Gender</b></p> <p>Nine of the participants were female, and one was a male.</p>	 <p>A pie chart showing the gender distribution of participants. The chart is divided into two segments: a large blue segment representing females (90%) and a smaller red segment representing males (10%).</p> <table border="1"> <thead> <tr> <th>Gender</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>Female</td><td>90%</td></tr> <tr><td>Male</td><td>10%</td></tr> </tbody> </table>	Gender	Percentage	Female	90%	Male	10%												
Gender	Percentage																		
Female	90%																		
Male	10%																		
<p><b>Home language</b></p> <p>All the participants spoke Tshivenda as a home language. One additionally spoke English in the home.</p>																			





Participant Variables	Graphic portrayal												
	<table border="1"> <caption>Language Preference</caption> <thead> <tr> <th>Language</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Tshivenda</td> <td>90%</td> </tr> <tr> <td>English &amp; Tshivenda</td> <td>10%</td> </tr> </tbody> </table>	Language	Percentage	Tshivenda	90%	English & Tshivenda	10%						
Language	Percentage												
Tshivenda	90%												
English & Tshivenda	10%												
<p><b>Residence/origin</b></p> <p>Six participants originated from Vhembe although they no longer reside there. Four originated and resided in Vhembe.</p>	<table border="1"> <caption>Residence/Origin</caption> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Originate from Vhembe</td> <td>60%</td> </tr> <tr> <td>Reside in Vhembe</td> <td>40%</td> </tr> </tbody> </table>	Category	Percentage	Originate from Vhembe	60%	Reside in Vhembe	40%						
Category	Percentage												
Originate from Vhembe	60%												
Reside in Vhembe	40%												
<p><b>Participant groups</b></p> <p>There were four elders, three academics and three caregivers of older children with CCN.</p>	<table border="1"> <caption>Participant Groups</caption> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Elders</td> <td>40%</td> </tr> <tr> <td>Academics</td> <td>30%</td> </tr> <tr> <td>Caregivers</td> <td>30%</td> </tr> </tbody> </table>	Group	Percentage	Elders	40%	Academics	30%	Caregivers	30%				
Group	Percentage												
Elders	40%												
Academics	30%												
Caregivers	30%												
<p><b>Occupation</b></p> <p>Of the participants, three were self-employed, and two each were educators, lecturers and retired. One participant worked as a Dean of a University.</p>	<table border="1"> <caption>Occupation</caption> <thead> <tr> <th>Occupation</th> <th>No. of participants</th> </tr> </thead> <tbody> <tr> <td>Dean</td> <td>1</td> </tr> <tr> <td>Lecturer</td> <td>2</td> </tr> <tr> <td>Retired</td> <td>2</td> </tr> <tr> <td>Self-employed</td> <td>3</td> </tr> <tr> <td>Educator</td> <td>2</td> </tr> </tbody> </table>	Occupation	No. of participants	Dean	1	Lecturer	2	Retired	2	Self-employed	3	Educator	2
Occupation	No. of participants												
Dean	1												
Lecturer	2												
Retired	2												
Self-employed	3												
Educator	2												



The children of the caregiver stakeholder group ranged from 9 years to 16 years living with CP, ID and other physical disabilities. Participants indicated that their interest in the Vhavenda culture started during childhood. Six of the ten participants still practice some of the traditions and four participants practice religious customs and Christianity. The majority of the participants have a deep interest in the cultural attire, dances, practices of initiation schools (for both males and females) and indigenous food.

## **5.5 Pilot investigations**

Two pilot studies were conducted to test and determine the feasibility of the procedures and methods to be employed (Thabane et al., 2010). Furthermore, pilot studies were conducted to practice, assess the effectiveness of data collection and to detect problems so as to change them before conducting the main study (Doody & Doody, 2015). Two pilot interviews (one in English and another one in Tshivenda) were conducted in order to determine the effectiveness of collecting interview data in both English and Tshivenda, as well as ascertaining the feasibility of the interview schedules.

### **5.5.1 Pilot Investigation I**

This pilot study was conducted with one participant. The participant was a 63-year-old female who resides in Vhembe and is an educator. She obtained a PhD in African Studies. She has a long-standing interest in the Vhavenda culture, in trying to understand the tradition and culture. Her PhD study solidified the interest.

The researcher emailed the participant the information letter and sent the consent form link via WhatsApp™. Once the participant consented to participating in the study, the researcher phoned the participant to schedule the interview, as well as to ask which network she used so as to send her data to view the videos and the communication board. The participant requested that interview questions be sent to her in advance in order for her to prepare for the interview. The researcher emailed the interview questions in both English and Tshivenda so the participant could decide which language she would like to use during the interview. The participant indicated that she would do the interview in English but would include Tshivenda here and there. The interview took an hour and a half to complete.

Table 5.3 describes the aims, procedures, materials, outcomes and recommendations of Pilot study I.

**Table 5.3**

*Pilot I: Aims, Materials, Procedures/Methods, Outcomes and Recommendations*

<b>Aim</b>	<b>Materials</b>	<b>Procedures/Methods</b>	<b>Results</b>	<b>Recommendations</b>
To determine if the information letter and online consent form were clear for the participant.	English information letter (Appendix D1) Online consent form (Appendix D2)	The participant was asked to read the letter and the online consent form and provide feedback to the researcher.	The participant reported that information was clear and understandable. The consent form had some errors due to predictive text.	Changes of the errors
To determine the feasibility of the recruitment process.	Cell phone Computer Information letter in PDF format Online consent forms	The researcher phoned and then emailed the potential participant to introduce herself and the study to the participant. Preliminary interest in participation was determined from the phone call. The information letter in PDF format and a link to the online consent was sent to the participant via WhatsApp™. The participant was asked to provide verbal feedback on the ease of completing the consent form online at the end of the interview.	The participant provided consent via the online consent form. The participant reported that she was initially not sure if she would be able to complete the consent form, but she did it without help.	The participants who might struggle with completing the online consent will be advised to ask someone at home to assist them with completing it. The researcher will orientate the participants to the online consent form telephonically if they do not have someone to assist them with completing it.
To determine if the participant could easily access and relate to the materials sent (videos and communication board).	Video clips from YouTube™ embedded onto PowerPoint (see Appendix D7) Communication board (see Appendix D8)	The videos were sent via WhatsApp™ to the participant to view before the interview. The participant was expected to view the videos before the interview. The participant was asked after the interviews if the materials were accessible.	At the end of the interview, the participant indicated that she did not experience problems with accessing the material before the interview. She was able to access with ease and relate to the explanations given by the researcher.	No changes will be made to how the participants access the material. The participants will be asked to view the video before and during the interview. The videos can be played when the researcher asks questions 3.1-3.3 about the strategies.



Aim	Materials	Procedures/Methods	Results	Recommendations
To determine feasibility of collecting biographical information before the interview.	Cell phone Biographical questions	Pre-interview phone calls were conducted by the researcher. The participant was phoned so as to schedule interview time and also to collect biographical information from the participant.	Biographical information of the participant couldn't be collected at the pre-interview phone call as the participant indicated that she was not feeling well. The biographical questions were deferred to the main interview.	Biographical questions will be asked during the interview for all the participants. Sending of questions before the interviews for the participant will be optional for all the participants.
To determine if the audio recorder captured the interview effectively and whether the audio files could be easily uploaded from the recorder to the laptop.	DW-Digital 8GB Dictaphone and Voice Recorder Huawei T5 Nova cell phone Laptop	The researcher attached an external microphone on the voice recorder and then phoned the participant with her phone on loudspeaker, placed next to the microphone. Then researcher pressed record when the participant responded to the phone call. The researcher uploaded the voice recordings from the voice recorder after every interview onto the computer for analysis.	Both devices functioned effectively. The uploading of the audio recording was easy. The recordings gathered were clear.	No changes
To determine the length of the English interview	English interview Schedule Voice recorder	The researcher checked the length of the recording at the end of the interview.	The English interview took an hour and 30 minutes.	No changes
To determine if the transcription verification process outlined by Clarke et al. (2017) was effective.	Recorded interview Google drive Transcribed interview	The researcher transcribed the interview and sent it to the research assistant who listened to the recording and checked the transcription against the recording. The research assistant edited the transcription where errors were noted and then sent the transcription back to the researcher who then went through it again.	The transcription and verification process was carried out effectively. The research assistant understood his role in the verification process and what was expected of him. The transcriptions were transcribed reliably and no errors were noted.	No changes
To determine feasibility of the thematic analysis in six steps as proposed by Braun and Clarke (2006, 2013)	Transcription Microsoft Word™ 2016 Microsoft Excel™ 2016	The data were coded according to the first three steps of the six steps as set out in Braun and Clarke (2006, 2013): becoming familiar with data and transcribing data, generating	The researcher coded the transcripts and submitted the initial codes and themes to the supervisor. The supervisor then commented and suggested	No changes will be made to the process



Aim	Materials	Procedures/Methods	Results	Recommendations
To evaluate the interview schedule by determining if the questions yielded data that was aligned with the aims of the interview	Interview schedule	<p>initial codes and searching for themes. Thematic analysis was conducted to capture provisional codes and themes. The researcher and supervisor had to verify the codes. The researcher and supervisor discussed the coding scheme and a provisional coding scheme was developed from Pilot I and II.</p> <p>The participant was interviewed using the interview schedule (see Appendix D5). The researcher read the interview schedule as it was and asked questions as they appeared on the interview schedule.</p>	<p>shortening the codes. A meeting was scheduled to discuss changes and discrepancies in the coding system, and the discrepancies were resolved in that meeting. A preliminary codebook was then developed from the supervisor's input and meeting.</p> <p>The participant struggled to understand the question about roles and confused the 'term caregiver' with 'domestic worker' (housekeeper). The researcher had to rephrase and probe a lot on this question.</p>	<p>The question about roles should be removed.</p> <p>The participants will be orientated to the term caregiver before asking the questions.</p>



### ***5.5.2 Pilot Investigation II***

The researcher effected changes as recommended from Pilot Investigation I before conducting the Pilot Investigation II. The first pilot interview was conducted in English; the second pilot interview was conducted to test the comprehensibility of the Tshivenda interview schedule, information letter and consent form script, and to evaluate the reliability of the transcription and translation of the transcript from Tshivenda to English. A 53-year-old participant who resides in Vhembe was interviewed for Pilot II. The participant was an elder in her community and she is knowledgeable about the culture and traditions of Vhavenda. She mentioned that she was taught by her elders about the culture and traditional practices, as she showed interest in her early years. The participant has 35 years' experience and interest in the traditions and child rearing practices of Vhavenda. The participant obtained a secondary school qualification (Matric), had adult basic education and training (ABET) in teaching, administrative and clerical work and financial administration. She is employed as a financial administrator. The results for Pilot II are depicted in Table 5.4.

Table 5.4

*Pilot II Aims, Materials, Methods/Procedures, Outcomes and Recommendations*

<b>Aim</b>	<b>Materials</b>	<b>Procedures</b>	<b>Results</b>	<b>Recommendations</b>
To determine if the Tshivenda information letter and online consent form were clear for the participant.	Tshivenda information letter and Online consent form (Appendix D3 and D4)	The participant was asked to read the letter and the online consent form (Appendix D3 and D4) and provide feedback to the researcher.	The participant reported that the information was clear and understandable. The consent form had some errors due to predictive text.	No changes to content were done, however, corrections were done on the consent form for the predictive text errors reported by the participant.
To determine the comprehensiveness, clarity and appropriateness of the interview schedule.	Interview schedule (Appendix D6)	The researcher conducted the pilot interview using the interview schedule. The researcher noted questions on which the participant required clarity. At the end of the interview the participant was requested to provide input on questions that must be added or deleted.	The participant reported that the questions were comprehensive, clear and appropriate. The participant recommended that the researcher use the word <i>muundi</i> or <i>mulondoti</i> together to denote “caregiver”	To use the word <i>muundi</i> or <i>mulondoti</i> together when conducting interviews in Tshivenda.
To determine the feasibility and length of the transcription and adapted back translation process outlined by Lopez et al. (2008).	Recording of the interview Transcribed Tshivenda interview Translated interview transcription (English version)	The audio recording was transcribed verbatim in Tshivenda by the RA. The transcription was verified against the audio recording by the researcher. The transcript was translated into English by a bilingual Tshivenda-English translator. The researcher verified the translation against the transcription.	Transcription and verification processes were conducted efficiently and were completed in 12 hours (transcription of the interviews took 8 hours, the verification took 4 hours). The translator required a day; he however did not specify how long it took him. The researcher spent 4 hours comparing the Tshivenda transcription to the translation. There were minor discrepancies found. The researcher resolved them with the translator telephonically.	No changes
To determine the length of the Tshivenda interview.	Tshivenda interview guide	The researcher checked the length of the recording at the end of the interview.	The Tshivenda interviews took an hour and a half (90 minutes)	No changes



## 5.6 Materials and instruments

Materials, equipment and instruments that were used to collect data for the interviews will be discussed and described in this section.

### 5.6.1 Information letter and consent form

The information letters (Appendix D1 and D4) introduced the investigation and the researcher. They outlined the title, rationale, procedures and ethical considerations of the research. The information letter was compiled in English (Appendix D1) and was also translated into Tshivenda by a lecturer in the department of Tshivenda at the University of Limpopo. The Tshivenda letter was checked by the researcher as she is a bilingual Tshivenda – English speaker. There were minor technical editorial errors that the researcher noted and corrected. The Tshivenda translation (Appendix D4) had no grammatical errors. The English concepts were depicted adequately.

An English electronic consent form (Appendix D2) was captured on Google™ forms, and was translated into Tshivenda (Appendix D4) and checked in the same way as the information letter. Both Tshivenda and English consent forms (Appendix D2 and D4) were then transferred to an online format using Google forms. The link was sent to the participants via WhatsApp™ so that they could indicate whether or not they consented to participating in the research. Table 5.5 below shows the materials used and a brief description with the rationale.

### 5.6.2 Other equipment and materials

The other material and equipment used for Phase 1.2 are described in Table 5.5.

**Table 5.5**

*Material and Equipment: Description and Rationale*

<b>Material</b>	<b>Description and rationale</b>
Interview schedule (Appendix D5-D6)	<b>Description:</b> The interview schedule was developed based on literature (see Table 5.6) and had three sections based on the sub-aims of the phase. Section 1 focused on communication interactions and had 11 questions. Section 2 was concerned with cultural beliefs of Vhavenda towards communication disabilities and it had four sub questions. Section 3 had questions related to the proposed programme to be developed in Phase 2. These questions were related to the





Material	Description and rationale
Synthesized member checking (SMC) email (Appendix D9)	<p>proposed skills that the researcher would like to train caregivers on. There were five sub questions in this section.</p> <p><b>Aim:</b> To identify and determine the cultural practices of Vhavenda with regards to caregiver-child communication interaction and their beliefs about children with a communication disability</p> <p><b>Rationale:</b> In order to develop a culturally sensitive, linguistically appropriate and contextually relevant programme, interviewing participants who understand the context would be the first step. This will aid in understanding the context better.</p> <p><b>Description:</b> An email with an overview of what is expected of the participants to do for SMC was sent out to them. This email also included a timeline of when the participants should respond.</p> <p><b>Aim:</b> To provide the participants an opportunity to verify if the analyzed data represents their views.</p> <p><b>Rationale:</b> As part of ascertaining trustworthiness, ensuring credibility of data is important in qualitative research</p>
Summary of data (Appendix D10)	<p><b>Description:</b> A written document with a summary of the results was sent out to the participants via email (see Appendix D10). There was also an audio file version of the summary that was compiled by the researcher. the researcher read and recorded the written summary in short clips according to the themes for the participants. This allowed participants to access the information in a format of their choice (written or audio).</p> <p><b>Aim:</b> To provide the participants an opportunity to listen to or read the results of the interviews so as to verify or add more information.</p> <p><b>Rationale:</b> As part of ascertaining trustworthiness, ensuring credibility of data is important in qualitative research</p>
Material to demonstrate AAC-related communication skills that the researcher intended to train (Appendix D7-8)	<p><b>Description:</b> Materials included a 36-sec video that depicted the proposed skills that were sourced from YouTube™ (<a href="http://www.youtube.com/watch?v=l2eDYGCR2NQ">www.youtube.com/watch?v=l2eDYGCR2NQ</a>) and a communication board created by the researcher using picture communication symbols from Boardmaker online (mealtime activity board). The mealtime activity board had 12 items on a 3x4 grid, using the modified Fitzgerald key for colour coding grammatical categories and parts of speech. The research used brown shaded symbols for people. Furthermore, mealtime vocabulary that is typically used by caregivers for and children was chosen and used on the boards.</p> <p><b>Aim:</b> Materials were developed so that the participants of the interview would understand the concepts of augmented language input, creating communication opportunities and responsiveness.</p> <p><b>Rationale:</b> With AAC being still relatively unknown in the Vhembe district, it was important that the researcher gave the participants a visual referent for the skills explained to them.</p>
Voice recorder with external microphone	<p><b>Description:</b> A DW-Digital 8GB Dictaphone and Voice Recorder with an external microphone attached to it was used so as to record the interview directly from the phone while it was on speaker.</p> <p><b>Aim and rationale:</b> To record the interviews so as to allow for verbatim transcription thereafter.</p>
Cell phone	<p><b>Description:</b> Huawei Nova T5 cell phone was used to phone the participants and conduct the interviews.</p> <p><b>Aim:</b> To phone the participants.</p>
WhatsApp™	<p><b>Description:</b> It is an instant messaging and Voice Over the Internet Protocol application that is used to text, call and send media in various formats.</p>



Material	Description and rationale
Google™ Drive	<p><b>Aim and rationale:</b> To send videos, letters and the communication boards to the participants.</p> <p><b>Description:</b> It is a file storage and sharing service offered by Google™.</p> <p><b>Aim and rationale:</b> To share documents and different files (audio files) with the Research Assistant for analysis.</p>
Laptop	<p><b>Description:</b> A laptop was used to email and share resources with the participants, upload the interviews from the recorder, and analyse the data using ATLAS.ti</p> <p><b>Aim:</b> To store and analyse data.</p>
ATLAS.ti 8	<p><b>Description:</b> It is a computer assisted qualitative data analysis software (CAQDAS) that was used to conduct thematic analysis according to Braun and Clarke's (2013) steps and procedures by Nowell et.al. (2017).</p>

### 5.6.3. *Development of the interview schedule*

The interview schedule was developed based on the literature on early communication intervention and cultural diversity. The cultural adaptation process model (Baumann et al., 2015; Bernal et al., 2009; Domenech Rodriguez et al., 2011), ecological validity model (Bernal et al., 1995) and ecocultural theory (Weisner, 2002) informed the development of the interview questions. Table 5.6 describes the development of the interview schedule. It depicts the aim, question, theoretical justification and the implications for programme development.

**Table 5.6***Interview Schedule Development*

<b>Sub-aim</b>	<b>Interview Questions</b>	<b>Theoretical justification</b>	<b>How this could potentially influence the program</b>
1. To determine cultural conventions of typical caregiver-child communication interactions			
1.1. To determine who children typically communicate and interact with or who is likely to interact with children aged 6 years or younger.	In a typical Vhavenda family, who would be likely to communicate or speak with a child aged 6 years or younger? Who would communicate the most to the child?	Many communication intervention programmes target caregiver-child dyads. However, in most African cultures children grow up in ‘extended families’ in which they might have multiple partners (Geiger & Alant, 2005). The child therefore does not only interact with the mother or primary caregiver in the course of the day (Louw & Avenant, 2002). However, the literature also emphasizes that the caregiver is an important communication partner and are capable of creating communication opportunities for their children (Granlund et al., 2008; Kaiser & Roberts,	To determine if caregivers are primary communication partners of the child in the Vhavenda culture as the intended programme aims to train caregivers of children with CCN.



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
1.2. To determine what activities caregivers and children typically engage in during the day; and which ones are rich in communication opportunities.	<p>What activities do caregivers and children aged 6 or younger usually engage in during the day? During which activity settings do adults and children typically talk?</p> <p>During which ones would it possibly be inappropriate or unusual to talk? What may be the reasons?</p>	<p>2013; Marshall &amp; Goldbart, 2008; Pennington et al., 2004)</p> <p>It is thus important to understand if this is the case in the Vhavenda culture.</p> <p>Activity settings are important in how children develop communication within the family context (Balton et al., 2019; Bruder, 2010). They provide an environment in which the child learns communication and other skills. Furthermore, they are important to take into consideration as they give insight to what is important for a particular culture and what is valued in order provide for validity of interventions. It will also provide an understanding of what is considered important in influencing the family and the child (Bernheimer et al., 1990; Skinner &amp; Weisner, 2007; Weisner, 2002).</p> <p>Interventions focused on</p>	<p>Knowing which communication-rich caregiver-child activities are typically conducted will enable to researcher to incorporate these into the intervention programme.</p>



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
1.3. To determine the purpose of communication interactions between caregivers and children	<p>For what purpose would caregivers interact or communicate with a child aged 6 or younger? What is the importance of speaking to the child?</p> <p>What is the purpose of young children speaking to caregivers? Is it seen as important for the child to do so?</p>	<p>caregiver-child interactions should be based on daily activity settings in order to make use of the already existing authentic learning experiences within the natural context.</p> <p>Cultural conventions differ from one culture to another with regards to the communication functions that are appropriate in caregiver-child interactions. Geiger and Alant (2005), describe caregiver child interactions in a traditional Botswana context, and note that children typically did not ask caregivers questions. Asians parents do not express emotions openly during parent-child interactions or on a daily basis (Awde, 2009; Vigil &amp; Hwa-Froelich, 2004). So it is important that purposes of communication interaction understood within Vhavenda culture.</p>	<p>The aim of the programme is to infuse AAC into caregiver-child interactions in a culturally relevant and congruent manner. As far as possible, typical communication functions in adult-child interactions should be maintained in the intervention. For example, when caregivers are taught to create communication opportunities, they should be taught to do so in a culturally relevant manner.</p>



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
<p>1.4. To determine particular pragmatic aspects of typical caregiver-child interactions. <i>(This question is optional and will only be used if additional clarity is needed.)</i></p>	<p>When caregivers and children interact during .... <i>(name activity that respondent described as communication rich)</i>, how would this usually happen? For example, where would the child be positioned in relation to the caregiver? Would the child make eye contact? What kind of things would the caregiver say, and what kind of things would the child say? Who would initiate verbal interaction and who would respond?</p>	<p>Which will in turn influence the activities and vocabulary of the purpose. Culture influences pragmatics skills (Turkstra et al., 2017). It is important that these social conventions are highlighted so as to avoid cultural bias (van Kleeck, 1994). During parent-child interactions, children learn more than just words, thus, understanding social conventions or pragmatics skills is vital in intervention planning for young children with language and communication difficulties. In some African cultures, eye contact is prohibited and seen as a sign of disrespect, however this rule might not be applicable in younger children but in older children (Murovhi et al., 2018). It is important to see which pragmatics conventions are</p>	<p>It is important that these social conventions are highlighted so as to avoid cultural bias in the current programme. Some of the pragmatic skills are westernized and might not be applicable to Vhavenda culture. It is important that the programme includes pragmatics skills that are congruent to the Vhavenda culture during parent child interventions.</p>



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
2. To determine the Vhavenda cultural beliefs about communication disorders, forms of communication and interventions for communication disorders	<p>What cultural or traditional beliefs do Vhavenda hold regarding communication disability in children? (What are their perceptions of communication disabilities?)</p> <p>Would a caregiver of a child with a communication disability usually seek help or intervention for their child? What would be the expectation of the intervention?</p>	<p>prohibited and not include them in the program.</p> <p>It is important for help givers or professionals to understand the cultural beliefs of the clients about a particular condition in order to provide culturally sensitive and responsive interventions (Bernal et al.,1999; Bernal et al., 2009; Louw &amp; Avenant, 2002)</p>	<p>Understanding cultural beliefs about communication disability and intervention will assist the researcher to identify what role a parent training programme as one intervention option can be expected to play. Knowledge of beliefs will influence how the programme introduces theoretical or conceptual models of improving communication interaction between caregivers and their children.</p>
	<p>What other forms of communication (besides speech) are accepted? Please provide examples of these methods and what messages may be communicated with these methods.</p>	<p>It is of utmost value to understand the modes of communication which are accepted in the Vhavenda culture because they help communicate a variety of communication functions. They are also important in understanding how communication</p>	<p>It is important to understand how the communication modes are applied in interaction in the Vhavenda culture, what this modes are used for and which ones are culturally acceptable. This will influence how the programme will incorporate different modes. This will further</p>



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
	<p>You have already told me how caregivers and young children without disabilities typically interact. In what way may these aspects be different if a child has a severe communication disability? (prompt on partners, activities, purposes, roles)</p>	<p>interaction between a caregiver and a child occurs (Mefadd &amp; Hustad, 2020; Lindsay Pennington &amp; McConachie, 1999). Communication is multimodal and should be treated as such even when introducing AAC. There are benefits to multimodal communication and that of AAC (Alant et al., 2006; Lundälv et al., 2014; Ronski &amp; Sevcik, 1997; Schlosser &amp; Raghavendra, 2004; Sennott et al., 2016; Sigafos &amp; Drasgow, 2001)</p> <p>Caregivers are reported to dominate parent child interactions with comments and question. This shows an asymmetry in interactions between caregivers of typically developing and that of children with disabilities (Anderson et al., 2015; Jennifer Kent-Walsh &amp; McNaughton, 2005;</p>	<p>inform coding of interaction during testing of the programme in Phase 3.</p> <p>It will inform the activities that the researcher will use for the training which are reported to be rich. Furthermore, understanding the dynamics of interaction will inform choice of theory or model that will form the development of the programme. This will moreover inform</p>





Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
<p>3. <b>To determine acceptability of some of the program content and methods</b></p>	<p>For my research project, I am planning to train caregivers on three specific aspects.</p> <p>Responsiveness: This means a caregiver expects a child to communicate and reacts to the child's behaviour as if the child is communicating or speaking. So, for example, if the child points to something the caregiver will give it to the child, as if the child asked for it. Responsiveness also means that the caregiver pays attention to what the child is looking at or doing, and comments on it. The caregiver may also imitate that the child is doing (Broberg et al., 2012; Shire et al., 2016; Yoder &amp; Warren, 1998).</p> <p>In the video I sent you, you could see that the child focused their attention on the doll's tummy. The adult recognizes that and responds by saying tummy. The child then lifts the doll and pats it - the adult responds by saying /hug- big hug/ while patting her own doll. The child points to the side with the cot and the adult responds by turning to the cot and taking out a doll. She reacts to the pointing as if the child asked something.</p> <p>Would teaching parents to act in this way be culturally appropriate in your opinion? If not, could it be changed to make it more so? Is there anything I should be aware of during this process to make sure it is acceptable to caregivers?</p>	<p>Light et al., 1985; Midtlin et al., 2015).</p> <p>According to the ecological validity model (Bernal, Bonilla &amp; Bellido, 1995), intervention is likely to be effective if it is compatible with the cultural patterns of the participants. An ecologically valid intervention is culturally sensitive .</p>	<p>what to include in the training material and resources.</p> <p>It is important to ensure mechanisms of change are compatible with the cultural patterns of the clients, in order to ensure accessibility and acceptability of the program.</p>



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
	<p><b><i>Providing communication opportunities:</i></b> the caregiver can encourage the child to communicate by asking a question, letting the child choose between things or by arranging the environment in such a way that the child is tempted to ask for something. The latter include strategies such as offering the child small quantities (e.g., biscuit, bite sizes of fruit and etc.) and withholding more until the child asks, placing desired items out of reach but in sight (e.g., desired food in a see-through tightly closed container), and creative stupidity. Once the opportunity has been offered, the caregiver then waits for 3-5 seconds for the child to respond, and then they can fulfil the child's response to the choice they made. If the child does not respond, the caregiver can attempt to cue a response by helping the child reach for they want or like. (Douglas et al., 2013; Muttiah, 2016).</p> <p><b>Offering small portions:</b> In the second video, I sent you, the adult gives the child a chocolate. The adult then closes and hides the chocolate packet. The child comes closer to the adult and the adult waits for a communicative attempt. The child the says /chokie please/, the adult gives the child another piece of chocolate.</p> <p>In the third video, the adult shows the child a banana and an apple and asks the child which one she wants. The child grabs the apple and vocalizes /aah/</p> <p>Would such a strategy be culturally appropriate in your opinion? If not, could it be changed to make it more so? Is there anything I should be aware of during this process to make sure it is acceptable to caregivers?</p> <p><b><i>Modelling augmented language input:</i></b> Parents will be given picture boards like the one I sent you. I will teach them to point to pictures as they are talking to the child. In this way they can teach the child to also point to pictures (Dada &amp; Alant, 2009; Drager et al., 2006; Harris &amp; Reichle, 2004).</p>		



Sub-aim	Interview Questions	Theoretical justification	How this could potentially influence the program
	<p>In the video: On this video you can see an adult talking and pointing to the relevant pictures on a picture board. For example, the adult said “today we worked” and she pointed to the picture of work. When she said “we were all done with work, we go to play with toys” and she pointed to all done, go, play and toys on the picture board.</p> <p>In the same way, the mealtime board can be used by both the caregiver and the child. The caregiver might signal the end of the mealtime activity by telling the child the tummy is full. The child can show “more” when they want more food. The adult can request the child to open the mouth by saying and pointing to picture showing ‘open mouth’</p> <p>Would such a strategy be culturally appropriate in your opinion? If not, could it be changed to make it more so? Is there anything I should be aware of during this process to make sure it is acceptable to caregivers?</p> <p>Would it be acceptable for me as a speech therapist to train caregivers of young children with communication disabilities to communicate more effectively with their children? What aspects should I be aware of in order to ensure that the training will be respectful and acceptable to caregivers?</p>		



## 5.7 Data collection procedures

These interviews were conducted telephonically due to the Covid-19 pandemic and the interview material was sent via WhatsApp™ and shared through Google™ Drive. Interviews were conducted using a regular cellular telephone call. Interviews enable a researcher to obtain information from the participants' point of view (Dilshad & Latif, 2013). Telephone interviews have certain advantages. These include cost-effectiveness, as time and money for travelling to an interview venue are not required for the researcher and the participants (Vogl, 2013) and they can be done with participants regardless of their geographical setting (Irvine, 2011). There have been reports of reduced social pressure and researcher bias associated with conducting telephone interviews (Farooq & De Villiers, 2017). Furthermore, this was the best way of collecting interview data, considering the Covid-19-related lockdown restrictions.

The telephone interview process as outlined by Farooq and De Villiers (2017) was followed; however, adaptations were made to this protocol for this research. The step-by-step guide included: pre-interview phone calls, setting up the interview, and conducting the interview as well as ending the interview appropriately.

*Pre-interview calls:* The researcher phoned the participants (after they consented to participate) in order to schedule the interview. Participants were asked which network they used so as to send them 1GB data for viewing videos and the communication board sent to them. They were also asked what platforms to use to send them materials.

*Negotiating interview environment and setting when preparing interview:* The audio recorder and cell phone were prepared accordingly and tested during pre-interview calls to ensure that the sound quality was good and communication was intelligible between interviewer and interviewee. The recording equipment was tested to ensure recordings were audible and intelligible.

*Main interview:* The researcher followed the interview schedule (see Appendix D5-6) to conduct the interviews. The researcher introduced the research, and reiterated the participants' rights to withdraw at any time or refrain from answering a question. When asking the interview questions, the researcher used the interview guide flexibly. In response to participants' answers, the researcher summarised, rephrased and checked for understanding, and also probed further as



the need arose. The researcher communicated presence (e.g., saying, “yes,” “uh-hah,” “mmm”) so that the participants would not feel as if they were talking to themselves during the interview.

*Ending the interview:* When interviews ended, the researcher asked the cultural stakeholders if there was anything else they wanted to add to the responses they had given. They were thanked and assured that they could contact the researcher if they needed further information. Furthermore, they were reminded that analysed interview data would be sent to them to ensure that the analysis expressed their views (synthesized member checking [SMC], Birt et al., 2016). The researcher saved the recordings and backed them up.

## **5.8 Data analysis**

Before the thematic analysis process, interviews were transcribed and prepared for analysis. Thematic analysis was done to analyse qualitative data collected from the cultural stakeholders' interviews.

### **5.8.1 Transcription**

Transcriptions of English and Tshivenda interviews were done by the researcher and research assistant on Microsoft Word 2016™. The researcher and research assistant split the interviews evenly amongst themselves. The transcriptions and audio recordings that were conducted by the researcher were sent to the research assistant for first pass verification of the transcription (Clark et al., 2017). The research assistant is bilingual in English and Tshivenda. He was a 3<sup>rd</sup> year Bachelor of Education student at the University of South Africa (UNISA). The research assistant listened to the audio recordings against the transcription to make sure that they were accurate and complete. Where errors were found, they would be corrected and noted by typing them in a different colour or highlighting where the mistake was. The verified transcription was sent back to the researcher who checked it against the recording to check the content for final verification (second pass verification). This process was replicated for the transcriptions carried out by the research assistant and checked by the researcher. These processes have been recommended to ensure reliability transcriptions (Clark et al., 2017). English transcripts were uploaded onto the ATLAS.ti 8 for analysis.



### 5.8.2 *Translation of the transcripts*

The audio recording was transcribed verbatim in Tshivenda by the research assistant or the researcher. The Tshivenda transcription was verified against the audio recording by the researcher if transcribed by the research assistant and vice versa if transcribed by the researcher. The verified transcription of Tshivenda interviews was translated from Tshivenda to English by a bilingual Tshivenda-English expert. The expert is a lecturer in the School of Language and Communication studies and holds a Master's degree in African Languages – Linguistics and Literature. The researcher verified the translated transcription as she is a bilingual Tshivenda-English speaker. The researcher verified the translated English transcript against the Tshivenda transcript. The English version of the Tshivenda transcriptions was uploaded onto the ATLAS.ti 8 for analysis.

### 5.8.3 *Coding*

Thematic analysis was done to analyse the interviews from the cultural stakeholders (Clarke & Braun, 2013; Nowell et al., 2017). This was done using a CAQDAS, namely ATLAS.ti 8. The six steps, according to Clarke and Braun (2013), were applied in the coding process and are represented in Table 5.7.

**Table 5.7**

*Thematic Analysis Process (Braun & Clarke, 2013)*

<b>Phases</b>	<b>How thematic analysis was done in this research</b>
<b>Phase 1</b> Becoming familiar with data and transcribing data	Verbatim transcriptions of the raw interview data were done by the researcher and others by the research assistant. In this way she became familiar with the data. The researcher read and re-read the transcribed interviews, and wrote down impressions and thoughts about the data.
<b>Phase 2</b> Generating initial codes	Initial codes were assigned to meaningful segments of the transcription. The codes were assigned with regards to the interview questions and aims. The supervisor verified coding of the first two transcripts from the pilot. A code list was then developed. (Round 1a). The researcher independently coded the first 3 transcripts from the main interview. The supervisor checked the coding once again, and the amended list of codes formed the basis of the coding scheme for the other transcripts.
<b>Phase 3</b> Searching for themes	Codes were then refined to ensure that each code is unique (Round 2 coding). Codes were grouped under themes/categories and subthemes. Theme generation was done according to the research question. The coding scheme was further developed to reflect themes, subthemes and codes.



<b>Phases</b>	<b>How thematic analysis was done in this research</b>
<b>Phase 4</b> Reviewing themes	Round 3 of coding: The themes, subthemes and codes in the provisional coding scheme were reviewed by the researcher and the supervisor according to the coded data and the whole data set. All text segments coded using a specific code, subtheme and theme were grouped to enable easy checking of consistency in the coding. Changes were made as necessary. The supervisor checked the coded data. Any proposed changes were discussed with the researcher and consensus was reached. Round 4 coding: This round of coding involved further merging of codes and categorizing them according to the sub-themes. The Atlas ti. folder was sent to the supervisor for final comments and discussions.
<b>Phase 5</b> Defining and naming themes	The researcher and the supervisor defined and named the themes, where disagreements arose, they had a consensus meeting to resolve definition of themes. This was done on Atlas.ti. 8. The researcher would define themes and send the folder to the supervisor for checking. In the meetings held via Zoom, the researcher and supervisor would discuss and agree on themes and definitions.
<b>Phase 6</b> Producing the final report	Summaries of the themes and subthemes were written up and supported by illustrative quotes from the data. Themes were interpreted in the light of the research questions and previous literature and theory.

Coding of the results on ATLAS.ti 8 was done over four rounds in order to categorise and summarise data by the researcher and the supervisor. Furthermore, the process was done to ensure that the coding process was reliable.

Round 1a: the researcher conducted open coding independently using phrases to tag the data segments from the pilots. The coding process allowed the researcher to condense or reduce the data (Saldana, 2016). An inductive approach was employed. The supervisor checked and made suggestions to the codes as well as compressing the codes. From this attempt, a first draft codebook was developed and used to code the first three main interviews. A total of 285 codes were generated from the two pilot interviews.

Round 1b: the researcher independently coded the data from the first 3 main interviews using the codebook developed from the pilot interviews and 623 codes were generated from this coding process. The researcher and the supervisor met to resolve and clarify some of the codes. A consensus was reached for the code differences. A revised codebook was developed.

Round 2: The last 7 transcripts were coded using the revised codebook from round 1b. The researcher coded independently. The supervisor checked the codes and reduced and merged some. The 623 codes were reduced to 246. At a consensus meeting, the need to further reduce codes was discussed.



Round 3: Some codes were merged according to the discussions at the consensus meeting held in Round 2. The codes were further reduced from 246 to 205 in this round.

Round 4: This round of coding involved further merging of codes and categorizing them according to the sub-themes. The researcher and the supervisor agreed on developing a table with theme, sub-theme and examples.

## 5.9 Trustworthiness of data

Credibility, confirmability, reflexivity and transferability were aspects of trustworthiness that were considered in this research.

*Credibility:* Credibility refers to the confidence that can be placed in the truth of research findings (Anney, 2014; Gunawan, 2015; Nowell et al., 2017). This entails whether or not the findings represent credible information drawn from the participants' original data and if it is the correct interpretation of the views they expressed during data collection. The researcher conducted synthesized member checking of the interviews with participants to ensure their views were well-represented (Anney, 2014; Leedy & Ormrod, 2016; Maguire & Delahunt, 2017; Nowell et al., 2017).

Synthesized member checking was done with the interview participants. An email with instructions (Appendix D9) together with a written and/or audio-recorded summary (see Appendix D10 for the written summary) of the results were sent to the participants. The participants were requested to go through the summary to verify if the results represent their views. If not, they were requested to highlight what needed to be added and what needed to be removed. Only one participant made additions to the summary pertaining to allowing the caregivers to take the lead and the researcher being a guide during training. PA03 added that, when this is done, caregivers take ownership of the training and "*it does wonders*". The rest of the participants felt their views were well-represented. However, AC01 commented on a typo in the document.

The researcher and her supervisor coded the data over four rounds to ensure that the coding process was reliable. They also held consensus meetings in order to resolve disagreements and discuss codes and possible themes.





*Transferability, Confirmability and Reflexivity:* Transferability is the extent to which results can be transferred to other contexts with other participants. The researcher wrote the research process so as to ensure that other researchers would be able to replicate the research in different contexts.

Confirmability and reflexivity are the degree to which the research can be corroborated by other researchers and ensuring that the data and interpretation are the views of the participants and not the researcher's imagination. The researcher kept a reflexive journal that detailed what happened during data collection to ensure reflexivity and confirmability (Anney, 2014; Noble & Smith, 2015; Nowell et al., 2017). A script was followed to carry out the interviews. This ensured consistency in the interview process. Thus, procedural fidelity was maintained by adhering to the interview script. During data analysis, two coders coded the data to enhance confirmability.

The data obtained from the interviews can be deemed trustworthy because of the processes followed in transcription verifications and also the translation and verification done for the data as outlined in Sections 5.6.1. and 5.6.2 above.

## **5.10 Ethical considerations**

Ethics comprise of principles that underlie morality that can be applied to research (Leedy & Ormrod, 2014; McMillan & Schumacher, 2014). The following principles, as set out in the Belmont report Appendix Volume II (1979), guided this study:

*Informed consent:* The participants were provided with information about the study in a language (Tshivenda or English) in which they are comfortable prior to the data collection by means of an information letter. This letter also included a link to the consent form. Participants were also encouraged to seek further clarification from the researcher on any aspect of the investigation from the researcher or her supervisors if needed. All 11 participants who were contacted consented to participate in the research by agreeing on the Google™ Forms link. This was done independently, although some participants noted that they were supported by a family member to help them access Google forms.

*Voluntary participation:* The participants were reminded in the consent letter that they were entitled to voluntarily participate in this study and that they were allowed to withdraw from the study at any given time, without negative consequences, or punishment of any sort. They



were assured that non-participation would not disadvantage them in any way. If participants should choose to withdraw, their data would not be used. Participants were once again reminded of these rights at the beginning of the telephonic interview. However, no participant withdrew.

*Protection from harm and respect for participants:* This study did not involve any invasive procedures and there were no risks of physical harm associated with participation. However, some unintended form of harm could have been caused as information shared in the interview might arouse sensitive emotions from the caregivers such as having to share their perceptions and experiences with communicating with their children with CCN and disabilities; a process which may be difficult and may bring the limitations their child faces to the forefront. The researcher made provisions to ensure that there was a certified and registered counsellor on stand-by to debrief the participants in case any emotional issues arose during data collection. She also ensured that participants were not subjected to embarrassment or any loss of self-esteem and treated all the participants with respect. Finally, the researcher also ensured that the questions asked did not, in any way, subject the participants to any form of discrimination and/or prejudice.

*The right to privacy and honesty:* The confidentiality of the participants was maintained in this study as they were allocated identification numbers as a form of protecting their identity. Their names were thus not written on any of the forms; however, the researcher created a separate file that was password-protected with a register and the names of the participants. The file was stored in a different folder from the one with the rest of the information pertaining to this research.

## **5.11 Findings**

Thematic analysis was guided by the interview questions. Three themes could be identified from the data that were closely related to the questions posed. These themes were (a) typical interactions for young children; (b) communication disability; and (c) comments on the proposed training (appropriateness and acceptability, as well as suggestions for change). A fourth theme emerged from the data. This theme was less closely linked to a specific question but was nevertheless reflected in the comments of various participants. This theme was concerned with changes over time. The four themes are described in more detail in the sections below and quotes are provided to exemplify the themes. Quotes are provided in italics, with additions by the



researcher in parentheses. Repetitions, vocalizations, or false starts were omitted for ease of reading, and these omissions are indicated by ellipsis points (...). Care was taken that the meaning of the original utterance was not changed by the omissions. Where participants switched to Tshivenda, the English translation is provided in braces {}. The codes assigned to participants indicate to which group they belonged, that is, caregivers (PA01-PA03), elders (EL01-EL04), or academics (AC01-AC03).

### 5.11.1 Theme 1: Typical interactions of young children

The theme ‘Typical interactions of young children’ encompassed any comments describing the interactions of young children with others, and specifically with caregivers. Six subthemes were identified under this theme, relating to (1) interaction partners, (2) the activities that young children typically engage in, (3) the purpose of communication, (4) how they interact, (5) topics that they talk about and the communication functions they express, and (6) other accepted forms of communication. Participants provided detailed descriptions of the interactions of young Vhavenda children without disabilities aged 6 years or younger. It became clear that children engage in a variety of activities with various partners, and that communication occurs during many of these activities, for various purposes. Table 5.8 shows the sub-themes, categories and examples of codes assigned as well as frequency with which this code appeared in the composite transcript.

**Table 5.8**

#### *Theme 1: Typical Interactions of Young Children*

Sub-theme	Category	Examples of codes	Frequency	
Interaction partners	Family members	Mother	8	
		Grandmother	6	
		Parents	4	
		Other (siblings, female elder, grandparents, helper)	1	
		Father	3	
		Peers	8	
Activities	Other	Where communication takes place	38	
	Communication rich	No communication	Meals	13
		When adults are talking	2	
	Play	Caregiver led	3	
		Child led	13	
	Importance of communication	Child-to-caregiver	9	
		Caregiver-to-child	12	



Sub-theme	Category	Examples of codes	Frequency
Purpose and importance of communication	Purpose: Child-to-caregiver	Sense of agency	1
		Talk about plans for the future	1
		For safety purposes	1
		Speech and language development	4
		Social closeness	3
	Purpose: Caregiver-to-child	Inability results in reduced self -efficacy and self-esteem	1
		Social closeness	1
		Language and communication skills	13
		Self esteem	2
		Link between parent-child interactions and relationship	4
How interaction occurs	Pragmatics and set up	Eye contact	10
		Adult-initiation of communication interaction	8
		Child-initiation of communication interaction	5
		Proxemics and positioning	7
Topics and functions	Child-to-caregiver	Communication functions	10
		Child focused topics	2
	Caregiver-to-child	Communication functions	17
		Taboos	1
Other forms of communication	Unaided communication	Various, such as gestures and sign language; facial expressions; miming and mouthing words; pointing to objects; demonstrations	18
		Touch	6
	Aided communication	Pictures and drawings	2

#### 5.11.1.1 Interaction partners

Mothers are partners that were frequently mentioned by the participants. Other partners include grandmothers, grandparents, both parents, siblings, elderly female people and other children. Some specific remarks in this regard included:

*It would be the mother or the female elders. (AC03)*

*Yah, uhm you know... the mother... uhm if the mother is not working, uhm, grandmother, if the grandmother if the grandmother is alive. (AC01)*

*In a sense that she (mother) is the one who carried him/her for 9 months (...) and after birth that child would be spending his/her time with the mother, the mother will be the one taking care of her making sure she is clean, she has eaten, breastfed, mmm so, while she will be doing that even if the child is still in the age of not being able to respond to... to the mother verbally (...), the mother will be doing all those things talking to the child. (EL02)*



### 5.11.1.2 *Activities*

Activities that young Vhavenda children engage in with the interaction partners were categorised into activities that fostered communication, those that were not considered suitable for communication, and play. The participants reported that activities which stimulated communication included child routines, caregiver-led activities (i.e. household chores), educational activities (i.e. drawing, painting), entertainment activities (i.e. watching TV) and physical activities (running, jumping). The household chores included the activities that the caregivers do around the house such as making the bed and sweeping. The participants mentioned how children try to imitate their caregivers. Educational activities included caregivers reading stories to their children and drawing.

Children engaged in play with their caregivers and other children. However, child-to-child play was mentioned frequently. It involves children playing with peers as opposed to adults. Some play activities were described to be adult-led such as playing cards with the children.

*...the setup for play in typical Venda context is that the child would be expected to play with others (other children). (AC01)*

In the Vhavenda culture, there are times when communication is prohibited. One does not eat and talk; and children are also not allowed to talk when elders are talking. These were activities that were categorised under no communication.

*Especially during eating time, they're being taught that we're now starting to eat, nobody must talk. (EL03)*

### 5.11.1.3 *Purpose and importance of communication*

When participants were asked about the importance of communication between the caregiver and the child, they unanimously agreed that it was important. Caregivers discussed both the importance of caregiver-to-child and child-to-caregiver communication.

To further explore the importance of communication, participants were asked about their perceptions about the purpose of communication. Caregivers reported that they communicate with their children for pedagogical reasons and for nurturing. Pedagogical reasons included



teaching them morals, values, respect and how to communicate. Caregivers also play a vital role in nurturing and modelling how children experience positive emotions towards others. Therefore, they communicate to foster the relationship between them and the child, for it to be a safe one and for the child not be scared of them. For example:

*...the child gets to know right from wrong because of the conversations. You ... cannot just come and blame a child that what you did it was wrong and have you had a chance to explain or to have that communication in between the two of you so that why I find it as important to communicate as early as it can be. (PA03)*

*It is very important yet again as the mother can start teaching the child right from wrong and also the mother can start teaching the child manners so that the child will not grow up lacking manners and being disrespectful. The mother will also help their child to not be too rough whilst playing with other kids. (AC02)*

*It is very important, as it makes it very easy for the child to then be able to communicate with their parent or guardian freely and without any fear. (EL04)*

Also, to enhance the language and communication skills of the child, as well as self-esteem seemed important. The most frequently-mentioned purpose as to why caregivers need to communicate with their children was in order to increase their speech-and-language repertoire.

*Yes, it is important for parents to constantly talk to the children especially for those that live in provinces such as Gauteng whereby so many different languages are spoken. So parents must constantly talk to their young children in their home language or mother tongue so that they may be able to learn how to speak their own language without any issues. (AC02)*

The participants showed that children communicate with their caregivers to ask questions, to express the sense of agency and to talk about their plans for the future. Child safety is an important aspect for caregivers, and one function of the child's communication would be to alert caregivers if any abuse was encountered.

*and also see what agency they (children) hold to effect change around them. (AC01)*

*He (child) like to tell me like mama when I grow up, I will buy you so many cars when I grow up, I want to be like this. (PA01)*



Children also communicate in order to increase their speech-and-language repertoire.

This was evident in the following statement:

*It is important that children are encouraged to speak back, uhm you know... so that they can experiment with words and sound. (AC01)*

It was reported that when children are unable to communicate, it becomes difficult for them to express who they are, which results in a reduced sense of self-efficacy and self-esteem as described in this extract

*...if the child is not able to express themselves in ways that they can be heard it will begin to affect their sense of self, self-efficacy and self-esteem. (AC01)*

#### 5.11.1.4 *How interaction occurs*

Participants were asked about how interactions happen during certain activities that they had mentioned earlier in the interview. In response to this question, pragmatics and the set-up of the interaction were described. Pragmatic conventions that the participants indicated included eye-contact and who usually initiates the interaction between the caregiver and the child. Maintaining eye contact was a convention generally used by caregivers during interaction for various reasons.

*Yes there will be eye contact. (AC02)*

Furthermore, the caregivers were reported to be the ones who initiated communication with their children frequently. They initiate interaction to establish the basic needs of the children and also to stimulate communication development in certain instances. Caregivers will also initiate in instances where the child is passive or shy.

*...it's usually the parent that starts talking. (AC03)*

*But some children are very shy and very quiet in a way that the mother should start. (EL03)*

Children also have the opportunity to initiate interaction with their caregivers in some instances and this is guided by what they would like to get across to the caregiver or when the child wants to express a basic need. Almost half of the participants described it.

*But it usually depends on who wants something from the other. For example, if the child is hungry, they will tell the parent... (AC03)*



Participants were also asked about the physical set up for interaction between the caregiver and the child. They reported on how far or close the child and caregiver will be from each other. However, how close or far the child is from the caregiver or vice versa depends on the activity they are participating in at that moment. This can be demonstrated by the following quotations:

*...like maybe lying on the side of the parent. (EL01)*

*It depends on what is happening at the particular time, for example whilst eating the child can be sitting next to the parent, or leaning against the parent, if bathing or the parent can just be nearby whilst the child is playing. (AC03)*

#### 5.11.1.5 Topics and functions

Caregivers and children talk about different topics and their communication fulfils a number of functions. The communication functions expressed by caregivers and children overlap in some instances and in other instances, they are different. Caregivers express a variety of communication functions in their interactions with their children. These functions include commenting, answering questions, giving their child instructions and directives, explaining requests and/or directives, asking the children questions, as well as teaching them.

*and if the child needs assistance to eat... you know... whatever that involves to be saying ndi khou toda u {I want to.. } dzhiani hafha {take this}, ni do fhedza nah? {will you finish?}. Ndi ni engedzedze nah? {should I give you more?} No fura naa? {are you full}, all that and uhm yah. During bath time to be talking about you know, anything that also just... the possibility of the child to begin to wash parts of their bodies themselves.*

(AC01)

On the other hand, the communication functions of children include expressing their needs/wants, sharing emotions, transferring information to their caregivers, asking questions, commenting about events and topics that are child-focussed. Children also communicate to make requests and talk about events.

*It is the time that those children are asking so many questions...because they want to know the questions like what? How? Why? Can you see? Why this happen? What is this? Why is this? (EL01)*





*I think they should... be able to communicate with their parents so that we can know how... they're feeling and to be able to express anything, what is happening in their life and what they enjoy, what they love actually. (PA02)*

Regarding topics, there are some topics that are considered taboo in the Vhavenda culture, which cannot be discussed with the child. A stakeholder who is also a caregiver indicated that topics around sex are prohibited and are taboo.

*In our Venda culture, you can't you can't talk about sex. (PA02)*

#### 5.11.1.6 *Other forms of communication*

Caregivers in the Vhavenda culture use nonverbal forms of communication to interact with their young children. Non-verbal communication involves aided forms which entail the use of aids that are external to the body such as pictures or objects. Unaided forms of communication include using gestures, sign language and facial expressions. These communication means can be used for different reasons and serve different functions.

Aided forms of communication that participants reported included the use of pictures that are readily available or pictures that caregivers can draw in order to communicate with their children. The unaided forms included the use of gestures, sign language, facial expressions, miming and mouthing words, pointing to objects and demonstrations. With the unaided forms, participants mentioned a specific look that they use to communicate with children, gestures, and sign language. This is illustrated by the following quotations:

*...or just look at them in a way that lets the child know that what they are doing is wrong. (AC03)*

*...they can even talk by actions, like, like actions or miming, like maybe there are visitors or maybe the child is free coming there shouting, the caregiver can put the finger on the mouth saying keep quiet or miming, mmm he or she can understand them. (EL01)*

*...if the child did something good, the parent can clap for the child without actually using the words. (AC02)*

Some of the aided forms of communication used by caregivers included the use of pictures as shown by the two quotations below:



*You can also maybe you use pictures, if you do not have pictures you can just take a pen or a pencil and a paper and then you draw something... (PA03)*

*You know, for a child to understand what you're, you're saying to them. I think the best way is when you're showing them the picture, they more relate to picture kind of thing. (PA02)*

### 5.11.2 Theme 2: Communication disabilities

This theme is concerned with the perceptions of Vhavenda regarding communication disabilities, beliefs about the cause, help seeking practices, expectations of help seeking, types of help, interaction partners, differences in communication with typically-developing counterparts and the activities they engage in with their caregivers. Table 5.9 describes sub-themes, categories and examples of codes that were identified in the data. Three categories were identified under this theme, relating to: (1) beliefs about the cause; (2) help seeking; (3) interactions; and (4) expectations.

**Table 5.9**

*Theme 2: Communication Disabilities*

Sub-theme	Category	Examples of codes	Frequency
Beliefs about the cause of communication disabilities	Supernatural	Witchcraft	9
		Curse or taboos (Parents are being judged)	6
		Caused by other people	3
		Will of the ancestors	1
		Witchcraft not seen as cause	1
Help seeking	Genetic	Hereditary	2
	Traditional	Use of Muthi (traditional medicine)	2
	Help seeking practices	Cultural practices	5
		Outcome of help seeking	4
		Parents do not seek help	2
		Parents do seek help	1
	Expectations of help seeking practices	Positive change	12
		Parent benefits	1
		Social support	1
	Type of help	Attend training	2
Educational/schooling		2	
Healthcare		12	
Religious		6	
Social assistance/grant		2	
Traditional healer		6	



Sub-theme	Category	Examples of codes	Frequency
		Miscellaneous (Other)	2
	Reasons for/influences on help seeking practices	Availability of services	2
		Awareness, knowledge, information and education	9
		Caregiver beliefs	8
		Caregiver emotions	3
		Caregiver practices	3
Interactions	Partners	Family members	10
	Differences	No differences	1
		Differences	2
	Communication	Nonverbal means	11
Partner communication strategies		3	
Lack or limited		4	
Raising a child with (communication) disabilities		Pragmatics	1
		Awareness	1
		Acceptance	8
		Stigma	3
		Caregiver emotions	2
		Caregiver patience	3

#### 5.11.2.1 *Beliefs about the cause of communication disability*

When participants were asked about Vhavenda's perceptions of the causes of communication disability, witchcraft was most frequently mentioned as the perceived cause. Curses or taboos were other causes of disability believed by Vhavenda according to the participants. Communication disabilities are believed to be caused by other people as a form of revenge, evil or envy towards the family of the child with disabilities.

*...unfortunately the belief(s) around witchcraft ...are... there. (AC01)*

*...it was very difficult because, they used to believe that if somebody is being born disabled, it will, it means, he/she is being witched before being born. (EL03)*

Hereditary factors were also believed to cause communication disability. However, it seems like Vhavenda tend to believe the child would have inherited the disability from the mother's side of the family.

*For example, when a child has a communication disability, the Vhavenda people usually start to look at the mother's side of the family as a way of suggesting that the child may have inherited the disability from the mother's side. (EL04)*



It was also mentioned that caregivers tend to be judged for having a child with a disability. For example, they may be accused of having contributed to the cause of the disability because they used traditional medicine ‘*muthi*’.

*and others will say we ‘fara-fara’ {fara-fara- is a word used in Tshivenda for using traditional medicine translated as touch-touch}, that’s why her child is like this or that. (PA01)*

### 5.11.2.2 Help seeking

The participants reported that some of the caregivers seek help, while others do not seek help for different reasons. However, it is noteworthy that not all help-seeking endeavours were assumed to be successful. Those that seek help do this in order to determine the source of the problem. When caregivers do seek help and are satisfied with the kind of help they receive, they will pass the information on to other parents. For the caregivers who do not seek help, this would be due to practices such as hiding the child or because of their beliefs.

For example, one participant said:

*Yes we do seek help but, we do seek help ‘cause, we seek help just because we want to know like what is the problem of the child when my child is talking like this.... (PA01)*

*Usually people with children with communication disabilities often hide the children at home as they feel like the children are a curse to them. (AC02)*

*...normally we do not. They will stay with the child and the child will grow and become an adult without even getting any help. (PA02)*

When participants were asked about caregivers’ expectations when seeking help, they indicated that everyone expects a positive result from their endeavours regardless of the help sought, whether it is spiritual, medical or traditional. However, depending on the type of help sought, expectations may be different. When parents consult pastors or traditional healers, the expectation may be complete recovery and disappearance of any disability. On the other hand, caregivers who consult medical practitioners may expect improvements in their child’s functioning, without necessarily expecting a complete healing. Another expectation is that the child would start talking. Apart from help-seeking expectations, there are expectations that are held by other participants regarding a child with a communication disability. Children with



communication disabilities are expected to learn how to talk when using nonverbal/ alternative methods.

*My own expectations were that, I wanna see a change from my son's life... Ok! I understood ... from the doctors that is condition is permanent. But, now with the explanation that was given was that if you attend this and this and that there are possibilities that he might move from position one to position two. Even though it's not a fully complete healing...(PA03)*

*I, if especially these who is going through the religious route and the traditional route. They expect miracle. They expect that if I can take my child out there, the pastor will pray to my child then he/she will be okay. And also the one who's going through the traditional route, they are expecting the traditional healer to heal the child and be like other people. (EL03)*

There was also an expectation that the child would eventually talk. Participants perceived that caregivers expect health professionals in general to help them with strategies to communicate with their children with communication difficulties, and to assist them in order to get a social relief grant.

*Their expectation is to... think that the - maybe the child will get help so that he can... she can... he/she can speak. (EL01)*

*...they usually just come to talk to the social worker to ask for the grant for the child. (AC02)*

Regarding the type of help, caregivers reported that they sought spiritual, medical, educational and social assistance for their children with communication disabilities. Participants reported that some caregivers would seek help from traditional healers, while some sought help from healthcare practitioners such as doctors, speech language therapists and physiotherapists. Seeking help from healthcare practitioners may be motivated by attempting to receive social assistance in the form of disability grants for the children, as a completed evaluation by a healthcare practitioner, with a formal medical diagnosis, is a prerequisite for the grant. Another source of help for caregivers includes readily available materials on the internet and learning resources that can assist them. An elder highlighted that since the world is changing and people are increasingly educated, they are in a position to get help from different sources.



*Nowadays, parents usually take their children to doctors and speech and hearing therapists as soon as they realize that their children have a communication disability, whereas the people in the olden days would usually go to the traditional healers in order to seek for help for the child from the traditional healers. (EL04)*

Awareness of services or lack of thereof influences help seeking behaviour. Caregivers of children with communication disabilities were reported to, at times, be unaware of the services available to them and their children until they consult a doctor, typically due to medical emergencies. Doctors or nurses then make them aware of the child's communication problem and the services available from other healthcare practitioners. If caregivers are aware of services, and have information about the services, they are more inclined to make use of these services.

Beliefs of caregivers also tend to influence how they go about seeking help for their child with a communication disability. Parents with certain faith convictions will take their children to pastors and prophets for prayer and await a miracle. Moreover, if they feel the child was meant to have a disability, they do not seek any help. Most parents will seek help out of feelings of frustration and also in a quest to determine what is wrong with the child. The caregivers' indigenous cultural/traditional practices will also influence their help seeking. Practices such as hiding the child will prevent caregivers from seeking help.

*So as they stick to their own believe they tend to sit down and relax and they do nothing while is still early. (PA03)*

*...you will sometimes find parents seeking services that will reflect this belief they think that witchcraft somewhere or punishment you know... so you will have people wanting the child to be prayed over. (AC01)*

### 5.11.2.3 Interaction

Regarding interactions with children with communication difficulties, participants highlighted that frequent interaction partners for children with communication disabilities are their mothers and other family members who play the motherly role in families without mothers. Unlike for children without disabilities, peers were not mentioned.

*...the family members in the house where they are living of which the mother is always the first priority I do not know why but its...like that. (PA03)*



When participants were asked about how interactions occur for a child with a communication disability, they reported that during interaction, participants noted that there were breakdowns in communication that occurred due to the nature of the communication disorder. This also highlighted the differences which exist in communication between typically-developing children and children with communication disabilities. These differences include repetition, speaking slowly and being patient with the child. Also, children with communication disabilities have limited exposure to interaction due to caregivers speaking less to them, using fewer words and the children not being included in interactions like their typically-developing peers.

*for a child who is unable to speak, it's difficult right? How will we communicate because the child will do what they want and I will not do what the child wants because I cannot hear (understand) her. So it's difficult. (PA01)*

*...its trial and error for a while and often times you know, parents and adults would use words less than they would typically use when the child has a communication disorder... (AC01)*

*The interaction will be different because you will be talking to the child and the child won't be answering you... (EL02)*

The participants further identified non-verbal means including vocalizations, use of sign language, drawing pictures and use of eye contact.

*It will be important for one to draw something for a child with a communication disability so that the child can be able to choose what he or she wants ...For example the parent can draw the pot and show it to the child, and if the child wants to go to the toilet, they can just point at the pot drawing to let the parent know. (AC02)*

*...this child who cannot speak, I think parents will just, they will demonstrate using concrete objects maybe in the morning when they're giving them food to eat. (EL01)*

#### 5.11.2.4 *Raising a child with a communication disability*

Emotions that caregivers experience when raising a child living with a communication disability cannot be discounted. Caregivers tend to experience difficulties because they find themselves isolated, as reported by one of the parents: "...because I know how difficult it is to



have a child with a disability." Moreover, "*sometimes you do not have someone to talk with and laugh with like it's difficult, very difficult.*" (PA01)

Despite the difficulties associated with raising a child with a communication disability, parents reported that one needs to exercise patience when communicating with their child as indicated by two of the parents. For example:

*It requires that you have a big heart in a day. Even on days that we do what the child does, it's like the child gets used to doing the activity but it requires patience. And having a child with a disability also requires patience.* (PA01)

*With that I think and I still believe each child deserves a chance. I should not always be in a hurry to say child please respond quickly, because this is me, (I) am an adult I know how to communicate and I know when (I) am communicating with an adult I get quick response. So with a child it's gonna be a different issue and it's gonna take time for a child to respond back. So I think whenever you are speaking with a child you should do it and know that you do have time for that.* (PA03)

### 5.11.3 Theme 3: Acceptability, appropriateness and suggestions for the proposed training

The theme encapsulates the participants' perspectives on the appropriateness and acceptability of the proposed strategies and materials that caregivers would be trained to implement with their children with CCN during the last phase of the study. It also encompasses suggestions that the participants made for changes or improvements to make the training more appropriate and acceptable for Vhavenda caregivers. Four sub-themes were identified which are: (1) skill, (2) training, (3) materials, and (4) other. Table 5.10 below shows the subthemes, categories, code examples and frequencies.

**Table 5.10**

*Theme 3: Acceptability, Appropriateness and Suggestions for the Proposed Training*

Subtheme	Category	Examples of codes	Frequency
Skills	Responsiveness	Appropriate	11
		Inappropriate	2
		Considerations	4





Subtheme	Category	Examples of codes	Frequency
		Suggestions	3
	Creating communication opportunities	Appropriate	9
		Inappropriate	2
Training	Modelling aided language input	Appropriate	11
	Suggestions	Promoting acceptance	17
		How to train caregivers	24
		What to train (content)	5
Material	Other	Trainer Characteristics	6
		Appropriate	1
		Inappropriate	1
Other		Suggestions	6
		Cultural sensitivity	4
		Activity example	2

### 5.11.3.1 Caregiver skills proposed for training

The participants were asked to comment on responsiveness, creating communication opportunities, and modelling aided language input. A total of 11 comments suggested that the participants perceived responsiveness as appropriate and acceptable. Participants provided examples and also commented on the videos that depicted the skill.

*I think this responsiveness communication is good. It's good. (PA02)*

*So for me the two things that I picked up from the video one is: you matter, your interests matter. But, will still communicate that the child is being listened to. (AC01)*

However, two comments suggested that responsiveness was not always considered an appropriate skill to train. One participant remarked on the child-centred nature of responsiveness, which she found to be incongruent with Vhavenda culture.

Some considerations that the researcher would need to take into account when training caregivers on responsiveness were also highlighted by the participants in the interviews. In addition to achieving the main goal of communication using responsiveness as a strategy, one of the participants suggested that activities should focus on fulfilling basic needs as opposed to prioritizing play activities. This was illustrated in the following quote:

*In a child's focus world, that would be appropriate, but in many traditional society, the child is not the centre of everyone's attention, so there would have to be other way of*



*responsiveness, but (that) will still communicate that the child is being listened to ...I think one would have to probably prioritize basic needs rather than... you know... something like hugging a toy. (AC01)*

Creating communication opportunities was described as appropriate by most participants. However, some concerns were also raised about this strategy. For example, participants reported that it might not be culturally appropriate to offer choices to the child, as it might be interpreted as spoiling the child.

*I feel like it is appropriate and it would be a good way of teaching the children how to communicate. I noticed on the video when the parent was holding both the banana and the apple that the child was forced to choose what he wanted and that made the child point at the fruit which they wanted. (EL04)*

*Culturally, they may feel like you're spoiling the child. They may ask you why you are giving the child so many things at once and suggest that you are wasting food. (AC02)*

Modelling aided language input was reported to be appropriate for use by Vhavenda caregivers.

*Yes, it's going to help by that way, it will help because when you have a child who cannot speak, it's difficult, so using pictures is good. The child can point and show you what they want. They can also come tell you I want this, I want that. Yes, it will help. (PA01)*

### 5.11.3.2 Training

The researcher enquired about how training can be made acceptable to Vhavenda caregivers. The participants provided suggestions on how to go about training, how the researcher can make training acceptable, what parents can be trained on and how the trainers should handle themselves. Participants suggested that the researcher should always find out what the participants are currently doing in order to learn from them and build on their expertise. Also, the researcher needs to establish the caregivers' levels of literacy and match the training to their context. The objectives and outcomes of the training should be clearly stated by the researcher. The benefits of using the strategies should also be clarified. It is also vital to establish caregivers' interest in the programme beforehand. Regarding the training approach, participants suggested



that the researcher needs be aware of challenges she might face, for example if caregivers feel that they are being stigmatized rather than being assisted.

*Some of the problems include the fact that some of the parents may feel like they are being taught juvenile and childish stuff. With that being said, a parent whose child has a communication disability and wants by all means to be able to communicate with their child, will take these teachings to heart so that they may be able to communicate with their child without any issues. (EL04)*

Regarding training suggestions, the following examples were outlined:

*I think it's always useful to get a sense about what they've been doing in so long, you know, like get a way of getting them to tell you what they've been doing up to this point so that they can share some of their own innovation, you know, because it's possible that they maybe be approaches that... you know... family on their own sort of design that we can tap into. (AC01)*

*I think that the first thing is how you introduce yourself. Secondly, maybe that how will you approach them and then thirdly, I think yes they'll accept you cause they know they are going to benefit out of it to be taught how to look after their kids, how to communicate with their kids cause if you look at it, is not all of us, that are proud and bold in such a way that we show off our children with disabilities. (PA01)*

Content suggestions were made by some participants. They suggested that the content of the training should include teaching caregivers to exercise patience when interacting and communicating with their children. Furthermore, the participants suggested that debunking some of the cultural beliefs regarding the cause of disability and being cognisant of the audience regarding their faith and beliefs would be important when training.

*The parents need to be taught first that they must be a bit more patient and understanding when it comes to the young child. This will help them know what to expect from the child and in turn, lead to them being a lot more understanding and lenient towards the child, which will help the child learn and develop in a much better way.” (AC02)*

They further suggested that, most importantly, the researcher would have to be sensitive to the culture and beliefs of the caregivers when developing content. To add onto the content suggestions, participants also alluded to how the researcher should handle herself. They



suggested that researchers should treat training of caregivers with sensitivity as the potential participants could be very sensitive.

Cultural sensitivity was another facet raised by some of the participants. They alluded to the fact that a balance needed to be maintained between being culturally relevant and using skills that have been proven to work.

*...so, ok, if you are go(ing) to work with the rural people, you need to be very sensitive because people living in rurals, they still follow culture and tradition a lot. Whether that person is educated or not, whether that person is a Christian or not, but some of the cultural practices they are still following them. It means when you go to that family, try to find out by all means if they are still following culture, but by not directly asking them, while you are speaking to them, you will be able to pick up that this is a Christian who still follows Tshivenda cultural practices... You should also be cognisant of that too. It helps you know how to address them depending on what they are inclined towards. If it happens that when you are talking to them, and note that this is a full Christian, you know that I am going to use Christian route and western route. Then if you pick up that this person mixed, when you charter the Christian territory you need to be extra careful. Let's say I do not mix with Christianity, and you are talking about that my religious inclination is demonic, I will not listen to what you will say to me. yes, because you are crushing my belief. (EL03)*

### 5.11.3.3 Materials

During the interviews, participants were provided with videos that demonstrated the use of the suggested strategies. A communication board was also provided to explain how to model aided language input. Participants provided input on the appropriateness and cultural sensitivity of the materials, and also provided suggestions. Overall, the participants indicated that the materials provided to them were appropriate. However, some of the materials that were considered inappropriate included the use of dolls as illustrated in one of the videos.

*Yah. Because during... in our culture we do not have dolls... we do not use dolls. (EL01)*

Some suggestions for materials were around aligning the material to the contexts, environment and the caregivers. The participants indicated that videos and communication



boards should show African black people because Vhavenda are sensitive. Therefore, it would help people to feel included and would allow them to relate to the material if black African people were used. Some of the participants reported on the videos, communication boards and materials used in the videos. This was illustrated in the following quotations:

*I think it will be appropriate to use black African people. (EL03)*

Furthermore, when it comes to providing children with food choices (shown in one video, where a child chose between an apple and a banana), they suggested that caution needs to be practiced and choices should be discussed with caregivers beforehand. When planning for an interaction between a child and a caregiver, it is important to take note of how certain things are modelled using toys. For example, the child showing affection to a doll might not be ideal for the Vhavenda culture as indicated by one of the participants:

*Yah so I think in traditional context, affection is shown to other humans before anything else. And then the second thing that I'm picking up from the video is the... that thing of connection, what does the doll represent? A doll represents something that I can show affection to and culturally, inanimate objects such as dolls in a rural context is a difficult one. That's why you find some dolls without legs. (AC01)*

One of the participants suggested that specific activities should be chosen for specific interaction partners. She suggests that play activities be set up for children and their playmates. Activities around meals should be done with parents as food is central to the Vhavenda culture.

*So, for other interest such as play interest, I would focus more on other children if there are possibilities for that... Something that would make sense to almost every parent ... rotates around food, right? (AC01)*

#### **5.11.4 Theme 4: Changes over time**

Participants reflected on changes they had observed over time. These changes related to the way in which parents and children interact, beliefs about disabilities, as well as comments that differentiated modern and traditional practices. Overall, these comments indicated an orientation amongst many participants that culture was not set in stone, and was ever-evolving. This was a marginal theme, and for this reason, only six codes were identified, with no subthemes or categories, as depicted in Table 5.11.

**Table 5.11***Theme 4: Changes over Time*

<b>Code example</b>	<b>Frequency</b>
Acceptance of the child	1
Changes in beliefs	5
Changes in practices	6
Perceptions of changes in era	6
Changes in communication partner	1
Child safety	1

Some of the participants indicated that the beliefs about disability are evolving as the times change. They attributed this partly to the fact that people are accessing formal education, which leads to an understanding that they can get medical care for their children. They also mentioned that people adhering to the Christian faith believe that every child is a gift from God. The noted a change in beliefs - from witchcraft causing the disability to the Christian beliefs of the child being a gift in the modern era. This was reported by some of the elders, for example:

*...but nowadays people are now educated. They know how doctors work and they take the child to the doctor. (EL01)*

*Because of Christianity, since most of us now are practicing Christian religion, we believe that this is a gift from God. Yeah, even though they are still some of the people who maybe are not Christians, because we cannot believe on the same thing some of us believe on African religions, so some of them feel that no, which culture play the role here, but really few of them, most of us nowadays because of Christianity, whether a child is disabled or fine, we believe that this is a gift from God...back then people were afraid of witchcraft and nowadays they are afraid of the witchcraft notion. (EL03)*

Parents seek help from various avenues and at present they can choose to see doctors and health professionals, whereas this was not always possible in the past. In recent times, caregivers are able to find resources that can help them with their child with a communication disability. These resources are readily available to them in the form of health professionals, spiritual leaders



and also traditional healers. Some participants suggested that awareness of medical options was linked to obtaining formal education.

*Yes, because nowadays, there are so many resources that we can use, you know to assist the child, , and, and most of the parents nowadays are being educated. (EL03)*

Also, acceptance of children with communication disabilities is on the rise as reported by EL03: *"ehm, I think nowadays its better, ...most of the parents are starting to accept their disabled children; but during those days it was so difficult"*.

Helpers are recognised as communication interaction partners for children nowadays as stated by (AC01): *"and in the new world that we live in, there are families that has a helper and the helper will be that person that actually spends more time with the child."* As, some parents work full time and grandmothers do not stay with them in nuclear families, most parents hire domestic workers to take care of the child on a day-to-day basis.

The participants further indicated that there should be consideration of which one is important for the caregivers, be it a modern or traditional cultural approach; and that the focus should be on helping the child communicate over respecting culture.

*Another thing that we must keep in mind is that the focus here should be on helping the child to communicate, not to respect the culture and tradition whilst the child cannot communicate with others. (AC02)*

## **5.12 Implications for the development phase**

In an attempt to explore appropriateness and acceptability of proposed strategies that stemmed from the scoping review, participants reported that all three strategies were appropriate, but also had suggestions as to how they can be made more appropriate for the targeted participants of the training.

Participants were asked about their perceptions of the Vhavenda pertaining to communication disability. In order for any intervention programme to be successful, it is important for the researchers to understand the knowledge, perceptions and practices of the targeted population (Boateng et al., 2017). In this regard, there were factors that were noteworthy such as beliefs regarding the causes of a (communication) disability, help seeking practices based on the beliefs, interactions between caregivers and children, how interactions happen and how





children with (communication) disabilities are raised. However, some changes in practice and perceptions were noted based on the changes in era and belief systems of Vhavenda, which the researcher would have to be aware of in order to avoid stigmatization or any form of discrimination against the participants. These factors informed some of the content that was included in the caregiver training programme developed and also guided ethical conduct.

Caregivers were asked about acceptability of the strategies that the researcher proposed to include in the training programme that emerged from the scoping review. It was interesting to see how the strategies were mostly considered acceptable, though the activities presented during the interviews to illustrate the strategy garnered some critique regarding their appropriateness for rural communities. The researcher therefore considered this in the development of the programme, for example, in preparing video clips to illustrate the strategies using activities that were culturally appropriate and acceptable as per the suggestions provided by the participants. In addition to the strategies, participants suggested how training should be executed and how the researcher should behave during training. These suggestions were implemented during training so as to enhance the cultural appropriateness and social validity of the training.

### **5.13 Summary**

The main purpose for conducting the interviews with Vhavenda cultural stakeholders was to explore how typical interactions between caregivers and children occur. In exploring typical interactions, it was pertinent to understand the interaction partners, activities that children engage in, the purpose of interaction, topics that are communicated about, other modes of communication used in communication, and how interaction happens. This translated into the inclusion of culturally and contextually relevant activities within the programme as well as excluding those that are considered taboo and those that do not stimulate communication interaction; seeing that the programme was aimed at training caregivers to implement AAC strategies that would foster communication and interaction with their children with CCN.

The results of the cultural interviews revealed activities that Vhavenda children and their communication partners engage with in daily interactions. Activities were categorised according to those that are rich in communication and those that do not involve communication. Activities during which communication is prohibited were also mentioned. Topics that are communicated





about as well as the importance of communication were described. Furthermore, other modes of communication that are used by Vhavenda other than speech were stated. To add onto these revelations, perceptions of and beliefs of Vhavenda about communication disability, how communication transpires between caregivers and children with communication disability, help seeking practices of caregivers in relation to the type of help, expectations thereof and reasons for help seeking were also explored. Additionally, how caregivers and children with communication disabilities interact was discussed. Participants noted differences in communication and interaction between children with (communication) disabilities and their typically-developing peers.



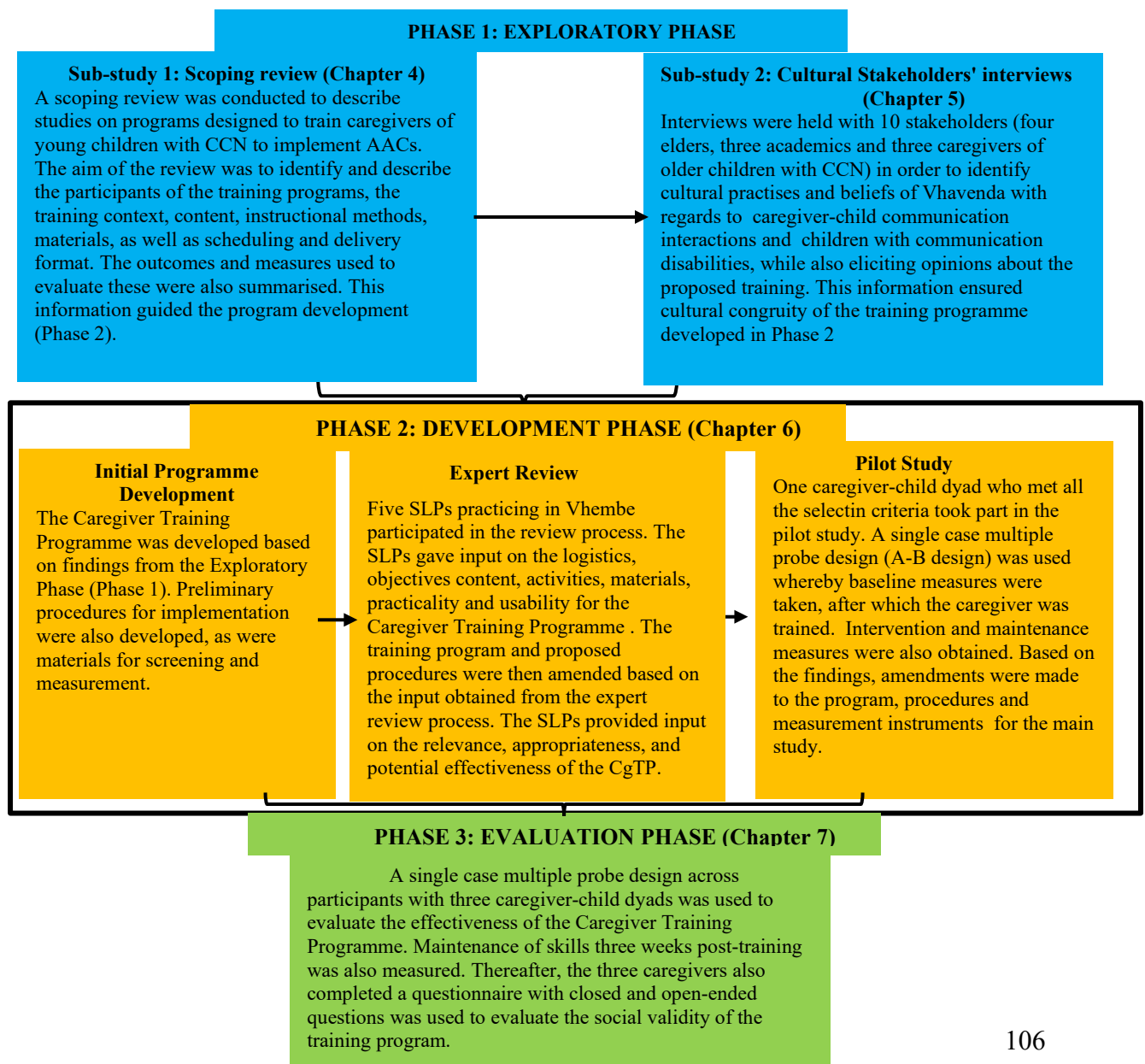
## PHASE 2: DEVELOPMENT OF THE CAREGIVER TRAINING PROGRAMME

### 6.1. Introduction

This development phase chapter explains the design, development and piloting of the custom-made caregiver training programme (CgTP) to be implemented in Phase 3 of this study. Figure 6.1 shows the schematic representation of three phases of the study that followed in a sequential manner. The focus of Chapter 6 is, however, on the development phase (Phase 2).

#### Figure 6.1

Overview of Methodology





The chapter commences with an overview of the aims of the development phase. Secondly, an overview of the development of the programme is provided. The framework that guided the development process is explained. Thereafter, the different sources of input that informed the programme are explained, namely theory, as well as the data gathered from Phase 1 (exploratory phase) of this study which comprised of a scoping review and Vhavenda cultural stakeholders' interviews. Thirdly, an overview is given of the initial programme content and materials. Fourthly, the expert review and pilot study are described as well as the resulting amendments made to the programme. Lastly, implications of this phase for the evaluation phase are discussed.

## **6.2. Aims of Phase 2**

### **6.2.1 Main aim of Phase 2**

The main aim for the development phase was to design and develop the CgTP, screening tools and measurement material for Phase 3 (Evaluation Phase) of the study, based on the data gathered in the exploratory phase.

### **6.2.2 Sub-aims of Phase 2**

In order to achieve the main aim of this phase, the following sub-aims were formulated:

- (i) To conceptualise and develop the CgTP and all materials required for its implementation;
- (ii) To ensure relevance and applicability of the CgTP through an expert review involving SLPs practicing in Vhembe district;
- (iii) To develop appropriate materials for screening of potential participants, measurement of dependent variables, checking of procedural fidelity, and obtaining caregiver feedback post-training in order to appropriately evaluate the implementation of the CgTP; and
- (iv) To determine appropriateness of all the materials and procedures proposed for the implementation of CgTP and the evaluation of its effect on caregivers (as conducted in Phase 3) by conducting a pilot investigation.



### 6.3. Overview of the development of the caregiver training programme

The overall development process was guided by the Design and Development paradigm by Thomas and Rothman (1994). The actual programme (content, instructional methods chosen, materials, etc.) was conceptualised based on various sources of input, including (a) theories of child development, (b) adult learning theory and (c) the findings from Phase 1. The sub sections that follow explain first the process (steps) that were followed in the development, and second, how various sources of input informed the actual programme.

#### 6.3.1 *Design and Development paradigm (Thomas and Rothman, 1994)*

Thomas and Rothman's (1994) Design and Development paradigm was used to guide the process of programme development. This model provided important guidelines that form the basis of a systematic conceptualization of designing and developing training. Thomas and Rothman (1994) suggested six steps when designing training programmes. These steps include: (a) problem analysis and project planning, (b) information gathering and synthesis, (c) program design, (d) early development and pilot testing, (e) evaluation and advanced development, and (f) dissemination. The steps are described in Table 6.1 with regards to how they were implemented in this study. Step A (problem analysis and project planning) and Step B (information gathering and synthesis) were carried out and discussed in Chapters 1, 4 and 5 of this study. This chapter focuses on Step C (programme design) and Step D (early development and pilot testing).

**Table 6.1**

*Steps Used to Develop the CgTP (adapted from Thomas and Rothman, 1994)*

Steps of design and development	Description of the steps for the current study
<b>Step A:</b> Problem analysis and project planning	The background and problem statement as well as the broad project planning were outlined in Chapter 1 of the dissertation.
<b>Step B:</b> Information gathering and synthesis	This step was conducted in the exploratory phase of this study. A scoping review was first done followed by interviews with Vhavenda cultural stakeholders. These were conducted sequentially as shown in Figure 6.1.



Steps of design and development	Description of the steps for the current study
<b>Step C:</b> Programme design	<p>The scoping review contributed to identifying an instructional protocol that was adapted for this study which has components that are evidence-based and have been shown to be effective when training communication partners (Kent-Walsh &amp; McNaughton, 2005). The components of the instructional protocol are discussed in detail in Section 6.4. Furthermore, the review analysed the content of caregiver training programs, the instructional strategies used and the outcomes that have been measured for the caregiver and child. The researcher then took this information and incorporated it into the instructional protocol to design the prototype of the programme. The researcher also identified some potential caregiver-implemented intervention strategies and presented these to the stakeholders in the stakeholder interviews, for validation and comment. During the interviews, stakeholders gave rich information on typical adult-child interactions, Vhavenda cultural views about communication disability and intervention, and commented on the applicability of the provisionally proposed intervention strategies.</p> <p>From the results of the scoping review and the cultural stakeholders' interviews, a prototype of the custom-made CgTP was designed.</p>
<b>Step D:</b> Early development and pilot testing	<p>Training material was presented to SLPs practicing in the five hospitals from which participants were recruited. The SLPs were requested to give input on the logistics, objectives content, activities, materials, practicality and usability for the CgTP. The experts received an invitation from a shared Google drive created by the researcher which had the CgTP materials (PowerPoint™ presentations, booklet and communication boards). From the expert input with SLPs, the researcher modified the materials based on the suggestions and feedback received from the experts.</p> <p>The researcher then conducted a pilot investigation with one participant who did not form part of the main investigation. The pilot investigation was done to evaluate the appropriateness and feasibility of all the materials and procedures proposed for the evaluation of the programme. Based on the results of the pilot investigation, the researcher made changes to the training materials, procedures and measurement instruments accordingly.</p>
<b>Step E:</b> Evaluation and advanced development	<p>The researcher evaluated the effect of the custom-made CgTP in Phase 3 using a single case multiple probe design across participants. Details are discussed in Chapter 7 (Evaluation Phase) for Phase 3. Suggestions for additional advanced development of the programme are made; however, these were not implemented as part of this study.</p>

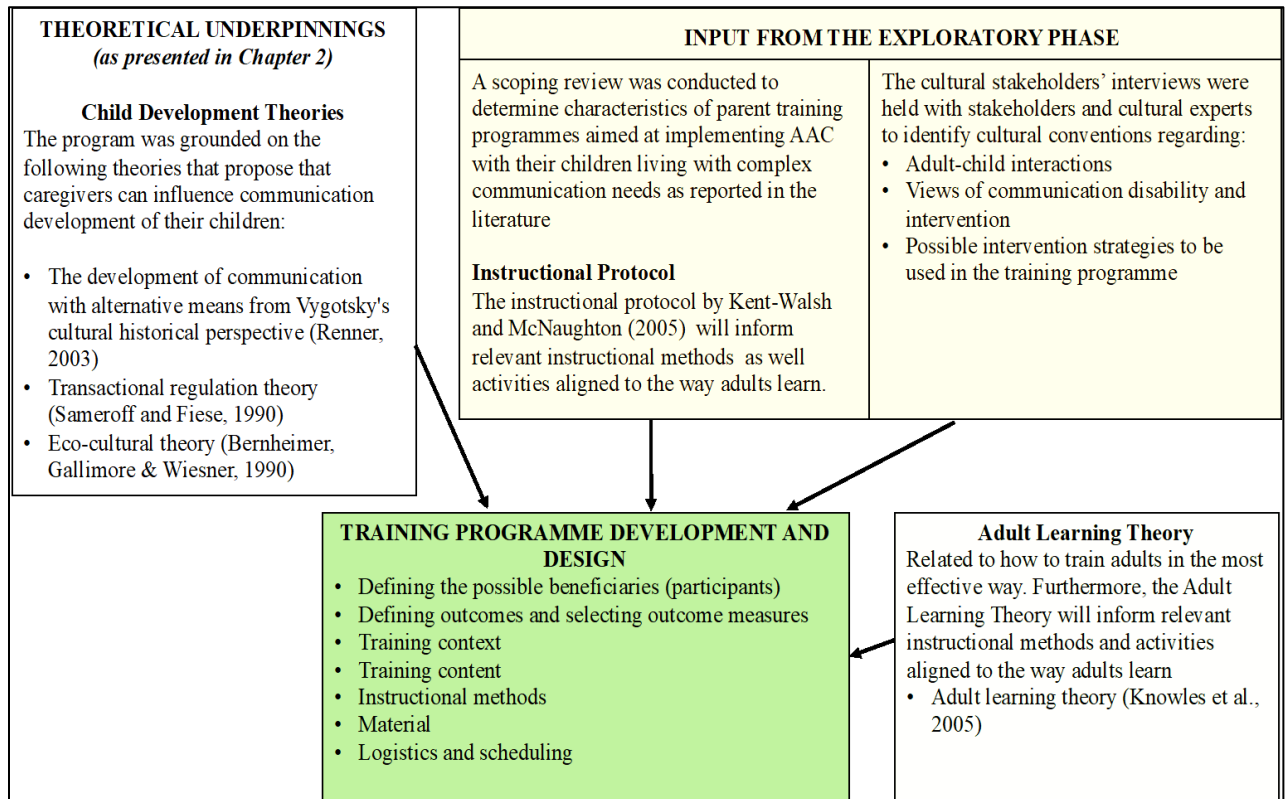
### 6.3.2 *Input that informed the CgTP*

Theoretical underpinnings that guided the development of the CgTP emerged from various entities. Some theories were from the field of language development and were concerned with how caregivers can influence communication development of their children. Furthermore, other theories that will be discussed in this section are those pertaining to how adults learn, which will guide the instructional approach of the CgTP. Input from the exploratory phase will be discussed in relation to the content and material of the CgTP. Figure 6.2 shows an overview of the various sources of input that influenced the development of the programme.



Figure 6.2.

*Input That Informed Development of the CgTP.*



### 6.3.2.1 Theoretical underpinnings of programme content

The researcher chose the transactional model of development, eco-cultural theory and the interpretation of Vygotsky's cultural historical perspective in relation to how children develop communication using alternative means. Additionally, the theorists posit the tenets of the theories on how communication development happens in a dyad and how the members of the dyad are influenced by each other in the environment, though Renner (2003) applied the cultural historical perspective on children with a communication disorder. The eco-cultural theory is concerned with the caregiver and the cultural context, as well as the usefulness of everyday routines. The transactional model talks about the reciprocal influence within the parent-child dyad and the relationship that exists between the caregiver and the child within a particular context.

- (i) The development of communication with alternative means from Vygotsky's cultural historical perspective (Renner, 2003).



Vygotsky proposed that children develop communication skills through a process that is socially mediated. Thus, a child requires an adult, a knowledgeable member of their society for them to attain communication skills, acquire cultural beliefs, values and so forth. Renner (2003) applied Vygotsky's cultural historical perspective to children in need of AAC. The author outlined how augmented communication development can be facilitated for children with CCN during caregiver-child interactions in daily routines. Firstly, Renner highlights the need for and legitimacy of implementing AAC. Vygotsky advocates that children with impairments (in this case CCN associated with developmental disabilities) should be afforded social contact in the same way as children without disabilities. The child should be afforded the same opportunities for social contact regardless of their disability. Therefore, the disability is seen to emanate more from the reaction of the environment than the child's functional limitations, in line with the social model of disability (Oliver, 2013; Samaha, 2007). In order to optimize the development of a child with CCN and overcome the disability, there is a need to create side-tracks of enculturation. These side-tracks can be created by substituting one mode with another but maintaining the same functions. In this case, in order to mitigate the limitations or lack of speech and language, Renner advises that speech can be substituted using AAC.

Secondly, Renner emphasised the importance of modelling. According to Vygotsky, children are reported to interact with experienced members of the social environment (caregivers or older children). These skilled individuals then model forms of culturally appropriate skills. Through guided learning, children learn and master skills with the help of the experienced models. Thus, when the adult models the use of AAC, then the children will learn how to use AAC.

Thirdly, Renner's application suggests that such modelling should take place in daily routines. The family should provide an environment that is conducive for the child's development. Therefore, when aided language input is integrated in the daily routines of the children by their caregivers, children with CCN will learn to use AAC in a communication environment that supports and promotes their communication skills. Vygotsky's theory as interpreted by Renner (2003) therefore supports the implementation of AAC in natural environments, through knowledgeable others (like parents and caregivers) modelling its use for their children with CCN.

- (ii) Transactional model of development (Sameroff & Fiese, 1990).





The transactional model by Sameroff (1975) argues that development in an individual is shaped by their interaction with the environment. This suggests that developmental outcomes do not result as a function of the individual. Thus, child development is seen as a result of the continuous dynamic interplay of the child and the experiences afforded by his/her family and the social context. This model is grounded on the bidirectional effects of the caregiver-child transactions and the environment (Sameroff, 1975; Sameroff & Chandler, 1975; Sameroff & McKenzie, 2003). The model posits that child development is influenced by the environment and vice-versa (Sameroff & Fiese, 1990, 2000).

For this reason, parent-mediated interventions are reported to be bi-directional in nature (O'Toole et al., 2016) due to the interplay between the adult (caregiver) and the child. Thus, when verbal or non-verbal communication from the child increases, the adult responds, and as the adult responds, the child will also increase their communication. In other words, when the caregiver responds accordingly to the child's communication attempts, the child will continue to initiate communication attempts, however if the caregiver does not respond accordingly, the child's communication attempts will be restrained. However, if the caregivers of a child living with disabilities and CCN reduce their interactions with the child, assuming that the child is not capable to interact with them, this will not foster communication development for this child.

Therefore, caregiver education (referred to as training in this study) has been reported to yield positive results in some behaviours and symptoms in children. Caregiver education has also been shown to yield positive results for families as well for caregivers who participate in parent education programmes (Brookman-Fraze, 2004).

(iii) Eco-cultural theory (Bernheimer, Gallimore & Wiesner, 1990)

The eco-cultural theory argues that the family socially constructs child activity settings to accommodate the needs of children within the family environment (Bernheimer et al., 1990). Furthermore, the theory posits that family members are more likely to implement and sustain interventions that fit into the daily routines of the family and those that yield positive outcomes for the family as a whole, as well as those that are in line with the parents' objectives and beliefs. Components of the eco-cultural theory are necessary to incorporate in intervention planning because it increases the "contextual fit", pointing out that interventions for young children should fit into the daily routines of a family and be incorporated therein





(Brookman-Fraze, 2004). Interventionists need to build on the strengths of the family and what the family is already doing rather than bringing in new concepts and forcing them onto families, because these new concepts might not build on their strengths and what they know. The concepts might not be culturally appropriate and contextually relevant. This might lead to interventions not being accepted by the families they are intended for. In the current study, the CgTP development was informed by stakeholder input and validated by an expert review before implementation. Also, caregivers chose the daily routines during which they wanted to implement the communication strategies.

#### 6.3.1.2.3 Adult learning theory (Knowles et al., 2005)

Adults are reported to learn differently from children (Knowles et al., 2015) in that they bring experience to the learning task. Therefore, adult learning principles should be adhered to when teaching adult learners. These principles have been widely used in training various stakeholders in the health and education sector. Knowles et al. (2015) revised the principles and condensed them to the following: (a) adults display a need to know why they should learn; (b) adult learning is driven by their motivation to problem solve; (c) training approaches used must match the background of the adults; (d) active involvement of adults in the learning process is key. Table 6.2 shows how the four adult learning principles as outlined by Knowles et al. (2015) will be applied in this training programme.

**Table 6.2**

*Application of Adult Learning Principles to the Proposed CgTP*

<b>Principle</b>	<b>Application to the CgTP delivery</b>
Adults display a need to know why they should learn	The researcher will describe the rationale for the CgTP. Caregivers will be given information letters outlining the investigation, including an explanation of why it is important to conduct the investigation. The researcher communicated the objectives of the different topics that were outlined in the presentations.
Training approaches used should match the background of the adults	The programme was designed from the data collected from the scoping review and stakeholder interviews. Training material was designed to accommodate caregivers with low literacy (Grade 4 minimum level) from a Tshivenda language and cultural background. The training materials were provided in both English and Tshivenda. Presentations that were used for the caregivers included pictures and videos that were adapted to be contextually relevant. The researcher used videos that had share-alike creative commons licensing and were approved by the cultural stakeholders during the interviews. Also videos from clinical training that parents consented to for the use of training from the clinic data repository will be used for the training. The clients and caregivers' faces will be blurred on the videos for



Principle	Application to the CgTP delivery
<p>Adult learning is driven by their motivation to problem solve</p> <p>Adults learn through doing</p>	<p>confidentiality purposes. Verbal descriptions and demonstrations were also used.</p> <p>All of the caregivers had a child with CCN and the training was aimed at helping them solve communication problems they experienced with their child. Training was aimed at helping them gain practical skills that they could implement directly with their child. Furthermore, they engaged in tasks where they able to apply their learning directly to themselves and their child by reflecting on their practices and applying their learning to propose possible solutions to the communication challenges they were experiencing with their child. During guided practice, caregivers were shown videos of their interaction with their child, and were asked what they thought went well during their interaction; what they thought they could have done differently; and how they could improve in the next session.</p> <p>Caregivers will be actively involved in various activities throughout the training. Caregivers will reflect on the daily training using a video or audio recording which they will send to the researcher. At the end of the two-day training, they will be asked to record a video of themselves teaching another adult the strategies using mnemonic, explaining each of the strategies described by the mnemonic and how to implement the strategies. The caregivers will have ample opportunities to practice implementing the strategies they were taught (offering communication opportunities, contingent responding and aided language modelling) during the guided practice sessions. Each recording will be followed by a feedback session to further guide their implementation.</p>

### 6.3.2.2 *Input from the exploratory phase*

Table 6.3 shows the input towards programme development from the scoping review and cultural stakeholders' interviews. Input was discussed based on its contribution to participant selection, training context, instructional methods, training material, logistics and scheduling, outcomes and measures used.

**Table 6.3***Input from Exploratory Phase to Programme Development*

<b>Aspect considered</b>	<b>Description with reference to findings from the scoping review and/ or interviews with cultural stakeholders</b>
Participants	<p>From the review evidence was found of previous successful caregiver training conducted with caregivers from low- and middle-income contexts and also rural contexts. Caregivers were trained to implement AAC with their children during daily activities. Gona et al. (2014) and Bunning et al (2014) reported on a home-based intervention and teaching caregivers in rural contexts of Kenya to implement various aided and unaided AAC systems. Results of this investigation showed that caregivers had positive experiences with the training as it was tailor-made for them, and that they could see positive outcomes when communicating with their children using AAC. However, no studies entailing training programs for South African caregivers were found.</p> <p>From the stakeholder interviews, the caregivers who interacted with children were mostly mothers, grandmothers and other family members. In this study, caregivers were therefore not limited to mothers only, but they could be any person other than the parent who is taking care of the child and responsible for carrying out care-giving tasks on a daily basis (Children's act 38, 2005). The participants were caregivers of children with CCN receiving SLP services at a hospital in Vhembe; they should speak Tshivenda as their home language; they should have at least a grade 4 level of literacy (reading and writing) in Tshivenda or English; However, one condition that was imposed was that caregivers should be older than 18 years. This decision was made to simplify caregiver consent.</p>
Training context	<p>A total of 13 of studies in the scoping review reported that intervention was done at the children's homes, although two of the 13 studies had a clinic and home component. Furthermore, the majority of the studies employed individual face-to-face training, although one study employed both group and individual sessions. The caregivers in this study were trained individually face-to-face in their homes by the researcher. Due to Covid-19, the researcher maintained social distancing of at least 1 to 2 metres from the caregivers, they wore a mask throughout and sanitized frequently. The CgTP had the potential of being implemented using synchronous telehealth practices if there were further lockdown restrictions.</p>
Training content	<p>From the scoping review, caregivers interacted with children in mealtime, play and educational activities (i.e. reading books). During the cultural stakeholders' interviews, it was reported that Vhavenda children communicate and interact with their caregivers in various daily routines. These daily routines include parent-led chores, child-led activities and also play.</p> <p>In the scoping review, it was found that most studies trained caregivers to implement specific strategies to implement with their children. This is understandable, as caregivers need to change their behaviour in order to change the behaviour of their children. However, a knowledge component was also observed as part of some of the trainings. For example, the ComAlong Programme (Ferm et al., 2011; Jonsson et al., 2011) provided</p>



Aspect considered	Description with reference to findings from the scoping review and/ or interviews with cultural stakeholders
Instructional methods	<p>background information about communication, AAC and using AAC at home. One of the andragogical principles by Knowles et al (2005) states that adults need to know why they should learn. Providing background information on these topics can help them to understand the significance of AAC in addressing communication barriers. However, a change in knowledge does not necessarily result in behaviour change. According to Powell and Dunlap (2010) a behavioural orientation in training is a characteristic of an effective parent training programme. The current programme was therefore designed to incorporate both knowledge and skills (behavioural) aspects. The knowledge component focused on educating caregivers about communication and its importance; AAC and the various systems and the strategies that facilitate communication development. The skills (behavioural) component focused on three strategies, namely contingent responding, offering communication opportunities and modelling aided language input. The specific behavioural strategies, were chosen as they are widely used in the field of AAC as indicated in the scoping review with intentional informal communicators in order to move them to becoming formal communicators using AAC. In some cases these strategies were used with beginning communicators. The scoping review also indicated that these strategies had been socially validated through caregiver input either before or after training.</p> <p>Cultural stakeholder interviews: the stakeholders were requested to provide input on the proposed three strategies' cultural appropriateness. They reported that all three strategies were considered appropriate and acceptable, although one participant remarked on the child centred nature of responsiveness, which she found to be incongruent with Vhavenda culture. Overall, they were considered culturally appropriate.</p> <p>From the scoping review, it was found that the instructional protocol on training communication partners by Kent-Walsh and McNaughton (2005) was used in a few studies to train parents. It was adapted and used for this study (see Section 6.4). This instructional protocol comprised of instructional strategies that have been reported to be effective in parent training.</p> <p>Instructional strategies such as verbal rehearsal, live demonstrations, modelling, strategy description, use of written materials, homework, controlled practice with feedback, videotaping parent-child interactions with feedback and video demonstrations were used in this study during parent training. Furthermore, reflection and commitment to strategy were employed in this study although these strategies were used less in studies in the scoping review. Commitment statements are important in intervention as they are a motivation to the participant to maintain new behaviour (Lokhorst et al., 2013). They are a visual reminder that influences changes in one's self-concept to align with new behaviour. They are valuable in motivating changes in cognition, values and attitudes towards the new behaviour learnt (Cialdini, 2001 as cited in Lokhorst et al., 2013). The pre and post commitment statements are significant in this research as it has been done in other studies and was used in other fields for continuing professional</p>



Aspect considered	Description with reference to findings from the scoping review and/ or interviews with cultural stakeholders
Training material	<p>development (Bornman &amp; Louw, 2019) and environmental interventions (Lokhorst et al., 2013) that when participants sign off or create their own statements, they are motivated to learn, change behaviour and use the newly learned behaviour. Reflection is an important aspect in the learning process as it affords the adult learner the same power that experiential learning affords them. This happens when an adult learner is able to articulate their thoughts about what they are learning about. This study will include reflective exercises for the caregiver after each session wherein they will log their thoughts about the session and what they have learnt using a video or audio.</p> <p>The rest of the strategies mentioned above have been recommended as significant in training parents also in low socio-economic contexts (Barlow et al., 2012; Engle et al., 2011).</p> <p>From the cultural stakeholder interviews, the stakeholders suggested soft skills that the researcher should take into consideration such as: treating caregivers with respect; take culture into consideration, respect their beliefs and being aware of the participants' beliefs in order to find a way to address them. The researcher noted all the suggestions and endeavoured to implement them in the training,</p> <p>The scoping review showed that the use of lectures, manuals and video demonstrations were employed in some of the studies. Therefore, the materials of the training programme developed for this study included MS PowerPoint™ 2019 presentations that had videos embedded to depict the strategies, a training booklet and examples of communication boards. The researcher developed a training booklet for the caregivers to refer to as the need arose. The materials used in this study were adapted to accommodate individuals with lower literacy levels because the participants in the review had higher levels of education.</p> <p>The review also revealed that parents were trained to implement various aided and unaided augmentative and alternative communication systems. For this study, however, children with mild fine motor difficulties were not excluded, thus it was decided to use communication boards rather than an unaided system such as key word signing. The proposed programme will train caregivers on how to use aided language input using communication boards. Additionally, for the current study, aided modelling was chosen as option as low technology boards with PCS symbols: 1) are a symbolic form of communication- aim is to move kids to more symbolic forms; 2) boards do not require intact fine motor skills; 3) are relatively inexpensive and therefore appropriate for resource constrained settings. It was observed from the scoping review that low technology AAC systems were used in LMICs with participants that have not yet been exposed to AAC before because they are cost effective (Bunning et al., 2014). Thus, researcher chose the use of communication boards for this study.</p> <p>The choice of vocabulary and symbols was influenced by the results obtained from the stakeholders' interviews. The stakeholders reported that it is important to use materials that speaks to Vhavenda culture and context (i.e., individuals and</p>



Aspect considered	Description with reference to findings from the scoping review and/ or interviews with cultural stakeholders
	<p>objects should be representative of the culture and context) because if materials do not talk to them, this might pose a threat for acceptance of the training as Vhavenda are sensitive about their culture.</p> <p>During the stakeholder interviews, participants were given a communication board of a mealtime activity. Stakeholders gave suggestions on how to make some of the of the vocabulary and picture items more culturally appropriate. For example, the stakeholders suggested modifications to the symbols on the communication boards should portray people of color [black Africans] as well as contextually relevant stimuli for Vhavenda (e.g., using a basin to bath not a bathtub). Also, the symbol that represented an adult should be that of an adult and not of someone who does not look like an adult. The preliminary communication boards shown to stakeholders were amended according to the feedback obtained before undergoing expert review.</p>
Logistical planning and scheduling	<p><b>Scheduling:</b> The studies in the scoping review that reported on the frequency of training sessions showed that sessions were conducted weekly, monthly or twice a week. The duration of the training reported ranged from 75 minutes to 16 hours in total. In the current study, an initial training of 8 hours (delivered over the course of two days) was followed by eight guided practice sessions of about 45 minutes each. It was surmised from the scoping review that this length and frequency of training could realistically induce a change in behaviour.</p> <p><b>Delivery format:</b> From the review, only one study reported on the use of online training with caregivers, while the remaining studies implemented face-to-face training. The current programme was designed for face-to-face individual training. However, it had the potential to be adapted to work for group training and using online methods. Due to the Covid-19 pandemic, the researcher decided to have the programme designed in such a way that it would be easy switch from face-to-face to online methods due to the unpredictability of the situation with the pandemic.</p>
Outcomes (DVs) and measures used	<p>From the scoping review it became clear that in most studies both the parent and the child outcomes were reported. In most studies, behavioural outcomes were measured. Regarding caregiver outcomes, contingent responding or responsivity was reported in seven studies; creating opportunities also in four studies and providing augmented input in the majority (<math>n = 15</math>) of the studies. These skills/strategies were then presented to the cultural stakeholders, who indicated that they were appropriate for caregivers and that they would assist the caregivers.</p> <p>The caregivers who participated in this study were therefore be measured on the following outcomes (dependent variables):</p> <ul style="list-style-type: none"> <li>- Frequency of caregiver's responses to child in a 10-minute interaction during a daily activity.</li> <li>- Frequency with which the caregiver offers communication opportunities in a 10-minute interaction during a daily activity.</li> </ul>





Aspect considered	Description with reference to findings from the scoping review and/ or interviews with cultural stakeholders
<p>Social validity: Procedures to enhance it and measure it</p>	<ul style="list-style-type: none"> <li>- Frequency with which caregivers model the use of aided language input in a 10-minute interaction during a daily activity.</li> </ul> <p>Regarding child outcomes, a total of 13 studies reported on pragmatic outcomes, such as frequency of turn taking and frequency of initiation. In this study, concomitant outcomes (DVs) for the child will also be pragmatic skills, namely:</p> <ul style="list-style-type: none"> <li>- Frequency with which the child takes communicative turns in a 10-minute interaction during a daily activity.</li> <li>- Frequency with which the child uses augmented output in a 10-minute interaction during a daily activity.</li> </ul> <p>The concomitant outcomes were measured in this study because of the transactional relationship that exists between the caregiver and the child in a particular context. Though caregivers will be trained, it is of paramount importance to see the outcomes in the child as they are trained to make a difference in the child's communication in this case. Thus, this will reveal the hypothesised nature of influence the child has on the caregiver and vice versa during communication interaction to aid language and communication development.</p> <p>From the scoping review, it became clear that behavioural variables were measured through observational recording, using tools (e.g., record sheets) developed particularly for the study rather than through standardised measures. These measurement instruments were custom made for each study. This then influenced the researcher to develop her own recording sheets and procedural checklists for this study.</p> <p>Social validity is enhanced when the input of stakeholders (and specifically caregivers who are to be recipients of the training) is obtained before and during training - that is, if they have choice and voice in the way the programme is designed and administered. From the review, nine studies reported that parents made choices about and/or gave input on the training prior to its commencement. These included choices and input on the materials used (e.g., books), the activities during which parents applied their newly acquired skills, the vocabulary, the type of AAC, and the communication functions targeted. In three studies, focus group discussions were used before implementing the training program so as to ensure cultural appropriateness of the content.</p> <p>Various procedures were implemented to enhance social validity of the caregiver training programme in this study. The process involved input from cultural stakeholders to guide the development of the programme. When the programme was developed, an expert review process was done with SLPs practicing in Vhembe to determine the relevance, appropriateness, and potential effectiveness of the proposed CgTP. Furthermore, caregivers were asked to choose activities during which they would implement the intervention strategies. Lastly, the social validity of the programme was assessed using a questionnaire that participating caregivers completed.</p>



## 6.4 Overview of the CgTP: Materials and content

This section provides an overview of the first iteration of the CgTP as it was originally conceptualised. The first section will discuss the conceptualisation of the CgTP and how it was aligned to the Kent-Walsh and McNaughton (2005) instructional protocol. The CgTP was based (with adaptations) on the instructional protocol by Kent-Walsh and McNaughton (2005). The original protocol includes eight steps; however, this study will use six of the eight steps:

- (i) Pre-test and commitment to instructional programme - the researcher introduces the logistics of the training to the participants
- (ii) Strategy description - the researcher describes the strategy, its components and steps required to remember implementation of the strategy.
- (iii) Strategy demonstration- the researcher models the use of the targeted strategy as well as the components and skills needed to carry out the strategy. In the current study, a video of how other parents have used the strategies will be used.
- (iv) Verbal practice of strategy steps – caregivers practice the strategy steps verbally. They name and describe the steps of the strategy as outlined in the mnemonic.
- (v) Advanced practice and feedback (guided practice with feedback) - the participants get to practice the strategies in a natural environment where the instructor gradually fades prompts.
- (vi) Post-test and commitment to long-term strategy use – the researcher documents and reviews the participants’ mastery of the strategy and compares the results to baseline. In this study, intervention probes will be conducted during the guided practice and feedback step. Once caregivers reach the teaching criteria after 8 sessions, treatment will cease. After a withdrawal of three weeks, maintenance probes will be conducted.

The way in which the instructional protocol is adapted and taken up in the caregiver training programme is further outlined in Table 6.3.

### 6.4.1 Overview of the programme

The programme comprised of various activities during a pre-experimental and an experimental stage. Table 6.4 shows the initial programme design including the activities (with indication of scheduling and duration), as well as associated aims, a description of the activities, materials and equipment.





Table 6.4

*Overview of the Programme: Activities, Aims, Description of Activities, Materials and Equipment*

Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
<b>Pre-experimental stage</b>			
Pre-intervention information gathering and screening (3 to 3.5 hrs; 1 -2 sessions)	<ul style="list-style-type: none"> <li>- To ensure caregiver-child dyads (CCDs) meet the selection criteria</li> <li>- To gather biographic data on the caregiver and to screen the child</li> <li>- To allow caregivers to choose an everyday activity during which they want to implement the strategies that they will be taught during the study</li> </ul>	<p>Screening and gathering descriptive data</p> <ul style="list-style-type: none"> <li>- Administration of the biographical questionnaire (see Appendix E1) the Likert scale flash cards (see Appendix E2)</li> <li>- Completion of the Communication Matrix (Rowland, 2013) based on observations and/or caregiver report (see Appendix F)</li> <li>- Screening of picture recognition and representational abilities to determine if the child can recognise picture communication symbols. A procedural script (see Appendix G1) and recording form (see Appendix G3) will accompany the picture recognition task. The researcher will ask the child to point out pictures of items on the PCS board. This task will also allow the researcher to complete the VFCS (Baranello et al., 2020) to classify the child's visual function (see Appendix H).</li> <li>- Screening of the child's motor abilities using either the or mini MACS (Eliasson et al., 2017) or MACS (Eliasson et.al, 2006) scales (see Appendix I1-I2) depending on the child's age. The children will be given various materials (as listed to the right) to enable the research to observe and classify their fine motor skills.</li> </ul> <p>Caregiver choice of activity Caregivers will be asked to indicate an activity they would like to participate in for the duration of the study wherein videos will be taken throughout the study.</p> <p>The researcher will explain the purpose of the pre-intervention commitment statements. Then, the caregivers will be asked to complete and sign the pre-intervention commitment form. The researcher will provide participants with a copy of their form as reminder of their commitment.</p>	<ul style="list-style-type: none"> <li>- Biographical questionnaire (see Appendix E1) and the Likert scale flash cards (see Appendix E2)</li> <li>- Communication Matrix (see Appendix F)</li> <li>- The picture recognition and representational screening task (Appendix G2)</li> <li>- VFCS (see Appendix H)</li> <li>- MACS and/or mini MACS (see Appendix I2 and I1).</li> <li>- Various materials to elicit fine motor skills (see Appendix J):             <ul style="list-style-type: none"> <li>• My body peg puzzle (girl and boy)</li> <li>• Fine motor bear puzzle</li> <li>• Linking stars (blocks)</li> <li>• Zipper, snap button, and button/buttonhole on a pocket</li> </ul> </li> <li>- Video camera</li> <li>- Cellular phone or voice recorder</li> </ul>
Commitment to training	<ul style="list-style-type: none"> <li>- To ensure caregivers are committed to the training and implementation of strategies</li> </ul>	<p>The researcher will explain the purpose of the pre-intervention commitment statements. Then, the caregivers will be asked to complete and sign the pre-intervention commitment form. The researcher will provide participants with a copy of their form as reminder of their commitment.</p>	<ul style="list-style-type: none"> <li>- Pre-intervention commitment form (see Appendix K)</li> </ul>



Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
Tablet training (1 to 2 hrs, 1 day after screening)	- To train caregivers on how to operate the tablets for recording and sharing activities	- The researcher will use a script to train caregivers on how to operate the tablet and use the different applications (APPs). - The caregivers will be afforded the opportunity to practice recording videos and audio material. Thereafter they will practice sharing them with the researcher via Google™drive folder.	- Tablet training leaflet with a script in English and Tshivenda (see Appendix L1-L2) - Video camera, - Connex 10"1 tablet.
<b>Experimental stage</b>			
Collecting baseline probes (15-min per session)	- To collect baseline probes by videotaping the CCDs during interaction with their children with CCN.	- The researcher will use a script to instruct caregivers. Caregivers will be asked to engage with their child in the chosen activity in a way they would do normally. The caregivers will use the activity board for the chosen activity to ensure that baseline and intervention probes were conducted in exactly the same way, but no instruction provided on use of board. The researcher will record 15 minutes of the interaction between the CCD during the chosen activity. - A minimum of five baseline probes over five consecutive days will be collected for the first CCD. The frequency and scheduling of baselines for the other CCDs will be described in Section 7.3 of Chapter 7.	- Communication board (Activity board) (see Appendix M) - Baseline, intervention and maintenance probe procedural script (see Appendix N) - Video camera
<i>Two-day training:</i> Day 1, Session 1a (1 to 1,5 hrs)	<p><b>Aims</b></p> <ul style="list-style-type: none"> <li>- To create awareness and impart knowledge regarding communication and AAC to caregivers of children with CCN.</li> <li>- To teach Strategy 1: Aided language input (Point talking)</li> </ul> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>- Caregivers will understand what communication is.</li> </ul>	<p>A PowerPoint presentation (see Appendix O1 and O2) was prepared on the following topics:</p> <p><b>Communication</b></p> <ul style="list-style-type: none"> <li>- What is communication?</li> <li>- Why do we communicate?</li> <li>- How do we communicate?</li> <li>- What if one cannot communicate?</li> </ul> <p><b>AAC</b></p> <ul style="list-style-type: none"> <li>- What is AAC?</li> <li>- Who benefits from AAC?</li> <li>- Why should we use AAC (myths and realities explained)?</li> <li>- Which AAC systems are there?</li> </ul>	<ul style="list-style-type: none"> <li>- Day 1 training presentation (see Appendix O1-O2)</li> <li>- Video camera</li> <li>- Communication board (see Appendix O3)</li> <li>- Training booklet (see Appendix P1-P2)</li> <li>- Tablets</li> </ul>



Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
	<ul style="list-style-type: none"> <li>- Caregivers will understand the fundamentals of AAC.</li> <li>- Caregivers will understand and know how aided language input is implemented</li> </ul>	<ul style="list-style-type: none"> <li>- How can communication be facilitated using AAC strategies with a child with CCN?</li> <li><b>Strategy 1: Point talking</b> <ul style="list-style-type: none"> <li>- What is ‘point talking’?</li> <li>- How can you use point talking with your child with CCN in everyday activities?</li> </ul> </li> <li>- The researcher will present the slide show in the participant’s home, using a laptop. The researcher will put the computer on a table and display the slide show.</li> <li>- The caregivers will be given training booklets and stationery (pen and pencil) to make notes during the presentation.</li> <li>- The researcher will explain each point and encourage caregivers to ask questions and contribute at any time.</li> <li>- A number of reflection activities/interactive activities will also be part of the training- throughout the presentations, caregivers will be asked questions regarding their communication with their children and their children’s communication skills, such as how their children communicate, how they think they could improve their current communication with their child, how they will implement the strategy taught at home, challenges they foresee if they were to implement the strategy. The reflection tasks are usually done after a strategy has been explained in the presentation.</li> </ul>	
<p><i>Two-day training:</i> Day 1, Session 1b (1 to 1,5 hours)</p>	<ul style="list-style-type: none"> <li>- To recap content of the previous session</li> <li>- To teach Strategy 2: Responding to your child (contingent responding)</li> </ul>	<ul style="list-style-type: none"> <li>- A PowerPoint presentation was prepared on the following topics:</li> <li><b>Revision:</b> What was learnt in Session 1a?</li> <li><b>Strategy 2: Responding to my child’s communication</b> <ul style="list-style-type: none"> <li>- What does it mean to respond to your child’s communication and actions?</li> <li>- How can you respond to your child with CCN in everyday activities?</li> </ul> </li> <li>- The presentation will be conducted in a similar way as in Session 1a. In addition, the caregivers will watch a video</li> </ul>	<ul style="list-style-type: none"> <li>- Day 2 training presentation (see Appendix Q1-Q2)</li> <li>- Video camera</li> <li>- Communication boards (see Appendix O3)</li> <li>- Training booklet (see Appendix P1-P2)</li> </ul>



Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
<i>Two-day training:</i> Day 2, Session 2a (1hr)	- To recap content of the previous day	<p>and discuss the presence/absence of Strategy 2 as seen in the video.</p> <ul style="list-style-type: none"> <li>- After the presentation, caregivers will be given a homework activity to complete for the next day. They will be asked to practice point talking using a communication board provided and also to practice responding to their child during their everyday routine. They will be asked to provide the researcher with feedback on their experience of implementing the strategies, any challenges they had and how these challenges could be addressed. They will be asked to record this feedback using an audio or video recording on the tablet.</li> <li>- Caregivers will be asked to discuss highlights from the previous day's presentation.</li> <li>- Caregivers will be asked if they used any of the strategies from the previous day</li> <li>- Caregivers will be asked if there is any specific area that they need the researcher to repeat for clarity.</li> <li>- Caregivers will be asked these questions from the procedural script for Day 2 of training (see Appendix Q3)</li> <li>- Two role play activities will be done to practice the two taught strategies. In the first, the researcher will be a parent of a child with CCN and the caregiver will provide this parent with advice. On how to respond contingently to their child. In the second, the researcher will be a child with CCN during a mealtime activity. The caregiver will have to use point talking while interacting with the 'child'.</li> </ul>	<ul style="list-style-type: none"> <li>- Communication boards (see Appendix O3)</li> <li>- Training booklet (see Appendix P1-P2)</li> <li>- Presentation slides (day 2) (see Appendix Q1-Q2)</li> <li>- Video camera</li> <li>- Tablets</li> <li>- Day 2 training procedural script (see Appendix Q3)</li> </ul>
<i>Two-day training:</i> Day 2, Session 2b (1hr)	- To teach caregivers how they can create communication opportunities for their child with CCN in daily interaction.	<p>A PowerPoint presentation was prepared on the following topics:</p> <p><b>Strategy 3: Providing communication opportunities</b></p> <ul style="list-style-type: none"> <li>- How to offer children opportunities to communicate using 4 strategies:             <ul style="list-style-type: none"> <li>- Choice making</li> <li>- Offering small portions</li> </ul> </li> </ul>	As stated above



Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
<i>Two-day training:</i> Day 2, Session 2c (30 min)	<ul style="list-style-type: none"> <li>- To teach caregivers the importance of waiting for a child to communicate during interaction.</li> <li>- To teach caregivers the mnemonic O-Mo (Po)-Wa-Re as a strategy to remember how to implement the strategies (offering opportunities for communication, contingent responding and modelling aided language input)</li> </ul>	<ul style="list-style-type: none"> <li>- Offering brief turns</li> <li>- Making desired items inaccessible.</li> <li>- What to be aware of regarding communication opportunities</li> </ul> <p><b>Waiting</b></p> <ul style="list-style-type: none"> <li>- Importance of waiting for the child to communicate</li> </ul> <ul style="list-style-type: none"> <li>- A PowerPoint presentation was prepared on the following topics:</li> </ul> <p><b>Recap:</b> The researcher will remind the caregivers of the strategies that they were taught in the two days, namely responding to the child; point talking; offering communication opportunities and waiting.</p> <ul style="list-style-type: none"> <li>- <b>‘Putting it all together’:</b> A mnemonic of the strategies will be presented to the caregivers as a memory aid to help them remember the strategies, however caregivers are taught the mnemonic (O-Po-Wa-Re) to help them to discover.</li> <li>- The presentation will be conducted in a similar way as in Session 1a.</li> <li>- After the presentation, caregivers will be given a homework activity on the strategies to complete and send to the researcher via Google drive on the second day after training is completed. They will be asked to practice implementing the strategies at home. Verbal rehearsal homework activity: the caregivers will be expected to prepare a video of themselves explaining each of the taught strategies based on the mnemonic, as if they were teaching another caregiver.</li> <li>- Caregivers will be asked to share the video with the researcher via Google <sup>TM</sup>Drive after a two-day break after training. They will be asked to share the video on the morning of the second day.</li> </ul>	<p>As above</p> <ul style="list-style-type: none"> <li>- Verbal rehearsal of strategy recording form (see Appendix R)</li> </ul>
<p>Verbal practice of strategy steps (two days after training)</p> <p>Intervention probes - guided practice with feedback</p>	<p>Caregivers will present the mnemonic O-Po-Wa-Re and share the video with the researcher.</p> <ul style="list-style-type: none"> <li>- To provide caregivers the opportunity to practice the implementation of the strategies</li> </ul>	<p><b>Probes</b></p> <ul style="list-style-type: none"> <li>- During each session, the caregiver will conduct the same activity as during baseline, implementing the strategies</li> </ul>	<ul style="list-style-type: none"> <li>- Tablet</li> <li>- Communication boards (see Appendix M)</li> <li>- Video camera</li> </ul>



Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
(eight sessions; 1 hour each)	<p>with their children in a routine of their choice and to provide them an opportunity to review and reflect on their implementation.</p> <ul style="list-style-type: none"> <li>- To provide caregiver with feedback on their implementation.</li> <li>- To measure caregivers' progress in strategy implementation</li> </ul>	<p>taught with their child. They will be video recorded for 15 minutes. No prompting or feedback will be provided before or during recording.</p> <p><b>Guided practice/feedback</b></p> <ul style="list-style-type: none"> <li>- After the recording is completed, caregivers will be shown the video of them interacting with child.</li> <li>- They will be asked to reflect on their performance and the interaction. The caregiver will have to reflect on what they did, what they could have done more and where they could improve.</li> <li>- The researcher will then highlight some of the areas wherein the caregiver had an opportunity to implement the strategy.</li> </ul>	<ul style="list-style-type: none"> <li>- Guided practice and feedback sessions</li> <li>- procedural script (see Appendix S)</li> </ul>
Social validation (1 day after last guided practice session)	<ul style="list-style-type: none"> <li>- To socially validate the caregiver training</li> </ul>	<ul style="list-style-type: none"> <li>- The researcher will read the statements and populate the survey. The long questions will be transcribed verbatim from the audio record the post intervention evaluation interview with the caregivers.</li> <li>- The caregivers will be asked to respond to a statement that the researcher will read to them using the 5-point Likert scale that ranges from strongly agree to strongly disagree. Furthermore, long open-ended questions will be read to the caregiver by the researcher.</li> <li>- The researcher will ask the caregiver open-ended questions and ask them to provide details. One day after the last guided practice session, the researcher conducted a social validation and drafted post commitment statements with the caregiver.</li> </ul>	<ul style="list-style-type: none"> <li>- Post intervention survey (see Appendix T1)</li> <li>- Likert scale flashcards (see Appendix T2)</li> <li>- Audio recorder or cellular phone</li> </ul>
Post intervention commitment (1 day after last guided practice session)	<ul style="list-style-type: none"> <li>- To draft post intervention commitment statements with the caregiver</li> </ul>	<ul style="list-style-type: none"> <li>- The researcher will facilitate the drafting of post intervention commitment statements.</li> <li>- Caregivers will be guided to come up with a vision and mission.</li> <li>- They will write it down and send photos of the document to the researcher or they can do an audio recording for the researcher to transcribe and type it out.</li> </ul>	<ul style="list-style-type: none"> <li>- Post intervention commitment statement template (see Appendix U)</li> <li>- Paper</li> <li>- Pen</li> <li>- Pencil</li> </ul>
Maintenance probes (3 weeks post intervention)	<ul style="list-style-type: none"> <li>- To collect maintenance probes 3 weeks post intervention</li> </ul>	<ul style="list-style-type: none"> <li>- Maintenance probes will be collected in the same way as baseline probes. At least three probes will be collected.</li> </ul>	<ul style="list-style-type: none"> <li>- Video camera</li> <li>- Communication boards (see Appendix M)</li> </ul>



Activities	Aims and objectives	Description of activities	Materials and equipment <sup>a</sup>
probes ; 3 sessions of 15 min each)	<ul style="list-style-type: none"> <li>- To determine if the caregivers continued using the strategies after training ceased.</li> <li>- To determine the effect of the training post intervention.</li> </ul>	These probes will be collected daily three weeks post intervention	
Closure (last day of maintenance probes 30min -1hr)	<ul style="list-style-type: none"> <li>- To terminate the study with the caregivers and bidding farewell to the participants</li> </ul>	<ul style="list-style-type: none"> <li>- After collecting maintenance probes on the third day, the researcher will thank the caregivers for participating in the study.</li> <li>- The researcher will hand over the tablets to the caregiver officially for them to keep.</li> <li>- The researcher will hand over the post intervention statements framed and typed for them to keep.</li> <li>- The caregivers will be given the other communication boards (activity boards) that were designed for the study in a folder for them to use augmented language input with their children in other activities.</li> </ul>	<ul style="list-style-type: none"> <li>- Communication boards (see Appendix O)</li> <li>- Tablets</li> <li>- Framed commitment statements</li> </ul>

<sup>a</sup> Materials referred to here were provisional and the final materials will be in the Appendices



### 6.4.2 *Development of materials*

This section provides a description of materials and equipment that were developed for the pre-experimental and experimental stages of the study in order to facilitate pre-training information gathering, screening and pre-training commitment, training and measurement of the dependent variables, as well as for the assessment of social validity of the programme. All the materials that were made available to participants in this study were made available in both Tshivenda and English. Materials were developed in English by the researcher. The materials were translated from the source language (English) to the target language (Tshivenda) by a bilingual Tshivenda-English translator. The researcher, who is bilingual English-Tshivenda, verified the translations. Where there were discrepancies, the researcher consulted with the translator and the discrepancies were resolved in the meeting in order to obtain consensus. In this section, all materials that were specifically developed by the researcher will be described in more detail. Additional materials used in the study is described in Section 7.6 of Chapter 7.

#### 6.4.2.1 *Materials for the pre-experimental stage*

##### (i) Tablet Training Leaflet and Script

A tablet training script and tablet training leaflet in Tshivenda and English (see Appendix L1-L2) were developed to train the caregivers on how to operate the tablet. The researcher used the tablet training script to orientate the caregivers on how to use their tablet, software and applications (apps). The caregivers were given the leaflet to keep. Photographs of the tablet components and clip art icons for the applications accompanied the text to help caregivers who needed visual cues to understand the text. The leaflet was designed by the researcher and it covered the following topics: (1) introduction to the tablet; (2) switching the tablet on/off; (3) charging the tablet; and (4) describing what each app will be used for. Table 6.5 shows a summary of the topics and a description of the content.



**Table 6.5***Tablet Training Leaflet Content*

<b>Topic</b>	<b>Description of content</b>
Introduction to the tablet	Various components (hardware and apps) of the tablet are outlined in the leaflet such as: <ul style="list-style-type: none"> <li>- Charger cable</li> <li>- Media cable</li> <li>- Charging head</li> <li>- The tablet</li> <li>- Volume, power and keyboard port</li> <li>- How to remove the tablet from the case</li> <li>- Folder with apps and apps</li> </ul>
Switching the tablet on/off	The on and off buttons were illustrated
Charging the tablet	There was information on if the battery percentage is low, the caregiver can charge the tablet.
Applications (apps)	The apps that will be used in the study were outlined together with their functions. These included Google™ Drive, camera, voice recorder and gallery. The researcher will go through each app individually and explain what it will be used for, and how to use it. <ul style="list-style-type: none"> <li>- Google drive: It will be used to share voice notes and videos</li> <li>- Voice recorder: It will be used to record voice notes for the activities (reflection)</li> <li>- Camera: It will be used to record videos for the training activities</li> </ul>

## (ii) Biographical questionnaire

The biographical questionnaire (see Appendix E1) was drafted to obtain background information about the child and the caregiver, and to ensure that they met the selection criteria. The questionnaire was divided into four sections and Table 6.6 describes the different sections and also provides a theoretical rationale for why each section was included.

**Table 6.6***Biographical Questionnaire Description*

<b>Sections</b>	<b>Description</b>	<b>Theoretical Rationale</b>
Section A	A1- Identifying information of the caregiver A2- Identifying information of the child A3-A4- Information about the child's fine and gross motor functioning A5-A6- Information about the child's visual and hearing status A7- Educational information about the child	This is valuable in compiling background information of the participants and also to describe them. Information about motor skills, vision and hearing was gathered to ensure that the child met the set selection criteria, and was also used to interpret the effects of the intervention in a more nuanced manner.
Section B	Questions about the child's communication and communication behaviour. Information about modes, communication functions and communication partners (Bornman, 2008; Mutthiah, 2015)	This will be useful in understanding how the child communicates with the caregivers so as build on their already existing communication skills, as the children are already receiving SLP services in their respective hospitals and are taught strategies to improve speech-language and communication outcomes.



Sections	Description	Theoretical Rationale
Section C	Information about activities in which the child engages and participates.	The researcher was able to identify suitable activities in which the caregiver communicates with their child. This will help the caregiver to choose an activity that is suitable for them (Mutthiah et al., 2015).
Section D	Aims to gather information about the caregiver's awareness and interests of AAC.	This will provide information on the caregiver's knowledge, awareness and interests of AAC. The researcher will be able identify gaps in knowledge and awareness of AAC which will aid in introducing AAC to the caregivers and promote acceptance thereof (Mutthiah, 2015, Oosthuizen et al., 2018).

Sections B, C and D of the questionnaire were developed by adapting sections of the questionnaires used in other research studies and PhD theses (Bornman, 2008; Mutthiah, 2015). The questionnaire was administered as an interview. The researcher filled it in for the caregivers. The researcher developed flash cards that illustrated the rating scales that were part of the questionnaire (see Appendix G2).

### (iii) Picture Recognition Task and Representational Task

The researcher developed a symbol recognition task (see Appendix G2) in order to evaluate the child's ability to recognise PCS symbols. The researcher selected 20 PCS that were deemed transparent and depicted objects with which children were expected to be familiar. The choice of objects and PCS was based on the researcher's experience of being a Muvenda speech and language therapist and understanding what the child would be familiar with, the interview results with Vhavenda cultural stakeholders, and knowledge drawn from research in developing a core vocabulary of Sepedi-speaking children (Mothapo et al., 2021) as well as research from activity settings of typically-developing children in peri-urban contexts of South Africa (Balton et al., 2019). The study by Mothapo et.al (2021) on developing core vocabulary for Sepedi-speaking children was deemed a useful source as the core vocabulary was for use with preschool aged children, and this study focuses on that age range. Furthermore, the noun classes in Sepedi and Tshivenda are closely related and it is difficult to directly translate sentences from English to either of the languages in the same structure that English follows. Verbs or action words seem to dominate the languages. The PCS were colour printed on an A4 board within a 5 x 4 grid. Each PCS was accompanied by the written words in Tshivenda and in English on top of the symbol. The boards were laminated. A total of 12 of the symbols were designated as test items, while five were



designated as foils. Three further items were trial items. Table 6.7 shows the trial items, test items and foils.

**Table 6.7**

*Recognition and Representational level of PCS*

<b>Trial and test item</b>	<b>Tshivenda word</b>	<b>English word</b>
Trial item 1	Sofa	Couch
Trial item 2	Tafula	Table
Trial item 3	Bodo/pani	Pot
Foil	Muri	Tree
Foil	Mmbwa	Dog
Foil	Vhurotho	Bread
Foil	Wadiropo	Wardrobe
Foil	Radiyo	Radio
Test item 1	Goloi	Car
Test item 2	Bola	Ball
Test item 3	Bigiri	Cup
Test item 4	Phuleithi/tshigodelo	Plate
Test item 5	Lebula	Spoon
Test item 6	Vhurukhu	Pants
Test item 7	Bulatsho ya mano	Toothbrush
Test item 8	Tshisibe	Soap
Test item 9	Founu	Phone (cell phone)
Test item 10	Bayi/nguvho	Blanket
Test item 11	Tshidulo	Chair
Test item 12	Tshikipa	Shirt

The child was asked to identify a picture that corresponds to a word that the researcher will name using the carrier phrase “Show me a \_\_\_\_\_” or “Let’s show (title of caregiver) the picture of a \_\_\_\_\_” {“Kha ntsumbedze \_\_\_\_\_” or “Kha ntsumbedze \_\_\_\_\_ (title of the caregiver) tshifanyiso tsha \_\_\_\_\_}. A response would be deemed correct if the child pointed to the picture that corresponds with the label the researcher would call out. For the trial items, the child would be asked to point to a picture of an item that the researcher would call out. After a correct response, the researcher would move on to the next item. If the child did not point to the correct picture, the researcher would repeat the item and if the child still did not respond correctly, the researcher would show the child the picture of the item and move onto the next item. The test items would be presented in three rounds. In the first round, each item would be presented once, and the researcher would note correct and incorrect responses. In the second round, all items for which incorrect responses were received in the first round would again be presented once, after the researcher has asked the child to look



carefully at the board. The same process would be followed for Round 3, where items that were incorrect in Round 2 would be presented again.

The researcher would score the child's responses as either correct or incorrect on a response form (see Appendix G3). The researcher would score the task by dividing the number of items correctly identified over the number of total symbols presented, and then multiply by 100 to get a percentage of correctly identified symbols. In order to be included in the study the child should correctly identify 75% of the PCS.

(iv) Pre-intervention commitment form

A pre-intervention commitment form (see Appendix K) was developed in order to motivate the caregivers to participate in the study and commit to behaviour change post intervention. The form developed also highlighted the activities for the different stages of this study. The commitment form gave detailed information about all the steps that formed part of the study (including the durations of all steps) from pre-intervention to maintenance. The commitment form was provided in both English and Tshivenda. Caregivers were asked to commit to each step by ticking statements that were applicable to them.

#### 6.4.2.2 Materials for the experimental stage

Various materials were developed for the experimental stage. The materials include procedural scripts and procedural fidelity checklists for probes, the two-day training and guided practice with feedback sessions. Furthermore, training slides and training booklets were developed, as well as the post intervention survey. Table 6.8 shows materials developed by the researcher for each step of the experimental stage and these will be discussed in Sections (i) – (vii).

**Table 6.8**

*Activities and Materials Developed for the Experimental Stage*

<b>Activity</b>	<b>Materials developed</b>
Baseline probes	- Communication board (activity board) of the activity that the caregiver chose. - Procedural script and checklist for probes - Timed event recording form
Training Day 1 and 2	- Day 1 and 2 training presentation - Communication boards - Training booklet - Training scripts (Day 1 and 2) - Procedural fidelity checklist (Day 1 and 2)



Activity	Materials developed
Verbal practice of strategy steps	- Response scoring form: Verbal practice and rehearsal activity
Intervention probes	- Communication board (activity board) of the activity that the caregiver chose. - Procedural script and checklist for intervention probes
Guided practice with feedback	- Timed event recording form - Guided practice with feedback: Procedural script and checklist
Social validation and post intervention commitment Maintenance probes	- Post intervention survey - Post intervention commitment form - Communication board (activity board) of the activity that the caregiver chose. - Procedural script and checklist for probes - Timed event recording form

(i) Communication boards

Five activity-based communication boards were developed for five different activities (see Appendix M). These activity boards were used as examples during the two-day training. The activities included (1) daytime activities (i.e., watching TV, listening to music; listening to a story or singing), (2) a morning care routine, and (3) dressing and undressing, (4) bath time, and (5) mealtime activity. Two different boards were developed for dressing and undressing – one for a boy and one for a girl. These activities were chosen by the researcher based on the results of the scoping review and the stakeholders' interviews. From the scoping review, activities that were reported included reading books, snack time, leisure activities and unspecified daily activities. During the interviews, stakeholders were asked to outline activities that Vhavenda children engage in with their caregivers. They reported on child routines, adult-led activities (chores), physical activities, educational activities and play activities. The vocabulary chosen for the communication boards was informed by data gathered from the interviews with cultural stakeholders and Mothapo et al. (2020), as well as from the scoping review. Furthermore, the researcher selected the vocabulary for the activities included in this study based on the researcher's experience as a Muvenda providing AAC intervention to young children, and in alignment with literature for recommended practice for choosing vocabulary for young children using AAC (Beukelman & Light, 2020a, 2013; Fallon et al., 2003).

The activity-based boards were made using Boardmaker® 7 editor (Tobii Dynavox, 2021). The boards had Tshivenda and English labels. The cells on the board were 5cmx5cm



in size. A grid format of 5x4 (rows x columns) was used. The vocabulary on boards was arranged using the Goossens, Crain and Elder (1992) key to colour code, and categorise word classes. Pink shading was used for verbs; blue was used for descriptors; green for prepositions; yellow for nouns; and orange for miscellaneous words such as Wh- questions, exclamations, negations and pronouns. The boards were printed in colour on an A4 cardboard and laminated. Table 6.9 shows the proposed vocabulary for the activity boards.



Table 6.9

*Activity Boards Vocabulary*

<b>Morning routine</b>	<b>Dressing/ undressing</b>	<b>Daily play activity</b>	<b>Mealtime</b>	<b>Bath-time</b>
I / nne (ndi)	I / nne (ndi)	I / nne (ndi)	I / nne (ndi)	I / nne (ndi)
Help /thuso (thusa)	Help /thuso (thusa)	Help /thuso (thusa)	Help /thuso (thusa)	Help /thuso (thusa)
Finished /fhedza	Finished /fhedza	Finished /fhedza	Finished /fhedza	Finished /fhedza
More /habe/hafhu/engedza	More /habe/hafhu/engedza	More /habe/hafhu/engedza	More /habe/hafhu/engedza	More /habe/hafhu/engedza
You /Vhone (inwi)	You /Vhone (inwi)	You /Vhone (inwi)	You /Vhone (inwi)	Soap/Tshisibe
Toothpaste/ kholugeithi	Want /humbela	Want /humbela	Want /humbela	Facecloth/tshitavhula (vasilapi)
Toothbrush /bulatsho ya mano	Dressing up /ambara	Play /tamba	Thank you/ ndo livhuwa	Lotion/mapfura
Soap /tshisibe	Undressing/ bvula	Ball /bola	Full/ fura	Bath/sambelo (tshigodelo)
Face-cloth/ tshitavhula (vasilpi)	Tshikipa / t-shirt	Listen /thetshelesa	Pray/ rabela	Water/madi
Lotion/ mapfura	Jersey /dzhesi	Sit/ dzula	Hot/fhisa	In/ ngomu
Eyes/ mato	Socks/ masogisi	Open mouth / atama	Cold/rothola	Sit/dzula
Rinse /kulukusha	Hat /munwadzi	Close /vala	Out/ u bva	Wash/ tamba
Spit /kha pfe	Jeans/bokhathi	Throw /posa/ pose	Open mouth / atama	Oh-oh / yowee
Open /vula	Pampers* /leri/phamphasi	Story/ folktale/ ngano/ tshitori	Close / vala	Splash / hasha
Close /vala	Long /milapfu/ zwilapfu	Radio / radiyo	Not nice /a zwi difhi	Smear/dodza
Drink /u nwa/inwani	Short /mipfufhi/ zwipfufhi	Music / dzinyimbo/muzika	Hot /fhisa	Wipe/ phumula
Face /khofheni	Vest /vese	Television (TV)/ thivi	Cold/ rothola	It's cold/ku kho rothola
Smear /dolani	<b>(Specific to girls):</b>	Food/ zwiliwa	Wrap/ putela	
Wash /tamba	Rokho /dress	Tired /neta	Drink /u nwa/inwani	
Cup /bigiri	Tshikete /skirt	Enjoy/nice (phina/zwavhudi)	Water/ madi	
	Underwear/		Food/ zwiliwa	
	panties (phenti)			
		Underpants /		
		shothopheni		

\*"Pampers" is a South-Africanism for nappies



(ii) Materials for collecting probes

The dependent variables related to the child and the caregiver in this study were measured using observational probes. Probes were collected during baseline, intervention (in parallel to guided practice sessions) and three weeks post-training (maintenance condition).

A timed event recording form (see Appendix V) was developed to record the DVs for each caregiver-child dyad. This form was used to record the time and occurrence of target behaviour by the child or caregiver during the 10-minute interaction. The response recording form will also be used for inter-observer agreement.

A procedural script and checklist for collecting probes during baseline, intervention condition and maintenance conditions (see Appendix N) were developed. The procedural checklist included: greetings, informing the caregiver that a 15-minute video would be taken of her and her child interacting during the chosen activity, encouraging the caregiver to ignore the camera, and stipulating that the researcher should remain within view in the recording to ensure that she did not provide visual or other prompts to the caregiver or child.

(iii) Training Day 1 and 2

The PowerPoint™ 2019 slides (see Appendix O1-O2 and Q2-Q3) for the training included content based on different topics and videos to illustrate the content. The content for Day 1 focused on the following concepts: communication, communication development, AAC and contingent responding; while the content for Day 2 described and explained the following concepts: creating opportunities for communication, waiting and the mnemonic of the strategies.

Procedural fidelity checklists were developed for each day of training (see Appendix O4 and Q3). The checklists were divided into different sections: greetings, explaining of objectives, discussing the schedule of the day, the researcher introduces the topic, defines the concepts, check for understanding, afforded the caregiver an opportunity to ask questions and make comments, shows videos, researcher presented artefacts, facilitates discussions with the caregiver at the end of each presentation or topic segment and explains the activities for the day (i.e. reflection tasks, homework activities).

(iv) Response form for scoring verbal rehearsal of strategies

The researcher developed a recording form (see Appendix R) to record the caregivers' responses during the verbal rehearsal activity. In this activity, the caregivers were expected to





take a video of themselves explaining the strategies' mnemonic - O-Po-Wa-Re - to another caregiver. The response form included the following items: explanation of offering communication opportunities; examples of offering communication opportunities; explanation of modelling aided language input (point talking); provision of examples; explanation of waiting for the child to respond for 6-10 seconds; explanation of responding to the child's communication behaviour; providing examples of how caregivers can respond to a child; prompting the child if they do not respond and caregivers responding to the child's prompted response.

(v) Guided practice with feedback script

The researcher developed a script for the guided practice sessions (see Appendix S). These activities took place immediately after each intervention probe.

(vi) Post-intervention survey

Social validity is an important aspect in behavioural research because it assesses social acceptability of interventions and it is important in determining the success of the intervention (Ogilvie & McCrudden, 2017). A post-intervention survey (see Appendix T1) was developed for this study in order to evaluate the social validity of the CgTP and to obtain qualitative feedback on the training programme. The survey was adapted from the Treatment Acceptability Rating Form - Revised (TARF-R) (Reimers & Wacker, 1992). The original scale consists of 20 items that are rated on a 7-point Likert scale, related to the constructs understanding, willingness, severity, affordability, disruption or time, side effects, effectiveness and reasonableness. The post-intervention survey for this study had 17 closed-ended questions rated on a five-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = not sure; 4 = agree; 5 = strongly agree), that were related to the constructs, plus 15 questions that measured the various constructs understanding, willingness, disruption or time, side effects, effectiveness and acceptability (in lieu of reasonableness). The description of the constructs is provided in Table 6.10. The constructs 'severity' (i.e., severity of the child's impairment) and affordability were relevant for this study, as the severity of the child's impairment was not expected to change, and as the intervention did not cost the caregivers anything. The caregivers were expected to evaluate the CgTP on these constructs. In addition to closed-ended questions to evaluate social validity, the survey also contained four open-ended questions to obtain general qualitative feedback on the programme. The caregivers were expected to explain the reasons for their responses to the open-ended questions. Lastly, one closed-ended question asked caregivers to rate the overall quality of the training.

**Table 6.10***Post-Intervention Survey Description*

<b>Construct</b>	<b>Description of the construct</b>	<b>Item number on the survey</b>
Understanding	This evaluates the extent to which the caregivers understand the intervention	1
Willingness	This is the extent to which the family members are prepared to alter their routines to encompass and include the intervention.	9-10
Effectiveness	This evaluates the caregiver's perceptions of the durability of the changes; the likelihood of the intervention to be effectual and their confidence in the success of the intervention	2-5; 16
Reasonableness	This evaluates the reasonableness and acceptability of the procedures by the caregivers.	6-8
Side-effects	This is the extent to which caregivers believe there will be disadvantages to taking part in the intervention, the level of discomfort felt by the child and the likelihood of the undesired side effects.	14-15
Affordability	This includes the caregiver's perceptions on the cost and affordability of the intervention. This aspect was not included in the study because the caregivers were not expected to pay for anything related to the study.	Not included
Disruption/ Time	This evaluates the caregiver's perceptions about the amount of disruption the implementation of the intervention causes to everyday life and the time required to carry out the intervention every day.	11-13
Severity	This aspect evaluates the caregiver's perceptions of the child's behavioural difficulties in comparison with their peers.	17

Caregivers were given a choice to complete the form independently, on hard copy or electronically. Alternatively, the researcher administered the survey in an interview format; using flashcards for the Likert scale to assist caregivers to select the ratings (see Appendix T2).

(vii) Post-intervention commitment statement

A template for a post-intervention commitment statement (see Appendix U) was developed in order to motivate caregivers to continue using the strategies they were taught even after training. The template consisted of two headings and their definitions. There was also an example of how the caregivers could formulate their own post-intervention commitment statements.



## 6.5 Expert review

Expert review focused on consulting experts in the field of study to obtain an informed opinion about the relevance, appropriateness, and potential effectiveness of the proposed CgTP for a specific population (Tshivenda speaking caregivers of children with CCN living in Vhembe district and receiving SLP services in Vhembe). Relevance refers to the extent to which an intervention is appropriate for the intended population as defined in the programme. The second dimension is the extent to which the intervention is appropriate for the intended population, which may be defined by age, culture, or other factors (Fernández-Gómez et al., 2020; Kassam-Adams et al., 2015). The last aspect is estimated effectiveness. This refers to the extent to which evidence, theory, and expert judgment would propose that a specific intervention would successfully change the intended behaviour.

The SLPs practising in the hospitals in Vhembe district of Limpopo participated in an expert review. The SLPs years of experience working in Vhembe district ranges from 4-25 years. They worked in Vhembe since their community service year and have not left. There were four females and one male. They all spoke Tshivenda as their home language. The expert review was conducted electronically. The researcher sent the SLPs emails with information (see Appendix W1) and the expert review questions attached (see Appendix W2). The researcher shared the training material with the experts (PowerPoint presentations for the two-day training in both English and Tshivenda and communication boards) via Google Drive™. Experts were requested to provide feedback on: (a) the training procedure and (b) the content of the proposed training programme.

### 6.5.1 Results of the expert review process

The results of the expert review are summarised in Table 6.11. Only sections that the experts commented on are reported in the table.



Table 6.11

*Expert Review Results*

<b>Aspect of the CgTP</b>	<b>Feedback from the experts</b>	<b>Changes made</b>
Caregivers will be met individually at their homes and children will be screened. Suitable days for training will be agreed upon by the researcher and the caregiver.	<ul style="list-style-type: none"> <li>- The experts deemed this aspect appropriate, considering Covid-19 regulations.</li> <li>- The program was reported to be well structured and orderly.</li> <li>- Some families are large and there is a likelihood that training will be disrupted</li> </ul>	No changes were made. The researcher will continue as planned. The researcher noted the comment about some families being large and the likelihood for disruptions.
Training will be done individually by the researcher at each caregiver's homes over the course of two days.	<ul style="list-style-type: none"> <li>- The experts reported that training in the home was appropriate and beneficial because it allowed caregivers to participate well as they will be in their natural environment.</li> <li>- E3 reported meeting caregivers individually will allow the researcher to note and address their specific challenges without having to generalize proposed solutions or training tips. Furthermore, home-based sessions will expose the researcher to the home set-up and the kind of resources the child has, thus allowing for modification, customization of strategies to fit the individual's needs.</li> </ul>	No changes were made
The caregiver will be provided with a training booklet (see included)	<ul style="list-style-type: none"> <li>- The experts found the idea of a training booklet appropriate as this will provide the caregivers with a reference to go back to even after the training has lapsed.</li> </ul>	No changes were made
A PowerPoint presentation will be played and the researcher will explain the topics. Caregivers will be able to follow in the training booklets. Caregivers will have the opportunity to ask questions at any time.	<ul style="list-style-type: none"> <li>- E4 asked if the materials will be available in Tshivenda although the Tshivenda version was provided. The rest of the experts approved of the procedure and deemed it appropriate.</li> </ul>	No changes were made
Activities will be conducted as indicated on the PowerPoint and the training booklet.	<ul style="list-style-type: none"> <li>- E4 suggested that the researcher included training caregivers on how to make basic communication systems (i.e. communication boards, vests and etc.) as part of the training.</li> </ul>	The comment from the expert was duly noted, however, this study focused on training caregivers on strategies.
Breaks will be taken as appropriate. The total training time per day is expected to last 3,5 hours.	<ul style="list-style-type: none"> <li>- The experts highlighted that 3,5 hours was too long, and that the researcher should show when breaks will be taken.</li> </ul>	The researcher asked the caregivers to decide when they would like to take breaks at the beginning of training.



<b>Aspect of the CgTP</b>	<b>Feedback from the experts</b>	<b>Changes made</b>
Day 1: Session 1a: Communication (Slides 5 to 15) (Booklet: pp. 3 – 7) <i>Please comment on content in general</i>	<ul style="list-style-type: none"> <li>- E1 reported that since the caregiver already knows the challenges her child has regarding communication, the researcher could make content with yes/no options to get caregiver to participate during the presentation; so as to improve concentration.</li> </ul>	The suggestion regarding adding questions to the slides was taken up by the researcher. No other changes were made.
Day 1: Session 1a: Point talking (slides 31-35) (Booklet: pp. 13 – 15) <i>Please comment on content in general and appropriateness of the strategy.</i>	<ul style="list-style-type: none"> <li>- E2 suggested that these two phrases should be added onto the slides "<i>Other people can have negative attitudes toward child and exclude child</i>"  "<i>Resulting in low self-esteem</i>"</li> </ul>	
Day 1: Session 1b: Responding to your child's communication. (Slides 36-44) (Booklet: pp16 – 17) <i>Please comment on content in general and appropriateness of the strategy.</i>	<ul style="list-style-type: none"> <li>- These were suggestions made by E1:</li> <li>- <i>The researcher should add this onto Slide 39: "They point to"</i></li> <li>- <i>Maybe give them an example on the different ways of communication.</i></li> </ul>	The phrase was added onto the slide. No further changes were made.
Day 2: Day 1-Recap (Slides 5-11) <i>Please comment on content in general.</i>	<ul style="list-style-type: none"> <li>- E1 suggested the researcher adds a question to find out if the caregivers have questions from the previous day's session ("<i>I think people are more comfortable with asking questions, especially when a topic they are not familiar with is introduced</i>")</li> </ul>	The researcher planned for the recap. Thus, there was no need to add questions on the slides.
Day 2: Session 1a Offering opportunities for communication (Slides 12-24) (Booklet: pp. 18 – 20) <i>Please comment on content in general and appropriateness of the strategy.</i>	<ul style="list-style-type: none"> <li>- E1 suggested that the researcher include punishment and reward technique (for example: if the child request for help you give them and if they don't then you don't give them)</li> </ul>	No changes were made as punishment and reward were not part of the current study.
Communication boards - dressing / undressing	<ul style="list-style-type: none"> <li>- E2 suggested that clothes worn in summer and winter should be included on the communication board.</li> </ul>	No changes were made because caregivers were trained in winter. Thus, winter clothes were depicted on the activity boards
Tshivenda booklet	<ul style="list-style-type: none"> <li>- E1 commented on the typos on the Tshivenda version of the programme</li> </ul>	The typos were fixed as suggested by the expert.



<b>Aspect of the CgTP</b>	<b>Feedback from the experts</b>	<b>Changes made</b>
Reflect on the practicality and usability of the proposed programme within your context	<ul style="list-style-type: none"> <li>- The programme is practical and user friendly for our population or the kind of clients we work with.</li> <li>- Implementation of this program at an early age will benefit many caregivers who are frustrated by living with children with CCN.</li> <li>- This program will enhance the children's ability to convey their needs and wants.</li> <li>- AAC will be easy to master for the caregiver because the proposed training program will motivate them to use AAC at home.</li> <li>- The translated version of the training programme is a great idea because it will give the caregivers more understanding of what the programme entails in their home language regarding: what is required from them; what is expected from them and what they can do to better their communication with their children.</li> <li>- It is clear, well explained and interesting.</li> <li>- It gives caregivers and opportunity to learn different mode(s) of communication to engage with their children and it will give them less frustrations.</li> <li>- Children living with a disability will also experience a feeling of belonging and not feel left out (excluded) due to their special needs.</li> <li>- The questions that caregivers might have regarding the programme are well explained in a way that they will understand, and they will also understand the child better.</li> <li>- It addresses common challenges that caregivers encounter when communicating with their children.</li> <li>- The practical part is well planned especially because it will be carried out in the caregivers daily living environment.</li> <li>- It will then be easier for SLPs to assist caregivers to carry on with the strategies learned during this study.</li> </ul>	Not applicable



<b>Aspect of the CgTP</b>	<b>Feedback from the experts</b>	<b>Changes made</b>
Provide any further comments or reflections on the proposed training programme	<p>The experts suggested the following:</p> <ul style="list-style-type: none"> <li>- After training, caregivers should meet in a group and reflect on their experience of the training; they might have some suggestions that could also be helpful /useful to others.</li> <li>- For sustainability purposes, for all the learnt skills and techniques, there could be a need for an evaluation of the success of the program after some time interval; maybe on a monthly, quarterly or bi-yearly basis ensuring the learnt skills continue.</li> <li>- Looks clear and appropriate for rural caregivers.</li> <li>- It would be of much help if it may include brief training on how to make communication boards or apron from any materials available at home</li> <li>- Lots of caregivers may benefit a lot from this training even though they will need further supervision.</li> <li>- This is an excellent work that will close the gap.</li> </ul>	Suggestions were noted but were not part of the current study.



Overall, experts found most aspects of the CgTP appropriate, relevant and useful. The experts had a number of suggestions for changes to the CgTP. Some related to additions to the Power Point slide, as well as corrections of typos, and these suggestions were taken up and changes were made. Some of the suggestions made, though valuable, were not applicable to this study, such as teaching caregivers how to make communication boards of their own. Overall, the experts found the CgTP appropriate and feasible for the target population

## **6.6 Pilot investigation**

A pilot investigation was conducted to test the appropriateness and effectiveness of the recruitment process, materials proposed for the main investigation, data collection procedures, research methods and data analysis methods proposed for the investigation (Thabane et al., 2010). It included checking that the recruitment strategy was effective to identify suitable caregiver-child dyads (CCDs) who met the selection criteria; that the selection criteria were appropriate; that data collection procedures were feasible; and that the research assistant was able to record the dependent variables from the videos. Additionally, the pilot investigation provided information on the feasibility of using the procedural scripts and checklists. The reliability of recording the DVs was also assessed. The effectiveness of the programme was also preliminarily assessed. The pilot investigation was done with one CCD.

### **6.6.1 Participants**

The pilot CCD consisted of a 28-year old primary caregiver (mother) and her son aged 6;3 (years; months) diagnosed with an ID. The caregiver has a matric (Grade 12) qualification; her home language is Tshivenda and she primarily speaks it at home. The child received speech therapy services once a month at one of the hospitals that gave the researcher permission to conduct the research. The child functioned at Level III of the Communication Matrix (Rowland, 2011); Level I of the VFCS (Baranello et al., 2020); and Level 1 of the MACS. The child's hearing abilities were within normal limits. The child correctly identified 91,7% of the 12 PCS symbols during the PCS recognition task. The child is an inconsistent sender and/or receiver of information with their familiar communication partners, thus functioning at a Level IV of the CFCS (Hidecker et al., 2011). The aims, procedures, materials, results and recommendations of the pilot investigation are discussed in Table 6.12.





Child and caregiver were recruited as part of the recruitment for the main investigation (as described in Chapter 7, Section 7.4.2). Seeing that the population for this investigation was small and specific, all potential CCDs recommended by the therapists at the participating hospitals were first screened, and then one CCD was selected as the pilot CCD as they were available and they met the selection criteria.

### ***6.6.2 Aims, materials, procedures, results and recommendations***

The aims, materials, procedures, results and recommendations of the pilot investigation are summarised in Table 6.12. Seeing that recruitment and selection of participants took place before the pilot investigation (in order to judiciously select a pilot participant from all possible participants), the recruitment process, screening materials and procedures as well as the selection process were not part of the pilot investigation.



Table 6.12

*Pilot Aims, Materials/equipment, Procedures, Results and Recommendations*

Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine if video recordings can be successfully used to rate procedural fidelity as well as record DVs.	<ul style="list-style-type: none"> <li>- Canon Legria HF 806 video camera</li> <li>- Canon IXUS 185 digital camera</li> <li>- Ring light docking</li> <li>- Laptop</li> <li>- Procedural fidelity checklists (baseline, training, guided feedback/intervention and maintenance)</li> </ul>	<p>During the two-day initial caregiver training, the researcher took videos of the training with the caregivers using the Canon Legria HF806 video camera. The procedural fidelity of the training was scored based on playback of the videos by an independent rater. During baseline, intervention and guided practice and maintenance probes, the researcher docked the Canon IXUS 185 on the ring light facing the caregiver. On a tripod stand, the researcher docked the Canon Legria HF 806 video camera facing the child. After recording, the researcher removed the micro SD cards and load videos on the laptop to view. The researcher and the research assistant used the videos to record the dependent variables. The research assistant also used the videos to rate the procedural fidelity of the probes.</p>	<p>The videos enabled easy recording of procedural fidelity of the two-day training. A 95% adherence to proposed procedures was recorded for Day 1 and 100% for Day 2. The child did not like the Canon IXUS 185 digital camera because it has a retracting lens; he was scared of it regardless of where it was placed. The researcher eliminated it for this caregiver-child dyad. The researcher took videos with the Canon Legria HF 806 video camera and the Huawei Nova T5 cell phone. The child and the caregiver were sitting facing each other and the communication boards were visible when the caregiver was pointing, though in some instances the caregiver put the board closer to her chest, and only her hand movements showed that she was pointing to the pictures. The caregiver would sometimes speak softly in some videos, though she was audible. The research assistant would have to go back on the video to ascertain what was said and sometimes ask the researcher if he did not understand what was said. Initially, it was difficult, however, with practice, he was able to record and analyse the DVs.</p>	<p>The researcher will switch off the camera sounds for the main investigation. The Canon IXUS 185 digital camera will be switched on without the child seeing as it has great sound quality and doesn't require lighting. It will be docked on a tripod facing the caregiver and the Canon Legria will be docked on the ring light facing the child for the main investigation.</p> <p>Caregivers will be advised to put the communication boards in clear view of the camera even when they have to pick the boards up in an activity. The caregivers will also be asked to speak audibly during the activities.</p>



Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine the suitability of the procedure and content of device training for the caregiver	<ul style="list-style-type: none"> <li>- Device Training leaflet</li> <li>- Connex 10,1' tablet</li> <li>- Canon IXUS 185 digital camera</li> </ul>	<p>The caregiver was trained on how to use their Connex 10'1 tablet for basic sharing of audio and video clips, as well as using Apps like Google™ meet and Google™ drive. She was provided with a leaflet that shows the basic functions of the tablet for ease of reference.</p>	<p>The device leaflet was well understood by the caregiver. However, the pictures that were on the pilot participant's leaflet were general icons that represent the actual tablet's icons. Furthermore, the caregiver enjoyed the session on how to operate the tablet as she was practically sharing different files.</p>	<p>Training will happen in the same way in which it was conducted for the pilot participant with the main investigation participants. The researcher will use pictures of the actual icons that are on the tablet for the tablet leaflet for the main investigation.</p>
To determine the suitability of the materials, activities and procedures used during the two-day training	<ul style="list-style-type: none"> <li>- Power point presentations with embedded videos as well as a mealtime communication board for one of the activities during training.</li> <li>- Training booklet</li> <li>- Training procedural fidelity checklist</li> <li>- Canon Legria HF806 video camera</li> <li>- Computer for video playback</li> </ul>	<p>The caregiver was given a training booklet and a communication board. The researcher trained the caregiver by presenting the PowerPoint on the computer. The laptop was put on a table in their home. The researcher followed a script to train the caregiver on Day 1 and Day 2; the sessions were video-recorded. An independent rater completed the procedural checklist based on the video recordings to determine if all procedures were followed according to the Day 1 and Day 2 training checklist.</p>	<p>The researcher found the script for each day of training easy to follow. The caregiver responded well to the training. The caregiver asked questions, she participated in the discussions and demonstrations tasks. The caregiver gave input during the discussion activities; she reflected back on some of the general information presented on communication and AAC with reference to her son. She tried demonstrating some of the role play activities for augmented language input. She asked for fewer breaks on Day 1 and 2. She was keen on doing the homework activities. She found that using Google drive to share her recordings was a tall order, so she decided to download WhatsApp™ for her to share the homework activities with the researcher. She was engaged, showed interest and asked appropriate questions. She remembered the mnemonic for Day 2's homework, however, she was asked to explain the one strategy as she forgot to explain it though she identified it.</p>	<p>The researcher will follow the same procedure as that of the pilot participant for the main investigation.</p> <p>The researcher will print the training booklet on A4 pages and then put it a file presentation folder.</p>



Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine the appropriateness of the procedures used during guided practice sessions	<ul style="list-style-type: none"> <li>- Procedural checklist</li> <li>- Canon Legria HF 806 video camera</li> <li>- Computer for video playback</li> </ul>	Every day after recording the intervention probe, the researcher showed the video recording to the caregiver. The researcher used the procedural script to ask the caregiver specific questions about what they did during the session. Thereafter, the researcher provided the caregiver with feedback on their session	A problem with the Tshivenda booklet was noted as the page numbering and orientation was incorrect due to a printing problem.  The caregiver participated fully in the feedback sessions. The caregiver was able to highlight her strengths and weaknesses in each session. The researcher was able to provide the caregiver with feedback on her implementation. The caregiver followed through with the recommendations and improved in subsequent sessions.	The procedure followed for the guided practice sessions will remain the same for the main investigation.
To determine the reliability and ease of recording the dependent variables from the videotaped probes	<ul style="list-style-type: none"> <li>- Research assistant training script</li> <li>- Response form</li> <li>- Canon Legria HF 806 video camera</li> <li>- Computer for video playback</li> </ul>	<p>The researcher watched the video recordings of each probe every day and recorded responses and time stamps onto the recording sheets based on the dependent variables defined for this investigation.</p> <p>The research assistant was trained to record the dependent variables from videos that the researcher collected, according to the operational definitions and checklists provided. The research assistant and researcher watched a 10-minute video of the baseline session for the pilot participant. The researcher and the assistant independently recorded the variables and compared the results. The research assistant training continued until there was a 90-100% agreement in recording before the assistant independently recorded responses of the probes. Agreement</p>	The research assistant struggled to hear the caregiver's responses in some of the segments; however, having replayed the video twice he could make out what she said. There was a 60% initial agreement between researcher and her assistant for recording responses during research assistant training. However, training continued until 90 % agreement was reached.	The research assistant and the researcher will independently record responses for the main investigation using event time recording using time stamps. The acceptable difference in the time stamps recorded by the researcher and research assistant will be 5sec.



Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine the appropriateness of the operational definitions formulated to record the participants responses.	<ul style="list-style-type: none"> <li>- Response form</li> <li>- Canon Legria HF 806 video camera</li> <li>- Computer for video playback</li> </ul>	<p>between the research assistant and the researcher was calculated.</p> <p>The researcher and her assistant discussed the appropriateness of the operational definitions and amended them</p>	<p>There were inconsistencies in the way the research assistant and the researcher scored the DV 'Contingent responding'. It was also noted that the definition of the DV 'child using augmented output' was incomplete.</p>	<p>The operational definitions for contingent responding and the child using augmented output will be amended for the main investigation based on the observations from the pilot investigation.</p> <p>Contingent responding should include that the caregiver can comment on the child's communicative actions by asking questions related to the child's actions.</p>
To determine the effectiveness and suitability of the teaching and learning criteria.	<ul style="list-style-type: none"> <li>- Computer</li> <li>- MS Excel 2019 software</li> </ul>	<p>The learning criterion set was defined as an increase of 25% or more on all three caregiver DVs as compared to the highest point during baseline for three consecutive probes. A minimum of 5 guided practice sessions with concomitant probes would be conducted. Furthermore, a teaching criterion was also set – intervention would cease after eight guided practice sessions. The intervention phase would be introduced to the next CCD when either of the criteria mentioned above are met. The researcher would plot</p>	<p>There was a difficulty with the learning criterion set of a 25% increase on all the DVs as some were on 0 during baseline, and 25% of 0 cannot be calculated.</p> <p>The learning criterion was met for contingent responding and modelling aided language input after three sessions. However, for offering communication opportunities the learning criterion was met only on the 5<sup>th</sup> session. It was not possible to cease intervention after 5 intervention probes as per the learning criteria for the pilot</p>	<p>The definition of the child DV 'child using augmented output' should include adapted ways of pointing to the communication board. For example, the child can use a pen or the caregiver's finger to point to the communication board</p> <p>The learning criteria set and used in the pilot investigation will be removed for the main investigation because some DVs will be at 0. The learning criterion will be removed for the main investigation and only a teaching criterion will be used. The criterion is that the intervention condition will be stopped after 8 sessions</p> <p>The researcher will use a minimum of five baseline probes for all CCD's in the main investigation to increase chance for stable baseline data.</p>



Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine preliminary effect of the caregiver training	Graphic representations of data (see Appendix X)	The researcher determined level, trend and variability of the results, and also percentage of non-overlapping data (PND) and Improvement Rate Difference (IRD) in order to report the effect of the intervention on the dependant variables.	<p>participant as all three caregiver DVs showed a decelerating trend by the 5<sup>th</sup> intervention probe though the learning criterion was reached by the 5<sup>th</sup> session. The intervention probes had to continue until the 8<sup>th</sup> session as per the conditions of the teaching criteria.</p> <p>The baseline data was stable when using the 80%-25% stability envelope. The results of the effect of training on the variables are as follows:</p> <p><b>Contingent responding:</b> an increasing trend from baseline to intervention was observed. There was relative level change from baseline to intention, which showed improvement. The IRD scores showed large effect size from baseline to intervention (100%). PND show the intervention to be effective (100%).</p> <p><b>Offering communication opportunities:</b> There was a slight increase in trend from baseline to intervention. The IRD showed a large effect from baseline to intervention (75%). PND show the intervention to be effective (75%).</p> <p><b>Modelling aided language input:</b> showed variability in trend though there was an increase from baseline to intervention. The IRD scores showed large effect size from baseline to intervention (100%). PND show the intervention to be effective (100%).</p> <p><b>Child communicative turns:</b> showed an accelerating trend from baseline to</p>	<p>Due to a small number of datapoints, the researcher decided to use a 80%-30% stability envelope (Gast, 2018) due to variability of data with the DVs.</p> <p>To use NAP and Confidence Intervals to estimate the effect of the intervention for the main study.</p>



Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine if all procedures during training and measurement (probes) could be executed reliably	<ul style="list-style-type: none"> <li>- Video recordings of all procedures during training and measurement (probes )</li> <li>- Procedural checklists for probes, initial-two-day training, and guided practice</li> </ul>	The research assistant used the checklists to score adherence to proposed steps during baseline, intervention and maintenance probes (20% of recordings per condition), as well as during the initial two-day training and the guided practice sessions.	<p>intervention. The IRD scores showed large effect size from baseline to intervention (87,5%). PND show the intervention to be effective (87,5%).</p> <p><b>Child using augmented output:</b> showed an accelerating trend from baseline to intervention. The IRD scores showed large effect size from baseline to intervention (75%). PND show the intervention to be effective (87,5%).</p> <p>It can be inferred that caregiver training was effective for both the caregiver and child.</p> <p><i>Baseline probes</i> : 100% procedural fidelity was reached.</p> <p><i>Training Day 1</i>: 95% procedural fidelity was reached.</p> <p><i>Training Day 2</i>: 100% procedural fidelity was reached.</p> <p><i>Verbal rehearsal of the mnemonic</i>: the caregiver obtained 80% for the activity. 80% criteria was set for caregiver to move to the next step.</p> <p><i>Intervention probes</i>: 100% procedural fidelity was obtained</p> <p><i>Guided practice with feedback session</i>: 90% procedural fidelity was obtained.</p> <p>The caregiver was satisfied with the training overall</p> <p>Understanding (5-Strongly agree)</p> <p>Effectiveness (4- Agree)</p> <p>Acceptability in lieu of reasonableness ( 4-5 rating)</p> <p>Willingness (5-strongly agree)</p>	No changes will be made to the procedures for data collection and training
To evaluate the materials and process used for socially validating the training programme	<ul style="list-style-type: none"> <li>- Post intervention survey</li> <li>- Post intervention survey flashcards</li> </ul>	The caregiver participated in a post intervention survey to share her experiences of the training regarding the appropriateness of the content, logistics and strategies. The caregiver was asked questions in an interview format and the researcher recorded her responses on the survey.	<p>The caregiver was satisfied with the training overall</p> <p>Understanding (5-Strongly agree)</p> <p>Effectiveness (4- Agree)</p> <p>Acceptability in lieu of reasonableness ( 4-5 rating)</p> <p>Willingness (5-strongly agree)</p>	No changes will be made for social validation



Aim	Materials and/ or equipment	Procedure	Results or Outcomes	Recommendations
To determine the appropriateness of the procedures used for developing post intervention commitment statements by caregiver	<ul style="list-style-type: none"> <li>- Writing materials</li> <li>- Paper</li> <li>- Pictures</li> <li>- A4 photo frames</li> <li>- Laminator</li> <li>- Laminating sheets</li> </ul>	<p>The caregiver was asked to comment on the appropriateness, acceptability and if the intervention achieved its goal. The caregiver was asked to make suggestions for improvements on any aspects of the training.</p> <p>The participant was asked develop her own post intervention commitment statement as an activity. The researcher provided the caregiver with headings (vision and mission) and explanations of the sections of what to include in a commitment statement. The caregiver was asked if she would like to write or record on audio. The researcher transcribed verbatim what the caregiver said. The researcher then printed and laminated the statements and put them on an A4 photo frame for the caregiver.</p>	<p>No disruptions to daily activities and chores were reported. The caregiver showed that the strategies align with her daily activities.</p> <p>Side effects (2-disaree)</p> <p>The caregiver mentioned that she gained knowledge and skills pertaining to the communication strategies towards the child's communication; and an increase in communication was reported. The caregiver reported that the strategies were reasonable and acceptable by the caregiver.</p> <p>The caregiver also commended AAC and the founders. She reported that AAC is helpful. The caregiver requested a copy of the board that was used for screening from the researcher.</p> <p>The caregiver wrote down her vision and mission. She focused on the strategies she learned and what she wanted to achieve by using the strategies consistently, every day with her child. She outlined what she wanted to achieve and expected to achieve.</p>	No changes will be made in the procedures for developing post invention commitment statements.





### **6.7. Implications for the evaluation phase**

The expert review and the pilot investigation resulted in amendments being made to increase the likelihood that the programme and evaluation material and processes proposed were appropriate, relevant and useful. Overall, experts found most aspects of the CgTP appropriate, relevant and useful. Some changes that were made included additions to the PowerPoint slides.

To summarise the recommendations from the pilot investigation: it was recommended that the camera functions and placement should be judiciously considered so as to pose minimal interference in adult-child interactions; the use of adapted pointing would be acceptable for children who might not want to directly point at pictures during intervention; the procedure for recording the interaction was changed to event-time recording and the use of tallying was discontinued. Some of the operational definitions had to be amended for Phase 3. The pilot revealed the necessity of using a teaching criterion during the main investigation instead of using both the learning and teaching criteria; furthermore the stability envelope was also amended due to limited datapoints. The other measures, procedures, and material were deemed feasible and no amendments were made for Phase 3.

### **6.8. Summary**

The chapter set out the development of the CgTP. It commenced with outlining the aims of the development phase. Thereafter, the development of the programme was explained, including the framework that guided the process of development and the sources of input (theory and findings from Phase 1) that guided content of the programme itself. The first iteration of the programme was then introduced, including the content and materials. Following the development, an expert review was carried out electronically with five SLPs practising in Vhembe. The results were reported, and they showed that the CgTP was applicable for use and acceptable for the target population. The pilot investigation was then described, including the participating CCD, the aims, materials, procedures, results and ensuing recommendations for the main investigation.



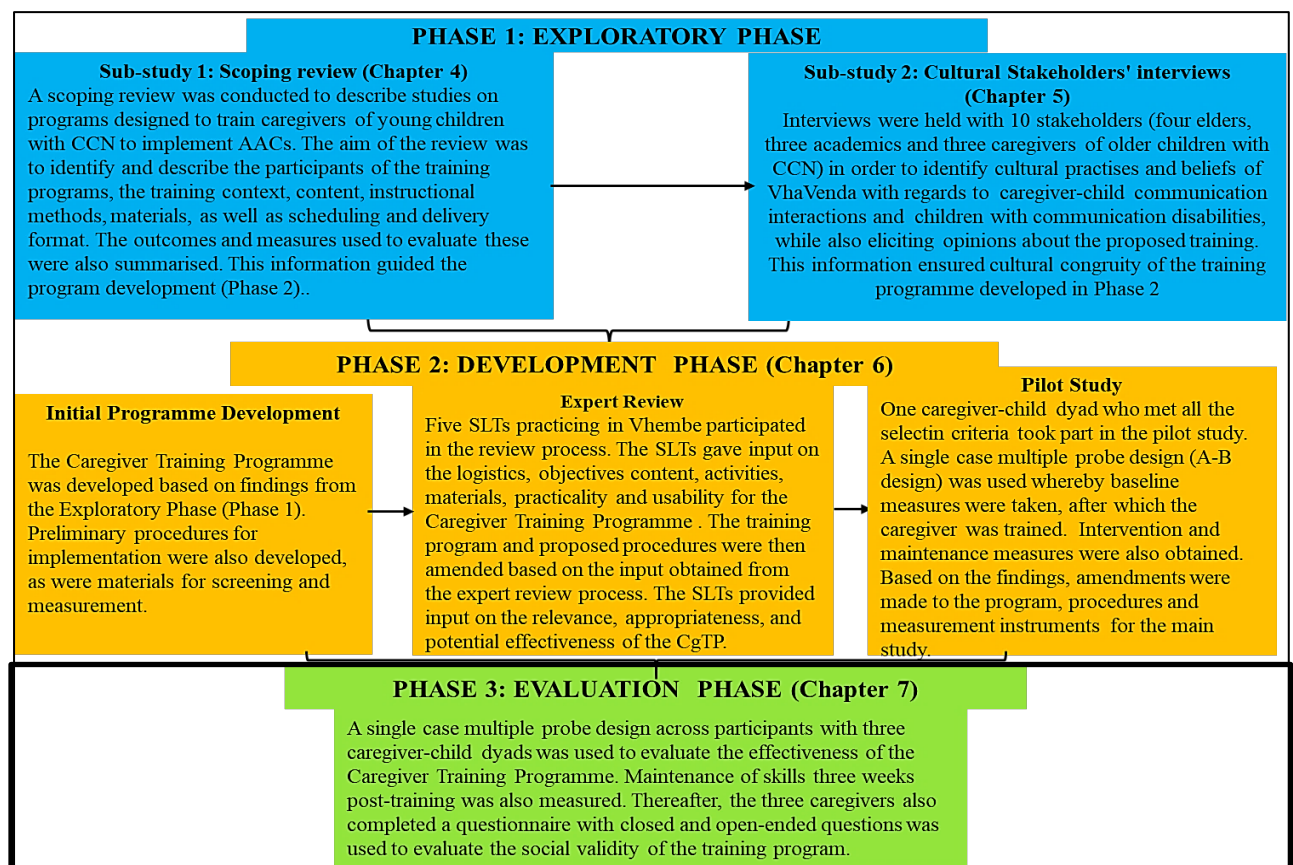
## PHASE 3: EVALUATION OF THE CAREGIVER TRAINING PROGRAMME - METHODOLOGY

### 7.1 Introduction

This chapter sets out the methodology for the third and final phase of this 3-phase mixed methods sequential design. This chapter focuses on the methods used for evaluation of the CgTP. The CgTP was designed and developed based on the data gathered from the exploratory phase (Phase 1) which comprised of a scoping review (Chapter 4) and Vhavenda cultural stakeholder interviews (Chapter 5). Expert input and a pilot investigation helped to further refine the programme during the development phase (Phase 2), as described in Chapter 6. Figure 7.1 shows the schematic representation of all three phases of the study; however, the focus of this chapter is on the methodology used during the evaluation phase (Phase 3).

**Figure 7.1**

*Overview of Methodology*





This chapter commences with setting out the aim and sub-aims of the evaluation phase. Thereafter, an overview of the stages of the evaluation phase is provided. The design used is then described, as well as the operational definitions of the dependent variables. A description of the sampling procedures, recruitment and selection of the participants follows. Descriptive details of the participants are also provided. The materials used during recruitment, screening and the experimental stage (training and measurement of DVs) are described. Furthermore, the data collection procedures are described, including procedures for the pre-experimental stage (including information gathering and screening, pre-intervention commitment and tablet training) as well as for the experimental stage (including baseline, intervention and maintenance probes, the two-day initial training, guide practice and feedback sessions, as well as post training commitment and social validation). The procedures used for data analysis are then described. Issues around reliability and validity are considered, and lastly, ethical considerations are described.

## **7.2 Aims of Phase 3**

### **7.2.1 Main aim of Phase 3**

The main aim of the evaluation phase was to implement and evaluate the effectiveness of the CgTP, designed to support caregivers of children aged 2-6 years with CCN who require AAC intervention living in the Vhembe district, in the Limpopo province.

### **7.2.2 Sub-aims of Phase 3**

In order to achieve the main aim of this phase, the following sub-aims were formulated:

- (i) To determine the effect of the caregiver training on the frequency of the caregiver's responses contingently to the communication behaviours of the child with CCN during a 10-minute interaction;
- (ii) To determine the effect of the caregiver training on the frequency of the caregiver's provision of communication opportunities to their child with CCN during a 10-minute interaction;
- (iii) To determine the effect of the caregiver training on the frequency of the caregiver modelling aided language input during a 10-minute interaction;
- (iv) To determine the effect of the caregiver training on the frequency of the child taking communicative turns during a 10-minute interaction;



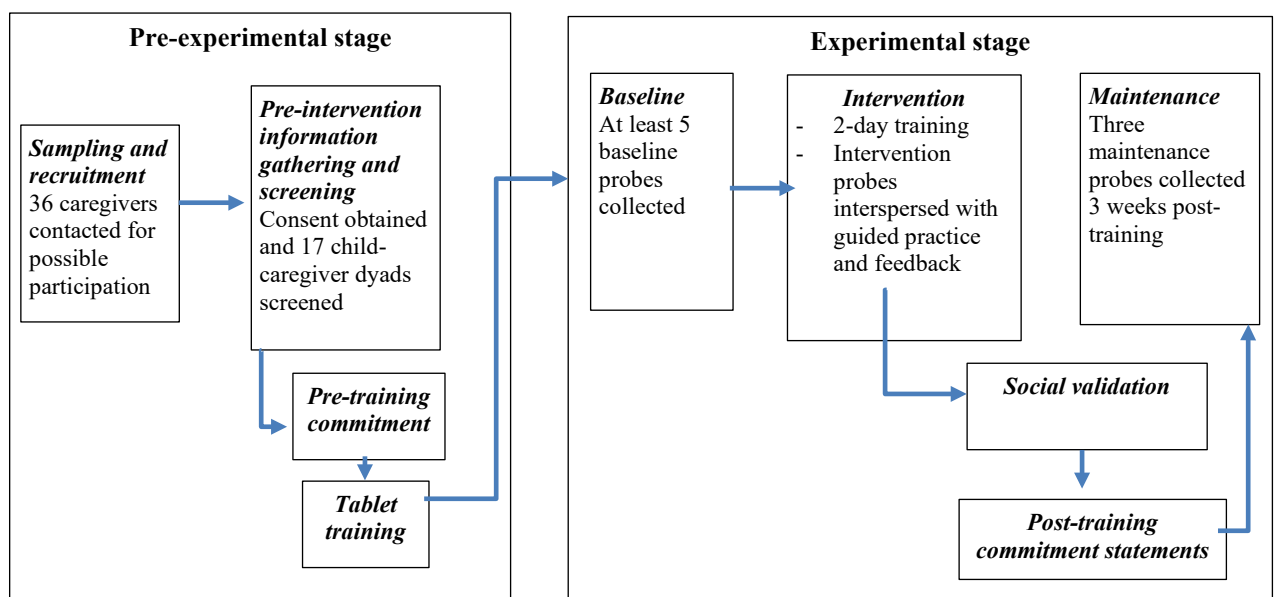
- (v) To determine the effect of the caregiver training on the frequency of the child using augmented language output during a 10-minute interaction with their caregiver.

### 7.3 Stages of Phase 3

The stages of this phase are set out in Figure 7.2.

**Figure 7.2**

*Stages of the Evaluation Phase.*



### 7.4 Design

A concurrent single case multiple probe design was used across three caregiver-child dyads to evaluate the effect of the caregiver training programme (CgTP) on the frequency with which caregivers of children with CCN implement three communication strategies in interaction with their children. The design was also used to determine the concomitant effects that the CgTP may have on two child communicative behaviours. A SCED multiple probe design is suitable for evaluating the effect of the intervention that is designed to cause gradual irreversible changes in behaviour. The design is used when the researcher aims to measure gradual changes in behaviour over a short period (Ledford, Gast & David, 2018; Tate & Perdices, 2019). Furthermore, it is also suitable when attempting to show an increase or decrease in a behaviour that is within the caregiver's repertoire (Gast & Ledford, 2009; Ledford & Gast, 2018). This research aims to show an increase in the frequency of certain



caregiver and child behaviours. The independent variable (IV) in this research is the caregiver training. Caregivers were taught how to offer their children communication opportunities, model aided language input, wait five seconds for the child to respond, and respond to their child's communication attempts. The caregiver dependent variables (DVs) were: (1) frequency of offering communication opportunities, (2) frequency of contingently responding to the child, and (3) frequency of modelling aided language input. Additionally, concomitant effects of the training on the child were measured by establishing (4) the frequency of communicative turns taken by the child (5) the frequency with which the child used augmented output during a 10-minute interaction. Table 7.1 shows the operational definitions for the DVs related to both caregivers and children.

**Table 7.1**

*Caregiver and Child-Related Dependant Variables: Operational Definitions*

Dependent Variables	Operational definition
<b>Caregiver-related variables</b>	
Frequency of caregiver's responses to child	The number of times a caregiver responds contingently to the child's communication attempts or communicative actions within a 10-minute interaction. This entails any action from the caregiver (verbal or nonverbal) that indicates that the caregiver has taken note of the child's communication act and has either understood it and responds appropriately to it verbally or non-verbally, or, alternatively, seeks clarification if the caregiver has not understood it. For example, the caregiver can make a comment in response to the child's communicative attempt or communicative actions, ask the child questions, direct a question to the child for clarity if the caregiver does not understand what the child wants, or the caregiver can comply with the child's request for action or for an item (Broberg et al., 2012; Shire et al., 2016; Yoder & Warren, 1999).
Frequency with which the caregiver offers communication opportunities	The number of times the caregiver offers the child an opportunity to communicate within a 10-minute interaction using one of the three taught strategies. In this investigation, caregivers will be taught to create communication opportunities by using three strategies: (1) <i>choice making</i> : the caregiver offers the child two options and provides an opportunity for the child to choose what they would like; (2) <i>offering small portions and brief turns</i> : the caregiver give the child a small portion of something (e.g., offering the whole item piece-by-piece to allow the child to request more of that item), or the caregiver provides a brief turn of an desired activity (e.g., roll a ball to the child and when the child rolls it back, the caregiver should wait for the child to request the ball before engaging in another turn allowing the child to request more); and (3) <i>making desired items inaccessible</i> : the caregiver places a desired item out of reach but within sight, thus making it inaccessible (e.g., by giving the child a transparent container that is tightly closed containing something that the child wants or holding a desired item out of the child's reach), in order to prompt the child to request the item (Campbell & Coletti, 2013; Schlosser et al., 2006; Sigafos, 1999).
Frequency with which caregiver models augmented language input	The number of times the caregiver points to the specific graphic symbol on the communication board while at the same time speaking the word or phrase which the symbol represents within a 10-minute interaction (Borgestig et al., 2017; Dada & Alant, 2009; Dada et al., 2019; Jonsson et al., 2011).



### Child-related variables

Frequency with which the child takes communicative turns	The number of times a child takes a communicative turn during a 10-minute interaction. In a child with CCN, a communicative turn is taken when the child transmits a message that is directed towards the caregiver, for example when the child vocalizes in response to the caregiver; or uses eye gaze towards an activity or object and then to the caregiver; or uses gestures to respond to the caregiver; or touches or leans towards the caregiver or smiles at the caregiver (Kent-Walsh et al., 2010; Muttiah et al., 2018; Rosa-Lugo & Kent-Walsh, 2008).
Frequency with which the child uses augmented output	The number of times a child independently points to a picture on the communication board within a 10-minute interaction. This could be after the caregiver asks a question or when the child initiates communication by pointing at a symbol on the communication board. The child can point to the picture in various ways such as pointing using their hands or fingers or using their caregiver's hand instead (Romski et al., 2010). For this investigation, only pointing that is judged to be purposeful and where the child clearly touches the picture symbol will be regarded as augmented output.

The dependent variables were measured by means of collecting probes under three different conditions (Ledford & Gast, 2018). These conditions were baseline, intervention and maintenance. In order to show experimental control and to establish whether a causal relationship exists between the IV and DV, the intervention was introduced in a staggered manner across the three CCDs. This means that intervention was introduced to CCD 1 once stability was seen for the DVs measured during baseline probes while the other two dyads remain in baseline. Initially, one baseline probe (B1) was collected on the same day for each of the three dyads. Then CCD 1 baseline probes were collected daily until stability was reached, where after intervention was introduced. Intervention consisted of two-day training, a two-day break, followed by eight guided practice sessions. Intervention probes were collected before every guided practice session. Baseline probes for CCD 2 and CCD 3 continued to be collected every fifth day, and also on the day that the first intervention probe for CCD 1 was collected. A teaching criterion was set for intervention probes to cease when eight guided practice sessions had been concluded. The teaching criterion was set to prevent negative reaction by the participants to repeated measurements (Schlosser, 2003). Three consecutive baseline probes were collected for CCD 2 once CCD 1 neared the end of their intervention phase. Once intervention ceased for CCD 1, intervention for CCD 2 commenced, while baseline probes were still collected for CCD 3 on every fifth day. Once again, three consecutive baseline probes were collected for CCD 3 once CCD 2 neared the end of intervention, and intervention for CCD 3 commenced once CCD 2 had completed intervention.





## 7.5 Participants

### 7.5.1 Sampling

Non-probability purposive sampling was used to select caregivers from the five hospitals. With purposive sampling, participants were selected based on the characteristics they possess based on the inclusion criteria. The caregivers who participated in the investigation were recruited from hospitals in Vhembe district. Typical case sampling method was used for this phase of the study as the participants needed to meet a stringent criteria (Elfil & Negida, 2017; Etikan et al., 2016; Leedy & Ormrod, 2016). Three dyads who met all the selection criteria, and who were recruited for the main investigation participated in the evaluation phase (Phase 3). In addition, a pilot investigation was conducted with one dyad who met the selection criteria proposed for the main investigation, prior to the main investigation. This pilot dyad did not participate in the main investigation.

### 7.5.2 Recruitment

Ethics approval to conduct this study was obtained from the Research Ethics Committee of Humanities, University of Pretoria (see Appendix A), as well as from the Limpopo Province Department of Health (see Appendix B1) and Vhembe District Department of Health (see Appendix B2). Permission to conduct research was obtained from the Head of the Ethics Departments of each of the five hospitals (see Appendix B3) who service Tshivenda-speaking children and their caregivers.

After obtaining permission from the hospitals, the researcher phoned the chief SLPs at the hospitals to request their assistance with caregiver recruitment and sent an email with details (see Appendix Y1). Information letters that included information about the research and consent forms for caregivers to give consent for SLPs to share their contact details with the researcher (see Appendix Y2) were emailed to the SLPs. In the same email sent to the SLPs, the researcher explained the selection criteria set out for this phase of the study. This was done so that the SLPs would approach caregivers of children with CCN on their caseloads who met the selection criteria to ask whether they would be interested in participating in the investigation. When a caregiver showed interest in participating in the training, the SLPs were asked to either give the caregiver the researcher's phone number so they could send a "Please call me" or "Call back" message to the researcher; or to request the caregiver's consent to share the caregiver's telephone number with the researcher. This consent was documented in writing by the SLPs.



When caregivers gave consent, the SLPs then shared the caregiver's number with the researcher. The researcher phoned the caregivers to give provisional information about the research, answer any questions, and confirm the caregivers' interest in taking part. The researcher also requested the caregivers' contact details for WhatsApp™ or email, so that she could send them electronic information letters regarding the research. The researcher sent each of the caregivers 500MB of data for accessing the information letter.

The SLPs at three of the five hospitals provided the researcher with 38 contact numbers of caregivers who were willing to participate and who had consented that the SLPs could share their contact details with the researcher. The SLPs from two hospitals did not respond to requests for recruitment. The SLP from one of the hospitals resigned after the emails were sent and no communication was received from the other hospital despite numerous telephonic attempts. The resident SLP was in meetings and network issues were reported. The researcher phoned the first 36 caregivers who were recruited from the three hospitals. Two of the caregivers could not be reached as their numbers remained on voicemail and they also did not respond to the text messages sent to them, thus leaving the researcher to recruit from 34 potential participants. The information letters with a consent form attached to it were sent to the 34 caregivers via WhatsApp™. Caregivers who showed interest in participating in the study gave verbal consent after they read the letters. The researcher phoned them to schedule an appointment for screening. Only 17 caregivers showed interest to take part in the research. On the day of the screening, the researcher indicated to the caregivers that only caregivers of children who meet the criteria will be phoned for data collection scheduling and also those who do not meet the criteria will be informed.

### 7.5.3 Selection criteria

Table 7.2 describes the selection criteria, justification for the criteria, and measurement used in order to ensure that both dyad partners (caregivers and children) met the criteria.

**Table 7.2**

*Selection Criteria for Caregivers*

<b>Criterion</b>	<b>Justification</b>	<b>Measure</b>
They must be the caregiver of the child aged 2-6 years with CCN	A caregiver is a parent or someone other than the parent who offers care to a child (Children's Act, 2005, S.3.18). Caregivers of children with CCN would typically take the child for therapy and know the child better than anyone. They also would typically	Biographical questionnaire (Appendix E1)





Criterion	Justification	Measure
Caregivers should live in an area where there is internet coverage	spend a significant amount of time with the child with CCN and therefore be able to implement intervention in daily routines since they interact with the child in these daily routines. This research targets caregivers of pre-school aged children with CCN who are communicating intentionally.	Biographical questionnaire (Appendix E1)
Caregivers should have literacy skills in Tshivenda or English at a minimum level of Grade 7	If there are lockdown restrictions at the time when intervention starts, then the researcher will have to use a tele-practice model to intervene and train caregivers. Caregivers will be expected to read the material given to them. According to Aitchison and Rule (2005), some countries in SADC consider an adult to have basic literacy when they have reached a grade level equal to Grade 4, however in South Africa a Grade 7 level is assumed as basic literacy level (Aitchison & Rule, 2005).	Biographical questionnaire (Appendix E1)
Caregivers should be willing to be video recorded for the repeated measures throughout the investigation	Only caregivers who consent to be video recorded will be included in this investigation. Video sessions of caregiver-child interaction need to be recorded for this investigation from baseline to post intervention conditions.	Consent form. (Appendix Y2)
Caregivers should be 18 years or older	Anyone who is 18 years or older does not require a parent or legal guardian to consent on their behalf. They are allowed to legally give consent in South Africa.	Biographical questionnaire (Appendix E1)
Caregivers must primarily speak Tshivenda to their child	This investigation is conducted in the Vhembe district in Limpopo and the programme is being developed to train Vhavenda caregivers. Vhavenda caregivers are the target population for this investigation.	Biographical questionnaire (Appendix E1)

Table 7.3 describes the selection criteria, justification for the criteria, and measurement used in order to ensure that the children meet the criteria.

**Table 7.3**

*Selection Criteria for the Children*

Criteria	Justification	Measure
The child must have CCN which implies limited speech (i.e. not more than 30 intelligible words).	The investigation aims to train caregivers of children with CCN to use aided language input in conjunction with naturalistic intervention strategies. Children with limited speech speak less than 30 intelligible words (Dowden, 1997).	Biographical questionnaire (Appendix E1)
The child must be aged 2-6 years old	This investigation targets caregivers of pre-school aged children with CCN.	Biographical questionnaire (Appendix E1)
The child must be receiving SLP services in any of the five hospitals in Vhembe that provided ethics approval	The child should be currently receiving SLP services in any of the hospitals in Vhembe as this is the target population for this investigation.	Biographical questionnaire (Appendix E1)
Child must be at a Level III (pre-symbolic level) or higher according to the Communication Matrix (Rowland, 2011)	Pre-symbolic communication comprises of communication through motor and vocal behaviours according to the Communication Matrix (Rowland, 2011). Children should demonstrate an intention to communicate for them to be included in the investigation so as to move them to a symbolic form of communication.	Communication Matrix (Rowland, 2011) (Appendix F)



Criteria	Justification	Measure
Child must function at a Level I-III of the Visual Functioning Classification Scale (VFCS) (Baranello et al., 2020)	The child must have adequate visual skills (corrected or not corrected) for them to be able to identify pictures on the communication board.	Visual functioning classification scale (VFCS) (Baranello et al., 2020). (Appendix H)
Child must correctly point out at least nine PCS symbols on a communication board containing 20 transparent symbols in a 5 X 4 grid in response to a verbal mand (“ <i>Show me the ...</i> ”). The researcher will request children to point out 12 of the 20 symbols, and children need to correctly point out at least 75% of these symbols (9/12 symbols).	The children should have adequate representational skills to recognise PCS. They should also have the visual and motor skills to point to 12 of 20 symbols in a 5 X 4 grid on an A4 landscape orientation board.	Picture recognition and representational task (Appendix G2)
Child must have functional hearing (with or without correction) to hear the caregivers speak to them during interactions.	Aided language input strategy uses augmentation of spoken language with AAC symbols. The children need to hear what the caregivers are saying while they point to make an association of the speech stimuli and the visual symbol.	Biographical questionnaire (Appendix E1)
Child must have adequate motor skills to select PCS. They must be at a Level I-III of the Motor Ability Classification System (MACS) or mini MACS (Eliasson et.al, 2006).	Children functioning at a Level I-III of the MACS (Eliasson et.al, 2006) or the Mini MACS will be included in this investigation because they will be expected to use direct selection to select the symbols. They will be expected to point using their finger or hand or caregiver’s hand or a pen or pencil or straw.	Motor Ability classification system (MACS) (Eliasson et.al, 2006) or the Mini MACS (Eliasson et al., 2017). (Appendix I1 and I2)

#### 7.5.4 Screening procedures

The researcher provided the caregivers with hard copies of the consent forms for them to read and sign. Thereafter the research and the caregiver went through the biographic questionnaire. The researcher read the biographic questionnaire and filled in the answers. The caregivers were given flashcards that depicted the Likert scale options for them to choose their options while the researcher recorded the responses on the questionnaire.

The researcher administered the PCS screening task to the child. This was followed by the fine motor activities and filling in the Communication matrix. The screening sessions were video-recorded so that the researcher could go through the recording to ensure nothing was missed and recording on the forms was accurate.

#### 7.5.5 Screening and selection of participants

A total of 34 caregivers were eligible for screening, however, after the telephone calls that were done by the researcher, 17 caregivers consented to screening . Seventeen caregivers provided written consent on the hard copy of the consent form for themselves and their children to participate in the research on the day of screening, though they were sent PDF



information letters via WhatsApp™. The researcher met each dyad at their home and screening procedures (see Section 7.5.4) were carried out. Table 7.4 shows the results of the screening (dyads that met and did not meet certain criteria).

**Table 7.4**

*Caregivers and Children Meeting/Not Meeting the Criteria*

Criterion	Met the criteria	Did not meet the criteria
<b>Caregiver Criteria</b>		
They must be the caregiver of the child aged 2-6 years with CCN	17	
Caregivers should live in an area where there is access internet coverage	17	
Caregivers should have literacy skills in Tshivenda or English at a minimum level of Grade 7	17	
Caregivers should be willing to be videotaped for the repeated measures throughout the study	17	
Caregivers should be 18 years or older	17	
Caregivers must primarily speak Tshivenda to their child	16	1
<b>Child Criteria</b>		
The child must have limited speech. They must not have more than 30 intelligible words.	17	
The child must be aged 2-6 years old	17	
The child must be receiving speech therapy services in any of the five hospitals in Vhembe who provided ethics approval	17	
Child must be at a Level III (pre-symbolic level) or higher according to the Communication Matrix (Rowland, 2011)	7	10
Child must function at a Level I-III of the Visual Functioning Classification Scale (VFCS) (Baranello et al., 2020)	17	
Child must correctly point out at least nine PCS symbols on a communication board containing 20 transparent symbols in a 5 X 4 grid in response to a verbal mand ("Show me the ..."). The researcher will request children to point out 12 of the 20 symbols, and children need to correctly point out at least 75% of these symbols (9/12 symbols).	8	9
Child must have functional hearing (with or without correction) to hear the caregivers speak to them during interactions.	16	1
Child must have adequate motor skills to select PCS. They must be at a Level I-III of the Motor Ability Classification System (MACS) or mini MACS (Eliasson et.al, 2006).	10	7

One dyad did not meet the criteria because the caregiver did not primarily speak Tshivenda to the child, mom spoke English and Sepedi, though the child met all the inclusion criteria. Nine of the 17 dyads could not be included because their children functioned lower than Level III on the Communication Matrix (Rowland, 2011); one of the children had visual difficulties; another child was living with uncorrected hearing loss though he met most of the criterion; eight children achieved less than 75% on the visual representation and PCS recognition task; and the children's motor skills were at Level IV-V on the mini-MACS and MACS scale. From Table 7.4 it is clear that seven dyads met all the selection criteria (based



on the both caregiver and child meeting the criteria). From the seven dyads that meet the criteria, one dyad participated in the pilot study, one dyad could not participate as the child was living with a suspected hearing loss for which they were awaiting management; three dyads were part of the main study and the other dyad could not participate in the study post screening as it was harvest season at their farm and the child and granny could not participate.

### 7.5.6 *Descriptive criteria*

Caregivers participating in this research were described according to their age, gender, relationship to child, home language, educational level, knowledge, awareness of AAC, communication skills and interests in AAC. Children who participated in this research were described according to their age, gender, diagnosis, education, motor, auditory and communication skills.

*CCD 1:* The caregiver was a 60-year old female, who is the grandmother and primary caregiver of her granddaughter aged 3;4 (year;month) living with cerebral palsy. The caregiver spoke Tshivenda to the child; she had a high school education (Grade 10). She reported that she did not know anything about AAC and was not aware of it. Her granddaughter attended an early childhood development centre in their community. She could produce the words *mma* (mom) and *hm* (yes), and attended speech therapy at the local clinic and one of the hospitals (Hospital A). She presented with adequate hearing and she was able to point to pictures using her hand though she was unable to walk independently. Her communication skills were at Level III of the Communication Matrix (pre-symbolic stage). They lived in a village that is almost 40km away from the hospital where they received rehabilitation services. They lived from in a 3-bedroomed house that had an indoor toilet that flushed. They obtained water from a tanker weekly and relied on rain water in their tank for laundry, cleaning and bathing. There were eight people in total living in the home (child, grandfather, grandmother, child's older brother and three cousins).

*CCD 2:* The caregiver was a 38-year old female, who is the mother and primary caregiver of her son aged 3;2 (year;month) living with spina bifida, hydrocephalus and epilepsy. The caregiver primarily spoke Tshivenda to the child and she had a matric (Grade 12). She further reported interest in learning and knowing more about AAC. The child did not attend an early childhood development centre, produced six intelligible words, namely *mma* (mom), *baba* (dad), *gugu* (granny), *jaja* (food), *nyanya* (water bottle), and *vivo* (cartoon). He



presented with adequate hearing; and he was able to point to pictures using his hand, though he was unable to walk independently. He was at Level III of the Communication Matrix (pre-symbolic stage). They lived in a peri-urban settlement that is almost 10km away from the hospital where they received rehabilitation services. They lived in a rented backroom bachelor pad that had a bedroom, kitchenette, bathroom with a toilet that flushed. There were four people in total living in the home (child, mother, father, child's elder brother).

*CCD 3:* The caregiver was a 39-year old female, who is the mother and primary caregiver of a 6;10 (year;month) old boy who was born prematurely at seven months gestation and was living with ID and a communication disorder as well as hemiparesis of the right side. The caregiver primarily spoke Tshivenda and English to the child. She had a Diploma in Information Technology. The child was attending a school for learners with severe ID due to the communication disorder despite the mother's requests to the district Department of Education to place him at a school where he would learn South African Sign Language (SASL). The child spoke 10 intelligible words; he received speech therapy services at one of the hospitals (Hospital B); he presented with adequate hearing; he was able to point to pictures using his hand; and he walked independently with a limp. He functioned at Level VI of the Communication Matrix (abstract symbol). They lived in a peri-urban settlement that is almost 8km away from the hospital where they received rehabilitation services. They lived in a 5-bedroomed house that had indoor toilets. There were five people in total in the home (child, mother, father, child's older brother and the house keeper).

## **7.6 Materials, instruments, and equipment**

### **7.6.1 *Material for Recruitment***

There was a hard copy and electronic version of both the information letter and consent form. The electronic version was sent to caregivers via WhatsApp™. The hard copy version was then provided to them during the face-to-face meeting when screening was conducted. The information letter contained a detailed overview of the research. The information letter and consent form (see Appendix C2-C3) were available in Tshivenda and English. The information letter had a reply or consent form attached to it. Caregivers were requested to indicate their willingness to take part in the research by signing the hard copy of the consent form.



## 7.6.2 *Instruments, Materials and Equipment for Screening*

The instruments that were specifically developed for this investigation were already described in Sections 6.4.3 of the previous chapter. Only the additional materials that were not developed by the researcher and were used for screening are described in this section.

### 7.6.2.1 *Communication Matrix*

The Communication Matrix (Rowland, 2013) can be used to assess communication skills of individuals. Any form of communication is accommodated and can be assessed on the matrix, including communication facilitated via AAC systems. Furthermore, it evaluates communication behaviours that are similar across all languages and cultures. The matrix was developed based on the early stages of communication development in typically-developing individuals. It covers seven levels that describe the increasingly complex communication behaviours in the initial stages of development. These levels are: (1) Level I- pre-intentional behaviours; (2) Level II- intentional behaviours; (3) Level III- unconventional pre-symbolic communication; (4) Level IV conventional pre-symbolic communication; (5) Level V- concrete symbols, (6) Level VI- abstract symbols, and (7) Level VII- language based communication. Plotting a person's skills on the Communication Matrix takes the intentionality (or lack of it) as well as the behaviours people use to communicate with others into consideration. In the online version of the Communication Matrix, the researcher entered the participants' demographic data with no identification details, and answered the questions about the client based on information she obtained during a recording of the child's interaction during the screening and also from questions that she asked the caregivers if she was uncertain. The programme then generated a report with results, giving details of the child's current functioning that can be used in goal setting. The online version allowed for ease of use, availability, accessibility and collaboration. Although the matrix is available in 12 international languages it has not been formally translated to Tshivenda or into any of the African languages. The matrix was validated for sensitivity to change, and was found to be sensitive to changes in individuals. For example, a study by Rowland and Schweigert (2000) on nonspeaking children with pervasive developmental disorders showed a mean gain of 13% in scores from beginning to the end of the school year. Gains in a larger group of 51 children (including youngsters with different severe and multiple disabilities) showed a mean gain



of 10% over the same period. The Communication Matrix has been used for children aged 1-18 years with various syndromes and neurodevelopmental disorders. Test-retest reliability was established with a sample of 19 children aged between 1 and 18 years and it was found to be 89%. Inter-rater reliability of 90% was also reported (Rowland, 2012). There are various studies that have used the Communication Matrix to determine level of communication of various individuals (Quinn & Rowland, 2017; Rowland, 2011; Rowland & Fried-Oken, 2010; Rowland & Schweigert, 1989, 2000; Vaughan, 2018).

The Communication Matrix was used to categorise the communication skills of the children in this investigation because research has shown that it is valid for various populations with heterogeneous diagnoses. Furthermore, it has been translated and used with different language groups and is readily available in those languages, though not in Tshivenda. A study has shown that it profiled the communication skills of non-verbal pre-linguistic children from different language groups (English and Spanish online), however there are other translations that have been used across 104 countries in the same way (Rowland & Fried-Oken, 2010). This investigation recruited caregivers of children who are intentional communicators and the Matrix caters for intentional communicators.

#### 7.6.2.2 *Manual Ability Classification System (MACS and mini MACS)*

The Manual Ability Classification system (MACS) (Eliasson et al., 2006) allows clinicians to classify children with CP according to how they are able to use their hands to handle objects in daily activities. It describes how a child with CP handles everyday objects rather than describing hand functioning. The MACS describes five levels of functioning and can be used for children 4-18 years. The Mini MACS (Eliasson & Krumlinde-Sundholm, 2013) was developed for use with children aged 1-4 years. The scale has been translated into 27 languages to date, though not in Tshivenda. It shows the versatility to move beyond language and cultural boundaries. The MACS' reliability index was measured by its intra-class correlation coefficient (ICC) between therapists (0.97), and its ICC comparing parent and therapist ratings (0.96). These values show good ICC. For the mini MACS, the ICC between two occupational therapists was excellent at 0.97 (95% CI 0.95–0.98), and the percentage of agreement between the occupational therapists was good (at 89%).





The inter-rater reliability (IRR) of the mini MACS was determined by having a parent and two occupational therapists administering it to each of 64 participants aged 1 to 4 years (Eliasson et al., 2017). The IRR between parent and Therapists 1 and 2 was 0.90 with CI of 0.84-0.99. The absolute agreement between parent and therapists was 65% and 69% respectively. The IRR between Therapists 1 and 2 was 0.97 and the absolute agreement was 89%. Additionally, IRR of age difference was done. For children up to 24 months this was based on 18 participants. It was found to be between 0.95 and 0.99 between parents and Therapist 1 and 2; the absolute agreement was 78% for the parents and 94% for the therapists (occupational therapists). For older children, 25 months and above, IRR was between 0.88 and 0.98. The results also showed moderate reliability between parents and Therapist 1 (60%) and Therapist 2 (64%) respectively, and a good reliability index between the two therapists (91%).

#### 7.6.2.3 Visual Function Classification System

The Visual Function classification system (VFCS) (Baranello et al., 2020) was used in conjunction with a picture recognition and representational skill assessment activity in order to describe the child's visual and representational abilities. The VFCS was developed and validated to classify visual abilities for children with CP in daily activities according to five levels (Baranello et al., 2020). The levels are described as follows:

- Level I: Uses visual function easily and successfully in vision-related activities;
- Level II: Uses visual function successfully but needs self-initiated compensatory strategies;
- Level III: Uses visual function but needs some adaptations;
- Level IV: Uses visual function in very adapted environments but performs just part of vision-related activities; and
- Level V: Does not use visual function even in very adapted environments.

The process of ensuring reliability of the VFCS involved ratings by 29 professionals, 39 parents, and 160 children living with CP. The VFCS yielded inter-rater agreement among professionals of 86% at 95% confidence interval levels, with test-retest reliability of 95%. Parent-professional inter-rater reliability on 39 children was moderate and weighted  $j=0.51$ . To date the VFCS has been translated to 16





languages, though not into Tshivenda. This shows that the VFCS is adaptable for use beyond cultural and language boundaries.

#### 7.6.2.4 Toys used for screening

Various educational toys were used during the screening in order to elicit child behaviour upon which their communication, visual and motor abilities could be classified using the classification systems described in Sections 7.6.2.1-7.6.2.3. A summary of the educational toys is provided in Table 7.5.

**Table 7.5**

*Toys used for Screening*

Toy	Description
<p>Two educational toys showing a boy and a girl with labels for body parts: head, eye, nose, mouth, ear, arm, elbow, stomach, hand, finger, leg, knee, ankle, foot, and toe.</p>	<p><b>Boy and girl peg puzzles</b> The puzzles were used to screen motor skills using the MACS or miniMACS. The peg puzzles have big pegs that can be managed by younger children 12 -18 months. These pegs can be easily manipulated by children who present with mild to moderate fine motor difficulties. The boy puzzle was used with male children and the girl puzzle with the female child. The children had to remove the peg pieces and then put them back. The researcher orientated the children before they were allowed to put together the puzzle.</p>
<p>A pile of colorful linking stars (bead chain) in various colors (red, yellow, blue, green, orange).</p>	<p><b>Linking stars</b> The linking stars were used during the screening as part of the motor activity. The children were orientated to how they can put together the blocks and break them down because the researcher was uncertain if the children have been exposed to toys like these.</p>
<p>A colorful puzzle board featuring a bear character and various fine motor skill pieces like a buckle, button, lace, snap, tie, and zip piece.</p>	<p><b>Fine motor skills puzzle board</b> The original puzzle had a buckle (belt and seat belt), button, lace, snap, tie and zip piece for children to practice their fine motor skills. This investigation used the snap button piece, zipper and the lacing piece, though the other pieces were available except for the actual button.</p>

#### 7.6.2.5 Equipment

Table 7.6 lists and describes the equipment that was used during screening.

**Table 7.6***Screening Equipment Description*

<b>Equipment</b>	<b>Description</b>
Canon Legria HF R806 and Canon Ixus 185 digital video cameras	Two video cameras were used to collect videos of the interaction between the caregiver and the child as a basis for answering the questions on the Communication Matrix. The researcher used one camera for this phase. The camera was positioned at an angle that allowed for the researcher to capture interaction between the caregiver and the child. The one camera served as standby due to load shedding and if the other one stopped working due to memory being full.
A ring light	A ring light was sometimes used to capture videos during the 10-minute interaction so as to get clear videos of the interaction between the caregiver and the child.
Laptop	The researcher uploaded videos taken during screening onto a laptop and used it for viewing these. Participant data obtained from screening was also summarised in MS Word and MS Excel files. The laptop was protected with a password that was known only by the researcher. All the file formats (MS Word, MS Excel based) were encrypted with a password and stored on this laptop. Relevant files were also shared with other team members via the drive.

**7.6.3 Materials and Equipment for the Experimental Stage: Training and Measurement**

Most of the training material was described in Section 6.4.2 in the previous chapter. However, the tablets and specific applications loaded onto the tablet that caregivers may have needed to use (in case of training having to take place remotely and sending homework activities) are briefly described in this chapter.

**7.6.3.1 Applications on tablets**

The participants were given Connex 10.1” 16 GB tablets to use in the investigation. The tablets had applications (apps) and software (an internet browser, video recording application and audio recording application) that helped with data sharing and recording of videos or audio that were used during this phase of the study. The researcher used her Student Google Gmail™ email address provided by the University of Pretoria and created three alias email accounts for each of the dyads. These email accounts were used to set up their tablets and allowed them access to Google™ Drive.

**7.6.3.2 Equipment**

The same equipment that was used during screening was also used during training and evaluation (see Section 7.6.2.5). Table 7.7 lists additional equipment that was used during training and measurement.

**Table 7.7***Training and Measurement Equipment Description*

<b>Equipment</b>	<b>Description</b>
Connex 10.1” 16GB tablet	Five Android LTE+Wifi tablet with a MicroSD slot, and a 2MP camera will be procured. Each caregiver received a tablet. The tablets were loaded with Apps (Google™ Meet and Drive). The tablets allowed the caregivers to record and share training activities and homework activities with the researcher.
Canon Legria HF R806 and Canon Ixus 185 digital video cameras	Two video cameras were used to collect videos of the interaction between the caregiver and the child. The researcher used the same camera for all participants during this phase. The camera was positioned at an angle that allows for the researcher to capture interaction between the caregiver and the child. The one camera served as standby due to load shedding and if the other one stopped working due to memory being full.
A ring light	A ring light was sometimes used to capture videos during the 10-minute interaction so as to get clear videos of the interaction between the caregiver and the child.
Laptop	The researcher uploaded videos onto a laptop and used it to upload files onto the drive for other members of the research team. The laptop was protected with a password that is known by the researcher and only she has access to it. All the other files formats (MS Word, MS Excel based) will be encrypted with a password and stored on this laptop.
Wi-Fi dongle	The researcher used a ZTE Wifi dongle to share data and transfer data from the Tablet to the Google drive.

**7.7 Procedures**

Covid-19 regulations set out by the South African Government, such as maintaining social distance between the caregiver and the researcher and wearing of masks, and, where possible, wearing personal protective gear and using sanitizer were observed when face-to-face training was conducted with the participants. The procedures included: (a) pre-training information focussed on gathering, screening and commitment to training; followed by tablet operation training; (b) collecting baseline probes ; (c) two-day training; (d) intervention probes and guided practice with feedback until teaching criterion has been reached; (e) conducting a post intervention survey to evaluate social validity and drafting post intervention commitment statements; and (f) collecting maintenance probes three weeks post intervention. Scheduling was arranged with caregivers in such a way that it was convenient for them, taking the constraints of the design into consideration. In general, sessions were scheduled on weekdays and Saturdays, but not on Sundays.



## 7.7.1 *Pre-experimental procedures*

### 7.7.1.1 *Pre-intervention information gathering and screening*

The researcher telephoned the caregivers who had consented to participate in the investigation individually to arrange a day and time to collect biographical information about them and their child. Screening of the child's abilities was conducted, in order to ensure that children met the selection criteria and also for descriptive purposes. This was done face-to-face with social distancing and wearing of face masks maintained based on the Covid-19 regulations. The screening tools that were used to screen and classify the children are described in Section 7.6.2. Table 7.8 shows the order in which the screening tools were administered.

**Table 7.8**

*Screening Tool Administration and Order*

<b>Tool</b>	<b>Administration</b>
Biographical questionnaire	The researcher asked caregivers questions from the biographical questionnaire in the form of an interview. The researcher asked the caregivers questions while completing the hard copy questionnaire.
Communication Matrix (Rowland, 2011)	The researcher video-recorded parent-child interaction that was to be used as a basis for entering data on the online Communication Matrix. She also posed some of the questions directly to parents, using a translated version of the Matrix questions (translated from English into Tshivenda by herself). Using this information, she completed the Communication Matrix online after the screening. The researcher populated the online English version based on the responses provided by the caregiver.
Motor Ability Classification System (MACS) (Eliasson et.al, 2006) or the Mini MACS (Eliasson et al., 2017)	The researcher provided the children with linking stars (blocks), peg puzzles, and a fine motor puzzle that had a zipping and snap buttoning activity. The children were encouraged to use these toys in order to observe and to classify their fine motor skills using the tool.
Picture Communication Symbol (PCS) Recognition Task	The child was asked to point to pictures on the boards using carrier phrases outlined in Section 6.4.3.1
Visual Function Classification System	The VFCS was completed by the researcher when the child was doing the PCS recognition task. The information gathered on the PCS task will help the researcher complete the VFCS.

Only four CCD dyads who met all the selection criteria were included in the investigation procedures described in the following sections. One of these CCDs could no longer participate in the investigation because the caregiver had to work shifts, while the remaining three participated in the main investigation.



### 7.7.1.2 *Pre-intervention commitment*

The pre-intervention commitment form is described in Chapter 6, Section 6.4.3.1 and attached in Appendix K. The researcher explained the form to the caregivers. They were then given the pre-intervention commitment form to fill out independently. For those who required assistance with writing, the researcher said the statements and waited for the caregivers to answer.

### 7.7.1.3 *Tablet Training*

The researcher conducted face-to-face training with the caregivers on how to use the tablet and the software included (Google™ Meet and Google™ Drive). Training was guided by a script that was embedded on the leaflet in English and Tshivenda (see Appendix L1-L2). Participants were trained on the operation of the tablet that they used for the training activities and homework. The tablets had folders with the child's name that housed all the apps. They were given a leaflet with visuals that corresponded to the icons on the tablet to support the tablet training (see Appendix L1-L2).

## 7.7.2 *Experimental procedures*

### 21. *Baseline probes*

Caregivers were asked by the researcher to select a daily routine from the options given to them (dressing/undressing routine, morning routine, mealtime, gardening bath time and leisure activity routine) or indicate an activity of their choice. This was done during the screening period and the caregivers were asked a few days before baseline probes were collected to ascertain their initial choice. Caregiver 1 chose a morning routine, Caregiver 2 a mealtime routine and Caregiver 3 a gardening (watering the garden) activity.

They were given the communication board corresponding to the activity they chose. However, no instructions were provided on the use of the boards. During baseline probes, caregivers were asked to interact with their child during the chosen routine in the same way they would interact typically for at least 15 minutes. The interaction was video recorded. The first 5 minutes were excluded from analysis. The caregiver and child DVs were recorded for the remaining 10 minutes of video recording.

A minimum of five baseline probes were collected. Baseline probes for the first session were collected for all three dyads on the same day. Thereafter, daily baseline probes for CCD 1 continued to be collected on the following days, until stability was



reached. Each probe was video recorded. The DVs (frequency of caregivers offering opportunities for communication, contingent responding, modelling aided language input, frequency of child taking communicative turns and frequency of child's pointing at symbols on a communication board) were recorded from the video recording using the customised event recording form. The number of times each DV occurred for each baseline probe was plotted on graphs. There were separate graphs for the caregiver and the child. The DVs were plotted using different colours and shapes for each DV. Visual analysis was done in order to determine level, trend and variability. Data were accepted as stable if 80% of datapoints fell within 30% of the stability envelope (80% - 30%) that was used to determine stability, as per the procedures proposed by Barton et al. (2018). Once stability was reached, intervention (training) for CCD 1 started, followed by collection of intervention probes conducted on a daily basis (except Sundays) before guided practice with feedback sessions. Additional baseline probes for CCD 2 and 3 were intended to be collected on every fifth day, as well as on the day when the first intervention probe for CCD 1 was collected. Once CCD 1 neared the teaching criterion, three consecutive baseline probes were collected for CCD 2 before transitioning into the intervention condition. A baseline probe for CCD 3 was collected on the day that the first intervention probe for CCD 2 was collected, whereafter baseline probes for CCD 3 were supposed to be collected in the 5-day rhythm, followed by three consecutive baseline probes for CCD 3 as CCD 2 neared the teaching criterion. Due to scheduling clashes the five-day rhythm for CCD 3 was not kept, with some intervals between baseline probes amounting to more than five days. However, as will be seen from the graph presented in Chapter 8, baseline probes were collected on both of the days when the first intervention probe was collected for CCD 1 and CCD 2, respectively, in order to show experimental control. Three consecutive baseline probes were also collected for CCD 3 prior to introducing intervention.

#### *7.7.2.2 Intervention*

Intervention consisted of initial training taking place over the course of two days, followed by a two-day break with a homework activity to be submitted on the morning of the second day of the break. Thereafter, eight intervention probes and eight guided practice sessions were conducted for each dyad. Intervention probes were always conducted first. Thereafter, the researcher viewed the recording made for the intervention probe together





with the caregiver, and encouraged self-reflection on the caregiver's performance. Feedback and suggestions were also provided.

## 22. Initial two-day training

Individual training was conducted for each caregiver. The initial training took place over two consecutive days in each caregiver's home. On the first day, two sessions were conducted (Sessions 1a and 1b). Within these sessions, the caregiver was taught theory on communication, AAC, contingent responding and modelling aided language input. On the second day, three sessions were conducted (Sessions 2a-2c). Caregivers were given an opportunity to recap the previous day's sessions and thereafter received training on strategies for creating communication opportunities and introduction to the mnemonic. More details about the contents of the sessions were provided in Section 6.4 of the previous chapter, and a detailed script is presented in Appendix O4 and Q3.

Day 1 training session took an average of an hour for two of the caregivers and an hour and a half for one. Day 2 training lasted for an hour to an hour and a half. This was due to the fact that caregivers wanted training without comfort breaks. When caregivers decided on a break, they would take 5 minutes at the most.

Each day upon arrival, the researcher greeted the caregiver and child. Thereafter the researcher set up the audio and video equipment where each participant designated (e.g., Caregiver 1 was in the lounge; Caregiver 2 was in the bedroom open area; and Caregiver 3 started in the kitchen then moved to the vegetable and flower patches); and commenced with the recording after which she presented the proposed programme for the day. The caregiver was invited to suggest any changes in scheduling, and a final programme was agreed upon.

The researcher started the PowerPoint presentations on her laptop and outlined the objectives of the day. She also informed the caregivers that they could stop the researcher at any time during the presentation if they required clarification or needed to ask questions. During Day 1 of the training, the researcher introduced the first topic, defined it, provided examples, showed videos and carried out activities with the caregivers. Thereafter, the caregiver and the researcher discussed the topic at hand for 10-15 minutes before moving on to the next topic once the previous one was exhausted. This cycle was repeated for all the other topics until the end of Day 1. The researcher then introduced a homework activity as



well as the reflection task. She then arranged a time to meet with the caregiver the next day; before bidding the caregiver, farewell and leaving.

For the second day of training (Session 2), the researcher followed all the steps pertaining to greetings and setting up of equipment. Afterwards, the researcher and the caregiver recapped on the previous day's sessions. If the caregiver needed to ask questions or ask for clarity, they could do this in the first 45 minutes of Day 2. After the recap and consolidation session, training continued in the same way in which it was done during Day 1. At the end of the training, the researcher explained the two-day break and the homework activity that the caregivers needed to submit to the researcher. The two-day break was chosen by the researcher as she wanted the caregiver to internalise the strategies rather than relying on immediate recall. The caregivers were told that they needed to record a video of themselves teaching another caregiver the steps that were captured by the mnemonic "O-Mo-Wa-Re". They sent this video to the researcher at 8am on the second day after the initial two-day training. Thereafter, the researcher greeted the participant and left.

During the two-day break, on the second day of the break, each caregiver sent a video of the homework activity (explaining the mnemonic). The researcher then used the timed event recording form for the activity (see Appendix V) to score the caregivers' performance based on the video recording they had sent, so as to determine if the caregivers could proceed to the intervention probes (guided practice with feedback sessions). The learning criteria were as follows: The caregivers had to be able to correctly explain at least eight of the 10 aspects to remember when implementing the O-Mo-Wa-Re sequence. If they had not reached the 80% criteria, the researcher would have discussed this with them telephonically. In this discussion, the researcher would have explained the steps that were incorrectly explained or omitted. Caregivers would then have been asked to re-do the video and to send it to the researcher by the afternoon of that day. The researcher would then have scored the videos again. However, all caregivers achieved more than 80% for their homework activity at first attempt.

#### 7.7.2.2.2 Intervention probes and guided practice sessions

These sessions commenced the day after the video-recording of the homework activity was received. Sessions were conducted daily, excluding Sundays, for eight consecutive days. On each day, the intervention probe was collected first. Caregivers were asked to engage with their child in the same activity that they had chosen for the baseline





condition. They engaged in the activity with their child for at least 15 minutes. The interaction was video-recorded. The researcher did not engage in any prompting or feedback during collection of intervention probes. A script for the intervention probes is provided in Appendix N.

Guided practice with feedback sessions was provided immediately after the intervention probe was conducted. The researcher and the caregiver analysed the video of the session together. This analysis happened in 5-minute segments (i.e., they watched 5 minutes at a time, and then stopped to discuss). The caregiver reflected on what went well (identified where they implemented each of the DVs), what could improve for the next session and where they could have used any of the strategies. The researcher added her observations about what went well and where the caregiver could improve. A script for the guided practice sessions is provided in Appendix S. Guided practice with feedback was also audio and/or video-recorded.

The DVs (frequency of caregiver offering opportunities for communication, contingent responding, modelling aided language input, frequency of child taking turns to communicate and frequency of child pointing at symbols on a communication board) were recorded from the intervention probe videos using the customised recording form. The number of times each DV occurred was plotted on graphs and visual analysis was done to determine level, trend and variability in the same way as in baseline condition. Furthermore, visual analysis was done, comparing baseline and intervention.

#### *7.7.2.3 Post intervention commitment*

The caregivers were asked to draft post-intervention commitment statements and this was done at the end of guided practice with feedback sessions. The caregivers were asked to use a template to create the post intervention commitment statement (see Appendix U). The post intervention commitment statements were framed for the caregivers and given to them as a reminder for them to continuously use the strategies. After completing the commitment statement, the researcher informed the caregiver that she would return to collect maintenance probes for three sessions after three weeks.

#### *7.7.2.4 Social validation*

Social validation is the process of assessing stakeholders' perspectives regarding the social value of the goals, methods and outcomes of the intervention (Schlosser, 1999; 2003).



An interview was conducted with each caregiver, administering the post intervention survey that was described in Section 6.4.3.2.6. This was done to assess the social validity of the caregiver training programme; obtain information on the perspectives of the caregivers regarding the intervention, the intervention components (goals, methods, outcomes), and how the intervention was carried out. Furthermore, their perspectives were obtained regarding whether any changes needed to be made to the programme. The constructs measured were understanding, willingness, severity, disruption or time, side effects, effectiveness and reasonableness; these were discussed in Section 6.4.3.2.6 and Table 6.10 in detail. The survey for the caregivers is given in Appendix T1.

#### *7.7.2.5 Maintenance probes*

Maintenance probes were collected daily for each dyad three weeks after the last guided practice session was conducted. This was done in exactly the same way in which baseline probes were collected. Three maintenance probes were collected for each dyad.

## **7.8 Data Analysis**

### **7.8.1 Recording of DVs**

The researcher recorded the caregiver's and child's communicative behaviours on the timed event recording sheets. The behaviours were recorded according to the operational definitions of the DVs for the caregiver and the child (see Table 7.1) respectively. The timed event recording form (see Appendix V) included the timestamp of when the DV was observed in the video. The DVs were recorded separately for caregivers and children and were counted to provide a measure of frequency of occurrence. The caregivers' DVs included frequency of contingent responses, frequency of offering communication opportunities and frequency of modelling aided language input, all measured within a 10-minute interaction. The child DVs were: frequency with which the child takes turns communicating and using augmented output during a 10-minute interaction. The number of occurrences of caregiver and child DVs per 10-minute session were counted and depicted on Excel sheets and then plotted on a graph.



## 7.8.2 Data Analysis

Data analysis for this phase of the study included doing a visual inspection (visual analysis), as well as estimating effect sizes using the non-overlap of all pairs (NAP) metric. The confidence interval (CI) was calculated to confirm the effect size.

### 7.8.2.1 Visual Analysis

Visual analysis was done to evaluate changes within conditions and across conditions. According to Lane and Gast (2013), visual analysis can be carried out within condition and between conditions. This was done by following the seven steps as suggested by Lane and Gast (2013) and Vannest and Ninci (2015). Table 7.9 shows the description of the steps for conducting visual analysis within conditions. Table 7.10 shows the steps for conducting visual analysis between conditions. Both tables also provide details of how these steps were executed in this investigation.

**Table 7.9**

*Steps for Within Condition Visual Analysis (Lane & Gast, 2013;2014)*

<b>Steps for within condition analysis</b>	<b>Application to the current investigation</b>
<b>Step 1:</b> Assign letters to each condition	The following letters were assigned: <ul style="list-style-type: none"> <li>- Baseline condition (phase) = A</li> <li>- Intervention condition (phase) = B</li> <li>- Maintenance condition (phase) = C</li> </ul>
<b>Step 2:</b> Count the number of sessions for each condition	The number of sessions were calculated and reported for each condition.
<b>Step 3:</b> Calculate the mean, median, range and stability for each condition	The mean, median and range were calculated. Then the stability and variation were determined. The stability was calculated based on the 80%-30% stability envelope in order to determine if the level of the DVs was stable or variable within each phase.
<b>Step 4:</b> Calculate the level of change within each condition.	The difference between the highest point and lowest point within conditions A, B and C was identified.
<b>Step 5:</b> Determine the trend	The split middle technique as described by Lane and Gast (2014) was used to determine trend within conditions.
<b>Step 6:</b> Determine the percentage of datapoints with instability for each condition	The difference between the first and last value within each condition was calculated.
<b>Step 7:</b> Evaluate the data paths	The free hand method was used to determine the data paths. This was done manually

The steps followed for between condition analysis are outline in Table 7.10.

**Table 7.10**

*Steps for Between Condition Visual Analysis (Lane & Gast, 2013;2014)*

<b>Steps for between condition analysis</b>	<b>Applied to the current investigation</b>
<b>Step 1:</b> Change in trend direction between adjacent conditions	The data trends between adjacent conditions were compared.
<b>Step 2:</b> Change in trend stability between conditions	The degree of stability (as calculated within a condition, as explained in Table 7.9) was compared across adjacent conditions.
<b>Step 3:</b> Level change between conditions	Calculations were done to determine (a) relative, (b) absolute, (c) median level change. The procedures as recommended by Lane and Gast (2013; 2014) were followed.
<b>Step 4:</b> Overlap of data between conditions	The NAP was calculated to determine percentage of non-overlap. The formula is outlined in Section 7.8.3.2.

#### 7.8.2.2 Non-Overlap of all Pairs (NAP)

The NAP calculation was done to estimate the effect of the intervention. This was calculated for baseline and intervention conditions (Parker & Vannest, 2009). This metric considers pairwise comparisons of the all the datapoints and it is not affected by variability as it takes into account all the datapoints. Each datapoint in the baseline condition is compared to each datapoint in the intervention condition. In the event of a variable that is hoped to be increased with intervention, a non-overlapping pair will have a baseline condition datapoint that is lower than the intervention condition datapoint. This is assigned a value of 1. A tied pair (baseline and intervention datapoints equal in value) is assigned a value of 0.5. An overlapping pair has a baseline condition datapoint that has a higher value than the intervention condition datapoint, and is assigned a value of 0. All values of the overlapping pairs are summed, and divided by the number of pairs to obtain a percentage of non-overlapping pairs (Parker & Vannest, 2009). The NAP metric was used to estimate the effect size, as it is not influenced by variability of data and outliers (Pustejovsky, 2018). Datapoints were variable within the intervention probes for this study. NAP values of 0.85-1.0 suggest large effects, 0.32-0.84 show medium effects and 0-0.31 show weak effects intervention (Parker & Vannest, 2009).

#### 7.8.2.3 Confidence interval (CI)

The Confidence Interval (CI) is a measure used to confirm if the effect sizes are true (Michiels et al., 2017). The 85% CI for NAP was calculated based on the bootstrapping technique, as recommended by Parker et al. (2009). The bootstrapping technique allows one



to estimate without assumption for a normal distribution, but by randomly simulating repeated observations from the actual data obtained. The CIs for NAP were calculated using the effect size calculator (*Single-case effect size calculator (Version 0.6.1) [Web application]*). <https://jepusto.shinyapps.io/SCD-effect-sizes>) by Pustejovsky et al. (2022).

## 7.9 Procedural fidelity and reliability of recording dependent variables

Procedural fidelity is the extent to which a procedure is implemented in the way in which the researcher intended. The researcher sought to increase procedural fidelity in this investigation by following a procedural script for all aspects of the intervention and measurement. Scripts were drawn up for baseline, intervention, and maintenance probes (see Appendix N), as well as for the initial two-day training (see Appendix O4 and Q3).

The procedural fidelity of both the measurement probes as well as the intervention procedures was determined for each CCD. A proportion of video footage amounting to 40% of the probes conducted during each condition (baseline, intervention and maintenance) per CCD, 40% of the training time per caregiver per Day 1 and Day 2 training, and 40% of guided practice sessions as implemented during the intervention phase were randomly selected and viewed by the research assistant who is a post graduate honours student and a bilingual English-Tshivenda speaker. The research assistant used a procedural checklist prepared for probes (Appendix N); Day 1 and 2 training (Appendix O4 and Q3) and for guided practice (Appendix S) to determine the number of procedural steps that were correctly executed. The percentage of correctly executed steps was calculated per session observed using the following formula:

$$\frac{\text{number of correctly implemented steps}}{\text{total number of steps}} \times 100.$$

To obtain an average percentage agreement per dyad and per phase, the percentage agreement scores of all the sessions observed for the particular dyad during the particular phase were summed and divided by the number of sessions. Results are reported in the following sections.

### 7.9.1.1 Procedural fidelity of the probes

The probes were subdivided into baseline, intervention and maintenance probes. Table 7.11 depicts percentage of agreement as a measure of procedural fidelity for the probes.

**Table 7.11**

*Mean Procedural fidelity of the Probes for all Participants and for all Conditions*

<b>Condition</b>	<b>CCD1</b>	<b>CCD2</b>	<b>CCD3</b>
Baseline probes	90%	89%	80%
Intervention probes	89%	89%	89%
Maintenance probes	100%	89%	88%

There was an agreement of more than 80% between the researcher and the research assistant. The percentage ranged between 80% and 100% for all the CCDs. This shows that the researcher followed most of the steps reliably when carrying out the probes.

### *7.9.1.2 Procedural fidelity of the training and guided practice sessions*

Table 7.12 shows the percentage of agreement for both training days and also for the guided practice and feedback sessions.

**Table 7.12**

*Mean Percentage of Agreement for Training and Guided Practice and Feedback Sessions*

<b>Training procedure evaluated</b>	<b>CCD1</b>	<b>CCD2</b>	<b>CCD3</b>
Day 1 Training	100%	100%	100%
Day 2 Training	100%	100%	100%
Guided practice with feedback sessions	100%	100%	100%

The percentage agreement of 100% was obtained between the researcher and the research assistant for all the CCDs. This shows that the researcher followed all training steps correctly as set out in the checklists.

## **7.9.2 Reliability of Recording the Dependent Variables**

### *7.9.2.1 Research assistant training*

The research assistant was trained to observe and record the variables as they occur from the video recording of each session, using a time stamp recording system that was documented on a timed event recording form (see Appendix V for recording template). Training was done using the video recording of the first baseline probe for the pilot participant. The research assistant was instructed to record the occurrence of the first variable with accompanying time stamps based on the last 10 minutes of the video. The researcher also independently recorded each occurrence of the first variable with time stamps for the same section of the video. The researcher and research assistant's recordings were then compared and behaviour recordings with accompanying time stamps that differed by no more than five seconds were counted as agreements, while recordings with time stamps that



differed by more than five seconds or occurrences of the variable that were recorded by one person but not the other were counted as disagreements. Where there was a percentage of agreement below 80%, the researcher and the research assistant discussed the differences. The research assistant and researcher then watched the video again and rescored the variable. Once a percentage of agreement of 80% and above was reached, the research assistant and researcher independently recorded the next variable, and the same process was followed. Therefore, the research assistant had ample opportunities to practice recording the variables and also had opportunities for discussion to ensure that he understood what was expected from him.

#### 7.9.2.2. *Timed event recording*

Timed event recording was used to enable the researcher and research assistant to determine inter-observer agreement of recording the dependent variables (see Table 7.1 for operational definitions) from the video recordings. Timed event recording consists of recording the occurrence of a dependent variable with a time stamp. This has been reported to be more reliable than other ways of recording variables observed from videos in intervention studies (Ledford & Gast, 2018; Walter et al., 2019). The researcher recorded all the dependent variables from the video recordings of all probes using the time event recording form. A proportion of video footage amounting to at least 20% of the probes conducted during each condition (baseline, intervention and maintenance) per CCD was randomly selected for viewing by the research assistant. Using the timed event recording forms (Appendix V), the research assistant independently recorded all dependent variables together with a time stamp of occurrence.

When the occurrence of a dependent variable was scored by both research assistant and researcher with no more than five seconds difference in the time stamp, this was considered an agreement. If one observer recorded a dependent variable whereas the other did not, or when there was a difference of more than five seconds in the recorded time stamp between the two observers, it was considered a disagreement (Ledford & Gast, 2018 p.193). The percentage of agreement as a measure of inter-observer agreement (IOA) was calculated per probe using this formula:

$$\frac{\text{number of agreements}}{\text{number of agreements} + \text{number of disagreements}} \times 100.$$

An IOA of 80% or more is generally deemed acceptable (House et al., 1981; Watkins & Pacheco, 2000).





The results are presented per CCD. For CCD1, sessions B1, I3, I5 and M3 were selected. Table 7.13 shows the IOA for the sessions for each variable.

**Table 7.13**

*IOA for CCD1*

Session/Variable	B1	I3	I5	M3
Contingent responding	90.8%	76.8%	81%	85.7%
Offering communication opportunities	100%	79.2%	100%	100%
Modelling aided language input	100%	87.5%	100%	83%
Child communicative turns	87.9%	87.4%	81.4%	85%
Child using augmented output	100%	100%	100%	100%

IOA for CDD1 ranged from 76.8% to 100% between the researcher and the research assistant for recording variables. The low scores of 76.8% and 79.2% were due to more behaviours recorded by either the research assistant or the researcher while and the other recorded less. These disagreements were resolved through a consensus meeting between the researcher and research assistant, as suggested in the literature (Malviya et al., 2021; Vollmer et al., 2008).

For CCD 2, the IOA was calculated for sessions B4, I4, I6 and M1. Table 7.14 shows the values of the IOA for CCD2.

**Table 7.14**

*IOA for CCD2*

Session/Variable	B4	I4	I6	M1
Contingent responding	91.4%	91%	84.9%	85.5%
Offering communication opportunities	100%	87.5%	100%	88.9%
Modelling aided language input	100%	80.8%	80.5%	81.7%
Child communicative turns	91.7%	88.7%	84.5%	88.9%
Child using augmented output	100%	83.3%	81.8%	100%

CCD 2's IOA per probe ranged between 80.5% and 100% for the various variables, showing an acceptable level of agreement for the recording of the dependent variables.

For CCD 3, the IOA was calculated for sessions B2, B6, I1, I5 and M2. Table 7.15 shows the values of the IOA for CCD3.

**Table 7.15**

*IOA for CCD3*

Session/Variable	B2	B6	I1	I5	M2
Contingent responding	79.3%	80.8%	90%	87.7%	95%
Offering communication opportunities	100%	100%	82.4%	100%	100%
Modelling aided language input	100%	100%	100%	93.3%	100%
Child communicative turns	80.1%	81.5%	80.8%	91%	90.3%





Child using augmented output	100%	100%	100%	85%	100%
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The IOA for CCD 3 ranged between 79.3% and 100% for the various variables. For most probes, an acceptable level of IOA was obtained. However, the agreement on the recording of contingent responding for B2 was somewhat low with an IOA 79.3%.

### 7.9.3 *Validity*

There are several threats to internal and external validity that need to be considered when employing single-case multiple-probe designs. Various precautions and safeguards were taken to minimise these.

#### 7.9.3.1 *Internal validity*

Internal validity was maintained in this investigation because procedures for the administration of intervention were similar for all the participants. The researcher and assistant(s) administered all procedures. In order to overcome some threats to internal validity such as attrition, experimenter bias and repeated testing, certain measures were taken in this investigation. Attrition was countered by recruiting at least five participants instead of three participants. However, the other CCDs could not make the intervention due to caregiver's work commitments. The researcher used a procedural script for the training so that it remained the same for all the participants, thus avoiding training drift. All the DVs were clearly defined and the same definitions were applied when recording the DVs from the probes used for baseline, intervention and maintenance. The use of scripts and measures for coding reliability between the researcher and the research assistant and inter-observer agreement was used to counter experimenter bias for this investigation. A teaching criterion was set as a safeguard against boredom and reactivity to repeated testing. Videos were taken for 15 minutes only during interaction so as to reduce reactivity and boredom of the participants. The researcher collected probes in baseline before providing training. No prompting or guidance was provided to caregivers during the probe, as participants served as their own control in SCEDs, making the need to recruit a control group obsolete.

The introduction of intervention to CCD 1 did not change the baseline performance of CCD 2 and CCD 3 (see graphs in Section 8.2; Figure 8.1 of the next chapter), and therefore, it is clear that experimental control was maintained. Though the sample was small, as is typical for SCEDs in most cases, the replication of the intervention across the three dyads at



three points in time and collecting baseline measures for the other dyads in a regular fashion counteracted some of the threats to internal validity. As the study employed a multiple baseline design that was concurrent, the vertical between participant visual analysis (CCD1 in treatment while CCD2 and 3 are in baseline) lends additional support that the IV is responsible for change in DV.

### 7.9.3.2 External validity

External validity refers to the extent to which results can be generalised to other settings and populations (Ledford & Gast, 2018). Caregivers were trained in their homes for this investigation. When familiar partners implement intervention in natural contexts, external validity is increased. Therefore, the primary caregivers of children with CCN were trained to implement interventions with their children at home. The heterogeneity of the population that is typical amongst children with CCN does pose a threat to external validity and limit generalizability. Participants were described in detail; thus, readers will be able to plausibly apply results to other dyads with similar profiles. However, producing evidence of external validity is not best achieved when using single case research as it is not the purpose, internal validity is, however, it was not the purpose of this study.

## 7.10 Ethical considerations

Ethics comprise of principles that underlie morality that can be applied to research (Leedy & Ormrod, 2014; McMillan & Schumacher, 2014). The following principles as set out in the Belmont report Appendix Volume II (1979) guided this investigation:

*Informed consent:* The participants were provided with information about the research in both Tshivenda and English. The information letter was sent to them by the SLP via WhatsApp™. If they showed an interest in the research, they either contacted the researcher directly or gave written consent that the SLP was allowed share their contact details with the researcher. After telephonic contact with the researcher, those that were still interested agreed to a face-to-face meeting with the researcher. At this meeting, the content of the consent letter was discussed with the potential participant and they had the opportunity to ask questions, before they were given an opportunity to consent or withhold consent for themselves and their child to participate in the research. By explaining the content of the information letter verbally, any barriers to informed consent that may have resulted from lower literacy skills were circumvented. The researcher took special care to explain the time requirements of the



research, ensuring that she clearly outlined the time commitments that caregivers were expected to make.

*Voluntary participation:* The right to voluntary participation was set out in the information letter. The researcher also reminded participants during the explanation of the contents of the letter that they were entitled to voluntarily participate in this research and that they were allowed to withdraw from the research at any time, without negative consequences, or punishment of any sort. They were assured that non-participation would not disadvantage them in any way. If participants should choose to withdraw, their data would not be used. Participants were once again reminded of these rights at the beginning of each day of training. However, no participant withdrew.

*Protection from harm and respect for participants:* This research did not involve any invasive procedures and there were no risks of physical harm associated with participation. However, some unintended form of harm could have been caused as intervention procedures took up time and required effort from the participants. The researcher periodically assured caregivers of their right to withdraw. The caregivers' schedules were respected and sessions were only scheduled when it was convenient for them.

*The right to privacy:* The confidentiality of the participants was maintained in this research as they were provided identification numbers as a form of protecting their identity. Their names were thus not written on any of the forms; however, the researcher created a separate file that was password-protected with a register and the names of the participants. The file was stored in a different folder from the one with the rest of the information pertaining to this research. The research assistant signed a confidentiality agreement obliging him to not share any information about the videos viewed for procedural fidelity and reliability ratings with anyone.

## 7.11 Summary

This chapter commenced with setting out the aim and sub-aims of the evaluation phase. An overview of the stages followed during the evaluation phase was provided. The single-case multiple-probe design that was used was described, as well as the operational definitions of the dependent variables. The sampling procedures, recruitment and selection of the participants were described, and descriptive details of participants were given. The materials used during recruitment, screening, and experimental stage were described. Furthermore, the data collection procedures were described, including procedures for the pre-



experimental stage (including information gathering and screening, pre-intervention commitment and tablet training) as well as for the experimental stage (including baseline, intervention and maintenance probes, the two-day initial training, guide practice and feedback sessions, as well as post training commitment and social validation). The procedures used for data analysis were then described. Issues around reliability and validity were considered, and lastly, ethical considerations were described



## . CHAPTER 8

### PHASE 3: EVALUATION OF THE CAREGIVER TRAINING PROGRAMME – RESULTS

#### 8.1 Introduction

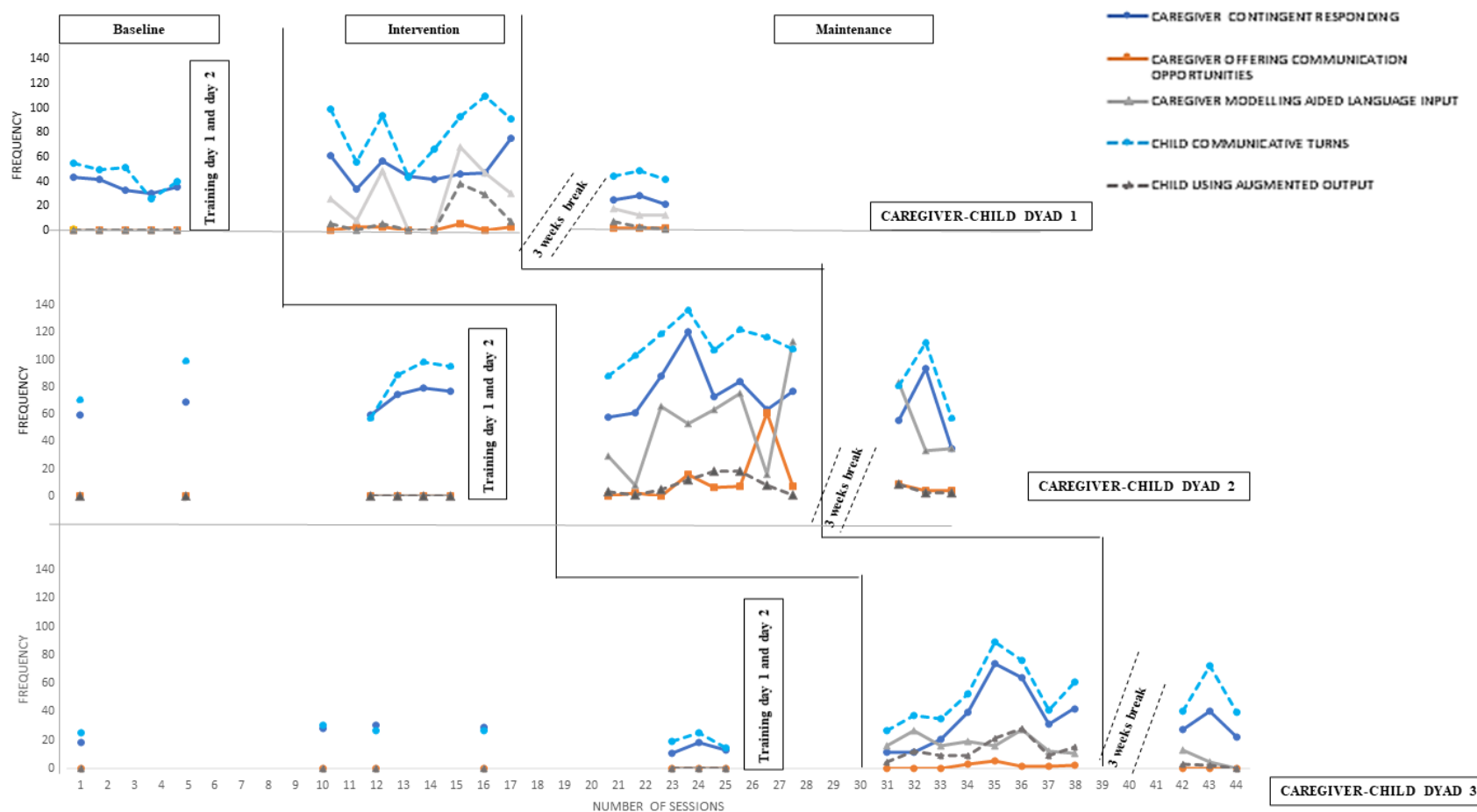
This chapter reports the results of the third phase of the study (i.e., the evaluation phase). The main aim of this phase was to implement and evaluate the effectiveness of the CgTP designed to support caregivers of children aged 2-6 years with CCN who require AAC intervention and who live in the Vhembe district, in the Limpopo province. The results of the experiment are reported per caregiver-child dyad (CCD) according to the effects of the intervention on each variable, namely on the number of times that, during a 10-minute caregiver-child interaction, (a) the caregiver responded contingently to the communication attempts of the child with CCN; (b) the caregiver provided communication opportunities to their child with CCN; (c) the caregiver modelled the use of aided language input; (d) the child with CCN took communicative turns; and © the child used augmented output. Each of the five dependent variables are presented in a graph and visually analyzed according to procedures described by Lane and Gast, (2014) for within and between conditions. This includes describing trend, level, stability and immediacy of change. Furthermore, means, medians, ranges, the non-overlap of all pairs (NAP) effect size and the confidence intervals (CIs) for each variable are reported.

#### 8.2 Overview of results

A visual representation of the dependent variables as recorded for the three CCDs is presented in Figure 8.1. Experimental control in a single-case multiple-probe design across participants that is concurrent can be observed if the introduction of intervention to the first participant (in this case CCD 1) does not change the baseline measures of the remaining participants.



**Figure 8.1**  
*Visual Representation of the Results*





As can be seen from Figure 8.1, some of the baseline measures for CCD 2 occurred concurrently with intervention probes for CCD 1. Similarly, other baseline probes for CCD 3 occurred concurrently with CCD1's and CCD 2's intervention probes.

Levels obtained during these baseline probes for CCD 2 and CCD 3 were not obviously different from those obtained in prior baseline probes. Similarly, baseline probes for CCD 3 occurred concurrently with intervention probes for CCD 2, and once again, the levels obtained during these baseline probes were not different from the levels obtained before. It can therefore be concluded that experimental control was maintained during the investigation.

### 8.3 Caregiver contingent responding

From Figure 8.1 it is clear that all caregivers already responded contingently during baseline. The mean numbers of contingent responses per 10 minutes of caregiver-child interaction for the baseline condition for the three caregivers were 36.6 for Caregiver 1, 69.5 for Caregiver 2 and 22.2 for Caregiver 3. The median numbers of contingent responses were 35 for Caregiver 1; 71.5 for Caregiver 2 and 18 for Caregiver 3.

Using a 80%-30% criterion for level stability (Ledford & Gast, 2018), baseline levels of contingent responding were found to be stable for Caregivers 1 and 2, while Caregiver 3 showed variability with higher levels of responding in Baseline Probes 2, 3 and 4, which then deteriorated to lower levels in the last three baseline probes before intervention commenced.

The trend for baseline measures was determined by using the split middle technique (Lane & Gast, 2013) for each caregiver. The trend for baseline showed a deterioration for Caregiver 1 and 3, while Caregiver 2 showed an improving trend.

All caregivers had a higher mean number of contingent responses during intervention, with mean numbers rising to 50.8 for Caregiver 1; 78 for Caregiver 2 and 36.5 for Caregiver 3. The median values were 46 for Caregiver 1; 75 for Caregiver 2 and 35 for Caregiver 3. Median level change (or relative level change) when comparing median values of baseline to median values of intervention therefore suggest improvements in all three caregivers – Caregiver 1 improved by 11 median points, Caregiver 2 by 4.5 median points and Caregiver 3 by 17 median points. The trend for intervention measures was also determined by using the split middle technique (Lane & Gast, 2013) for each caregiver. The trend for intervention showed a very slight deterioration for Caregiver 1, while Caregiver 2 and 3 showed improving trends. However,



it has to be noted that performance was variable and data paths somewhat erratic, so that the split middle technique is of limited value.

Caregiver 1 showed an immediate level change. She contingently responded 35 times on the last baseline and 61 times on the first intervention probe. Caregiver 1's contingent responding was somewhat variable during intervention, peaking on the last probe. The values were increasing and decreasing in the first three probes. There was a decline for Probes 4 and 5 and an increase (accelerating trend) for the last three probes.

Caregiver 2's contingent responding decreased to below baseline levels in the first intervention probe, and thereafter increased consistently in the first four intervention probes, reaching levels above the highest baseline probe for the third and fourth probes. An inconsistent decrease and increase were seen in the fifth to eighth probe, with a decrease from the fourth to fifth probe, while an increase was observed from the fifth and sixth probe, and then another decrease from the sixth to the seventh intervention probe and an increase from the seventh to the eighth probe.

Caregiver 3's contingent responding remained at a low level during the first two intervention probes. A consistent increase was seen from the third to fifth probe, peaking on the fifth probe. An inconsistent pattern was observed from the fifth to the eighth probe, characterized by a decrease from the fifth probe to the seventh probe and an increase from the seventh to the eighth probe.

NAP was chosen as an effect size estimate (Lane & Gast, 2013; Parker & Vannest, 2009; Scruggs & Mastropieri, 1998) to describe the change in the variable when comparing baseline and intervention phases. NAP was chosen as it is not influenced by variability of data and outliers (Pustejovsky, 2018). Furthermore, to ascertain the precision of the effect size, confidence intervals (CIs) of 85% were calculated for NAP. The 85% confidence intervals are accepted and used in single case designs where the data is sparse (Michiels et al., 2017; Parker & Vannest, 2009). The values are given in Table 8.1.



**Table 8.1***Contingent Responding: NAP Values, CIs, and Their Interpretation*

Participant	NAP	
	Value and CIs	Interpretation
Caregiver 1	0,89 [0,66 -0,97]	Strong effect
Caregiver 2	0,61 [0,39 -0,80]	Medium effect
Caregiver 3	0,73 [0,51- 0,87]	Medium effect

The normative ranges for the NAP are as follows (Parker & Vannest, 2009 p.364): NAP values between 0-0.31 show weak effects; values between 0.32-0.84 show medium effects; and values between 0.85-1.0 show large or strong effects. Based on NAP values, the intervention showed a strong effect for Caregiver 1, while the effect sizes for Caregiver 2 and 3 showed medium effects of the intervention. It can be concluded that the intervention had medium to large effects for contingent responding. This can be assured by the CIs obtained for the NAP values. The CI for Caregiver 1 was narrow, with a difference of 0.31. For Caregivers 1 and 2, the CIs were somewhat wider. However, the lower boundaries of all CIs were still within the medium effect range.

From Figure 8.1, it is clear that levels of contingent responding were not maintained post intervention. The mean number of contingent responses deteriorated to 24.7 for Caregiver 1; 61 for Caregiver 2, and 29.7 for Caregiver 3. The median values also decreased when compared to the intervention phase. The median values were 24.5 for Caregiver 1, 55 for Caregiver 2 and 27 for Caregiver 3. All caregivers showed an immediate drop in level when comparing the number of contingent responses during the last intervention probe to those obtained during the first maintenance probe. Levels remained low for all caregivers, with some variability seen for Caregiver 2.

The trend for the maintenance condition was also determined by using the split middle technique (Lane & Gast, 2013) for each caregiver. The trend for the maintenance condition showed deterioration for all three caregivers for contingent responding. Child 2 had been hospitalized with an infection, while the doctors also needed to adjust his medication for seizures just prior to commencing with maintenance probes. Child 1 was recovering from flu during maintenance probes, as there was a rise in flu cases in their area in November and December 2021. This possibly affected the caregivers' responses during maintenance.



#### 8.4 Caregiver offering communication opportunities

Figure 8.1 shows that during baseline, none of the caregivers used the specific strategies that together were defined as offering communication opportunities to their children. These strategies included offering choices, offering brief turns and small portions, as well as putting a desired item out of the child's reach but not out of the child's sight. The mean number of communication opportunities offered for baseline was therefore 0 for all three caregivers.

During the intervention probes, the mean number of times caregivers used the strategies to offer communication opportunities were 1.8 for Caregiver 1; 12.4 for Caregiver 2 and 1.5 for Caregiver 3. Caregivers also showed an increase in the median values for intervention which were 3 for Caregiver 1; 6.5 for Caregiver 2 and 1 for Caregiver 3.

None of the caregivers showed an immediate level change when comparing the last baseline probe to the first intervention probe. Some of the datapoints showed performance returning to or remaining at zero during some of the intervention probes for the three caregivers (Intervention Probes 4, 5 and 7 for Caregiver 1; Intervention Probe 3 for Caregiver 2; as well as Intervention Probes 2 and 3 for Caregiver 3). In general, gains remained somewhat modest, with Caregivers 1 and 3 never exceeding a level of five opportunities offered during intervention probes. Caregiver 2 increased her number of opportunities to a greater extent, with the number of opportunities peaking at a level of 61 during the seventh intervention probe. However, this performance seemed to be somewhat of an outlier, with performance during the remaining probes ranging from zero to 16. During the last intervention probes, all of the caregivers showed levels above zero and therefore an improved level as compared to baseline, with Caregiver 1 offering three opportunities, Caregiver 2 offering seven opportunities, and Caregiver 3 offering two opportunities.

When the split-middle technique was used to determine trend for within intervention condition, Caregiver 1 showed a deteriorating trend, while both Caregivers 2 and 3 showed an improving trend.

The NAP values are displayed in Table 8.2 with their interpretations.

**Table 8.2**

*Offering Communication Opportunities: NAP Values, CIs and Their Interpretation*

Participant	NAP	
	Value and CIs	Interpretation
Caregiver 1	0.75 [0.50, 0.89]	Medium effect
Caregiver 2	0.88 [0.66, 0.96]	Strong effect
Caregiver 3	0.81 [0.58, 0.93]	Medium effect

There is evidence that the intervention had a positive effect on the number of times the three caregivers used the strategies they had been trained on to offer communication opportunities to their children. This can be seen in the results presented in Table 8.7 based on the NAP values. However, the effect is not strong for Caregivers 1 and 3 (i.e., medium effect size), however, strong effects were seen for Caregiver 2. The CIs obtained for Caregiver 1 were [0.50, 0.89], for Caregiver 2 [0.66, 0.96] and for Caregiver 3 [0.58, 0.93]. The CI ranges obtained for the NAP values ranged varied from 0.30 to 0.39, thus showing they are narrow. It can be concluded that the NAP values were precise with 85% confidence.

From Figure 8.1, it is clear that levels of use of the strategies to offer communication opportunities were not well-maintained post intervention. Compared to intervention, the mean number of times strategies were used deteriorated to 5.7 for Caregiver 2 and to 0 for Caregiver 3. However, there was an increase in mean for Caregiver 1 ( $M=2$ ). The split middle technique showed that the trend for the maintenance condition was deteriorating for Caregiver 2 and Null for Caregivers 1 and 3.

Caregivers 1 and 3 showed an immediate drop in level when comparing the number of opportunities provided during the last intervention probe (3 for Caregiver 1 and 2 for Caregiver 3) to those obtained during the first maintenance probe (2 for Caregiver 1 and 0 for Caregiver 3) while Caregiver 2 showed an immediate increase in level from 7 to 9. The levels, however, remained low for all caregivers.

#### **8.4.1 Caregiver modelling aided language input**

From Figure 8.1, it is clear that none of the caregivers modelled aided language input for their children before they were trained, as baseline measures were at zero for all caregivers. All caregivers had a higher mean number of instances of modelling aided language input during



intervention, with numbers rising to 28.5 for Caregiver 1; 52.9 for Caregiver 2 and 17.8 for Caregiver 3. The median values were 28 for Caregiver 1; 58 for Caregiver 2 and 16 for Caregiver 3. All caregivers displayed an immediate level change when comparing the last baseline probe (being zero for all the caregivers) to the first intervention probe, with Caregiver 1's modelling increasing to 26 times, Caregiver 2's modelling to 29 times, and Caregiver 3's modelling to 16 times. The relative level change shows an improving trend from baseline to intervention.

Caregiver 1's modelling behaviour was somewhat inconsistent during the first five intervention probes, showing a decrease from the first to the second probe, then a peak during the third probe and returning to baseline levels during the fourth and fifth probe. Modelling again peaked during the sixth intervention probe, and levels were also relatively high in the seventh and eight intervention probes, although a decreasing trend was seen in the last two probes. Caregiver 2's behaviour was also inconsistent in the first five intervention probes, showing a decrease from the first to the second probe, then an increase in the third probe, and a slight decrease again in the fourth probe. An increasing trend was seen over Intervention Probes 5 and 6, a drastic decrease was observed in Probe 7 and a significant increase in Probe 8. Caregiver 3 showed a somewhat variable pattern during intervention. Frequencies observed varied between 10 and 27, without a clear trend. The highest frequency was obtained during the sixth probe, and thereafter performance declined during the seventh and eighth probes.

Non-overlap of all pairs (NAP) were calculated as estimations of effect size (Lane & Gast, 2013; Parker & Vannest, 2009) in comparing baseline and intervention phases. The results are summarized in Table 8.3. The suggested interpretations for these values are depicted in Table 8.3.

**Table 8.3**

*Modelling Aided Language Input: NAP Values with Their Interpretation*

Participant	NAP	
	Value and Cis	Interpretation
Caregiver 1	0.88 [0.64, 0.96]	Strong effect
Caregiver 2	1.0 [1.00, 1.00]	Strong effect
Caregiver 3	1.0 [1.00, 1.00]	Strong effect

Intervention for modelling aided language input was effective for all the caregivers from baseline to intervention and is evident based on the NAP and this can be supported by the visual



analysis. The CIs obtained for all the caregivers on NAP values were narrow, indicating that there is great precision of the effect of the intervention (Parker et al., 2009).

From Figure 8.1, it is clear that levels of modelling aided language input deteriorated during maintenance probes, specifically for Caregivers 1 and 3, although Caregiver 3's levels increased from 10 in the last intervention probe to 13 in the first maintenance probe. The mean number of modelling aided language input deteriorated to 14 for Caregiver 1, and 5.7 for Caregiver 3. Caregiver 2 showed a slightly better performance, with a mean number of modelling aided language input of 50.3 during maintenance, which is well above the baseline performance of zero and only slightly below the average obtained during intervention ( $M = 52.9$ ).

However, her performance in the first maintenance probe dropped to a level of 83 as compared to a level of 113 during the last intervention probe, and performance further deteriorated in the last two maintenance probes to levels of 33 and 35 respectively. When using the split-middle technique to determine trend, all three caregivers showed a deteriorating trend for this variable during maintenance

## 8.5 Child communicative turns

From Figure 8.1, it is clear that all children already took communicative turns during baseline. The mean number of child communicative turns for baseline was 44.4 for Child 1; 84.7 for Child 2 and 25.2 for Child 3. The medians were 50 for Child 1; 28.5 for Child 2 and 25 for Child 3. Using an 80%-30% criterion for level stability (Ledford & Gast, 2018), baseline levels of child communicative turns were found to be stable for all the children. Child 1 and Child 3 showed deteriorating trends while Child 2 showed a slightly increasing trend.

All children had higher mean values for child communicative turns during intervention, with averages rising to 81.5 for Child 1, 112.4 for Child 2 and 52.1 for Child 3. The median values for the number of times the child took communicative turns during intervention was 92 for Child 1; 112 for Child 2 and 46.5 for Child 3. Both median and relative level of change between baseline and intervention showed improvements.

Using the split middle technique to estimate trend, all three children showed accelerating trends for child communicative turns during intervention. Child 1 showed an immediate level change from 40 in the last baseline probe to 99 in the first intervention probe. Some variable



performance was then seen in the first four probes, but then steadily increased performance in Probes 5-7, with only a slight decrease again in Probe 8. Child 2 showed an initial decrease in level (95 in last baseline probe to 88 in first intervention probe), while Child 3 showed an increase in level from 14 to 26 when the last baseline probe was compared to the first intervention probe. Both Child 2 and Child 3 showed increasing trends in the first four and five intervention probes respectively, and thereafter performance became slightly variable.

NAP was calculated to estimate effect size (Lane & Gast, 2013; Parker & Vannest, 2009) in comparing baseline and intervention phases. The results are summarized in Table 8.4. together with the suggested interpretations for these values.

**Table 8.4**

*Child Communicative Turns: NAP Values, CIs and their Interpretation*

Participant	NAP	
	Value and CIs	Interpretation
Child 1	0,93 [0.70, 0.98]	Strong effect
Child 2	0,92 [0.71, 0.98]	Strong effect
Child 3	0,96 [0.79, 0.99]	Strong effect

The intervention had a strong effect on the variable child communicative turns for all the children when comparing baseline to intervention. It can be concluded that the intervention was effective according to the NAP metric. The CIs obtained were: Child 1 [0.70, 0.98], Child 2 [0.71, 0.98] and Child 3 [0.79, 0.99]. The CIs obtained for the NAP values were relatively narrow, suggesting that there is 85% confidence in the precision of the effect.

From Figure 8.1, it is clear that levels of child communicative turns achieved during intervention were not maintained post intervention for Child 1 and 2. Mean number of child communicative turns deteriorated to 45 for Child 1 and to 83.3 for Child 2. Child 3's performance was slightly better maintained, only deteriorating somewhat from an average of 52.1 during intervention to an average of 50.3 during maintenance. All children displayed an immediate drop in level when comparing the number of child communicative turns during the last intervention probe to those obtained during the first maintenance probe. All three children exhibited deteriorating trends for child communicative turns during maintenance.



## 8.6 Child using augmented output

From Figure 8.1, it is clear that none of the children pointed to symbols on the communication boards during baseline and their performance was at zero for all tiers. All children had a higher mean number during intervention, with numbers rising to a mean of 10.5 for Child 1; 8.3 for Child 2 and 13.4 for Child 3. The median values increased during intervention to 5 for Child 1; 6.5 for Child 2 and 10.5 for Child 3. All the children showed an immediate level change when comparing the last baseline probe to the first intervention probe, with Child 1's performance rising from 0 to 5, Child 2's performance from 0 to 3, and Child 3's performance rising from 0 to 4. All three children showed variable levels of this behaviour during intervention, but generally increasing trends according to the split middle technique. Child 1 and Child 2 showed limited use of the board in the first few sessions, but then an increase was evident. Child 1's pointing to the communication board was inconsistent in the first five intervention probes, varying between 0 and 5. The child's performance peaked in Probe 6 at 38, and thereafter a decline was seen for Probes 7 and 8. Child 2's behaviour was also on a low level for the first three probes, with frequencies varying between 1 and 5. During Probe 4, the child's behaviour increased until it peaked in Probes 5 and 6, and then a decline was seen for Probes 7 and 8. Child 3's performance was variable during intervention, ranging in frequency between 4 and 28. From Intervention Probes 4 to 6 an increase was observed, with behaviour peaking, similar to Child 1 and 2, in the sixth intervention probe, while a decline was seen for Intervention Probes 7 and 8.

NAP values were calculated as estimations of effect size (Lane & Gast, 2013; Parker & Vannest, 2009) in comparing baseline and intervention phases. The results are summarized in Table 8.5.

**Table 8.5**

*Child Using Augmented Output: NAP Values, CIs, and their Interpretation*

Participant	NAP	
	Value and CIs	Interpretation
Child 1	0,81 [0.57, 0.93]	Medium effect
Child 2	1,00 [1.00, 1.00]	Strong effect
Child 3	1,00 [1.00, 1.00]	Strong effect



Child 2 and 3's results showed a strong effect from baseline to intervention, while Child 1's effect size shows a medium effect according to NAP values. The CIs obtained were narrow for all three children: Child 1 [0.57, 0.93], Child 2 [1.00, 1.00] and Child 3 [1.00, 1.00].

From Figure 8.1, it is clear that levels of producing augmented output were not maintained post intervention. Mean number deteriorated to 3.7 for Child 1; 4.3 for Child 2 and 1.7 for Child 3. Child 2 showed an increase from 1 to 9 from the last intervention probe to the first maintenance probe; Child 1's datapoints stayed the same and Child 3 showed an immediate drop in level when comparing the number of times, the child used augmented output during the last intervention probe to those obtained during the first maintenance probe. Levels deteriorated over the three maintenance probes for all children, with Child 1 ending on 1, Child 2 on 2 and Child 3 on a level of 0.

## 8.7 Social validity

A post-intervention survey was used to obtain evidence of social validity of the intervention with the caregivers. A total of 17 closed-ended Likert scale questions were included, based on the Treatment Acceptability Rating Form - Revised (TARF-R) (Ogilvie & McCrudden, 2017). The Likert scale was a 5-point scale ranging from strongly disagree (rating of 1) to strongly agree (rating of 5). There were four open-ended questions that asked caregivers what they liked, if they wanted to change anything about the programme, and if the programme had positive and/or negative consequences. Lastly, they were asked to rate their level of satisfaction from very satisfied to very unsatisfied on a scale of 1 to 5, with a neutral answer (3) if they were "unsure". The results of this social validity are discussed according to the domains measured by the TARF-R, namely understanding, effectiveness, acceptability, reasonableness, willingness, disruption/time, side effects and overall satisfaction with training. Table 8.6 shows the summary of ratings for each of the domains.

**Table 8.6**

*Average Caregiver Ratings for Constructs*

Construct	Number of questions	Average rating obtained	Range
Understanding	1	5	5
Effectiveness	6	4.7	4-5
Acceptability in lieu of reasonableness	3	4.8	4-5





Willingness	2	4.7	4-5
Disruption	2	4.7	4-5
Time	1	4.6	4-5
Side effects	2	4.7 <sup>a</sup>	4-5
Overall satisfaction	1	5	5

<sup>a</sup> These items were reverse scored so that a high score indicated a small disruption/time sacrifice, and minimal side effects.

From Table 8.6 it is evident that the average ratings obtained showed that the CgTP was socially valid. High ratings were obtained on items related to understanding, effectiveness, acceptability in lieu of reasonableness, side effects and willingness. This means the caregivers understood the content and what they had to do with their children, that they perceived the programme to be effective in increasing their own knowledge and skill and also to improve their children's communication skills. They also found the programme to be acceptable for them and their families, and they were willing to share what they had learnt with others. Caregivers saw no negative consequences and side effects associated with the training and were overall satisfied with it. All three caregivers indicated that the implementation of the training activities did not disrupt much of their daily activities as it was embedded in their natural routines. Furthermore, they reported that the strategies they learned fit easily into their routines.

Regarding the first open-ended question, caregivers reported that they liked various aspects of the training. Two caregivers reported that they liked the strategies overall, and one reported she liked offering children choices, teaching the children how to sequence activities (i.e., what comes after washing your face in a bath-time routine, praying before eating in a mealtime routine) and also the importance of responding. The caregivers reported that the training improved their child's language development (i.e., sentence construction, saying words). When the caregivers were asked if they wanted to make any changes to the training programme, they unanimously reported that they liked the programme as it was and would not like to make any changes.

Caregivers were asked if they could observe or foresee any negative consequences to using the strategies they learned with their child. In their responses, they reported that overall, they expected no negative consequences as the programme had helped with facilitating communication with their children, given that every child has a right to communicate. Furthermore, one of the caregivers highlighted that child with disabilities, including communication disabilities, have the right to learn like their peers without disabilities and that



the charts (communication boards) offered their children the opportunity to learn. Another caregiver reported that the strategies provided their children “a right way” of communicating.

In conclusion, caregivers were asked if using the strategies taught had positive consequences. Their responses showed that they observed positive outcomes in various aspects of communication and interaction. They reported less frustration during communication with their children because they responded to the children’s communication attempts; they reported “open” communication with their children (i.e., communicating freely) and those children were beginning to articulate words more intelligibly. They also reported that the programme facilitated their children’s understanding of everyday items (i.e., what a cup is and what it is used for), and that it increased their own awareness of how to communicate with children with CCN. Furthermore, the strategies brought about understanding between their children and other communication partners, especially when the children pointed to the boards. Caregivers also reported that they set aside time during the day to orientate their children to the communication board and the symbols and trying to understand what their children wanted.

All three caregivers indicated that they were ‘very satisfied’ with the training in response to the 5-point Likert scale question probing overall satisfaction. Table 8.7 shows some of the words and word approximations that children had started producing (according to parent reports) after being exposed to the training programme. Word approximations are spelled phonetically as they were spoken.

**Table 8.7**

*Parent Report of Words and Word Approximations Spoken by Children Post Intervention*

<b>Child ID</b>	<b>Words</b>
Child 1	Pfa (spit), ee (yes) ii (used when you are giving someone something)
Child 2	Vhevhe/vhea (put) Vuye/Vule (researcher’s name) Nama (meat) Yesh (yes)
Child 3	Baby Nne (I) Futhi (More) Thuso (Help) Bumba (fat one) Puck/ prick (he calls the thorn plant) Bruce/Bruno (Dog’s name)



## 8.8 Summary

This chapter described the results of the effects of the CgTP on the five variables that were outlined for this phase of the study. Furthermore, the results pertaining to the rating of the social validity of the programme were presented.

The CgTP was shown to have medium to strong effects on the five variables (including caregiver and child variables). Strong effects were seen for modelling aided language input for all three caregivers and child communicative turns for all three children. Medium effects were seen for Caregivers 1 and 3 for the variable offering communication opportunities; Caregivers 2 and 3 for the variable contingent responding; and Child 1 for the variable child using augmented output. The rest of the caregivers and children showed strong effects for offering communication opportunities, contingent responding and child using augmented output. It can therefore be concluded that the training had medium to strong effects for the dependent variables.

The caregiver training was rated positively by caregivers and was shown to have social validity according to the participants.



## CHAPTER 9

### PHASE 3: EVALUATION OF THE CAREGIVER TRAINING PROGRAMME - DISCUSSION

#### 9.1. Introduction

The effects of the CgTP on the variables are discussed in this chapter. The independent variable was CgTP, and the dependent variables for caregivers were: (a) the frequency of caregivers contingently responding to their children; (b) the frequency of the caregiver offering the child communication opportunities; and (c) the frequency of the caregivers modelling aided language input to their children – all as measured during a 10-minute caregiver-child interaction. The child concomitant variables were (a) the frequency of the child taking communication turns; and (b) the frequency of the child using augmented output during a 10-minute interaction. The effects of the CgTP will be discussed according to the caregiver and child variables and then compared to other studies that measured the variables. Reasons for the differences and similarities will be discussed.

#### 9.2. The effects of CgTP on the caregiver variables

The results of the CgTP showed medium to strong effects of the intervention for contingent responding and caregiver offering communication opportunities for some of the caregivers; while there were strong effects on modelling aided language input. However, none of these effects were maintained for any of the variables and for any of the caregivers' post intervention.

##### *9.2.1. The effect of the CgTP on caregivers contingently responding to their children in a 10-minute interaction*

The caregivers were contingently responding to their children during baseline (i.e., even before the intervention began), which means they had this skill prior to training. Caregivers across cultures respond contingently to their children (Tamis-Lemonda et al., 2014) without needing training to do so, but this process can be disrupted when children are less communicative and responsive (Slonims et al. 2006). The fact that caregivers responded contingently to children before training may have been partially influenced by their attendance of speech-language therapy with their children prior to the commencement of the investigation.



However, all three caregivers increased the frequency of responding contingently to their children during intervention. In light of the important role that contingent responding plays in children's communication development, this is to be welcomed. For example, caregivers' contingent responding has been shown to increase the expressive language of children (Paavola et al., 2005; Tamis-Lemonda et al., 2001). Thus, the more the caregivers respond, the more encouraged the children are to communicate. The more children communicate with the caregivers, the more the caregivers recognise, interpret and respond to the children's communication. This therefore sets in motion a virtuous cycle to enhance child communication development.

The results obtained in this investigation differed somewhat for each caregiver-child dyad. Caregiver 1's performance on contingent responding showed that the intervention had a strong effect and an improvement in this behaviour was seen during intervention. The caregiver was responding contingently more frequently to the child's behaviour during intervention. Medium effects of the intervention were seen for Caregivers 2 and 3. The variability in the results for the three caregivers may have been due to various reasons. For example, differences between the caregivers' responsiveness could possibly be attributed to either child or caregiver characteristics. Sigafos et al., (2000) report that caregivers are more responsive when children tend to display vocal behaviours rather than non-vocal behaviours such as gestures and/ or facial expressions. Various studies showed that where children display intentional communicative behaviours, caregivers tend to respond contingently more often than when children are pre-intentional communicators (Yoder & Warren, 1999). Additionally, when caregivers perceive their children to have a severe disability, contingent responding will be negatively affected as caregivers perceive the child not to be able to communicate.

The child's mode of communication might affect contingent responses from the caregiver (i.e., when child is intentional in their communication by pointing to something and vocalising, it is easy for the caregiver to interpret and respond to the child's communication attempt) (Cress et al., 2013). The likelihood of caregivers noticing the child's communication behaviours is higher when the child uses a more understandable method of expression, whereas a less understandable method would lead to inconsistencies in recognising the attempt (Deveney et al., 2016).

Although strong effects were seen for Caregiver 1, her child seemed unwell during the second intervention session and this caused a decrease in the frequency of contingent responding



(see Figure 8.1). Furthermore, Caregiver 2's child was ill during their first two sessions, which could explain why the number of times she contingently responded to her child gradually increased after the first two sessions. Caregiver 3's performance on contingent responding decreased in the last few sessions. This may have been related to the child's challenging behaviour. The child exhibited escape behaviour and would move away from the location of the task where he was supposed to water and the caregiver would have to bring him back to task. As caregiver contingent responding depends directly on the child's actions, it is to be expected that caregivers have more difficulty responding contingently when the child is not responsive or is unwilling to engage (Cress et al., 2013; Sigafos et al., 2008).

Previous studies have also shown how training was effective in increasing the frequency of contingent responding in parents. Broberg et al. (2012) used a pre-test, post-test design to determine the effects of the ComAlong program (a packaged parent training programme) on the responsivity of parents of children using AAC. They coded 105 videos obtained from the ComAlong programme. From the videos coded, parents who participated in the ComAlong training showed a significant increase in their responsive communication with their children on the Responsive Augmentative and Alternative Communication Style (RAACS) scale after training. Two studies were conducted with SCEDs and specifically multiple probe designs (MP) by Douglas and colleagues (2017; 2018), to determine the effects of online parent training on amongst others, the frequency of parents responding to their child's communication. In both studies children had CCN and used AAC. Parents were trained to use the POWR strategy (**P**repare the activity and AAC; **O**ffer opportunities for communication, **W**ait for the child to communicate and **R**espond to the child's communication). In both studies, intervention clearly had a positive effect on the frequency of parent responses to their child's communication on six of the seven parents participating, with NAP values between 0.91 and 1 when comparing baseline data to intervention phase data. Maintenance results from both studies showed some variability – although five parents showed an increase in responding during maintenance, two showed a drop, and data patterns for all parents remained variable or declining.

Limited maintenance of contingent responding was also observed in the current investigation. For various reasons, it seemed that caregivers would still have benefitted from further guided practice to establish their behaviours. A more gradual withdrawal of support (e.g., guidance on every second session) may have assisted them to maintain their skills better.



### ***9.2.2. The effect of the CgTP on caregivers offering communication opportunities to their children in a 10-minute interaction***

It was evident that none of the three caregivers used any of the specific strategies to create communication opportunities (offering choices, providing brief turns or small portions, and making a desirable item inaccessible) for their children before training. Medium effects for the intervention were seen for Caregivers 1 and 3 and strong effects were seen for Caregiver 2. It is clear that the intervention had a positive impact on the number of times the caregivers offered the children opportunities to communicate using the three strategies. This is somewhat consistent with what has been found in previous studies where caregivers increased the frequency with which they offered communication opportunities to their children after they had received training. Specifically, the studies by Douglas and colleagues (2017; 2018) also measured the effect of parent training on offering communication opportunities. Both studies used single case multiple probe design and the effects of the intervention were measured using the NAP metric. Medium to strong effects were seen for the seven parents taking part in the two studies, with NAP values ranging from 8.88 to 1.

In the current investigation, none of the three caregivers maintained the skill of offering communication opportunities post intervention. The findings from Douglas et al. (2017; 2018) were somewhat more positive. In the 2018 study, two of the three caregivers showed a decline in offering communication opportunities during the maintenance condition, while one maintained the skill. In the 2017 study, one caregiver did not maintain the skill; one caregiver maintained the skill on the same level as during intervention and the other two caregivers showed an increase during the maintenance phase.

It has to be noted that, in this investigation, only instances in which the specific strategies (offering choices, providing brief turns or small portions, and making a desirable item inaccessible) were observed, were counted as evidence of creating communication opportunities. During baseline observations, the caregivers were not offering their children choices, providing brief turns and small portions or making a desirable item inaccessible during the selected routines and/or activities. However, this does not mean that the caregivers were not offering opportunities for communication as other methods can be used to do so, such as asking questions, requiring the child to name items, and providing an opportunity for a child to imitate



(Sigafoos, 1999) which they were already doing. A wider definition may have captured more instances of caregivers doing so. This may also have contributed to better maintenance as caregivers may have found it easier to expand on behaviours that were already in their repertoire. Communication opportunities that parents were taught in the Douglas et al. (2017; 2018) studies included asking the child questions, commenting about what was happening in the activity, and offering the child choices. This may also be a reason why results in this investigation differed from those found by Douglas and colleagues (2017; 2018).

### ***9.2.3. The effect of the CgTP on the frequency of caregivers modelling aided language input to their children in a 10-minute interaction***

Although caregivers were receiving SLP services in the government hospitals, none of the caregivers were exposed to AAC and how to model aided language input to the children living with CCN prior to training. The intervention showed strong effects for all three caregivers. Caregivers in this investigation modelled aided language to their children during intervention by pointing to the relevant symbols on the communication board while verbalising the word during the activity they self-selected for the duration of the investigation.

When comparing the results obtained from this investigation to those of other studies, similarities were observed. In a study by Senner et al. (2019), researchers used a pre-test post-test research design to measure the effect of parent instruction on modelling AAC use in naturally occurring activities. The parents were taught to implement the strategy that includes using Slow rate, Modelling AAC, Respect and reflect, Repeat, Expand and Stop (SMoRRRES). An increase in the utterances modelled by the parent on the child's SGD was seen for all four parents. Parents increased their aided models when they used the children's SGDs after they were trained to implement partner augmented input (PAI) strategies using the child's SGD.

Rosa-Lugo and Kent-Walsh (2008) employed a single case multiple probe design across participants to determine the effects of a parent instructional programme on the communication of two Latino parents and their Latino children using AAC. In this investigation they taught parents how to use AAC modelling, expectant delay, open ended questions, and responsiveness to the child's communication. The parents implemented the strategy with 90% accuracy and maintained the skills, including AAC modelling.





Kent-Walsh and colleagues (2010) taught parents to implement the RAAP strategy and embed modelling of AAC during a story book reading routine. They used a single case multiple probe design across participants to train the parents. The parents implemented the strategy with 90% accuracy and maintained the skills including AAC modelling in all the conditions (intervention, generalisation and maintenance).

In the current investigation, aided modelling was not well-maintained after intervention, and all three caregivers showed some deterioration of the frequency with which aided modelling was provided. This finding contrasted with the findings by Rosa-Lugo and Kent-Walsh (2008) and Kent Walsh et al. (2010). Once again, it seems that more guided practice sessions and a more gradual fading of support may have helped parents to better maintain this skill.

### **9.3. The effects of caregiver training on the child variables**

The results of the CgTP showed that the intervention had medium to strong effects for the concomitant variables measured for the children in the dyads. These variables were the number of times the child takes communicative turns and the number of times the child used augmented output during the 10-minute interaction. As none of the variables were maintained post intervention for the caregivers, it was to be expected that none of the variables were maintained for the children due to the reciprocal nature thereof.

#### ***9.3.1. Effects of caregiver training on the frequency of child communicative turns during the 10 minutes interaction***

Although the children were taking communicative turns during intervention prior to the caregiver training (i.e., baseline), the number of turns increased for all children during the intervention probes – showing that the training had a strong effect on this variable. An immediate increase was seen for Child 1 and 3; however, a more gradual increase was seen for Child 2.

These findings are consistent with research showing that child communicative turns increased after parents had received training on AAC strategies. Binger et al. (2008) reported that children in their study increased the number of times they took communicative turns due to parents employing expectant delay strategies. Other studies that showed an increase were Dodge-Chin et al., (2022), Kent-Walsh, Binger, and Malani (2010), Nunes and Hanline (2007), and Rosa-Lugo and Kent-Walsh (2008).



Dodge-Chin et al., (2022) used a randomised single case multiple probe design across four participants to assess the feasibility of a telepractice-based intervention using the RAAP strategy across five dyads. They measured the effects of the strategy on the number of communicative turns the children took during interaction as a secondary variable. The NAP metric for child communicative turns ranged from 0.33 to 1.0 across the children within the dyads, suggesting some weak and some strong effects. Weak effects were seen for Children 1 and 4, medium effects for Child 3 and strong effects for Children 2 and 5. Furthermore, some of the children showed declines in maintenance condition whereas smaller and moderate changes were also observed. The results of the current investigation are similar to those of Dodge-Chin and colleagues' study as the effects of the intervention varied across the participants. Some children displayed changes in maintenance while others did not show any changes.

With regards to the child's performance being variable, this was also observed in a study by Douglas et al. (2013) where paraeducators were trained on two strategies (IPLAN [Identify activities for communication, Provide means for communication, Locate and provide vocabulary, Arrange environment, use iNteraction strategies] and MORE [Model AAC, Offer opportunities for communication, Respond to communication, Extend communication]) in order to enhance communication of the learners in their study. Commonalities with the results for this study were seen regarding variability of the child's performance on taking communicative turns (Douglas et al., 2013), with some children's performance remaining variable and not clearly well-maintained.

In a third study, Rosa-Lugo and Kent-Walsh (2008) used a multiple baseline design with two dyads to determine the effect of a parent instructional programme on the communication of Latino parents and their children. They used communication displays that are similar to the child's AAC system during storybook reading. The children showed an increase in their frequency of taking communicative turns from baseline to intervention and also generalised this skill and maintained it post intervention. It is to be expected that when caregivers do not show maintenance of a skill, the children are likely not to maintain the skill because of the reciprocal nature of influences that the child has on the caregiver and the caregiver on the child according to the transactional model of development.



### ***9.3.2. Effects of caregiver training on the number of times the child used augmented output during the 10-minute interaction***

Although children had access to communication boards during baseline, they did not use them or point to symbols on the boards prior to caregiver training. There was an immediate change during intervention as compared to baseline for all the children. Overall, the intervention had strong effects on Child 2 and 3; and medium effects on Child 1.

These results align well with previous studies where children began using their AAC systems with their parents after the parents were trained to model the use of the child's system (Binger et al., 2008). Binger et al. (2008) aimed at investigating the effects of the instructional programme on the multi-symbol utterances produced by Latino children with CCN. A single case multiple probe design across participants was used. Children began producing spontaneous multi-symbol utterances on the SGDs when their parents modelled AAC using their SGDs during story book reading. Two of the children consistently used the multi symbol utterances during maintenance and one child showed a decline.

In the study by Senner et al. (2019), authors set out to determine the effects of parent instruction on modelling AAC use in natural contexts. A pre-test post-test design was used in this investigation. An increase in children's use of their SGDs was observed post parent training, but it was not significant.

Some differences were observed in the Ronski et al. (2010) study. The aim of this study was to compare the performance of children with developmental delays who were assigned randomly to a parent coaching intervention. The researchers evaluated differences in the performance of the children on augmented and spoken word size and use thereof, vocabulary size, and communication interaction skills. The participants were divided into the augmented input (AI) group, augmented output (AO) and the spoken communication (SC) groups. Parents were coached to model SGD use in AI group; to use hand-over-hand prompts in AO group, and to focus on producing speech sounds in SC group. Children in the AO group used the augmented words more than children who were assigned to the AI group.

### **9.4. Reasons for the results obtained**

The effects of the intervention on caregiver and child variables may have been influenced by the characteristics of the CgTP, and may also be explained from its theoretical underpinnings.



#### **9.4.1. Characteristics of the CgTP**

Various characteristics of the CgTP may have contributed to the effect it had both on caregivers and on children. These characteristics include the instructional strategies used, the individualised nature of the programme, the frequency and duration of the training and guided practice sessions, as well as the context and activity settings chosen for training.

The instructional strategies employed in the delivery of the CgTP are in line with those that have been reported to be useful for training of caregivers in LMICs and high income countries (HICs) (Barlow et al., 2012; Kaminski et al., 2008; Lundahl et al., 2006; Reichle et al., 2019). Instructional strategies such as feedback, observation, and reflection were employed and they are considered mostly behavioural in nature. They were reported to be effective when used in coaching families (Sheldon & Rush, 2010).

Regarding delivery format of the CgTP, caregivers were trained individually. Although individualised training may have had various advantages and disadvantages when compared to group training methods, both formats have been found to help caregivers gain the necessary skills for addressing problem behaviours in younger and older children (Cotter et al., 2013; Lundahl et al., 2006). Individualized training can be readily tailored to the needs of specific caregivers and children. In this investigation, training was similar, though individualised for each caregiver-child dyad, because the caregivers chose activities in which they would implement the strategies they had learnt. Individual training is effective as the caregiver's needs can be accommodated more readily than in group training. Also, training can be tailored to meet the caregiver's learning pace and level of literacy.

As far as possible, baseline probes, intervention probes and maintenance probes were conducted on a daily basis. However, the scheduling of daily sessions was motivated partly by practical constraints because the investigation was conducted during the Covid-19 pandemic. The researcher had to wait for interprovincial travel bans to be lifted in order to travel to the province where the investigation was conducted and be able to conduct the sessions in the caregivers' homes. As a result, the time frame within which the training and data collection could be conducted was somewhat limited. In a recent study, parents recommended that the frequency of the sessions should be reduced to less than three times a week as more engagement than that was too intensive for them (Timpe et al., 2021). This may explain the dosage of most parent



training studies ranging from once weekly (Bornman et al., 2001; Anna Jonsson et al., 2011; Senner & Baud, 2017; Tait et al., 2004) to twice a week (Ronski et al., 2010). Studies that included a frequent dosage for shorter periods typically ranged from two to three weeks in total and also tended to train parents on at least two variables and strategies that are packaged such as the RAA, RAAP and SMoRRES. The current investigation also trained caregivers on multiple strategies. This may have led to some information overload; caregivers could possibly give attention to one strategy and neglect another during an intervention session with their child (for example, the caregiver could focus on responding to the child and neglect to offer communication opportunities to their child as she might not be able to implement all the strategies at once).

Caregivers did not maintain any of the learnt strategies post intervention, and children therefore also did not maintain any of the behaviours measured. It is apparent that caregivers still required the feedback and guided practice provided during intervention probes in order to continue using the strategies they were taught. A longer period of providing this support and a gradual fading of this support may have assisted caregivers to maintain skills. Booster sessions with feedback and guided practice could have been implemented when the first probe in maintenance returned to baseline or was lower than the highest point in baseline in order to maintain the skill. Booster sessions have been used in various previous caregiver training programmes and have assisted in enabling caregivers to maintain learnt behaviours (Kaiser & Hancock, 2003; Thunberg, 2013). Although external constraints (time and Covid-19 pandemic) made this challenging, this should be a consideration for future trainings.

#### ***9.4.2. Theoretical underpinnings: Transactional Model of Development***

Visual analysis results as shown in Chapter 8, Figure 8.1, show the reciprocal relationship between the child and the caregiver. It is evident that, in many instances, caregiver and child variables follow a similar pattern, and seem to mirror each other. The frequency with which the child took communication turns, for example, seemed to mirror the number of caregiver contingent responses. Although maybe less obvious, the number of times the children pointed to symbols on the board at times seemed to mirror the aided models provided to the child. It is clear therefore, that a change in parent behaviour brought about a change in child behaviour. This can further be supported by the premise of the transactional model of development (Sameroff, 2009),



which proposes that there is a transactional influence between the caregiver and the child within the environment that affects child development. Child development (including communication and language) is viewed as a product of the constant interactions between the child and the experiences provided by the family and the context. Thus, when the caregiver responded less, the child showed a decrease in communication turns and vice versa. The same could be seen on the influence the caregiver had on the child and the child on the caregiver when AAC was modelled versus the number of times the child used augmented output.

Training caregivers to increase or implement certain behaviours in interaction with their children can therefore have a positive effect on the child's communication behaviours, and, in turn, further encourage caregivers to maintain and increase these behaviours. The success of the programme can therefore be attributed to the training, but also to the manner in which parents implemented the behaviours and then experienced positive changes in their children. Likewise, it was apparent that, on days when children did not respond positively, caregivers had more difficulty implementing the strategies they had been taught.

Renner (2003) outlined Vygotsky's cultural historical perspective with regards to communication development using alternative methods. To compensate for limited or missing speech, alternative forms of communication should be implemented. However, these forms need to enable the expression of the same communication functions that children without disabilities would express, and also need to be aligned to the child's cognitive, motor, perceptual and linguistic skills in order to be implementable by the child (Renner, 2003). In the current investigation, children learnt to use the activity-specific communication board to express themselves. It seems therefore that the alternative communication form was well-aligned to their abilities. Even Child 1 and 2, whose communication skills were on a pre-symbolic level, were able to start pointing to picture symbols, thereby using a more symbolic form of communication. The inclusion of different parts of speech potentially widened the types of communication functions that could be expressed, such as comments, requests and social messages. Although Child 3 also started pointing to pictures on the board, access to 20 vocabulary items may have been somewhat limiting for him in view of his communication skills falling at the level of abstract symbols. AAC systems that are too limiting will not be used and are likely to be abandoned (Moorcroft, Scarinci et al., 2021, Moorcroft, Meyer et al., 2021).



The alternative form implemented should also be appropriate to the context and partners. These aspects were considered in the planning and design of the intervention and the materials. Given that the training was implemented in a rural setting of Vhembe, the researcher chose low-tech aided AAC to implement in the investigation. This was deemed more appropriate and sustainable, because the communication boards are affordable and accessible to the participants. Low-tech aided AAC has been implemented in various intervention studies, including some conducted in South Africa (Dada & Alant, 2009; Tönsing, 2016; Tönsing et al., 2014).

Furthermore, Vygotsky focuses on the importance of social interaction with people in the environment for cognitive and language development. Development is rooted in a cultural environment. This implies that language and communication are associated with the shared social structures embedded in the culture, which results in language development being culturally and socially driven. When a child with disabilities interacts with a competent member of a particular culture who could be an adult (which in the current investigation was their caregiver), the social environment affords the child with a model of culturally-valued skills and abilities. The intervention also took place within the naturalistic environment of each child, at their home within their daily routines. Hence, AAC was implemented in their natural routines within the cultural and social environment. The care taken in culturally validating the current intervention before delivery (see Section 9.4.3) could therefore have contributed to the success of the intervention.

#### ***9.4.3. Social and cultural validity of the intervention***

The current study employed a sequential process of development and evaluation to ensure that the intervention would be socially and culturally valid. Thomas and Rothman's (1994) Design and Development paradigm was used to guide the development of the intervention (CgTP). This framework has seven steps, and this study used the first four steps which are: (a) problem analysis and project planning, (b) information gathering and synthesis, (c) programme design, (d) early development and pilot testing.

In the first phase of this study, Vhavenda cultural stakeholders were interviewed, in order to identify the cultural practices of Vhavenda with regards to caregiver-child communication interaction, as well as their beliefs about children living with a communication disability. Furthermore, the researcher wanted to obtain their perceptions on the Vhavenda





cultural conventions of typical caregiver-child communication interactions; the cultural beliefs of Vhavenda about communication disorders, forms of communication and interventions for communication disorders; and to determine acceptability of the proposed programme strategies and considerations for cultural appropriateness of the CgTP. This process served both the cultural and social validation in the initial phase.

Furthermore, instructional strategies to train caregivers (identified from a scoping review of the literature) were presented to the Vhavenda cultural stakeholders for input on what they regarded as appropriate and not appropriate for their context. Recommendations on how to make the strategies and training acceptable to the target populations were drawn from this exercise. The researcher designed and developed the CgTP based on this input.

Ensuring that interventions aimed at supporting child development are culturally appropriate is integral to ensure that these interventions respect and strengthen the cultural patterns of child rearing, rather than imposing ways of interacting with children that are incompatible with the community's values (Morelli, Bard et al., 2018). Attempting to understand caregivers' lived reality before "subjecting them to treatment" is essential to avoid reducing them to treatment recipients and negating the experiential and cultural knowledge they bring (Pillay & Kathard, 2018). Rooted in Western and colonial approaches, communication interventions often presuppose a specific world view (scientific, positivist) and therefore appear incompatible with other world views (Pillay & Kathard, 2018). Stakeholders who participated in the interviews seemed aware of these world view clashes as they juxtaposed medical and Christian worldviews with traditional cultural ones. At times there were even signs of internalized oppression as stakeholders seemed to suggest that traditional views were perceived as unhelpful to foster child communication skills. While the interview data was helpful to adjust some of the proposed strategies and materials, it has to be noted that many aspects of the programme (e.g., quantitative way of measuring success) were still rooted in Western models, even though an attempt was made to have stakeholders' input in programme development.

The second activity related to social validation was the expert review process. SLPs practising in Vhembe district were recruited to obtain an informed opinion about the relevance, appropriateness, and potential effectiveness of the proposed CgTP for the target population. They were requested to comment and recommend changes on the delivery format,





content and materials. Changes were made in accordance with their suggestions. Furthermore, caregivers were requested to choose an activity they would like to use for the duration of the investigation. Caregiver 1 chose a morning routine, Caregiver 2 a mealtime routine and Caregiver 3 a gardening (watering the garden) activity.

The last activity entailed an evaluation of social validity by participants. Caregivers were given a post-intervention survey based on the Treatment Acceptability Rating Form-Revised (TARF-R) (Ogilvie & McCrudden, 2017). There were 17 closed-ended questions using a 5-point Likert scale and four open-ended questions that asked caregivers about what they liked, if they wanted to change anything about the programme, and whether the programme had positive and negative consequences. Lastly, they were asked to rate their level of satisfaction.

The results of the post-intervention survey showed that the caregivers were satisfied with the training in general. Moreover, they deemed the CgTP to be socially valid in terms of the constructs measured by the TARF-R; namely understanding, effectiveness, acceptability, reasonableness, willingness, disruption/time and side effects. Research has shown that social validity in AAC interventions is an important aspect as it is instrumental to closing the gap between research and practice (Biggs & Hacker, 2021).

Social validation has been carried out in AAC intervention research and the results of this study can be compared to other studies (see review as discussed in Chapter 4) that involved processes before and after the interventions. It was reported that the majority of the studies evaluate social validity at the end, rather than taking it into consideration from the pre-intervention to the post-intervention stage.

The process then proceeded to socially validate the intervention could also have contributed to the effectiveness of the intervention. Thus, some factors that affect the implementation of interventions in real-life situations such as the setting, the demographic profile of the participants and other psychosocial factors were also considered in the conceptualisation of the current study. These factors cannot be controlled during experimental trials, but they would manifest when implementing these interventions in real life.

Intervention research is often presented as a progression from studies that are high in internal validity and low in external validity to those that then attempt to implement the intervention in 'real life.' The implication is that that the effectiveness of an intervention needs to be established in rigorously-controlled, internally-valid studies before applying such



interventions in less controlled environments (Damschroder et al., 2009; Peters et al., 2013). However, the caregiver-mediated intervention developed and implemented in the current study needs to be environmentally (caregiver) driven, and not only environmentally mediated. For this reason, it was important to consider contextual fit during the design and development of the intervention so that the intervention will have uptake and sustainability with the target population and context. Therefore, this intervention balanced both internal validity and some aspects of external (ecological) validity when designing the intervention (Rothwell, 2005), though external validity was not the main purpose of this study.



## 10.1 Introduction

The main aim of this study was to develop and evaluate the effectiveness of a culturally and linguistically appropriate training programme designed to train caregivers of children aged 2-6 years with CCN to implement AAC in a low-income rural context of South Africa. A three-phase mixed methods exploratory design was used.

This final chapter of the thesis provides a summary of the results obtained from the three phases of the study as well as the conclusions drawn from these phases. Thereafter the clinical implications are highlighted followed by a critical evaluation of the study after which recommendations for future research are discussed.

## 10.2 Summary of the results and conclusions

### *10.2.1. The summary of this thesis is organised according to the three phases of the study.1*

#### *Phase 1: Exploratory phase*

The aim of the exploratory phase of the study was to map the information available in the literature regarding the nature of caregiver training programmes designed for caregivers of children living with CCN and to explore the cultural practices of Vhavenda with regards to caregiver-child communication interaction, as well as their beliefs about children with communication disabilities. The exploratory phase comprised of two studies. The first study entailed a scoping review of the published literature documenting programmes and approaches that focused on training caregivers to implement AAC. The second study involved conducting interviews with cultural stakeholders to understand the cultural practices of Vhavenda with regards to caregiver-child communication interaction, and their beliefs about children with CCN.

Phase 1 concluded by highlighting the significant elements of caregiver training approaches with regards to the training recipients, the delivery format and content of the training as well as instructional techniques used, and the outcome measures reported. Furthermore, the review identified caregiver-implemented intervention strategies that were commonly used for young children living with CCN and these were presented to the stakeholders during the interviews, for validation. An instructional protocol by Kent-Walsh and McNaughton (2005) was



also identified and this was used to inform how the training should be conducted and what should be included to facilitate the training. The cultural stakeholder interviews provided information regarding Vhavenda cultural practices regarding typical adult-child interactions, Vhavenda cultural views about communication disability and intervention, and commentary on the applicability of the provisionally-proposed intervention strategies. The data collected in the exploratory phase was incorporated into the initial development of the CgTP.

### ***10.2.2 Phase 2: Development phase***

In this phase, the CgTP was developed. An expert review was done with SLPs practising in Vhembe to ensure relevance and applicability of the CgTP. The experts validated the CgTP and deemed it relevant and applicable for caregivers living in Vhembe. A pilot study was conducted with one caregiver-child dyad to ensure that the preliminary procedures for programme implementation, materials for screening and measurement were feasible. A number of small changes were made to materials and procedures ahead of the main study.

The development phase ensured that caregivers were trained using a culturally, contextually and linguistically appropriate CgTP. Furthermore, the results from the pilot study ascertained the feasibility and appropriateness of procedures, measures, material and analysis of data. The recommendations were then implemented in Phase 3.

### ***10.2.3 Phase 3: Evaluation phase***

In the final phase, a SCED, specifically a multiple-probe design across three caregiver-child participant dyads was used to measure the effects of the CgTP on five variables. The independent variable (IV) for this study was the caregiver training. The DVs measured in relation to caregivers were: (a) frequency of contingently responding to the child, (b) frequency of offering communication opportunities, and (c) frequency of modelling aided language input – all measured within a 10-minute caregiver-child interaction. The concomitant effects of the training on the child were measured by establishing (a) the frequency of communicative turns taken by the child (b) the frequency with which the child uses augmented language output during a 10-minute interaction. The dependent variables were measured by means of collecting probes during baseline, intervention and maintenance conditions. The intervention was introduced in a staggered manner across the three caregivers to show experimental control and to establish if



there is a causal relationship between the IV and DV. The first baseline probes were collected on the same day for all three dyads. CCD 1's baseline probes were collected daily until stability was reached; thereafter intervention was introduced. The intervention consisted of two-day training, a two-day break afterwards wherein the caregivers were supposed to submit a homework activity. This was followed by eight guided practice with feedback sessions. Intervention probes were collected first, before every guided practice with feedback session. Baseline probes for CCD 2 and CCD 3 continued to be collected at intervals. Three consecutive baseline probes were collected for CCD 2 once CCD 1 neared the end of their intervention phase. Three consecutive baseline probes were collected for CCD 3 once CCD 2 neared the end of intervention.

The intervention showed medium to strong effects on the variables that were outlined. Strong effects were observed for modelling aided language input for all the caregivers; offering communication opportunities for Caregiver 2; contingent responding for Caregiver 1; child communicative turns for all three children; and child using augmented output (CUAO) for Child 2 and 3. Medium effects were seen for Caregivers 1 and 3 for the variable offering communication opportunities; Caregivers 2 and 3 for contingent responding; and Child 1 for the variable child using augmented output. It can therefore be concluded that the caregiver training was effective in changing the behaviour of caregivers and also the communication behaviours of their children during the chosen everyday activities. However, effects were not maintained post intervention for any of the 3 parent-child dyads.

In addition, the social validity of the intervention was determined using a survey adapted from the Treatment Acceptability Rating Form -Revised by Reimers and Wacker (1992). The post intervention survey completed by the caregivers indicated that the training programme had high social validity. The caregivers reported that the CgTP facilitated their understanding and knowledge, and that they experienced the training programme as effective, acceptable and reasonable. They also reported that they were willing to teach these newly-learnt skills to other family members, and that they did not experience the CgTP as being disruptive to their daily schedules. No negative side effects were reported and all caregivers stated that they were satisfied with the training.

It can be argued that various factors contributed to the success and effectiveness of the intervention. The process followed in designing and developing the intervention followed the evidence-based practice framework. This framework outlines the significance of considering



research evidence, combining it with stakeholder input and the researcher's expertise as a clinician. The researcher based the study on previous research (scoping review), theoretical grounding (child development theories, eco-cultural theory and adult learning theory) together with the process of ensuring cultural and contextual congruence through the cultural stakeholders' interviews (Chapter 5). Furthermore, the programme developed by the researcher underwent an expert review process (Chapter 6) wherein SLPs provided input to ensure usability and feasibility, as well as cultural and contextual appropriateness of the CgTP. In order to ensure caregivers' input, the caregivers who took part in Phase 3 were also given the opportunity to choose the activities during which they wanted to learn to foster the use AAC with their children in their daily routines.

One possible reason why caregivers did not maintain the skills they were trained in post-intervention may be that the withdrawal of support offered during guided practice was too abrupt. A more gradual fading of support may have led to better maintenance. Lack of time precluded this possibility in the current study.

### 10.3 Implications for practice

The development and evaluation of the CgTP was a first attempt to rigorously develop and experimentally test the effectiveness of a training programme aimed at training Vhavenda caregivers to implement AAC strategies appropriate to beginning communicators. The results of the study suggest that the two-day initial training combined with subsequent guided practice sessions during daily activities in the home context afforded parents the support needed to implement strategies that support their children's communication and use of AAC. All children participating in the study were aged between 2 and 6 years and were intentional though not necessarily symbolic communicators. All caregivers had literacy skills in English and/or Tshivenda (by self-report) on at least a Grade 7 level. The lack of maintenance of strategy use suggests that support may be needed for a longer period of time and may need to be gradually faded over time rather than being withdrawn completely after eight sessions.

These results may be useful to clinicians who are supporting children in need of AAC and their families. They may be able to incorporate aspects of this programme into their clinical practice, in order to support the implementation of AAC for the benefit of beginning communicators and their caregivers in the South African context. This study showed that AAC



has benefits even for beginning communicators on a pre-symbolic level, and that AAC does not need to be the last resort once interventions focusing on improving spoken language skills have failed. Specific aspects of the programme are flexible and amenable to be customised and applied in ‘real world’ clinical and home settings. For example, parents could choose their preferred routines and support was provided in actual home settings rather than in a controlled laboratory setting. Despite lack of control over variables such as the presence of other family members, and other contextual factors, effects were still achieved, suggesting that the intervention is robust enough to not be unduly affected by such variables. Also, while guided practice sessions were intended to be implemented daily during weekdays, amendments were made to the scheduling of sessions due to factors such as family availability and child health. Although this may have reduced experimental control, such scheduling constraints are a common occurrence in clinical practice, and therefore may have increased external validity of the study. The process followed in ensuring cultural appropriateness through stakeholder inputs and expert review also strengthens the external validity of the programme, and the use of both English and Vhavenda during training and implementation ensured linguistic congruence between service providers and recipients. The use of accessible language, and engaging training strategies such as videos as well as memory strategies such as a mnemonic may have contributed to the effectiveness and these may easily be applied in clinical practice. The high social validity ratings given by parents suggest that they valued the intervention and would be likely to accept or engage in a similar intervention being offered to them through a health service system.

At the same time, clinical practice and research conditions do typically differ, and amendments may need to be made to the CgTP to be compatible with the constraints of clinical practice. For example, the intensity of the treatment (multiple sessions weekly) and the location (in the home) may need to be changed in accordance with the resource and time allocations afforded to clinicians in public health settings. Group rather than individual training may need to be considered. Telepractice options rather than face-to-face training may also need to be considered when caregivers and clinicians are unable to meet due to geographical distance, transport costs or other reasons (e.g., pandemic). However, making such amendments may affect the effectiveness of the CgTP, and additional implementation research (Peters et al., 2013) may be needed to understand how the CgTP can be adapted for clinical practice and yet retain its effectiveness. However, the current study lacks the larger context to say what comes next.



The lack of maintenance should alert clinicians that eight sessions of guided practice may not be enough to promote a sustained behaviour change in caregivers, and that they may need additional support. Besides more sustained guided practice sessions, the training on the strategies could be adapted and broken down in individualised sessions so as to allow for consolidation of one skill at a time over time.

The CgTP was developed in a way that it is flexible and can be used to train caregivers to implement AAC with their children with CCN. The strategies of the programme can be implemented by caregivers with children diagnosed with developmental disorders from an early age; that is earlier than two years of age. The delivery of the CgTP can be conducted individually or in a group format in the home context or hospital setting. Furthermore, the CgTP can also include training of various communication partners, not just caregivers but other family members, in line with family-centred practice. The instructional protocol used to deliver this study allows for adaptation and modifications of components depending on the contexts. The training can be adapted and allow caregivers to be trained using online and/or tele-rehabilitation platforms. The training on the strategies can be adapted and broken down in individualised sessions so as to allow for consolidation one skill at a time over time. Additionally, the strategies that were included in the programme allow for training and implementation using a multi-step mnemonic in different activity-based settings that caregivers and children engage in daily.

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multi-step mnemonic in different activity-based settings that caregivers and children engage in daily.

#### **10.4 Evaluation of the study**

The strengths and limitations will be discussed in the sections following.

##### ***10.4.1 Strengths of the study***

This study is the first of this kind aimed at developing, implementing and evaluating a caregiver training programme in South Africa using an experimental design that enhanced the control of many threats to internal validity. South Africa is a diverse country, also referred as “rainbow nation”, with 11 official languages and diverse cultures. The context of this study is Vhembe district in the Limpopo Province of South Africa, which is largely populated by Vhavenda, Tsonga and BaPedi. The Limpopo Province is largely rural and the majority of the individuals living with disabilities and CCN rely on the poorly-resourced public healthcare system to access rehabilitation services. This study makes an important contribution to the field of AAC intervention literature as it expands the focus of AAC interventions to non-Western, hitherto under-served contexts. Furthermore, the current study adds to the body of evidence regarding the effectiveness of AAC interventions that are culturally and contextually appropriate to train caregivers of young children living with CCN in rural contexts.

The CgTP went through an iterative process to ensure social validity with various stakeholders. The process began with research-based evidence wherein the researcher conducted a scoping review to identify various aspects of caregiver training in implementing AAC. From the scoping review evidence, the researcher conducted interviews with cultural stakeholders to partly validate and seek their opinions regarding the cultural appropriateness and contextual relevance of the strategies so as to inform programme development. Furthermore, an expert review of the CgTP was conducted with SLPs practising in Vhembe to ensure its feasibility and acceptability. This process was followed by caregivers being asked in the screening process to identify activities that they engage in with their children as well as asking them to choose an activity that they would like to be trained on. In doing so, the researcher included the caregivers’ voices in the research. After caregivers were trained, they also voiced their perceptions on the various constructs that validated the programme.



Caregivers' voices were important and this confirms the need to respect the adage of "Nothing about us without us." It can be concluded that the training programme that had caregivers been trained in English only; and had the researcher not adhered to the recommendations of the interviews, expert review process and pre-training information gathering sessions, the training programme would not have been as effective as it was. The current study bridges the gap from research to practice by highlighting that when due processes of social and ecological validity are followed, experiment-based interventions can be implemented and will be effective in natural environments. This was evident in the results obtained from the implementation and use of the CgTP in training caregivers of children living with CCN who require AAC in low-income contexts during the intervention condition. Research evidence has shown the benefits of introducing AAC early for children living with CCN (Branson & Demchak, 2009; Ronski et al., 2010) and the benefits of AAC intervention in these contexts (Bornman et al., 2001; Gona et al., 2013b; Zuurmond et al., 2018). Some of the benefits of this intervention include bringing awareness of AAC in the contexts (Myers, 2007; Sansosti et al., 2014), affording the children alternative forms of communication which will aid them in being integrated within their communities, afford them an opportunity to participate with their peers within their communities, as well as, afford them entrance to education, which will later translate to employment.

A number of characteristics of this programme may have made it specifically suitable to the target population. The material used for the training accommodated various characteristics of the participants (caregivers) such as language and level of education. The material and content were translated to Tshivenda and the expert panel gave input on the Tshivenda material for ease of understanding, cultural and contextual appropriateness as well as acceptability. Caregivers had a choice of the language of training. Furthermore, the constructs (understanding, effectiveness, acceptability, reasonableness, willingness, disruption/time, side effects and overall satisfaction with training) evaluated for social validity showed that the programme was socially valid.

The principles of adult learning were integrated into the training of the parents, supplemented by an adaptation of the Kent-Walsh and McNaughton (2005) instructional protocol to guide the study. This protocol is evidence-based and has been used to guide training of parents from diverse cultural backgrounds, specifically Latino, African American parents (Binger et al., 2008; Kent-Walsh, Binger, & Hasham, 2010; Kent-Walsh, Binger, et al., 2015).



The intervention took place in the homes of the participants, thus reducing the stress and costs to caregivers associated with travelling. It is noteworthy that the study took place during the Covid-19 pandemic when the restrictions for travel were lifted. Given the nature of co-morbid conditions that affect children living with DD and CCN, the researcher could not risk cross infections, and thus the study was conducted at the homes of the participating caregivers, even though there were possibilities of conducting the study in central places such as primary healthcare clinics or the hospitals where they normally receive services.

The use of low-technology AAC systems in this study was a stepping stone towards the possibility of using mid to high-technology AAC systems in the South African context. The low tech AAC boards were cost effective and portable as the initial starting system. It was easy for caregivers to model the use of aided AAC to their children in the activities they chose. At the end of the intervention, caregivers were given extra communication boards for use in other activities that were not part of the study.

The experimental design used to evaluate the effectiveness of the CgTP was a single case multiple probe design across three participants. Three independent opportunities were afforded by this design to observe a change in the dependent variables, thus giving it experimental control. This increases the internal validity as it is likely that changes observed in the dependent variables are indeed the result of the intervention.

The procedural fidelity of the administration of the probes as well as all intervention activities was high. An independent observer found that, on average, 88-100% of the steps were accurately executed. This further strengthens the internal validity of the study.

The use of effect size estimates (NAP) and confidence intervals, together with visual analysis, provided a robust way of analysing results and strengthening confidence in the effects of the training programme..

Although there was some homogeneity in the participant group in terms of the presence of AAC, there was also variability. For example, the children had different diagnoses including cerebral palsy, intellectual disability and spina bifida, and they were from a heterogeneous population with regards to their diagnoses. They were living with a variety of DD; their communication abilities ranged from Level III to Level IV on the Communication Matrix; had a variety of communication and language skills; and were aged between 3 and 6 years. This suggests that the CgTP can be helpful to children with some variation in skills profile and age.



However, the children could use the activity-specific communication boards effectively with their caregivers.

#### ***10.4.2 Limitations of the study***

The visual analysis showed that the participants did not maintain the skills during maintenance condition. Lack of maintenance patterns could be as result of limited to no support received by the caregivers during guided practice sessions. Also, the early withdrawal of support before behaviours were more firmly established in the repertoires of the caregivers could allude to the possibility of caregivers not maintaining the skills. Setting a learning criterion may have ameliorated the possibly premature discontinuation of the intervention condition. Similarly, booster sessions may have been appropriate once it became clear that the behaviours were not maintained. However, neither option was practical within the time constraints of the study. It is also possible that the repeated measurement during the same activity led to the participants being reactive and bored, thus contributing to limited maintenance. Inclusion of generalisation probes could have probably assisted the non-maintenance of the skills.

The researcher chose low-technology aided AAC systems for caregivers to implement with the children without consulting with caregivers prior to implementation.

Conducting training with only three participants limits the generalizability of the results to the larger population, though the intervention proved to be effective. Furthermore, focusing on one activity during the training and collection of probes precludes any conclusions being made about the generalizability of the skills to other activity settings. Despite the lack of generality inherent in this study, it was necessary and prudent to examine the causal relation between the CgTP and targeted outcomes using cost-effective methods before advancing the intervention toward more expensive and larger studies that could produce greater generality potential.

Time constraints for conducting the study and timelines for completion of PhD studies prevented the researcher from including a projected five CCDs, which could have shown different results. Furthermore, instead of collecting intervention probes daily, the researcher could have collected probes every second day. The results could have been affected by daily repeated measurements because they tend to inhibit performance if there are no incentives or reinforcement. No incentives were offered in this study for the caregivers and this could have negatively affected results. Although there was some variability on the characteristics of



children and caregivers, the selection criteria for the study were relatively strict, and therefore it is not possible to generalise results to children who may be younger, older, or who have different communication profiles.

### 10.5 Recommendations for future research

There are a number of recommendations for future research arising from this current study. The current study sits in Phase III of the of the five phase model of intervention research by Fey and Finestack (2009). This study showed evidence of early efficacy if the CgTP. The next phase would be to get evidence of later efficacy (Phase IV) which is tested in contexts different to the current one and then evaluate the effectiveness of the intervention in Phase V of the model.

It is always recommendable to attempt to replicate findings in subsequent SCEDs or in experimental group designs, although the latter would be difficult due to the small size of the target population. Replications of this SCED should include an amended training procedure aimed at promoting stronger effects and better maintenance. This could be achieved by setting a learning instead of a teaching criterion to ensure that a robust frequency of strategy implementation is reached before treatment is discontinued. A condition of intermittent rather than continuous guided practice support could be considered after the condition of continuous support, to establish whether behaviour changes when support is not given during every session. Also, if maintenance probes show a reduction in behaviour, booster sessions can be implemented to support a return to levels of behaviour measured during intervention. Future replications, generalization probes could be conducted in other activity settings of the caregiver's choice. Additionally, conducting social validation with the caregivers before collecting baseline probes, during intervention and after intervention, thus comparing the social validation at different times would ensure pre- and post-social validity. Expert review with various stakeholders at different aspects of research will provide the researcher with information pertaining to changes that need to be effected so as to strengthen the validity of the intervention.

A further replication of the current study using SGDs instead of communication boards is recommended. Studies have shown the effectiveness of using SGDs with younger children. Currently, there is funding available for assistive devices (i.e., wheelchairs, hearing aids) through the state tender. The Department of Basic Education through their



tender system have managed to procure introductory AAC devices that can only be used at the schools and cannot be taken home. In the public healthcare sector in South Africa, there is a need for SGD provision on a larger scale and therefore a similar study might be instrumental in establishing the effectiveness of training parents to implement SGDs in the home context. Such studies would guide appropriate procurement and implementation of SGDs for the benefit of beginning communicators in the rehabilitation services sub-directorate.

Once the effectiveness of the CgTP has been better researched, implementation research (Peters et al., 2013) may assist in converting the CgTP from its current form to a form that can be rolled out on a larger scale in clinical practice. The involvement of role players like Department of Health officials, service managers, heads of rehabilitation services in public health institutions, as well as caregivers and family members through qualitative and mixed-method approaches and/or participatory action research can establish feasible methods to facilitate implementation in practice, and also assist in evaluating the effects of such implementation.

A further replication of the current study using SGDs instead of communication boards is recommended. Studies have shown the effectiveness of using SGDs with younger children. Currently, there is funding available for assistive devices - including introductory AAC devices in the public healthcare sector in South Africa, and therefore a similar study might be instrumental in leveraging the procurement of more devices in the rehabilitation services sub-directorate. This will afford children with CCN their fundamental human right to communicate by ensuring access to a voice. This will, in turn, give them access to education and employment.

In the current study, the researcher implemented an individual face-to-face training model. At the dawn of tele-practice within rehabilitation services in the South African context, it is recommended that the effects of repeating the CgTP training be evaluated, using tele-health methods. Research is emerging in other LMICs on the use of tele-practice models in providing interventions to children with CCN, and hence such a study would expand the current body of emerging evidence that is needed to advance the field of caregiver training in AAC.



## 10.6 Summary

This chapter provided a summary of the study according to the three phases that formed part of the exploratory sequential mixed methods design. It was shown how data collected from published research and stakeholder interviews during the exploratory phase provided the basis for the development of the CgTP during the development phase. The implementation and evaluation of the programme as conducted during the last phase (using a single case multiple probe design across participants) was also summarised and concluding remarks on the reasons and factors that influenced the effectiveness of the CgTP on the caregiver and child variables were outlined. A discussion of the clinical implications of the study was provided to illustrate the significance of the study. Strengths and limitations as well as the recommendations for future research that emerged from this study were discussed.



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## APPENDIX A

## Ethical Clearance From the Faculty of Humanities Research Ethics Committee



29 May 2020

Dear Mrs VP Ndanganeni Madima

**Project Title:** Augmentative and Alternative Communication in early childhood intervention: Adaptation and evaluation of parental training in a low-income rural context of South Africa.

**Researcher:** Mrs VP Ndanganeni Madima

**Supervisor:** Prof KM Tönsing

**Department:** CAAC

**Reference number:** 11374633 (HUM010/0819)

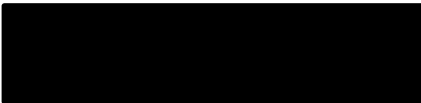
**Degree:** Doctoral

I have pleasure in informing you that the above application was **approved** by the Research Ethics Committee on 29 May 2020. Data collection may therefore commence.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should the actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

We wish you success with the project.

Sincerely,



**Deputy Dean: Postgraduate Studies and Research Ethics**  
**Faculty of Humanities**  
**UNIVERSITY OF PRETORIA**  
 e-mail: PGHumanities@up.ac.za

Fakulteit Geesteswetenskappe  
 Lefapha la Bomothe

Research Ethics Committee Members: Prof I Pikirayi (Deputy Dean); Prof KL Harris; Mr A Bizos; Dr A-M de Beer; Dr A dos Santos; Ms KT Govender; Andrew...; Dr P Gubure; Dr E Johnson; Prof D Maree; Mr A Mohamed; Dr I Ncoane; Dr C Puticelli; Prof D Revum; Prof M Soec; Prof E Tjallard; Prof V Thebe; Ms B Tshepo; Ms D Mkhalela



## APPENDIX B

## B1 Department of Health Limpopo Ethical Clearance



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

## Department of Health

Ref : LP-201911 - 002  
Enquires : Ms PF Mahlokwane  
Tel : 015-293 6028  
Email : [Kurhula.Hlomane@dhsd.limpopo.gov.za](mailto:Kurhula.Hlomane@dhsd.limpopo.gov.za)

Vuledzani Madima

**PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES**

Your Study Topic as indicated below;

**Augmentative and alternative communication in early childhood intervention: adaptation and evaluation of parental training in low-income rural context of South Africa.**

1. Permission to conduct research study as per your research proposal is hereby Granted.
2. Kindly note the following:
  - a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
  - b. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
  - c. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
  - d. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
  - e. The approval is only valid for a 1-year period.
  - f. If the proposal has been amended, a new approval should be sought from the Department of Health
  - g. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

  
Head of Department

25/11/19  
Date

Private Bag X9302 Polokwane  
Fidel Castro Ruz House, 18 College Street, Polokwane 0700. Tel: 015 293 6000/12. Fax: 015 293 6211.  
Website: <http://www.limpopo.gov.za>

*The heartland of Southern Africa. Development is about people.*



## B2 Vhembe District Health Ethical Clearance



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

### DEPARTMENT OF HEALTH VHEMBE DISTRICT

Ref: P/4/1/1  
Enq: Human Resource Development  
Tell. 0159621002  
Date: 08/01/2010

To: Vuledzani Madima

FACULTY of HUMANITIES  
UNIVERSITY OF PRETORIA

**SUBJECT: REQUEST FOR A PERMISSION TO GAIN ACCESS TO PHC FACILITY FOR RESEARCH PURPOSE (Augmentative and Alternative Communication in early childhood: Adaptation and evaluation of parental training in a low context of South Africa.)**

1. The above matter has references.
2. The Department of Health Primary Health Care acknowledges receipt of your communicate regarding the request of permission conduct research as indicated above at Primary Health care facilities Vhembe District..
3. Kindly be informed that authority has been granted for you to gain access to the targeted clinic for research purposes.
4. Kindly take note that you will be expected to comply with the policies, rules and regulations that govern public institutions.
5. Be advised that the Department is not liable for any harm or injuries that may occur whilst you are in the clinic premises or environment.
6. Hoping you will find this in order.

CHIEF DIRECTOR HEALTH CARE SERVICES

8/1/2020  
DATE

Private Bag X5009 THOHOVANDOU 0950  
Old Parliamentary Building Tel: (015) 962 1848, (015) 962 1852, (015)962 1001/2/3/4/5/6  
Fax (015) 962 2373/ (015)9622274/ 4623.

*The heartland of Southern Africa – development is about people!*



B3 Hospitals Ethical Clearance

TSHILIDZINI HOSPITAL ETHICS COMMITTEE

Memorandum of understanding

Tshilidzini Hospital Ethics Committee with VP Madima at their meeting resolved to sign a Memorandum of Understanding after the two parties have agreed on the following information:

Handwritten marks on the left margin, including the number '3' and a signature.

- Reasons for making a research at Tshilidzini hospital.  
My target sample is caregivers of children with severe communication disorders receiving speech therapy services at hospitals in Vhembe offering speech therapy services. Tshilidzini hospital is one of the severe hospitals.
- What will be the benefit of the entire hospital community out of your findings?  
The findings will translate to empower both SLTs and caregivers implement AAC strategies with their children with communication disorders. Caregivers will be able to communicate with their children adequately. It will offer culturally and contextually appropriate services.
- Who to meet in conducting your research?  
I would like to meet with SLT at your hospital and discuss the research project as well as request their assistance with recruiting participants.
- What do you do with your findings?  
The findings will be disseminated to all the parties involved and will be published and presented at conferences.
- We will require the hard copy of your research.  
The research dissertation will be available digitally on UP space. Results can be presented in writing to the hospital.
- We do not anticipate any information to be divulged to all types of media without the knowledge of the Ethics Committee and Hospital Board. All the information of this study is grounded on ethical considerations and will be adhered to.
- Memorandum of understanding should be signed by both parties.

Signed by

[Redacted signature]

23/01/2020  
Date:

[Redacted signature]





**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

**DEPARTMENT OF HEALTH  
SILOAM HOSPITAL**  
Confidential

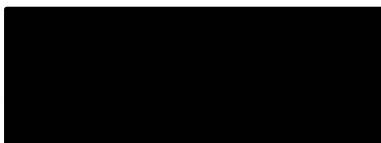
Ref : S4/2/1/1/3  
Enq : Mushaphi N.T: HRD  
Date : 17 December 2019

To: Vuledzani Madima

DEPARTMENT OF HEALTH
SILOAM HOSPITAL
20 DEC 2019
REGISTRY
Private Bag X2432 Louis Trichardt 0920

**RE: PERMISSION TO CONDUCT RESEARCH: YOURSELF.**

1. The above matter refers.
2. The Hospital highly acknowledges the receipt of your letter dated 11/12/ 2019 regarding the above matter.
3. Kindly note that the institution is granting you permission to come and conduct research in Augmentative and alternative in early childhood intervention: Adaption and evaluation of parental training in low- income rural context of Vhembe District Hospitals in Limpopo Province.
4. You are kindly requested to adhere to the conditions as set out in your approval from the Provincial Office.
5. Hoping you will find the above in order



17/12/2019  
Date

Private Bag X2432. Makhado, 0920  
Tel (015) 973 0004/5/6, 015 973 1447/8, 015 973 1977, 015 973 1892/4/9 Fax (015) 973 0607.

***The heartland of Southern Africa – development is about people!***



REPLY SLIP

Name of CEO/Hospital manager: LIESE MOHEDLOU

Name of Hospital: MESSINA HOSPITAL

**Project title:** Identifying, adapting and evaluating a programme aimed at training caregivers of young children with complex communication needs to implement augmentative and alternative communication in a low-income rural context of South Africa

**Researcher:** Ms Vuledzani P. Madioma, PhD Candidate, Centre for AAC  
**Supervisors:** Prof K Tönsing, Prof J. Bormman

I, Liese Mohedlou, hereby  
 (Name and surname of CEO/Hospital manager)

(please tick box that applies)

**give** permission to Ms Vuledzani P. Madima to conduct all the three phases of the study entitled: *Identifying, adapting and evaluating a programme aimed at training caregivers of young children with complex communication needs to implement augmentative and alternative communication in a low-income rural context of South Africa* at the abovementioned hospital. This permission is voluntary and we understand that we can withdraw our participation as a hospital at any time with no consequences. We understand that all information obtained and used in this study will be treated as confidential. Please tick all the applicable boxes below to indicate your response

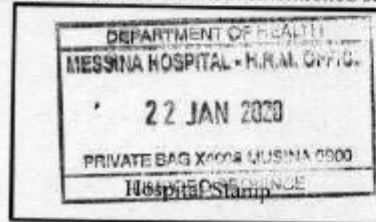
OR

**do not give** permission to Ms Vuledzani P. Madima to conduct the abovementioned study.

Signature of CEO/Hospital Manager

2020-01-22

Date:



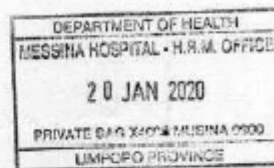


**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

**MESSINA HOSPITAL**

REF: S5/2/6/1/1  
Enq: Radzilani A.C  
DATE: 20 January 2020

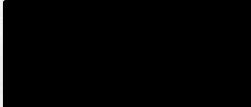


**FROM: HUMAN RESOURCE DEVELOPMENT**

**TO: Ms Madima Vuledzani**  
Faculty of Humanities  
UNIVERSITY OF Pretoria

**RE: PERMISSION TO CONDUCT RESEARCH AT MESSINA HOSPITAL UNDER THE STUDY TOPIC: AUGUMENTATIVE AND ALTERNATIVE COMMUNICATION IN EARLY CHILDHOOD INTERVENTION: ADAPTATION AND EVALUATION OF PARENTAL TRAINING IN A LOW-INCOME RURAL CONTEXT IN VHEMBE DISTRICT LIMPOPO PROVINCE**

1. The above matter has reference.
2. This office wishes to inform you that your application has been approved as per conditions stipulated on your letter of permission granted by Head of Department. You are requested to liaise with HRD office regarding your commencement date.
3. Your co-operation will be highly appreciated.

  
CHIEF EXECUTIVE OFFICER

*2020 01 20*  
DATE

**EXCELLENCE IS OUR PASSION**

CNR CALDERWOOD AND WHITTHYE STREET, PRIVATE BAG X 4006, MESSINA, 0900 TEL: (015) 534 0446, FAX: (015) 534 0819

*The heartbeat of Southern Africa - development is about people*







**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

**DEPARTMENT OF HEALTH  
MALAMULELE HOSPITAL**

REF : S 4/5  
ENQ : Siwela T.S  
DATE : 24/12/2019

TO WHOM IT MAY CONCERN

**SUBJECT: PERMISSION TO CONDUCT A RESEARCH: VULEDZANI MADIMA**

1. This serves to acknowledge the receipt your application to conduct a research study at Malamulele hospital and the research topic is "Augmentative and alternative communication in early childhood intervention: adaptation and evaluation of parental training in low-income rural context of south Africa"
2. The permission to conduct the study in question is recommended since has all the requirements such as : the application letter, research proposal, Training institutions Ethical clearance certificate, Provincial and District offices approvals as prescribed by departmental circular no 24 of 2015.
3. Hopping for an effective cooperation between the participants of this research

Thank you



24/12/2019  
DATE

CONFIDENTIAL



Malamulele Hospital Private Bag x9245 Malamulele 0982  
Tel: (015) 851 0026/1020/1017/1019 Fax: (015) 851 0620

*The heartland of Southern Africa - development is about people*



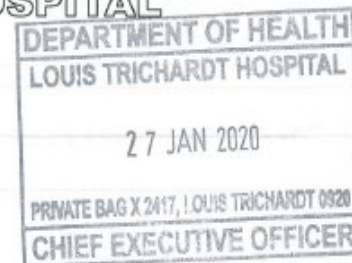
CONFIDENTIAL



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

**DEPARTMENT OF HEALTH  
LOUIS TRICHARDT HOSPITAL**

Ref: 4/2/2  
Enq: Masindi L.P  
Email: Londani.Masindi@dhsd.limpopo.gov.za  
Date: 22/01/2020



**TO: Vuledzani Madima  
University of Pretoria**

**SUBJECT: APPROVAL TO CONDUCT RESEARCH AT LOUIS TRICHARDT HOSPITAL:**

1. The above matter has reference.
2. Permission to conduct the following research topic **"AUGMENTATIVE AND ALTERNATIVE COMMUNICATION IN EARLY CHILDHOOD INTERVENTION: ADAPTION AND EVALUATION OF PARENTAL TRAINING IN A LOW-INCOME RURAL CONTEXT OF SOUTH AFRICA"** has been granted.
3. The above permission is subject to the conditions as set down in both permission letters from Provincial Health Department dated 25/11/2019 and Vhembe District Office dated 08/01/2020.
4. Thank you.

  
ACTING CHIEF EXECUTIVE OFFICER

27/01/2020  
DATE

P/BAG X 2417 LOUIS TRICHARDT 0920

TEL: 015 516 0148 Crn. Hospital & Snyman Street Fax: 015 516 3252/ 4658

The heartland of Southern Africa- development is about people



## APPENDIX C

## C1 Search Strategy per Database

Database	Hits	Search terms
Academic search complete	638	(((((("PARENTS") OR ("CAREGIVERS")) AND ("CHILDREN")) OR ("TEENAGERS")) AND ("COMMUNICATIVE disorders")) OR ("DEVELOPMENTAL disabilities")) AND ("PARENTING education")) OR ("CAREGIVER education")) OR ("PROGRAM design (Education)) AND ("MEANS of communication for people with disabilities")) OR ("MEANS of communication for the developmentally disabled")) OR ("COMMUNICATION devices for people with disabilities")
ERIC (EBSCO)	60	(((((("Caregivers") OR ("Parents")) AND ("Caregiver Training")) OR ("Parent Education")) OR ("Parenthood Education")) OR ("Programs")) AND ("Communication Disorders")) OR ("Developmental Disabilities")) AND ("Augmentative and Alternative Communication")
PsycINFO	107	(((((("Parents") OR ("Caregivers")) AND ("Parent Training")) OR ("Parenting skills")) AND ("Child Characteristics")) OR ("Adolescent Characteristics")) AND ("Communication Disorders")) OR ("Developmental Disabilities")) AND ("Augmentative Communication")
PYSCARTICLES	5010	"Communication Disorders" OR ("Developmental Disabilities") AND ("Augmentative Communication") OR means of communication for people with disabilities
FAMILY AND SOCIETY STUDIES	105	(((((("ZU parents") OR ("ZU caregivers")) AND ("ZU caregiver education")) AND ("ZU children")) AND ("ZU communicative disorders")) OR ("ZU communicative disorders in adolescence") OR ("ZU communicative disorders in children") OR ("ZU communicative disorders in infants")) AND ("ZU developmental delay") AND ("ZU developmental disabilities")) AND ("ZU picture exchange communication system")) OR ("ZU communication devices for people with disabilities"))
CINHAL	2	S23 AND s24 AND S31 AND (S25 OR S26) AND S27



Database	Hits	Search terms																																												
MEDLINE	4	<table border="1"> <thead> <tr> <th>#</th> <th>Searches</th> <th>Results</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>caregivers/ or parents/</td> <td>90936</td> <td>Advanced</td> </tr> <tr> <td>2</td> <td>exp Education, Nonprofessional/</td> <td>263768</td> <td>Advanced</td> </tr> <tr> <td>3</td> <td>*Early Intervention (Education)/</td> <td>2801</td> <td>Advanced</td> </tr> <tr> <td>4</td> <td>communication disorders/ or developmental disabilities/</td> <td>21225</td> <td>Advanced</td> </tr> <tr> <td>5</td> <td>Communication Aids for Disabled/</td> <td>2561</td> <td>Advanced</td> </tr> <tr> <td>6</td> <td>(ALTERNATIVE and augmentative).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]</td> <td>672</td> <td>Advanced</td> </tr> <tr> <td>7</td> <td>adolescent/ or child/ or infant/</td> <td>3020468</td> <td>Advanced</td> </tr> <tr> <td>8</td> <td>2 or 3</td> <td>266169</td> <td>Advanced</td> </tr> <tr> <td>9</td> <td>5 or 6</td> <td>2757</td> <td>Advanced</td> </tr> <tr> <td>10</td> <td>1 and 4 and 7 and 8 and 9</td> <td>4</td> <td>Advanced</td> </tr> </tbody> </table>	#	Searches	Results	Type	1	caregivers/ or parents/	90936	Advanced	2	exp Education, Nonprofessional/	263768	Advanced	3	*Early Intervention (Education)/	2801	Advanced	4	communication disorders/ or developmental disabilities/	21225	Advanced	5	Communication Aids for Disabled/	2561	Advanced	6	(ALTERNATIVE and augmentative).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	672	Advanced	7	adolescent/ or child/ or infant/	3020468	Advanced	8	2 or 3	266169	Advanced	9	5 or 6	2757	Advanced	10	1 and 4 and 7 and 8 and 9	4	Advanced
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8	2 or 3	266169	Advanced																																											
9	5 or 6	2757	Advanced																																											
10	1 and 4 and 7 and 8 and 9	4	Advanced																																											
Health Source: Nursing/Academic Edition	14	<pre> (((((((DE "CARE"IVERS") O" (DE "P"RENTS")) AN" (DE "PARENTING edu"ation")) O" (DE "CAREGIVER edu"ation")) AN" (DE "pr"ograms")) AN" (DE "CH"LDREN")) O" (DE "ADOLE"ENCE")) O" (DE "YOUTH")) AN" (DE "COMMUNICATIVE dis"rders")) AN" (DE "COMMUNICATIVE disorders in ch"ldren" "R DE "COMMUNICATIVE disorders in i"nfants")) AN" (DE "MEANS of communication for people with disabi"ities")) O" (DE "MEANS of communication for the developmentally di"abled") </pre>																																												
Africa-Wide Information	4	<pre> (((ZU "augmentative and alternative communi"ation") o" (ZU "augmentative communi"ation")) or (((ZU "means of communi"ation"))) AND (S5 AND S6)) AND (S5 AND S6) </pre>																																												
SOCIAL WORK ABSTRACTS	25	<pre> (((((((((((ZU "care"ivers") o" (ZU "care"akers")) or (((ZU "p"rents")) ) and (((ZU "parent tr"ining")))) or (((ZU "parent training p"ogram")))) and (((ZU "ch"ldren")))) or (((ZU "youth")))) or (((ZU "adole"cents")))) and (((ZU "communication dis"rders")))) or (((ZU "developmental disabi"ities")))) or (((ZU "developmental di"order")))) and (((ZU "communication t"erapy")))) or (((ZU "early interv"ntion")) </pre>																																												
SCOPUS	652	<pre> ( ALL ( parent* OR caregiver* ) AND ALL ( parent* AND traning OR parent* AND education OR training OR program* ) AND ALL ( child* OR adolescen* OR youth ) AND ALL ( little OR no AND speech OR development* AND delay* OR disabilt* OR communicat* AND disorder* OR communicat*269an </pre>																																												



Database	Hits	Search terms
		wanangabilit*) AND ALL ( augmentative AND alternative AND communication OR aac OR aided AND language OR aided AND language ) )



## C2 Scoping Review Summary of Studies

Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to- face/self-study	Caregiver(s)	Child(ren)
1. Binger, Kent-Walsh, Berens, Del Campo & Rivera, (2008) USA	Mixed methods: Focus group and SCED (MP across participants)	$N = 3^a$ : father ( $n = 1$ ), mother ( $n = 2$ ); $M_{age} = 35$ yrs; high school ( $n=2$ ) and bachelor's degree ( $n=1$ );  Children: $N = 3$ ; $M=41$ months; Other genetic syndromes	Aided; augmented input <sup>b</sup> , milieu teaching <sup>c</sup> and provide a means of communication in the activity <sup>f</sup> ; joint book reading	Researchers; Individual; Face-to-Face	Increase in steps correctly implemented	Increase in the number of multi- symbol messages produced in joint book reading
2. Bornman, Alant, & Meiring, (2001) South Africa	Case report	$N = 1$ ; mother; 43 yrs; psychologist;  Child: $N = 1$ ; $M=78$ months; CAS	Aided; milieu teaching and provide a means of communication in the activity;book reading	AAC-trained SLP; Clinic; Individual; Face-to-Face	Increase in level of questions per'Bloom's taxonomy and number of questions asked	Increase in frequency and appropriateness of responses during joint book reading
3. Broberg, Ferm & Thunberg, (2012) Sweden	Quasi- experimental: Pre-test post-test with comparison group (non- random, non- equivalent)	$N = 43$ <i>Comparison group</i> : $N=6$ ; <i>Experimental group</i> : $N=37$ : father ( $n=17$ ), mother ( $n=20$ );	Both (aided and unaided); augmented input strategies <sup>d</sup> , milieu teaching and responsivity; daily activities	Two professional course leaders (one was SLP); Central meeting point; Group (max 10); Face-to-face	RAACS scale: Responsivity increased significantly for the experimental group from pre- to post-training.	None reported



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
		M= 35 yrs; post-high school (n=43)  Children: <i>N</i> = 28; <i>M</i> = 48 months (12-60); NDD and Genetic syndromes				
4. Ferm, Andersson, Broberg, Liljegren & Thunberg, (2011) Sweden	Mixed methods: Surveys and interviews	Data for <i>N</i> = 48 children were reported; <i>M</i> = 48 months; NDD, unknown diagnosis and mixed diagnoses	Both (aided and unaided); augmented input strategies, milieu teaching and responsiveness; daily activities (not specified)	Four professional course leaders (two were SLPs); Central meeting point; Group (max 10); Face-to-face	Parents valued most aspects of the course. Positive changes in their own communication. Parents reported positive changes in the child's communication.	None reported
5. Jonsson, Kristoffersson, Ferm, & Thunberg, (2010), Sweden	Mixed methods: Survey and case studies	Survey: <i>N</i> =65: father (n=22), mother (n=43); <i>M</i> = 36 yrs; Post high school (n=65) Case Study: <i>N</i> = 4; <i>M</i> = 34 yrs; mother(n = 3), father (n = 1);	Both (aided and unaided); augmented input strategies, milieu teaching and responsiveness; daily activities (not specified)	Two professional course leaders (one was SLP); Central meeting point; with Group (max 10), face-to-face	Survey: Parent perceptions of the ComAlong boards were positive. 61% of the parents reported positive changes in their communication.	Case study: Children pointed to pictures on boards (data of observations not quantified)





Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to- face/self-study	Caregiver(s)	Child(ren)
		<p>university degree (n = 4)</p> <p>Children: Survey: data for 38 children were reported; M=37months; NDD Case study: N = 3; M = 62 months; CP and ASD</p>			<p>60% reported positive changes in their child's communication.</p> <p>Case study: Parents used the boards often and engaged in aided language stimulation (data of observations not quantified). Parents perceived the child to be more competent in communication-related body functions and structures, and activities.</p>	
6. Bunning, Gona, Newton & Hartley, (2014) Kenya	Quasi-experimental single group pretest-posttest	<p>N = 7 (two additional caregivers were included in the study but not in the review due to their children not meeting criteria)</p> <p>Children: N = 7 (two additional</p>	Both (aided and unaided); augmented input strategies, milieu teaching, provide a means of communication in the activity and responsivity; daily activities (not	Home; Individual; Face-to-Face	Parents perceived the child to be more competent in communication-related body functions and structures, and activities.	Child competence in communication as measured by CP-A (parent-completed) increased from pre- to post-intervention for all children, and participation opportunities showed increases for 3 of 7 participants.



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
7. Gona, Newton, Hartley & Bunning, (2014) Kenya	Case series, qualitative	children were included in the study but not in the review due to not meeting criteria); <i>M</i> = 90 months; NDD Refer to Bunning et al. (2015)	specified); daily activities  Refer to Bunning et al. (2014)	Refer to Bunning et al. (2014)	Parent experiences pre-and post-intervention: Some caregivers viewed their skills and the level of family support and connection positively post-training. Child skills were viewed positively post-training	None reported
8. Calculator, (2016) USA	Quasi-experimental "B" design (qualitative methods were used for open-ended questions)	<i>N</i> = 18; parents; post high school ( <i>N</i> = 18) Children: <i>N</i> = 18; Age range 3 -18 yrs;	Unaided; milieu teaching, augmented input and output; three parent- and SLP-identified routine situations	Manual written by researchers and coaching by own SLP; Home; Individual; self-study and own SLP provided face-to-face support	Parents rated all four programme goals important pre-intervention, and evaluated effectiveness and acceptability of the	GAS scores (given by parents) of four goals (related to ENG use and challenging behaviour ) showed that children met or exceeded the



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
9. Chaabane, Alber-Morgan & DeBar (2009) USA	SCED ( Multiple baseline design)	Genetic syndrome (Angelman Syndrome) <i>N</i> = 2: mother ( <i>n</i> = 2); <i>M</i> =37.5 yrs; high school ( <i>n</i> = 2)  Children: <i>N</i> = 2; <i>M</i> = 66 months; ASD	Aided; augmented input, augmented output and provide a means of communication in the activity; researcher (experimenter); routines not reported	Variables setting and whether its group or individual was not reported; Researcher (experimenter); Face-to-Face	program positively post-intervention.  Correct implementation of the strategy: percentage of the correct implementation of the strategy was <i>M</i> =97% and 98 % for both mothers, respectively.	expected scores as rated before training.  No of correct improvisation: Increase in correct improvisation increased from baseline to generalization 83% and 84 % respectively, and generalization probes were 80-100%.
10. Douglas, Nordquist, Kammes & Gerde, (2017) USA	SCED (MP across participants)	<i>N</i> = 4: father ( <i>n</i> = 1), mother ( <i>n</i> = 3); <i>M</i> =37 yrs; high school ( <i>n</i> = 4)  Children: <i>N</i> = 4; <i>M</i> = 49 months; CP and Genetic syndromes	Both (aided and unaided); milieu teaching and provide a means of communication in the activity; play, music anart	Parent-provided communication opportunities: Strong effects were seen (NAP=1) for Dyads A,B and D. Medium effects were seen (NAP=0.88) for Dyad C. Responses to child communication Strong effects	Child communication instances increased: Strong effects were seen (NAP=1) for Dyads B and D. Medium effects were seen (NAP=0.81 and 0.91) for Dyads A and C.	



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
					(NAP=1) Dyad A,B,and D. . Medium effects were seen (NAP=0.91) for Dyad C.	
				Home; Individual online self -study with researcher feedback on		



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to- face/self-study	Caregiver(s)	Child(ren)
	Mixed methods: Focus group and SCED(MP across participants)	<i>N</i> = 6: mother (n = 6); M = 36 yrs; high school (n = 1) and post high school(n = 5)  Children: N = 6; M = 74 months; DS & CP	Aided; augmented input and milieu teaching strategies; book reading with researcher selected books	Researcher; Setting not reported; Individual; Face-to- Face  instructional activities completed	Percentage steps correctly implemented: increased from 0% at baseline to 90% or higher across all intervention, generalization and maintenance sessions	All children at least doubled the number of communicative turns from baseline to intervention, generalization and maintenance. All increased number of semantic concepts expressed.



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
USA 12. Nunes & Hanline, (2007) USA	SCED (MB across activities)	<i>N</i> = 1: mother; 30 yrs; high school  Child: <i>N</i> = 1; 54 months; ASD	Aided; Augmented input, output, milieu teaching strategies and provide a means of communication in the activity; play and care routines selected by the researcher	Doctoral student ; Home; Individual Face-to-Face.	Frequency of use of four strategies: Environmental arrangement and AAC modelling increased. Mands and physical guidance for the child to use AAC did not increase.	Frequency of child communication turns increased. Most turns were non-imitative and were accomplished with aided AAC rather than verbal/vocal modes or manual signs/gestures.
13. Olive, Lang & Davis, (2007) USA	SCED (MP across activities)	<i>N</i> =1: mother; post high school  Child: <i>N</i> = 1; 48 months; ASD	Aided; Augmented output strategies; 4 leisure activities selected by mother: book reading, art, memory, puzzles	Graduate research assistant; Home, Individual; face-to-face and self-study	Correct implementation (95.9% ) of FCT strategy during intervention. Parent rated FCT as acceptable	Challenging behaviour reduced after the intervention was implemented. Attention requests increased in first 2 activities after the



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
14. Park, Alber-Morgan & Cannella-Malone, (2011) USA	SCED (Changing criterion design)	<i>N</i> = 3: mother ( <i>n</i> = 3); <i>M</i> =34 yrs.; high school ( <i>n</i> = 1), post high school ( <i>n</i> = 2)  <i>Children: N</i> = 3; <i>M</i> = 30 months; ASD	Aided; augmented output strategies, milieu teaching strategies and provide a means of communication in the activity; requests of preferred items	Researcher; Home; Individual, Face-to-Face	before and after training and increased her ratings of its effectiveness post-training PECS Phase 1-3 procedures implemented correctly on average 99.6% of the time. Acceptability of intervention was rated highly (average of 4.97 on the 5-point scale).	introduction of the intervention, and generalized to other 2 activities post-intervention.  Independent picture exchanges increased from 0 at baseline to 65% - 100% during Phase 3B and were maintained 1 month post-training at 97.5-100%.
15. Romski, Sevcik, Adamson, Cheslock, Smith, Barker, & Bakeman, (2010) USA	Randomized controlled trial (with 3 treatment groups)	<i>N</i> = 62: father ( <i>n</i> = 4), mother ( <i>n</i> = 58); <i>M</i> = 37 yrs.; high school ( <i>n</i> = 6) and post high school ( <i>n</i> = 56) <i>Children: N</i> = 62; <i>M</i> = 30 months; Genetic syndromes, seizure disorders,	Aided; augmented input, augmented output, milieu teaching strategies and provide a means of communication in the activity; play, book reading and snack	Six female interventionists; Lab and Home (18 sessions in Lab, 6 sessions in the home); Individual; Face-to-face	Procedural fidelity of strategy implementation was high for parent-supported and parent-led sessions (Kappa's of 0.91-0.94).	AC-I and AC-O groups made more expressive vocabulary gains, used more spoken words, and improved their TTR and intelligibility rating more than the SC group. AC-O group used more



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
16. Ronski, Sevcik, Adamson, Smith, Cheslock & Bakeman, (2011) USA	Randomized controlled trial (with 3 treatment groups)	CP, unknown diagnoses <i>N</i> = 53: father ( <i>n</i> = 4), mother ( <i>n</i> = 49); <i>M</i> = 37 yrs.; high school ( <i>n</i> = 6), post high school ( <i>n</i> = 47)  Children: <i>N</i> = 53; <i>M</i> = 30 months; Genetic syndromes, seizure disorders, CP, unknown diagnoses	As for Ronski et al (2010)	As for Ronski et al (2010)	PPOLD measures: Parents from all three groups perceived themselves as more successful in influencing their child's language development post intervention, but parents in the AC-I and AC-O groups showed a higher increase. There was a decrease in perceived difficulty for AC-I and ACO groups but increase for SC group. There was an increased rating of technology as helpful for all three groups, with the highest increase for AC-O group.	augmented words that AC-I group. None reported





Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
17. Rosa-Lugo & Kent-Walsh (2008) USA	Mixed methods: Focus group (3 culture experts, one of which was parent) and SCED (MPD across participants)	<i>N</i> = 2: mother ( <i>n</i> = 2); <i>M</i> = 39 yrs.; high school ( <i>n</i> = 2)  Children: <i>N</i> = 2; <i>M</i> = 81 months; Cystichyroma & DD	Aided; Augmented input, milieu teaching strategies and provide a means of communication in the activity; Book reading	Researcher; Home; Individual; Face-to-Face	Percentage steps correctly implemented: Showed 100% PND from baseline to instruction; and 91% PND for maintenance.	Percentage of communicative turns taken (in relation to opportunities created): Showed to 100% PND from baseline to instruction. Collateral data shows an increase in semantic concepts produced (PND=100%) from baseline to instruction.
18. Senner, Post, Baud, Patterson, Bolin, Lopez & Williams, (2019) USA	Quasi-experimental Pre-posttest	<i>N</i> = 4: mother ( <i>n</i> = 4); post high school Children: <i>N</i> = 4; <i>M</i> = 82 months; NDD and VF paralysis with tracheostomy	Aided; Augmented input, milieu teaching strategies and provide a means of communication in the activity; core leisure activities	Researchers and student clinicians; University clinic; Individual/group sessions; Face-to-Face	Percentage of modelled utterances (i.e. utterances accompanied by aided input) significantly increased from pre to post-test. Parents found the training useful and saw changes in their children.	The number of unique words independently produced on SGD increased but not significantly.



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
19. Sigafoos, et al., (2004) USA	Case report	N=1; mother Children: $N = 1$ ; $M = 144$ months; DD and seizure disorder	Aided; Augmented output, milieu teaching strategies and provide a means of communication in the activity; Snack and leisure activities	Researcher; University cafeteria and student meeting area, with feedback in the Home; Individual; Face-to-Face and telephonic	None reported	Frequency of independent requests using an SGD (in response to an opportunity created) increased from 0 at baseline to 100% during the university training sessions and generalized to the home activities.
20. Starble, Hutchins, Favro, Prelock & Bitner, (2005) USA	Case report	Parents: (mother and father); $M = 38$ yrs; post high school  Children: $N = 1$ ; 54 months; CP	Aided; Augmented input, milieu teaching strategies and provide a means of communication in the activity; Parent-identified activities	Researcher; Home; Individual, Face-to-Face	High satisfaction rating of relevance and appropriacy of training, customization of SLPs' sensitivity and knowledge; scores were lower for the comfort of using the device	None reported
21. Tait, Sigafoos, Woodyatt, O'Reilly, & Lancioni, (2004) Australia	SCED (MP across behaviours)	$N = 6$ : mother ( $n = 6$ ); other details were not reported  Children: $N = 6$ ; $M = 30$ months SQ CP with epilepsy, mild	Both (aided and unaided); augmented input, augmented output, milieu teaching strategies and provide a means of communication in	Researcher; Home; Individual, Face-to-Face	The number of times strategy was correctly implemented increased from baseline to intervention.	The number of original prelinguistic behaviours decreased The number of target replacement communication behaviours generally increased



Authors, date and country	Research design	Participants: Caregiver and Child variables	Training		Outcomes	
			Type of AAC implemented; Skill/strategy trained; Routine targeted	Delivery: trainer; training setting; group/individual; online/face-to-face/self-study	Caregiver(s)	Child(ren)
		hearing impairment, mild vision impairment, and cortical visual impairment, and epilepsy	the activity; play, mealtime, social			

*Note.* PPD = Profound phonological process disorder, VCFS = Velocardiofacial Syndrome (also known as DiGeorge Syndrome), VPI = Velopharyngeal Insufficiency, CAS = Childhood apraxia of speech, CP = Cerebral Palsy, ASD = Autism Spectrum disorders, ID = Intellectual disabilities, DS = Down Syndrome, DD = Developmental disorders/disabilities, VF = Vocal Fold, SQ = Spastic Quadriplegia AC-O = Augmented communication - output, AC-I = Augmented communication - input, SC = Spoken communication; ENGs = Enhanced natural gestures, RAACS = The Responsive Augmentative and Alternative Communication Style Scale, CP-A = Communication profile (Adapted), PND = Percentage of Nonoverlapping Data, IRD = Improvement Rate Difference, NAP = Nonoverlap of All Pairs, FCT = Functional Communication Training. TTR = type token ratio

<sup>a</sup> An additional caregiver participated in the focus group that preceded the training. <sup>b</sup> Augmented input strategies are used when the communication partner models the use of the AAC strategy, for example by supplementing verbal speech with a manual sign or pointing to a picture symbol. <sup>c</sup> Milieu teaching involves teaching communication skills within the natural environment, using strategies such as mands, expectant delay, and environmental arrangements <sup>d</sup> Augmented output refers to prompting the child to use the AAC modality. <sup>e</sup> Responsivity refers to parent communicative behaviors that include contingent responding to a child's communication attempts and initiation. <sup>f</sup> Provide a means of communication in the activity (using AAC) which include offering the child choices, interrupted chain strategy and etc.



## APPENDIX D

### D1 Cultural Stakeholder Interviews Participant Information Letter (English)



June 2020

Dear Sir/Madam

#### RE: INVITATION TO GIVE EXPERT INPUT AS PART OF A RESEARCH STUDY

My name is Vuledzani P. Ndanganeni (Madima). I am PhD student at the Centre for Augmentative and Alternative Communication, University of Pretoria. My supervisor is Prof K. Tönsing and my co-supervisor is Prof J. Bormman. I am conducting a multi-phase research study aimed at developing and testing a caregiver training programme. The aim of the programme is to train VhaVenda caregivers of young children who have severe communication disabilities to implement other forms of communication (also called augmentative and alternative communication or AAC) with their children. I would like to invite you to take part in Phase 1 of this project.

**Name of the project:** Augmentative and Alternative Communication in early childhood intervention: development and evaluation of parental training in a low-income rural context of South Africa.

#### What is the purpose of Phase 1 of this study?

During Phase 1, I would like to develop an understanding of parenting practices of VhaVenda caregivers with regards to the beliefs they hold about communication and interaction between an adult (parent or caregiver) and a young child. By understanding these practices, I will be able to embed the practices into the caregiver training programme for young children with difficulties communicating who need other forms of communication.

#### Why is this study important?

When children cannot speak, they need other forms of communication to help them to learn, communicate with others, and have friends. Parent training programs have helped parents and children in other countries to use these other forms of communication. With this study I want to develop and test a program that will help children and parents from a VhaVenda background.

Centre for Augmentative and Alternative  
Communication, Room 2-36, Corn path  
Building, Lynnwood Road  
University of Pretoria, Private Bag X20  
Hatfield 0026, South Africa  
Tel +27 (0)12 420 2001  
Fax +27 (0) 86 5100841  
Email saak@up.ac.za  
www.aac.up.ac.za

Fakulteit Geesteswetenskappe  
Lefapha la Bomotheo



#### **How will this study be conducted?**

This study has three phases. In the first phase, I identified parent training programmes that have been developed to support parents implement augmentative and alternative communication (AAC) with their children from the literature. I also want to obtain input from cultural experts, like yourself, on relevant parenting practices that can be embedded in the programme. Phase 2 will entail initial programme development based on the information obtained in Phase 1. I will then obtain further input from speech therapists and parents of children with disabilities on the program, and revise it.

In the third phase I want to implement the program. I want to train parents of children with CCN use other forms of communication with their children. I also want to test that the program works and is effective.

#### **What is expected of me as a participant in the interviews study?**

If you agree to take part, I will ask you to avail yourself for a telephone interview. The interview will take place at a time convenient for you. You will be sent materials two days before your interview day for you to look at and short videos to watch. Some of the interview questions will be based on the material. This interview will take about 40-60 minutes. Interviews will be recorded. After I have conducted all the interviews, I may email or whatsapp you a summary of the main topics discussed, to ensure that I have captured these accurately and completely. Your feedback on this summary will be highly appreciated.

A link with the electronic consent form will sent to you in order for you to officially respond to my request.

#### **What will I benefit from participating from this study?**

Although there may be no direct benefit to you, the potential benefit of your participation will be knowledge gained in understanding the cultural beliefs or views of the VhaVenda community about communication disorders, parent training and communication intervention services children with severe communication disabilities. This will provide me with guidance to develop a training programme that is culturally sensitive. The information can also help other interventionists (e.g., speech-language therapists) to ensure that their interventions are culturally valid. This knowledge will help contribute to the much needed research and interventions about delivering valid and effective communication intervention services for children with severe communication disabilities, that can improve developmental outcomes of the child and the family's quality of life. Since you will have to watch some videos before the interview day, you will be compensated with 1GB of data of the network provider you use.



**What steps will be taken to protect me if I decide to participate in this study?**

The study has been approved by the Ethics Committee of the Faculty of Humanities, University of Pretoria (Protocol number 11374633 /HUM010/0819). The following ethical considerations drive this study and will be adhered to by the researcher and the team.

**Informed consent:** Should you be confident that this letter explains the study fully, you are welcome to complete the electric consent form (link will be sent) to indicate whether or not you want to participate. Should you require further information, you are welcome to contact the researcher (see details below) before making a decision about you participation.

**Voluntary participation:** You are entitled to voluntarily participation in this study. You will be allowed to withdraw from the study at any given time, without negative consequences, or punishment of any sort. None of the data collected from you will be used if you decide to withdraw from the study. Non-participation will not disadvantage you in any way.

**Protection from harm and respect for you:** The researcher will not expose you to any form of harm. The study does not entail any invasive procedures. There are no risks associated with participating in this current study. The researcher will ensure that you are not subjected to embarrassment or any loss of self-esteem. The researcher will ensure that the questions asked would not, in any way, subject you to any form of discrimination and/or prejudice. The researcher will treat you with respect.

**The right to privacy and honesty:** Confidentiality will be maintained in this study. You will be given an identification number and your name will not be written on any of the data collection forms; however, the researcher will create a separate file that will be password-protected with a register of your names. This file will be stored in a different folder from the one with the rest of the information pertaining to this study. No identifying information will be included in any dissemination of results. Only the researcher and the research team will have access to the audio recordings. Data will be stored and secured at the Centre for Augmentative and Alternative Communication (CAAC) for 15 years. The research assistants will have to sign a contract, guaranteeing non-disclosure of any details.

**Will I have access to the research results?**

The research results will be made available upon request following the completion of the project. Witten and verbal feedback will be disseminated. The research data will be stored both as hard copy as well as in electronic format at the University of Pretoria for 15 years as part of the ethical requirements of the University. Results will also be disseminated with the research community through the thesis, presentations at conferences nationally and internationally as well as publications in journals.





## D2 Cultural Stakeholder Interviews Participant Consent form (online English )

# Cultural Stakeholder Interview Consent Form

Title: Augmentative and Alternative Communication in early childhood intervention: Development and evaluation of parental training in a low-income rural context of South Africa.

[Sign in to Google](#) to save your progress. [Learn more](#)

\*Required

Email \*

Your email address

Thank you for your interest in this study. Before proceeding, please ensure you have read and understood the information letter pertaining to this study. The study is conducted by Vuledzani Ndanganeni (Madima) under the supervision of Prof Kerstin Tönsing and co-supervision of Prof Juan Bormman. Your consent is voluntary, and you may withdraw from the study at any time. The interviews will be audio-recorded. The data will be stored for 15 years at the CAAC and all data will be treated confidentially. The transcribed data (with all identifying information removed) may be re-used for analysis. The results of the study will be used to write a thesis, scientific papers and give conference presentations. Kindly tick the option applicable to you. \*

- I give consent to participate in this study.
- I DO NOT give consent to participate in this study.



### D3 Cultural Stakeholder Interviews Participant Information Letter (Tshivenda)



Fulwi 2020

Aa!

#### NDIVHO: THAMBO YA U SHELA MULENZHE KHA ȚHODISISO

Dzina Țanga ndi Vuledzani P. Ndanganeni (Madima). Ndi mutshudeni wa Vhudokotela nga pfunzo ngei *Centre for Augmentative and Alternative Communication*, Yunivesithi ya Pretoria. MufhaȚusi wanga ndi Vho Phurofesa K. Tönsing ngeno muthusa mufhaȚusi hu Vho Phurofesa J. Bormman. Ndi khou ita Țhodisiso i tevhezaho maga o vhalaho yo livhanywa na u bveledza khathihi na u lingedza mbekanyamushumo ine ya u pfumbudza vhaleli vha vhana. Ndivho ya mbekanyamushumo iyi ndi u pfumbudza vhaleli vha VhavenȚa vhane vha Țhogomela vhana vhane vha vha na vuholefhali ha vhudavhidzani uri vha kone u shumisa dziȚwe nȚila dza vhudavhidzani musi vha tshi khou davhidzana na avho vhana. Ndi tama u vha ramba uri vha shele mulenzhe kha Țiga Ța u thoma Ța ino Țhodisiso.

**Țoho ya Țhodisiso:** Nyombedzelo na dziȚwe nȚila dzine dza shumiswa kha vhudavhidzani na vhana vhaȚuku: VhudȚowedzi na tsenguloso ya vhu pfumbudzi ha vhabebi vhuponi ha mahayani a Afurika Țshipembe.

**Ndivho ya Țiga Ța u thoma Ța ino Țhodisiso ndi Țifhio?**

Kha Țiga Ța u thoma, ndi ȚoȚa u Țalukanya maitete ane vhaleli vha vhana vha VhavenȚa vha a tevhezda ho sedzwa na vhutentatenda havho malugana na vhudavhidzani vhu kati ha muthu muhulwane (mubebi kana muleli) na Țwana muȚuku. Nga u pfesesa maitete aya, ndi Țo kona u katela maitete eneo kha mbekanyamushumo ya u pfumbudza vhaleli vha vhana vhaȚuku vhane vha Țangana na vhu konȚi nahone vha ȚoȚaho u shumiselwa dziȚwe nȚila dzi khwiȚisaho vhudavhidzani.

**Ndi ngani ino ngudo i ya ndeme?**

Musi vhana vha sa koni u amba, vha ȚoȚa u shumiselwa dziȚwe nȚila u vha thusa u guda, u davhidzana na vhaȚiwe, na u fhaȚa vhu konani. Mbekanyamushumo dzi pfumbudzaho vhabebi dzo no thusa vhabebi na vhana kha maȚiwe mashango uri vha kone u shumisa nȚila dzenedzi dzine dza khwiȚisa vhudavhidzani. Nga ino ngudo, ndi khou ȚoȚa u bveledza na u lingedza mbekanyamushumo ine ya Țo thusa vhana na vhabebi vha VhavenȚa.

**Ngudo ino i Țo itwa hani?**

Heino ngudo i na maga mararu. Kha Țiga Ța u thoma, i topola mbekanyamushumo dza vhu pfumbudzi dzo no shumiswaho u tikedza vhabebi uri vha shumise nyombedzelo na dziȚwe





ndila dzi khwinisaho vhudavhidzani na vhana u bva kha maiwalwa o fhambanaho. Ndi tođa hafhu u kuvhanganya makumedzwa a vhadivhi vha mvelele, sa vhone, malugana na maitelekwaone ane a nga katelwa kha mbekanyamushumo ya vhpupfumbudzi. Liga la vhuvhili li do katela mveledziso ya mbekanyamushumo ine ya do vha yo disendeka nga mafungo a liga la u thoma. U bva afho ndi do inga nga makumedzwa a vhatshenzheli vha muambo na vhabebi vha vhana vha vholefali kha mbekanyamushumo khathini na u vusuludza mbekanyamushumo yeneyo.

Kha liga la vhuraru, ndi tođa u shumisa mbekanyamushumo ine nda do vha ndo i bveledza. Ndi tođa u pfumbudza vhabebi vha vhana vhane vha tangana na vhuikonzi musu vha tshi davhidzana nga u shumisa dziwe ndila dzine dzi nga khwinisa vhudavhidzani na vhana avho. Ndi tođa hafhu u lingedza uri mbekanyamushumo ine nda do vha ndo i bveledza i a shuma na uri i a fusha thodea dza zwe ya bveledzelwa zwone naa?

Ho lavhelelwa zwifhio kha nge sa mudzheneleli kha nyambedzano malugana na thodisiso? Arali vha tenda u shela mulenzhe, ndi do vha humbela uri vha dinee tshifhinga tsha u fara nyambedzano na nge nga lutingo. Nyambedzano i do farwa nga tshifhinga tshine vhone vhone vha do vhone tsho vha fanela. Hu na zwine vha do rumelwa uri vha zwi sedze ho katelwa na vidiyo pfufhi, maduvha mavhili phanda ha musu nyambedzano i tshi nga farwa na vhone. Dziwe dza mbudziso dzi do disendeka nga zwine vha do vha vho zwi vhone kha mafungo ane vha do vha vho rumelwa. Nyambedzano yo anganyelwa u bva kha mithethe ya fuma u ya kha ya furathi. Nyambedzano dzi do rekhodiwa. Nga murahu ha musu ndo no khunyeledza nyambedzano dzothe dza thodisiso, ndi nga vha rumela manweledzo a nyambedzano yashu nga 'email' kana nga 'WhatsApp' ndo sedza mbuno dzine ra do vha ro rera nga hadzo, hu u itela u khwathisedza uri maambiwa avho ndo a rekhoda nga ndila yone nahone nga vhudalo naa. Phindulo yavho kha manweledzo eno i do livhuwiwa zwihulu.

Vha do rumelwa fomo ya thendelo uri vha kone u fhindula khumbelo yanga lwa tshiofisi.

U shela hanga mulenzhe kha ino ngudo hu do mmbuedza mini?

Naho hu nga si tou vha na mbuelo yo vha livhaho thwii, honeha, mbuelo ine vha nga i wana nga kha vhadzheneleli havho hu do vha hu ndivho malugana na vhutendatenda kana mbonelo ya Vhavenda malugana na vhuikonzi ha vhudavhidzani, u pfumbudzwa ha vhabebi na maiwe maga ane a dzhiwa hu u tođa u thusa vhana vhane vha tangana na vhuikonzi ho kalulaho ha vhudavhidzani. Hezwi zwi do gnea tsumbavhuyo musu ndi tshi bveledza mbekanyamushumo ine ya anana na maitele a mvelele. Mafungo ane nda do a kuvhanganya a do thusavho na vhaiwe vhadzheneleli siani la u khwinisa vhudavhidzani (vhadivhi vha muambo) uri vha kone u bveledza ndila dzine dza dzhiela nzhele mvelele kha zwa vhudavhidzani. Heyi ndivho i do thusavho na kha u bveledza thodisiso ine ya tođa nga matso matswuku na dziwe thusedzi dzo livhanywaho na u thusa vhana vhane vha vha na vholefali ha vhudavhidzani uri vhana vha bveledzee na matshilo a mita a khwinisee. Sa vhunga vha tshi do lavhelesa vidiyo phanda ha musu hu tshi nga farwa nyambedzano na vhone, vha do newa IGB ya 'data' ho sedzwa uri vha shumisa zhendedzi lifhio la zwa vhudavhidzani.



**Ndi maga afhio ane a do tevhedzwa u ntsireledza arali nda nanga u shela mulenzhe kha ino ngudo?**

Heino ngudo yo newa thendelo nga Ethics Committee of the Faculty of Humanities, Yunivesithi ya Pretoria (yo taluswa nga heyi nomboro: 11374633 /HUM010/0819). Maga a tevhelaho ndi ane a sumbedza vhudifari vhune mutodisisi na vthatusi vhawe vha do a tevhedza.

**Thendelo:** Arali vha na vhuṭanzi ha uri luno luhwalo lu talutshedza ngudo nga vhudalo, vho tendelwa u dadza fomo ine vha do rumelwa u sumbedza uri vha khou tenda u shela mulenzhe kana a vha todi u shela mulenzhe. Arali vha toda zwiuwe zwidombedzwa, vho tendelwa u kwamana na mutodisi (zwidombedzwa zwo newa afho fhasi) phanda ha musi vha tshi nga dzhia tsho malugana na vhudzhenelani havho kha thodisiso.

**Vhudipetshedzi ha u shela mulenzhe:** Vha na ndugelo ya u dipetshedza u shela mulenzhe kha ino ngudo. Vha do tendelwa u dibvisa kha ino ngudo tshifhinga tshiiwe na tshiiwe, hu si na masiandoitwa mavhi ane vha do tangana nao kana u pfiwa vhuṭungu nga ndila ifhio na ifhio. Mafhungo othe ane a do kuvhanganywa u bva kha vhone ha nga do shumiswa arali vha dibvisa kha ino ngudo. U sa shela mulenzhe havho a zwi nga vha huvhadzi na luthihi.

**Tsireledzo kha khombo na u vha thonifha:** Mutodisisi ha nga vha isi kha nzulele ine vha do vha khomboni nga ndila ifhio na ifhio. Ngudo ino a i katela maitale ane a nyadza tshirunzi tsha muthu. A hu na khombo dzine muthu a nga diwana o wela khadzo nga nthani ha u shela hawe mulenzhe kha ino ngudo. Mutodisisi u do khwathisedza uri vhone a vha shoniswi kana u xeletshelwa nga vhudifulufheli musi vha tshi khou shela mulenzhe kha ino ngudo. Mutodisisi u do zwi ita mafhungo uri mbudziso dzine a do vha vhudzisa, a dzi na tshitalula kana khethululo nga tshivhumbeo tshifhio na tshifhio. Mutodisisi u do vha thonifha.

**Ndugelo ya tsireledzo ya tshirunzi na vhufulufhedzei:** U shela havho mulenzhe kha ino ngudo hu do vha ha tshidzumbi. Vha do newa nomboro ya vhune nahone dzina lavho a li nga do uwalwa kha masiatari ane a vha na mafhungo o kuvhanganywaho; naho zwo ralo, mutodisisi u do sika faila ya madzina avho ine ya do tsireledzwa uri i si vulwe nga nnyi na nnyi. Faila yeneyi i do vhuṭungwa kha faila nthihi na maiwe mafhungo a kwamaho ino ngudo. A hu na fhethu na luthihi hune madzina avho kana zwithu zwine zwi nga vha talula zwa do katelwa musi hu tshi khou andadzwa mvelelo dza ngudo. Ndi mutodisisi khathihi na vhashumisani vhawe fhedzi vhane vha do thetshelwa nyambedzano ine ra do vha ro i rekhoda. Mafhungo o kuvhanganywaho a do vhuṭungwa ngei *Centre for Augmentative and Alternative Communication (CAAC)* lwa miwaha ya fumithanu. Avho vhane vha do vha vha tshi khou thusa mutodisisi, vha do saina nyandano ine ya khwathisedza uri a vha nga do bvukulula zwidombedzwa zwa ino ngudo.

**Ndi do kona u wana mvelelo dza thodisiso naa?**

Mvelelo dza thodisiso dzi do swikelelwa fhedzi musi thodisiso yo no khumyeledzwa. Muvhigo u do andadzwa wo tou uwalwa na nga u tou amba. Mafhungo a thodisiso a do tou gandiswa khathihi na u vhuṭungwa kha mutshini (sa khomphyutha) lwa miwaha ya fumithanu hu u toda u fusha thodea dza vhudifari ha vhatodisisi vhuṭoni ha Yunivesithi. Mvelelo dzi do andadzelwawho na vhaiwe vhatodisisi nga u tou gandisa thodisiso, u tou amba maguvhanganonani a Afurika Tshipembe na mashangodavha khathihi na u tou andadza kha dzhenala.



## D4 Cultural Stakeholder Interviews Participant Consent form (online Tshivenda)

### Thendelo ya u shela mulenzhe kha ngudo

Hei ndi fomo ya u nea thendelo kha u shela mulenzhe kha ngudo hei ya nga ha u davhidzana vhukati ha vhana na vhabebi (vhaundi) vha vho.

Email \*

Valid email address

This form is collecting email addresses. [Change settings](#)

Ndo vhalo vhurifhi he nda rumeliwa hone nga Vho Vuledzani Ndanganeni (Madima) nga ha ngudo ya vho. Ndi khou khwathisedza uri ndo pfesesa honeha ndi na ndivho nga ha ngudo iyi khatihhi na zwo lavhelelwaho nga mutodisisi.



Multiple choice ▼

- Ee!! Ndi nea thendelo ya u shela mulenzhe kha ngudo ine thoho yayo ndi: Augmentative an... X
- Hai!!!! A thi khou nea thendelo ya u shela mulenzhe kha ino ngudo. X



## D5 Cultural Stakeholder Inter-views - Interview Schedule (English)

### ENGLISH INTERVIEW SCHEDULE

Hello! My name is Vuledzani Ndanganeni (Madima). Thank you for volunteering to take part in this interview. You have been asked to participate as your point of view is important to this study. I realize you are busy and I appreciate you making time to participate. This interview is intended to understand the beliefs and practices of Vhavenda parents regarding communication interaction between parents and young children. I also want to understand cultural beliefs about children with a communication disability, and how some of the intervention strategies may be viewed by parents. The interview will take 60-90 minutes. It's important that I record it and I hereby request your permission to audio record the interview to facilitate data analysis. *Do you give me permission to record the interview?* (Participant responds)

I will be recording the interview in order to be able to transcribe what is said accurately. I would like to assure you that the discussion will be confidential. The recordings will be uploaded onto a cloud and kept safely in a password protected computer. The transcription of the interview will not contain any information that would link you to specific statements. The transcribed interviews will be kept for 15 years at the University of Pretoria Centre for Augmentative and Alternative Communication. If there are any questions that you do not wish to answer, you may refrain from doing so. However, I will be grateful if you contributed to all the questions. Please let me know when you would like to take a 5-minute comfort break so that we can pause and take a break during the interview.

*“Some of the questions are based on the videos that were sent to you. The first few questions are aimed at understanding typical parent-child communication interactions.”*

#### INTERVIEW QUESTIONS

1.1. In a typical Vhavenda family, who would be likely to communicate or speak with a child aged 6 years or younger? Who would communicate the most to the child?



### INTERVIEW QUESTIONS

<p>1.2. What activities do parents and children aged 6 or younger usually engage in during the day?</p> <ul style="list-style-type: none"> <li>- During which activities do adults and children typically talk?</li> <li>- During which ones would it be inappropriate or unusual to talk? What may be the reasons?</li> </ul>
<p>1.3. Is it important for parents to speak to young children?  <b>Follow up:</b> Why is it important/not important? (this may already give an idea as to the purpose? May not need to ask the next question?)  <b>Probe:</b> For what purpose would parents interact or communicate with a child aged 6 or younger? (if participants struggle, give examples: parents would want to teach children. they could teach how to communicate or behave or morals or values).</p>
<p>1.4. Is it important for young children to talk to their parents?  <b>Follow up:</b> Why is it important/not important?  <b>Probe:</b> What is the purpose of young children speaking to parents?</p>
<p>1.5. When parents and children interact during (<i>name activity that respondent described as communication rich</i>), how would this usually happen? For example, where would the child be positioned in relation to the parent? Would the child make eye contact? What kind of things would the parent say, and what kind of things would the child say? Who would start talking first and who would answer?</p>
<p>1.6. What other forms of communication (besides speech) are accepted? Please provide examples of these methods and what messages may be communicated with these methods.</p>
<p>1.7. What cultural or traditional beliefs do Vhavenda hold regarding communication disability in children? (What are their perceptions of communication disabilities?)</p>
<p>1.8. Would a parent of a child with a communication disability usually seek help or intervention for their child?</p>
<p>1.9. What kind of help would they seek?</p>
<p>1.10. What would they expect from....when seeking his/her help?</p>
<p>1.11. You have already told me how parents and young children without disabilities typically interact. In what way may these aspects be different if a child has a severe communication disability? (prompt on partners, activities, purposes, roles)</p>
<p>3.1. For my research project, I am planning to train parents on three specific aspects. The first is called responsiveness: This means a parent expects a child to communicate and reacts to the child's behaviour as if the child is communicating or speaking. So, for example, if the child points to something the parent will give it to the child, as if the child asked for it. Responsiveness also means that the parent pays attention to what the child is looking at or doing, and comments on it.</p>





### INTERVIEW QUESTIONS

The parent may also imitate what the child is doing. In the video I sent you, you could see that the child focused their attention on the doll's tummy. The adult sees that the child looks at the doll's tummy and the parent says tummy. The child then lifts the doll and passes it - the adult responds by saying /hug- big hug/ while patting her own doll. The child points to the side with the cot and the adult responds by turning to the cot and taking out a doll. She reacts to the pointing as if the child asked something.

- Would teaching parents to act in this way be culturally appropriate in your opinion?
- If not, could it be changed to make it more so?
- Is there anything I should be aware of during this process to make sure it is acceptable to parents?

3.2. The next thing I would like to teach parents to do is to give their child opportunities to communicate. This means that the parent can encourage the child to communicate by asking a question, letting the child choose between things or by arranging the environment in such a way that the child is tempted to ask for something. For example, the parent can give the child a little bit of food, like a small piece of a biscuit, or fruit and then not giving the child more until the child asks. Another example is putting something the child really wants where the child can see but not reach it. For example, some food can be in a see-through container that is tightly closed. In the second video, I sent you, the adult gives the child a chocolate. The adult then closes and hides the chocolate packet. The child comes closer to the adult and the adult waits for a communicative attempt. The child then says /chokie please/, the adult gives the child another piece of chocolate. In the third video, the adult shows the child a banana and an apple and asks the child which one she wants. The child grabs the apple and says /aah/

- Would teaching parents to act in this way be culturally appropriate in your opinion?
- If not, could it be changed to make it more so?
- Is there anything I should be aware of during this process to make sure it is acceptable to parents?



### INTERVIEW QUESTIONS

3.3. The last strategy involves pointing to pictures while speaking. Parents will be given picture boards like the one I sent you. I will teach them to point to pictures as they are talking to the child. In this way they can teach the child to also point to pictures. In the video: On this video you can see an adult talking and pointing to the relevant pictures on a picture board. For example, the adult said “today we worked” and she pointed to the picture of work. When she said “we were all done with work, we go to play with toys” and she pointed to all done, go, play and toys on the picture board. In the same way, the mealtime board can be used by both the parent and the child. The parent might signal the end of the mealtime activity by telling the child the tummy is full. The child can show “more” when they want more food. The adult can request the child to open the mouth by saying and pointing to picture showing ‘open mouth’

- Would teaching parents to act in this way be culturally appropriate in your opinion?
- If not, could it be changed to make it more so?
- Is there anything I should be aware of during this process to make sure it is acceptable to parents?

4. Would it be acceptable for me as a speech therapist to train parents of young children with communication disabilities to communicate more effectively with their children? What aspects should I be aware of in order to ensure that the training will be respectful and acceptable to parents?

- Is there anything you would like to add that you think will be useful to the study?
- Do you have any questions you would like to ask me before we conclude the interview?

Thank you for sharing your time, knowledge, expertise and experiences with me and contributing towards the study. I will send the analysed interview results for you to check if it represents your views. I really appreciate your input in this regard. Have a good (evening, afternoon or morning further). Aa!!”



## D6 Cultural Stakeholder Inter-views - Interview Schedule (Tshivenda)

### TSUMBAVHUYO YA NYAMBEDZANO – VHAṬALUKANYI VHA MVELELE

*Aa! Dzina ḽanga ndi name Vuledzani Ndanganeni (Madima). Ndi a livhuwa vho tenda u shela mulenzhe kha ino nyambedzano. Vho humbelwa uri vha shele mulenzhe kha ino nyambedzano ngauri vhuḽfiwa havho ndi ha ndeme kha ino ngudo. Ndi a zwi pfesesa uri vha muthu ane a dzula o fareledzwa nga mishumo minzhi, ngauralo, ndi a livhuwa vho ḽiḽnea tshifhinga tsha u shela mulenzhe kha ino nyambedzano. Ndivho ya ino nyambedzano ndi u ṽoda u pfesesa maitete a sialala na a mvelele ane tevhezwa nga vhaleli vha Vhavenḽa o livhanywa na vhudavhidzani vhukati ha vhaleli vha vhana vho holefhalaho na vhana vhone vhaḽe, khathihi na vhutendatenda malugana na vhana vhaḽe vha vha na vuholefhalo ha vhudavhidzani. Nyambedzano ino yo anganyelwa u dzhia mithethe ya fuiḽa u ya kha ya furathi. Ndi zwa ndeme uri ndi rekhode nyambedzano yashu. Ngauralo, ndi humbela thendelo yavho uri ndi rekhode sa vhunga makumedzwa avho a tshi ḽo nthusu kha tsaukanyo ya mafhungo o kuvhanganywaho.*

*(Mufhinduli u a fhindula)*

**TSHIDZUMBE NA U SA BULWA MADZINA:** “Ndi ḽo rekhoda nyambedzano yashu hu u itela uri ndi kone u ḽwalulula maambiwa avho o tou ralo. Ndi tama u vha fulufhedzisa uri nyambezano Iashu i ḽo vha ya tshidzumbe. Zwo rekhodiwaho, zwi ḽo vhulungwa kha khomphyutha hune zwa ḽo tsireledzwa nga ḽdila ine zwi nga si ḽo swikelelwa nga nnyi na nnyi. Muḽwalululo wa nyambedzano a u nga ḽo vha na mafhungo ane a ḽo ita uri vha ṽumanywe na zwe vha amba. Muḽwalululo wa nyambedzano yashu u ḽo vhulungwa University of Pretoria Centre for Augmentative and Alternative Communication lwa miḽwaha ya fumiḽhanu. Arali hu na mbudziso dzine vha pfa vha sa ṽodi u dzi fhindula, vho tendelwa u ḽibvisa kha u fhindula. Fhe296an wanndi nga livhuwa arali vha shela mulenzhe kha u fhindulwa ha mbudziso dzoṽhe.” “Ndi humbela uri vha mmbudze arali vha tshi ṽoda tshikhala tsha u awela lwa mithethe miḽhanu uri ri kone u ima, vha awele phanḽa ha musi nyambIdzano i tshi nga bvela phanḽa.”





*“Dziñwe mbudziso dzo ðisendeka kha ðhalutshedzo na tsumbedzo dze vha rumelwa. Ndivho ya mbudziso dza u ranga dzi si gathi ndi u ðoda u pfesesa vhudavhidzani ho dowealeho vhukati ha vhaleli na vhana.”*

<b>Mbudziso dza Nyambedzano</b>
Kha muᄁa wo ðowealeho wa Vhavenᄁa, ndi nnyi ane a nga anzela u davhidzana <sup>297</sup> an wan amba na ᄁwana wa minwaha ya rathi kana ya fhasi ha ya rathi? Ndi nnyi ane a nga ambesa na ᄁwana?
Ndi ᄁowenᄁowe dzifhio dzine vhaleli vha vhana vha minwaha y <sup>297</sup> an whi na ya fhasi ha ya rathi vha anzela u ðidzhenisa khadzo musi vha tshi khou lela vhana? Kha ᄁowenᄁowe dzenedzo dza ðuvha liñwe na liñwe, ndi dzifhio dzine dzi nga <sup>297</sup> an waa sa dzo pfumaho nga vhudavhidzani? Ndi kha nzulele dzifhio dza ᄁowenᄁowe hune vhatu vhahulwane na vhana vha anzela u amba vhoᄁhe? Ndi kha nzulele dzifhio dza ᄁowenᄁowe hune vhudavhidzani vhu nga iledzwa kana hune vhudavhidzani a ho ngo ðowealea? Ndi ngani zwo ralo?
Ndi ndivho ifhio ine vhaleli vha vhana vha ðoda u i swikelela nga u davhidzana na ᄁwana wa minwaha ya rathi kana wa minwaha ya fhasi ha ya rathi? Ndi ngani zwi zwa <sup>297</sup> an wan amba na ᄁwana? Ndi ndivho ifhio ine ya ðoda u swikelelwa musi vhana vhaᄁuku v <sup>297</sup> an wan amba na vhaleli vhavho? Zwi vhonwa zwi zwa ndeme musi ᄁwana a tshi ita ngauralo?
Kha vhudavhidzani na ᄁwana, mushumo wa muleli ndi ufhio? Mushumo wa ᄁwana wone ndi ufhio? (Ho lavhelelwa zwifhio kha ᄁwana?)
Ndi vhutendatenda vhufhio ho livhanywaho na mvelele ya Tshivenᄁa kana sialala la Tshivenᄁa vhune Vhavenᄁa vha vhu tevhedza musi zwi tshi ᄁa kha u davhidzana na vhana vhane vha vha na vuholefhali ha vhudavhidzani? (Ndi dzifhio mbonalo dzine Vhavenᄁa vha vha nadzo malugana na vuholefhali ha vhudavhidzani?)  Ndi dzifhio dziñwe ᄁila dza vhudavhidzani (nga nᄁa ha muambo/u amba) dzo ᄁanganedzwaho? Ndi humbela uri vha ñee tsumbo dza ᄁila dzenedzi khathihi na zwine dza amba zwone.  Vho no mmbudza uri vhaleli vha vhana vha anzela u davhidzana hani na v <sup>297</sup> an vha si na vuholefhali. Hu nga vha na phambano kha kudavhidzanele na vhana arali vho vha vha tshi khou davhidzana na ᄁwana ane a vha na vuhohfelani ha vhudavhidzani? (vha kwamevho na vhatikedzi, ᄁowenᄁowe, zwipikwa na dziñwe nyito)  Muleli wa ᄁwana ane a vha na vuhohfelali ha vhudavhidzani u na hune a nga ðoda thuso kana vhudzheneleli ha vhañwe vhatu uri vhudavhidzani na ᄁwana vhu konadzee? Ndi dzifhio ndavhelelo dzine dza livhanywa na u dzhenelela ha vhatushi kha uri vhudavhidzani na ᄁwana onoyo vhu konadzee?



### Mbudziso dza Nyambedzano

Hu na maitete ane a dzhiwa sa o dowealeho musi hu tshi khou aluswa n'wana wa min'waha ya fhasi ha ya rathi, sa u mu beba mutanani? Mañwe maitete a ngaho enea ane a dzhiwa sa a dowealeho kha vhana vha min'waha ya fhasi ha ya rathi ndi afhio? (Maitete aya o vha a tshi do tangedzea kha n'wana ane a vha na CCN na vuholefhalo?)

Ndi tama u divha mihumbulo yavho malugana na u tangedzea ha zwi tevhelaho kha mvelele ya havho: U fhindula, ndisedzo ya zwikhala zwa u amba musi hu tshi khou davhidzaniwa. (thalutshedzo dzi do newa)

Kha thodisiso yanga, ndo anganya u pfumbudza vha thogomeli vha vhana ndo livhanya u pfumbudza honoho na zwiteñwa zwiraru.

U fhindula ndi musi muleli a tshi lavhelelwa u dzhiela nzhele ndingedzo dza vhudavhidzani dzine n'wana a dzi shumisa u davhidzana nga u mu fhindula. Muleli a nga fhindula na u talusa zwine n'wana a khou lingedza u amba nga u mu vhudzisa mbudziso, u mu fhindula na u nea n'wana zwine a nga vha a tshi khou toda zwone ngauri muleli a vha o kona u talusa ndingedzo dza vhudavhidzani dzine n'wana a dzi shumisa. Ndi toda u vha pfumbudza uri vha kone u dzhiela nzhele ndingedzo dza vhudavhidzani dza n'wana (sa tsumbo, arali n'wana a lila...). Ndi toda hafhu u vha pfumbudza u dzhiela nzhele ndila dzenedzo na uri vha nga dzi fhindula hani. (Tsumbedzo ya uri izwi zwi shuma hani?) U ya nga kuvhonele kwavho, maitete aya a nga tangedzea kha mvelele ya havho? Arali phindulo hu 'hai', zwi a konadzea uri maitete aya a shandukiswe lune a anana na maitete a mvelele ya havho? Hu na zwine nda tea u zwi dzhiela nzhele kha u ita uri u pfumbudzwa ho raliho hu tangedzee kha vhaleli?

Ndisedzo ya zwikhala zwa vhudavhidzani: muleli a nga vhudzisa mbudziso dzine dza fhindulwa nga 'Ehe/Hai', mbudziso dzine dza tendela vhudodombedzi, kana u nea n'wana tshikhala tsha u nanga. Muleli u lindela lwa mithethenyana miraru u ya kha mitanu hu u itela uri n'wana a vhe na tshikhala tsha u fhindula, a konaha u fhindula zwine n'wana a khou amba nga hazwo, a khwañhisedza zwine n'wana a amba kana a nea n'wana tshikhala tsha u nanga. Arali n'wana a sa fhindula, muleli a nga lingedza u sika dzinwe ndila dzine dzi nga tutuwedza n'wana u amba, sa tsumbo, nga u fara tshanda tsha n'wana a tshi khou mu thusa u sumba na u nanga zwine a toda.

U ya nga ha kuvhonele kwavho, maitete o raliho a nga tangedzwa kha mvelele ya havho? Arali phindulo hu 'hai', zwi a konadzea uri maitete enea a shandukiswe lune a swika hune a anana na mvelele ya havho? Hu na zwine nda tea u zwi dzhiela nzhele hu u itela uri maitete enea a tangedzee kha vhaleli?

Thusedzi ya kushumisele kwa luambo i katela u shumiswa ha tshifanyiso kana u davhidzana hu tshi khou shumiswa daba la zwifanyiso li fanaho na le nda vha rumela.



### **Mbudziso dza Nyambedzano**

Muleli u sumba zwiga kha ḁaba ḁa ḁowendowe zwenezwo musi a ts299an wan amba na ḁwana. Muleli u sumba tshiga tshine tsha ombedzela ipfi (sa tsumbo, Muleli: “ḁisani mupopi mukapu”-muleli a mbo ḁi sumba zwiga zwo imelaho ipfi ḁi ombedzelwaho).

*“Hu na zwiḁwe zwine vha ḁoda u engedza zwine vha vhona zwi tshi nga vha zwa ndeme kha ino ḁodisiso? Hu na mbudziso dzine vha ḁoda u mmbudzisa phanda ha musi ri tshi nga khunyeledza nyambedzano yashu? Ndi a livhuwa u kovhelwa tshifhinga tshavho, ḁdivho, tshenzhemo khathihi na u shela havho mulenzhe kha ino ngudo. Ndi ḁo vha rumela muḁwalululo wa nyambedzano yashu uri vha khwaḁhisedze uri ndi makumedzwa avho. Ndi ḁo vha kovhela mawanwa a ḁodisiso, arali vha tshi nga zwi takalela. Vha nga ḁḁivhadza nga u tou shumisa mulaedza wa luḁingo arali vha tshi nga zwi takalela u kovhelwa mawanwa. Ngauralo, ndi a livhuwa u shela havho mulenzhe u swika zwino. Kha ḁi vhe ḁuvha ḁavhudi (vhusiku havhuḁi, masiari/mathabama avhuḁi kana matsheloni/maḁavhelo avhuḁi). Aa!”*



### D7 Interview Material - Videos

Responsiveness: <https://www.youtube.com/watch?v=W34UiOUQWcc&t=36s>





<https://www.youtube.com/watch?v=I2eDYGCR2NQ>

A YouTube video player interface. The video content shows a young child with curly hair, wearing a pink t-shirt, sitting on a grey carpeted floor. The child is looking down at a white tablet computer. On the tablet screen, there is a grid of letters from A to Z, with some letters highlighted in blue. The video player controls are visible at the bottom, including a play button, a progress bar, and various icons for volume, settings, and full screen. The video title "Play (k)" is visible in the bottom left corner of the player.



Aided language modelling:

[https://www.youtube.com/watch?v=zLL\\_HmNud38&list=PLYfSIQfM1jurE-PmMLHI1-1UhrNH5Dhjd](https://www.youtube.com/watch?v=zLL_HmNud38&list=PLYfSIQfM1jurE-PmMLHI1-1UhrNH5Dhjd)

A video player interface showing a woman and a young boy. The woman is holding a blue communication board with several icons, including a pair of hands, a person, a right-pointing arrow, a pair of lungs, a person sitting in a wheelchair, and a person with a speech bubble. The boy is looking at the board. The video player has a red progress bar and a control bar at the bottom with icons for play, volume, and other settings. The video title and URL are displayed above the video frame.





D8 Interview Material-Communication Board

<p>Nne / I</p>	<p>Dzula/Sit</p>	<p>toda / want</p>
<p>Vhone / you</p>	<p>Atamani /open mouth</p>	<p>Fura /tummy full</p>
<p>Ndo livhuwa/ Thank you</p>	<p>u la /eat</p>	<p>Engedza / more</p>
<p>Thuso/ Help</p>	<p>u tamba zwanda/ wash hands</p>	<p>Difha /yummy (tasty)</p>

## **D9 Synthesized Member Checking (Email)**

Dear Stakeholder\_

I recently interviewed you about interactions for young children under the age of six years in the Vhavenda culture. Thank you for having taken the time to participate in the interviews, I learnt a lot of things and found interesting data. I interviewed about 10 people during that period.

As I mentioned to you before starting the interview, I am now sending you a summary of the results (see document attached). In order to make sure I did not miss anything, I want to ask you to please read through the summary. If you think I missed something or did not interpret something correctly, please let me know. You are welcome to provide feedback in the document, or send me a text or an email. If you prefer you can also let me know and I will call you so that we can discuss any feedback you have.

I would be most grateful for your response by Thursday 19 .11.2020.

**Kind Regards**



## **D10 Synthesized Member Checking Summary**

### Summary of results obtained in cultural stakeholders' interviews

I summarised the responses under four main categories. The first is about how children interact, the second about communication disabilities, the third about the training I want to do and the fourth is about how things have changed in the Vhavenda culture over time.

#### **How young children without disabilities interact**

When asked about who would typically interact with a child six years or younger, stakeholders mentioned that the children will interact with the mother, grandmother, parents and grandparents. However, if the mother is young, the grandmother and elderly women assume the role that the mother would take. They do this to teach the mother how it is done. Other family members such as siblings and elderly females (i.e. the aunt, cousin) were also mentioned. Furthermore, due to the changing times and the lives of primary caregivers, teachers at creche and the helper may also be important communication partners of the child.

Children and caregivers typically do a number of activities together. When caregivers go on their daily chores (i.e., sweeping, making the bed, cleaning) children under six years are involved as their caregivers are teaching them to do the chores and also talk to them during the chores to stimulate language. Other activities included daily child routines such as bathing, brushing teeth, eating, playing and some of the activities that people in rural areas engage in during harvesting season. Children aged 6 or younger play with other children but also play with caregivers, especially the younger children. Caregivers and children communicate with each other during most of these activities. However, some participants mentioned that talking is prohibited when children are eating because of safety reasons (to prevent choking), respect for the cook and also it is tradition not to eat and talk.

It was reported that it is important for children to talk to caregivers and for caregivers to talk to children in the Vhavenda culture. Children will communicate to caregivers for various reasons such as talk about their plans for the future or share what has happened to them. This is especially important if the child has had a bad experience. Children will also express when they need or want something. By talking to caregivers, children can improve their speech- and language skills and form relationships with others. Caregivers

communicate with children in order to comment, answer the children's questions, give children instructions, ask the children questions, and teach the children.

When asked about who is allowed to start the conversation, participants indicated that both caregivers or children can start the conversation (initiate interaction).

Although some participants mentioned that amongst older individuals eye contact is not always appropriate, it was reported that young children may look a parent in the eye.

It was reported that a variety of communication methods (not only speech) are acceptable and important in the Vhavenda culture. Most if not all of the participants reported the use of the look or eye that caregivers use to reprimand, discipline or indicate dissatisfaction with the child's behaviour in the presence of visitors. They furthermore use this to correct child's behaviour. Other methods included touch (i.e. a smack), pointing, gestures, vocalisations and using mouthing (i.e. silently moving your mouth to speak without using your voice), demonstrations and the use of pictures or drawings.

### **Communication disability**

Vhavenda often believe that communication disability occurs as result of witchcraft, curse or parents breaking taboos. Other beliefs about the cause of communication disability include: other people could have caused it, hereditary, use of 'muti' and that it is the will of the ancestor. One of the participants reported that parents are judged in their respective communities. Some reported that not everyone believes that witchcraft causes a communication disability.

When asked about the help that parents seek for their children with communication disabilities, it was reported that some will seek help from the traditional healers, prophets or pastors. When parents seek such help, the parent often expects a miraculous complete healing. Others parents are seeking help from healthcare practitioners such as doctors, speech language therapists and physiotherapists. When parents seek such help they typically do not expect a miracle cure, but they do expect their child to improve, and maybe learn how to speak, to communicate, for others to understand the child and for the child to grow up to be more independent and responsible. Parents expect healthcare professionals to help them or teach them how to communicate with their kids. Most participants reported that expectations of help seeking are that the children will talk.

Other forms of help that parents sought were help to get the care dependency grant, or help for their children to get an education. Parents were also offered help through community empowerment programmes. These programmes were highlighted as helping parents to make their own choices and become empowered.

In general, all caregivers expect positive changes when seeking help regardless of where they go for help.

One participant mentioned that, even when parents wait for a miracle, they should take other action in the meantime, rather than doing nothing. It was also reported that some caregivers do not seek help because they hide their children. Some believe that nothing can be done to help the child while others believe the child will improve without intervention.

When asked if the way in which caregivers and children interact differs when the child has a communication disability, compared to the child not having a disability, there were various opinions. In general, participants felt that the interactions were the same, and that the children with communication disabilities did the same activities. However, it was reported that children with communication disability may be more passive in interaction, and that they require more patience and understanding. They were also reported to be slower.

### **Comments on the training I want to do**

*During the interview, I asked you and the other participants if the strategies I want to train caregivers to use are appropriate in the Vhavenda culture. These strategies are: 1) responding to the child, 2) giving the child opportunities to communicate, and 3) pointing to pictures while speaking. You will remember that I asked you to watch some videos and comment on the skills and the way in which they were trained.*

Although most participants mentioned that these strategies are appropriate, there were some suggestions to amend the training to be more culturally appropriate. One participant mentioned that in the traditional Vhavenda culture, the child is not at the centre for everyone. This should be kept in mind when responding to the child. Participants also commented on the material that was used in the videos shown to them. When creating communication opportunities (choice making activity), it was suggested that the

researcher uses items and foods that are available to the child in their context. Pointing to pictures while talking was widely accepted with the following reasons: child knows what is being said, child learns effectively how to point and talk, child will remember, t'e child's mind will function effectively with pictures, aids quick understanding of message and quickens the learning process.

Participants in general felt that the caregivers will accept the strategies if they help the child and improve their quality of life. When training caregivers, the researcher must establish if the caregivers are interested in the training, find out if they are committed, and establish a good rapport. She must be friendly. The researcher should establish what parents have already been doing and build on it. The researcher must acknowledge that parents have skills and expertise. The researcher must be respectful of parents' practices and accommodate everyone regardless of their beliefs and practices. The researcher must use the caregiver's l-anguage - simple terms that everyone can understand. She should use materials that are culturally acceptable.

### **Changes in the Vhavenda culture over time**

Some participants mentioned that there have been changes in the Vhavenda culture over time. Some mentioned that the way in which children are raised and in which they interact has changed over time. For example, grandparents may not be living with the family and therefore play less of a role in childcare. On the other hand, paid helpers may play more of a role. Parents nowadays may also not allow their children out of sight as easily due to concerns about safety. It was also mentioned that practices such as hiding children with disabilities and beliefs about the cause of communication disabilities have changed over time. Some of these changes were caused by changes in religious beliefs and levels of formal education. It was mentioned that some of the training strategies may be better accepted by parents who are 'modern'.

**APPENDIX E**  
**E1 Biographical Questionnaire**

Participant ID: PA-

**SECTION A: BIOGRAPHICAL INFORMATION**

**A1 Caregiver Information**

What is your age? \_\_\_\_\_

What is your gender?

	Female
	Male
	Other

Relationship with the child: \_\_\_\_\_

What is your highest qualification level? \_\_\_\_\_

What is your home language? \_\_\_\_\_

Where do you attend Speech therapy?

	Siloam Hospital
	Tshilidzini Hospital
	Donald Fraser Hospital
	Musina Hospital
	Louis Trichardt Memorial Hospital

How often do you take your child for speech therapy?

	Once a week
	Once every two weeks
	Once a month
	Once every two months
	Every 6 months
	Once a year
	When we have money

**A2 Child Information**

What is your child's gender?

	Female
	Male

What is your child's age? \_\_\_\_\_

What is the diagnosis of your child? \_\_\_\_\_

**A3 Fine Motor status**

How does your child indicate what they want?

**A4 Gross Motor status**

How does your child move around?

**A5 Visual status**

Describe yo'r child's vision?

**A6 Hearing status**

Describe yo'r child's hearing skills.

Has yo'r child's hearing been tested ?

If yes, what were the results?

**A7 Education information**

Does your child attend any educational or child care setting?

	Yes
	No

If yes, please describe the setting

\_\_\_\_\_

**SECTION B : COMMUNICATION**

**B1**

Does your child use spoken words to communicate? \_\_\_\_\_

**B2** If yes, How many spoken words does your child use to communicate? \_\_\_\_\_

Does your child use different words to communicate? Describe:

\_\_\_\_\_

**B3** How does your child communicate?

Gestures	
Points to things	
Vocalizations (sounds)	
Jargon (talking in a language you don't understand/Baby language)	
Unintelligible speech (unclear words)	
Facial expressions (e.g., smiling)	
Signs from sign language	
Communication board or book with pictures	
Speech Generating device (device that talks loud)	
Eye pointing	

**B 4:** How do you communicate with your child?

\_\_\_\_\_  
\_\_\_\_\_

**B 5** Does your child respond when you call their name?

	Yes
	No
	Sometimes

Please specify what happens: \_\_\_\_\_

\_\_\_\_\_

**B 6** Does your child understand when you talk to him?

	Yes
	No
	Sometimes

Please specify \_\_\_\_\_

\_\_\_\_\_

**B7**

**Communication Functions**

*Which of the following communication functions does your child do and how well do they do it?*

	Less										Most
Request help	0	1	2	3	4	5	6	7	8	9	10
Request objects	0	1	2	3	4	5	6	7	8	9	10
Protest	0	1	2	3	4	5	6	7	8	9	10
Confirm	0	1	2	3	4	5	6	7	8	9	10
Draw attention to his/herself	0	1	2	3	4	5	6	7	8	9	10
Get othe' people's attention	0	1	2	3	4	5	6	7	8	9	10
Label items	0	1	2	3	4	5	6	7	8	9	10
Make choices	0	1	2	3	4	5	6	7	8	9	10
Indicate humour	0	1	2	3	4	5	6	7	8	9	10
Show interest in objects	0	1	2	3	4	5	6	7	8	9	10

**B8**

**Frequency of Communication**

*How frequently does the child communicate with the following people?*

	Not at all										Most of the time
Caregiver	0	1	2	3	4	5	6	7	8	9	10
Parent	0	1	2	3	4	5	6	7	8	9	10
Siblings	0	1	2	3	4	5	6	7	8	9	10
Peers	0	1	2	3	4	5	6	7	8	9	10
Unfamiliar people	0	1	2	3	4	5	6	7	8	9	10



**SECTION C : ACTIVITIES**

**C1 Activities that caregivers engage in with their child**

*Which communication rich activities do you and your child engage in? ( name 3)*

---



---



---

*How frequently do you and your child communicate in these activities ?*

Less \_\_\_\_\_ Most

1      2      3      4      5      6      7      8      9      10

**C2 Activities Rating**

*Which activities would you say you and your child engage in the most? Rate the activities .*

Less \_\_\_\_\_ Most

Morning routine (waking up, brushing teeth and washing the face)

1      2      3      4      5      6      7      8      9      10

Mealtime (breakfast, Lunch)

1      2      3      4      5      6      7      8      9      10

Snack time (when the child wants water, juice, biscuits or simbas)

1      2      3      4      5      6      7      8      9      10

---

Bath time

1      2      3      4      5      6      7      8      9      10

---

Dressing up

1      2      3      4      5      6      7      8      9      10

---

Which daytime activity do you interact in with your child? \_\_\_\_\_

---

*Examples : Daytime activities (playing with child, singing, reading, telling a story or etc)*

**C3** Which activities would you say are enjoyed by you and your child ?

Morning routine (waking up, brushing teeth and washing the face)

1      2      3      4      5      6      7      8      9      10

---

Mealtime (breakfast, lunch)

1      2      3      4      5      6      7      8      9      10

---

Snack time (when the child wants water, juice, biscuits or simbas)

1      2      3      4      5      6      7      8      9      10

---

Bath time

1      2      3      4      5      6      7      8      9      10

---

Dressing up

1      2      3      4      5      6      7      8      9      10

---

**SECTION D: AUGMENTATIVE AND ALTERNATIVE COMMUNICATION**

**D 1** Awareness

Have you heard of augmentative and alternative communication before ?

	Yes, ive heard about it
	No, I have never heard of it
	Unsure

*If the participant answers no to the question, give a definition of AAC.*

AAC is ways other than speech that are used to enhance or repl“ce the”"normal" ways of communication. Others will write or type what they want to say, use gestures, pictures, signs, gestures, devices and etc.

If yes, describe what you know: \_\_\_\_\_

---

Are you aware that AAC strategies help children and adults communicate better where it is difficult?

	Yes
	No
	Unsure

**D2** **Interests**

**D2.1** Do you think using AAC would benefit other children with CCN?

	Yes
	No

Do you think the use of AAC will benefit your child?

	Yes
	No

Are you interested in learning how to implement augmentative and alternative communication?

	Yes
	No

**D2.2** On a scale of 1 to 5 (1 being less interested and 5 being most interested), please rate the following in the order of priority by crossing off the number.

*I am interested in learning how to implement AAC during the following activities with my child:*

Morning routine (waking up, brushing teeth and washing the face)

1      2      3      4      5

Mealtime (breakfast, Lunch)

1      2      3      4      5

Snack time (when the child wants water, juice, biscuits or simbas)

1      2      3      4      5

Bath time

1      2      3      4      5

Dressing up/Undressing

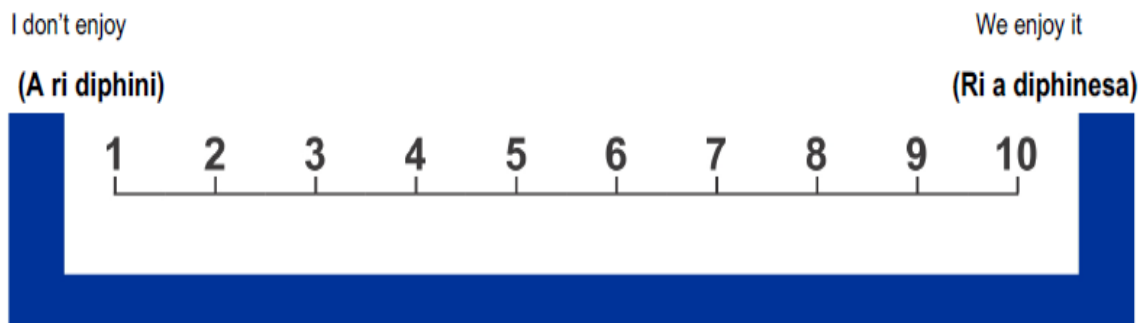
1      2      3      4      5

Daytime activities (playing with child, singing, reading, telling a story or etc)

1      2      3      4      5



## E2 Biographical Questionnaire Flash Cards



## APPENDIX F

### Communication Matrix

#### Communication Matrix Questions and Answer Options

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Updated 09-2012

#### GETTING STARTED...

Please check **ONE** of the four statements below that **best** describes the communication skills of your child.

\_\_\_\_A. *My child doesn't seem to have real control over his body yet. The only way I know that he wants something is because he fusses or whines when he's unhappy or uncomfortable, and he smiles, makes noises or calms down when he's happy and comfortable. Does this statement describe your child? If you checked this statement, go to Section A (p. 1)*

\_\_\_\_B. *My child has control over her own behaviors, but she doesn't use them to try to communicate to me. She doesn't come to me to let me know what she wants, but it's easy for me to figure out, because she tries to do things for herself. She knows what she wants, and her behavior shows me what she wants. If she runs out of something to eat, she will just try to get more, rather than trying to get me to give her more. Does this statement describe your child? If you checked this statement, go to Section B (p. 2)*

\_\_\_\_C. *My child clearly tries to communicate his needs to me through gestures, sounds or language. He knows how to get me to do something for him. He uses some of the kinds of behaviors below to communicate:*

- Gestures such as pointing, shaking his head, tugging at my arm or looking back and forth between me and what he wants
- Sounds such as squealing to show you he wants something or fussing when he doesn't want something
- Language or symbolic forms of communication such as speech, written words, Braille, picture symbols, 3-dimensional symbols or sign language

**If you checked this statement, go to Section C (p. 4)**

**APPENDIX G**

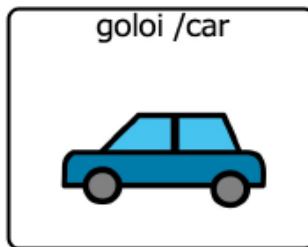
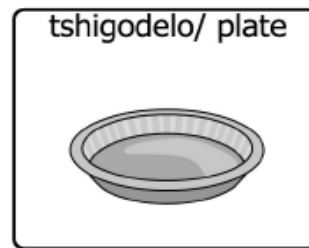
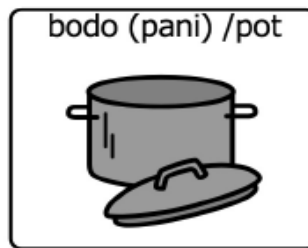
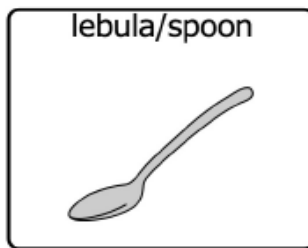
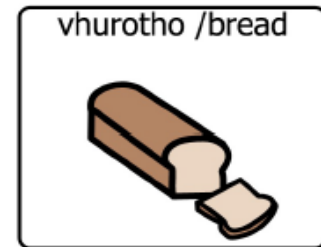
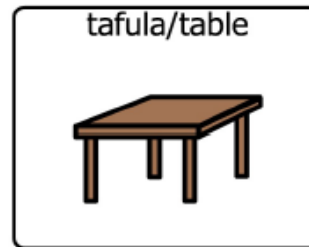
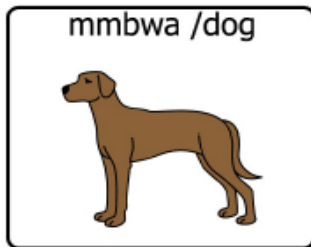
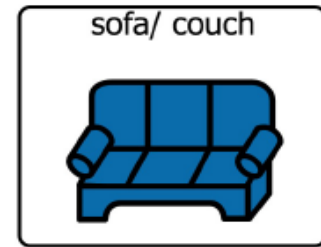
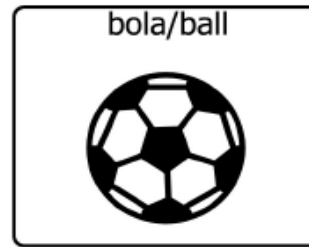
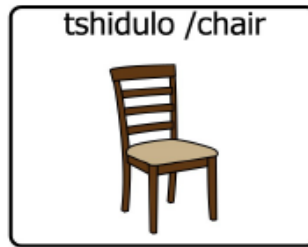
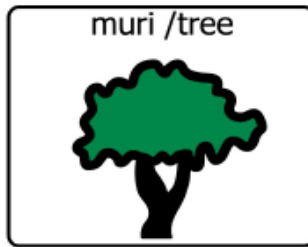
**G1 Picture Recognition and Representational Task Procedural script**

	The researcher introduces the activity to the child	The researcher shows the child one board at a time.	The researcher calls out the word using the carrier“ phrase "show me t” e _____”	The researcher makes sure the child is focused on the communication board.	The researcher makes sure the child listens to the word by repeating the target word twice.	The researcher waits 5-10 seconds for the child to respond .	If the child points to an incorrect picture, the researcher will ask the child to look at the picture again to find the target word	The researcher acknowledges t’ e child’s response by“ saying “aha “ or hmm “	The researcher will close the session by giving the child a sticker on the forehead and also on the hand.
<b>TRIAL ITEMS</b>									
Couch									
Table									
Pot									
<b>TEST ITEMS</b>									
Car									
Ball									
Cup									
Plate									
Spoon									
Pants									

	The researcher introduces the activity to the child	The researcher shows the child one board at a time.	The researcher calls out the word using the carrier“ phrase "show me t” e _____"	The researcher makes sure the child is focused on the communication board.	The researcher makes sure the child listens to the word by repeating the target word twice.	The researcher waits 5-10 seconds for the child to respond .	If the child points to an incorrect picture, the researcher will ask the child to look at the picture again to find the target word	The researcher acknowledges t’ e child’s response by“ saying “aha “ or hmm ”	The researcher will close the session by giving the child a sticker on the forehead and also on the hand.
Toothbrush									
Soap									
Phone (cell phone)									
Blanket									
Chair									
Shirt									



G2 Picture Recognition and Representational Task



### G3 Picture Recognition and Representational Task Scoring Form

Participant ID: \_\_\_\_\_

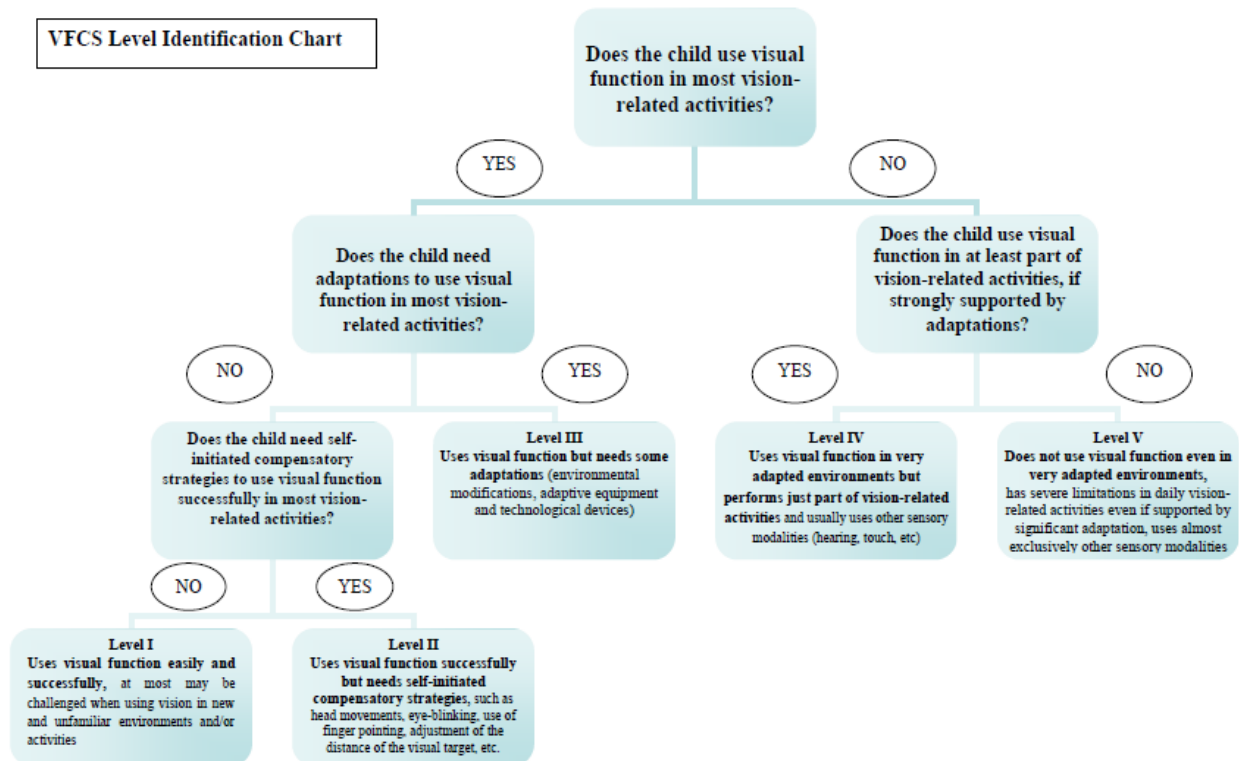
Trial item 1	Couch	
Trial item 2	Table	
Trial item 3	Pot	
Test item 1	Car	
Test item 2	Ball	
Test item 3	Cup	
Test item 4	Plate	
Test item 5	Spoon	
Test item 6	Pants	
Test item 7	Toothbrush	
Test item 8	Soap	
Test item 9	Phone (cell phone)	
Test item 10	Blanket	
Test item 11	Chair	
Test item 12	Shirt	

Correct items	
Total number of items	12
Percentage of correct items	%



## APPENDIX H Visual Function Classification System

VFCS Level Identification Chart





## APPENDIX I

### I1 Mini- Manual Abilities Classification System



#### What do you need to know to use Mini-MACS?

Mini-MACS users need to find out what objects the child usually handles and how they handle them: with ease or difficulty, quickly or slowly, with precision or randomly? For example, you can ask about and/or observe how the child uses his or her hands when playing and during meals, or when participating in usual activities of daily living.

Ask questions about the child's self-initiated ability and how much adult help and support the child needs to handle everyday objects, e.g. toys.

Below is a description of the five Mini-MACS levels of children's self-initiated ability and their need for assistance or adaptation when handling objects.

- I. **Handles objects easily and successfully.** The child may have a slight limitation in performing actions that require precision and coordination between the hands but they can still perform them. The child may need somewhat more adult assistance when handling objects compared to other children of the same age.
- II. **Handles most objects, but with somewhat reduced quality and/or speed of achievement.** Some actions can only be performed and accomplished with some difficulty and after practice. The child may try an alternative approach, such as using only one hand. The child need adult assistance to handle objects more frequently compared to children at the same age.
- III. **Handles objects with difficulty.** Performance is slow, with limited variation and quality. Easily managed objects are handled independently for short periods. The child often needs adult help and support to handle objects.
- IV. **Handles a limited selection of easily managed objects in simple actions.** The actions are performed slowly, with exertion and/or random precision. The child needs constant adult help and support to handle objects.
- V. **Does not handle objects and has severely limited ability to perform even simple actions.** At best, the child can push, touch, press, or hold on to a few items, in constant interaction with an adult.

#### Distinctions between Levels I and II

Children in Level I may have slightly more difficulty handling items that require good fine motor skills compared to children without disabilities of the same age.

Children in Level II handle essentially the same objects as children in Level I, but they may encounter problems performing tasks and/or take longer to perform them, so they often ask for help. Functional differences between hands may cause performance to be less effective. They may need more guidance and practice to learn how to handle objects compared with children in Level I.

#### Distinctions between Levels II and III

Children in Level II can handle most objects, though they may take longer and do so with somewhat less quality, and they may need a lot of guidance and practice to learn how to handle objects.

Level III children manage to use easily handled objects but often need help placing objects in an easy position in front of them. They perform actions with few subcomponents. Performance is slow.

#### Distinctions between Levels III and IV

Children in Level III manage to use easily handled objects independently for short periods. They perform actions with few subcomponents, and the actions take a long time to perform.

At best, children in Level IV can perform simple actions such as grasping and releasing easily handled objects that are offered in an adapted position. They need constant help.

#### Distinctions between Levels IV and V

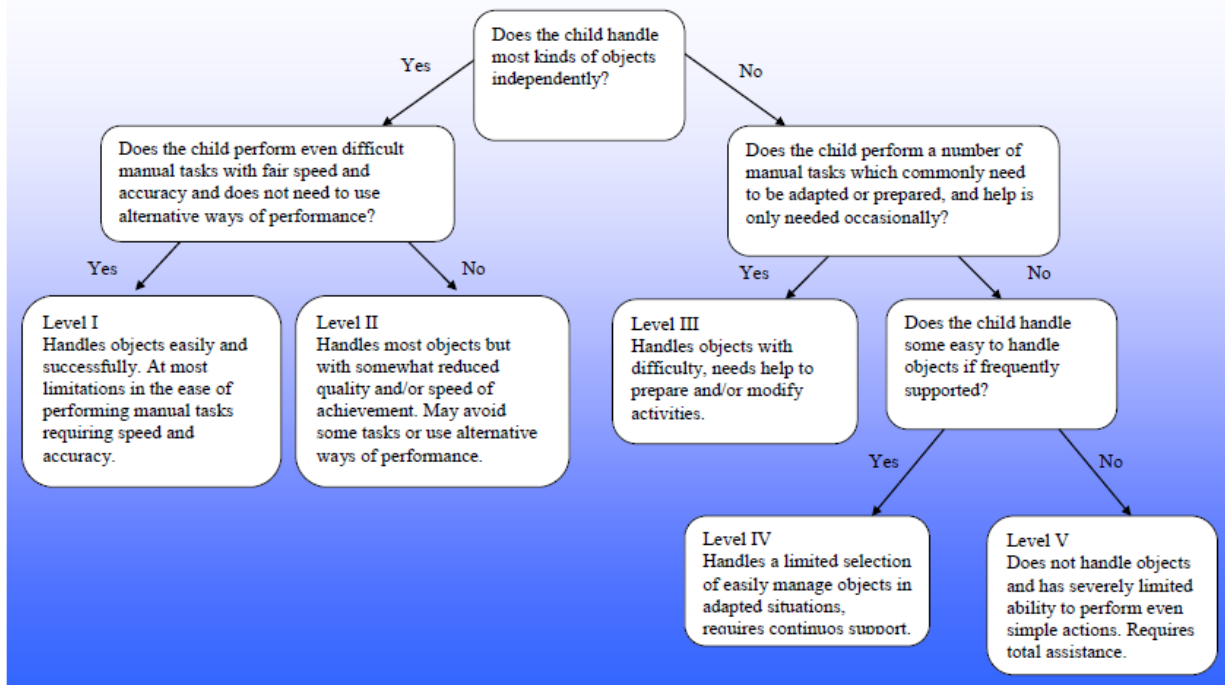
Children in Level IV perform individual actions with a very limited selection of objects and need constant help.

At best, children in Level V perform simple movements in special situations. For example, they can press a simple button or hold single, simple objects.



## I2 Manual Abilities Classification System

Supplementary MACS level identification chart  
To be used together with the MACS leaflet

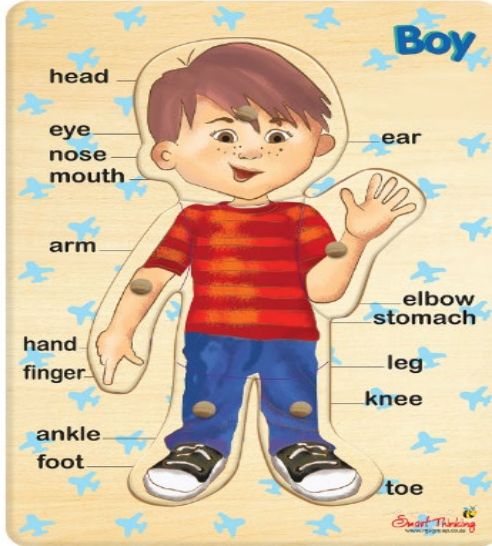


Field trial version

## APPENDIX J

### Materials for eliciting fine motor skills

#### *Boy and Girl Peg Puzzles*



#### *Linking Stars*



#### *Fine Motor Skills Puzzle Board*





**APPENDIX K**

**Pre- Intervention Commitment Form**

	<b>Muano/statement</b>	<b>Hai/No</b>	<b>Ee!/Yes</b>
1.	Ndi kho u nea thendelo mutodisisi ya u ri a de mudini wa hashu. I allow the researcher to come into our home		
2.	Ndi khou nea muthodidisi thendelo ya u tola nwana wanga na u mmbudzisa dzi mbudziso. I allow the researcher to screen my child and also ask me questions.		
3.	Ndi do fhindula mmbudziso dzothe nga ngoho I will answer all the questions truthfully		
4.	Ndi do vhudzisa hune nda sa pfesese I will ask questions where I do not understand		
5.	Ndi do dzudzanya na mutodisisi maduvha na tshifhinga zwo teaho uri ri ise phanda na thodisiso heyi I will provide the researcher with accurate days and times		
6.	Ndi do divhadza mutodisisi hu tshe na tshifhinga tshi no lingana awara dza 24 kana duvha uri ri do vha ri siho. I will inform the researcher with 24 hrs if I will not be available		
7.	Ndi do shela mulenzhe kha u pfumbudziwa lwa maduvha mavhili uya nga he zwa talutshedziwa I will participate in the training over 2 days consecutively		
8.	Ndi do khwathisedza uri ndi vhe hone lwa maduvha mavhili a u pfumbudziwa I will be available for training over the 2 days		
9.	Ndi do shumisa tshomedzo dzothe dzine nda do fhiwa dzone uya nga hune mutodisisi a do vha o ntalutshedza ngaho. I will use all the equipment and materials that will be given to me as directed during in the training.		



	<b>Muano/statement</b>	<b>Hai/No</b>	<b>Ee!/Yes</b>
10	Ndi do vusuludza zwe nda pfumbudziwa zwone khathihi na u vhudidzisa hune a thongo pfesesa I will refer back to the training booklets and ask the researcher questions.		
11	Ndi do shela mulenzhe kha ndowe ndowe dzothe I will participate in all the activities		
12	Ndi do shela mulenzhe musi hu khou dzhiwa dzi vidiyo lwa maduvha mararu uya kha matanu musi ri tshi thoma nga heino ngudo. I will participate in the 3-5 sessions for when the researcher takes videos in the beginning of the study.		
13	Ndi do ita tshunwahaya dzothe dzine nda do newa I will do homework that the researcher gives me		
	328an wananganwananga ri do vha hone kha luta lwa vhuna musi mutodosisi a khou foda nga vidiyo lwa maduvha matanu uya kha a malo, nda dvha hafhu nda shela mulenzhe kha dzinyambedzano. I will avail myself and my child for the researcher to take videos of the guided practice sessions (5-8 sessions)		
14	Ndi do shela mulenzhe kha luta lwa vhutano musi mutodosisi a khou foda nga vidiyo lwa maduvha mararu uya kha matanu mafhedziseloni a ngudo heina nga murahu ha vhege 3. I will avail myself and my child for the researcher to take videos of the maintenance sessions (3-5 sessions)		
15	Ndi do isa phanda na u shumisa mbekanya maitele musi ndi kho davhidzana na nwana duvha linwe na linwe. I will use the strategies taught during daily activities		



## APPENDIX L

### L1 Tablet Training Script (English) and L2 Tablet Training Script (Tshivenda)

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#### *INTRODUCTION TO USING THE TABLET – KUSHUMISELE KWA THEBULETHE*



BY: VULEDZANI P. NDANGANENI (Madima)

APPENDIX M







Communication Boards (Activity Boards)

GARDENING/WATERING - U SHELEDZA NGADENI

<p>nne (ndi)/ I</p> 	<p>toda (humbela)/want</p> 	<p>mashika /dirty</p> 	<p>inga ngomu /n</p> 	<p>bakete/bucket</p> 
<p>vhone/ you</p> 	<p>shela/pour</p> 	<p>habe (futhi)/more</p> 	<p>nnda / out</p> 	<p>bommbi (phaiphi)/tap</p> 
<p>ndo livhuwa/thank you/</p> 	<p>sheledza /water</p> 	<p>thuso /help</p> 	<p>vala/close</p> 	<p>madi /water</p> 
<p>fhedza/finished</p> 	<p>o shuma /good job</p> 	<p>vula/open</p> 	<p>maluvha/flowers</p> 	<p>ngadeni /garden</p> 



## U tamba khofheni-Morning brushing and bathing routine

<p>nne (ndi) / I</p> 	<p>humbela (toda)/ want</p> 	<p>mato / eyes</p> 	<p>khofheni/ face</p> 	<p>habe/futhi/more</p> 
<p>Vhone (inwi) / You</p> 	<p>tamba/wash</p> 	<p>tshisibe/soap</p> 	<p>mano/teeth</p> 	<p>ndo fhedza/finished</p> 
<p>dodza/smear</p> 	<p>inwani/drink</p> 	<p>bigiri /cup</p> 	<p>bulatsho/toothbrush</p> 	<p>Ndi zwavhudi/good</p> 
<p>kulukushani/rinse</p> 	<p>ipfani/spit</p> 	<p>thuso/help</p> 	<p>colgeithi/toothpaste</p> 	
<p>vala/bonya/close</p> 	<p>vula/ open</p> 	<p>tshitavhula/facecloth</p> 	<p>mapfura /vaseline/lotion</p> 	

U ambara na u bvula zwiambaro (Musidzana)- Dressing and undressing

<p>nne/ndi/ I</p> 	<p>humbela (toda)/ want</p> 	<p>vese /vest</p> 	<p>dzhesi/jersey</p> 	<p>zwilapfu/ long</p> 
<p>Vhone/inwi/ you</p> 	<p>u bvula/undress</p> 	<p>tshiketthe/skirt</p> 	<p>tshikipa/t-shirt</p> 	<p>zzipfufhi/ short</p> 
<p>u ambara/dress up</p> 	<p>thuso/help</p> 	<p>rokho / dress</p> 	<p>maswogisi /socks</p> 	<p>habe/futhi/more</p> 
<p>phenthi /panty</p> 	<p>leiri /nappy</p> 	<p>munwadz / hat</p> 	<p>bokhathi/jeans</p> 	<p>ndo fhedza/finished</p> 



### U ambara na u bvula zwiambaro (Mutukana) - Dressing and undressing

nne (ndi) / I 	humbela (toda)/ want 	vhurukhu / trouser 	tshikipa/t-shirt 	zwilapfu/ long 
Vhone (inwi) You 	u bvula/undress 	vese /vest 	dzhesi/jersey 	zwipfufhi/ short 
u ambara/dress up 	thuso/help 	munwadz / hat 	maswogisi /socks 	habe/futhi/more 
gebisi / cap 	leiri /nappy 	Bokhathi / jeans 	shothopheni/briefs 	ndo fhedza/finished 



Matwele-Daytime activities

<p>nne (ndi) I</p> 	<p>humbela (toda)/ want</p> 	<p>muzika/ luimbo/ music</p> 	<p>bola/ball</p> 	
<p>Vhone (inwi) You</p> 	<p>imba / sing</p> 	<p>Thivi / television</p> 	<p>tshitori / story</p> 	<p>bora / not interesting</p> 
<p>u diphina / enjoy</p> 	<p>raha/ kick</p> 	<p>radiyo/ radio</p> 	<p>neta/ tired</p> 	<p>habe/futhi/more</p> 
<p>tamba /play</p> 	<p>lavhelesa/vhona/ watch</p> 	<p>tshintsha /change channel</p> 		<p>ndo fhedza/finished</p> 
<p>thetshelesa/listen</p> 	<p>vhala/ read</p> 	<p>thuso/help</p> 		

## Mealtime - Zwiliwa



**APPENDIX N**

**Procedural fidelity Script – Baseline, Intervention and Maintenance Condition**

Participant ID:

Date:

Session:

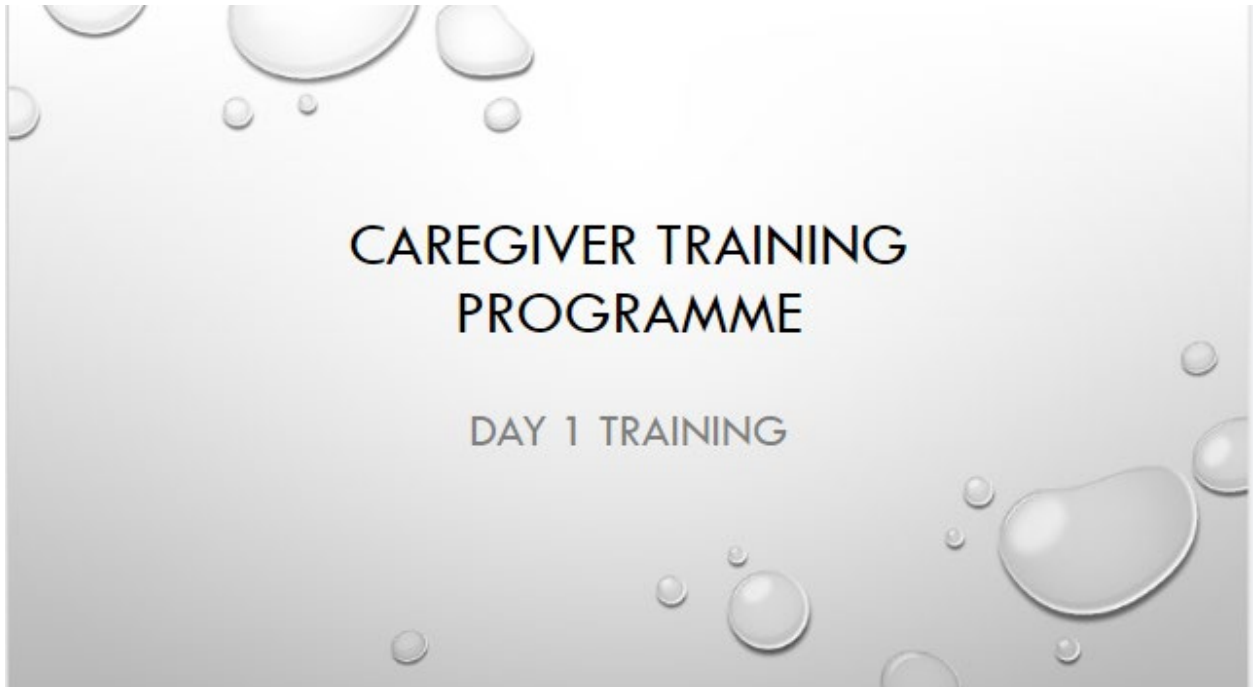
<b>Baseline, Intervention and Maintenance conditions</b>	<b>Done</b>	<b>Not done</b>
The researcher greets the participants		
The researcher introduces herself informally "Vuledzani is back again today"		
The researcher instructs the caregiver they must interact with the child how you normally do in the activity they chose before.		
The researcher tells the caregiver that the video will be taken for 15 minutes.		
The researcher instructs the caregiver to ignore the cameras and researcher as much as possible.		
The researcher removes remains in camera view but not distracting the child		
The researcher does not provide any comments or prompts to the caregiver-child dyad during the video		

<b>Total number "Done"</b>	
<b>Total number of items</b>	7
<b>Percentage</b>	%



## APPENDIX O

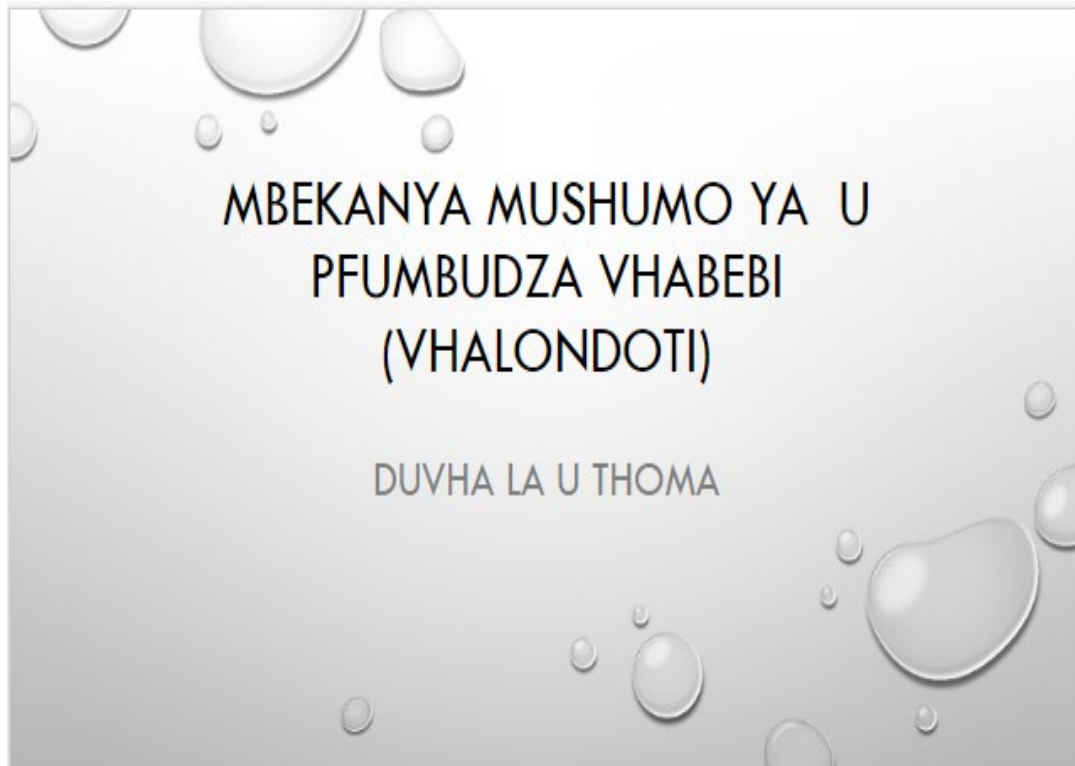
### O1 Day 1 Training Presentation (English)



**For the complete set of training slides, please go to :**

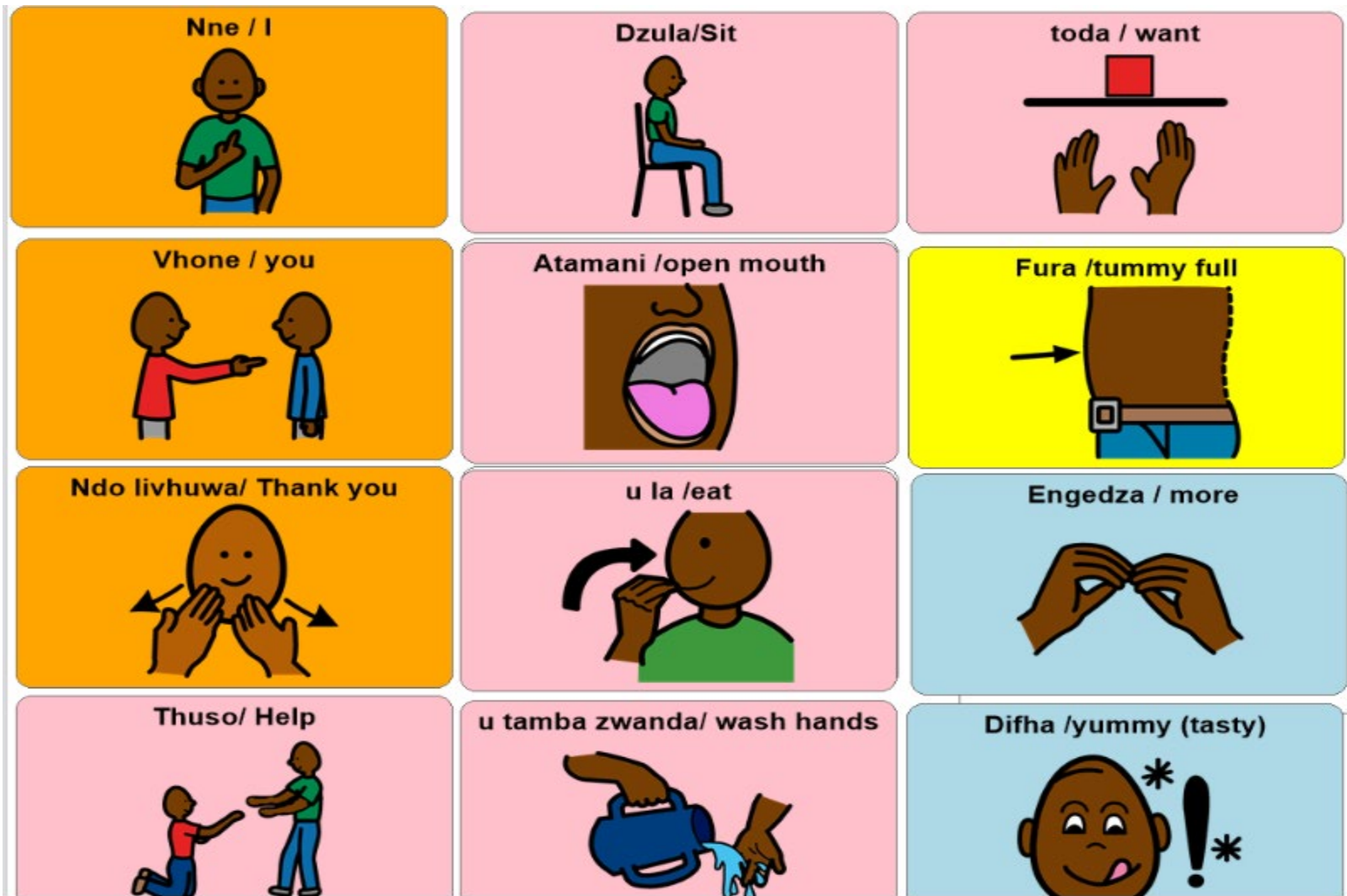
**[https://drive.google.com/file/d/1o6t\\_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share\\_link](https://drive.google.com/file/d/1o6t_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share_link)**

## O2 Day 1 Training Presentation (Tshivenda)



**For the complete set of training slides, please go to :**  
[https://drive.google.com/file/d/1o6t\\_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share\\_link](https://drive.google.com/file/d/1o6t_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share_link)

O3 Training Materials - Communication Board example





### O4 Day 1 Training Procedural Fidelity Script

**Participant ID:**

**Date:**

<b>Activity</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
Setting up equipment			
Greetings			
Introductions			
Handing caregiver material			
Scheduling of the day			
Introduction to topics			
Objectives explained			
The researcher explains what is expected of the caregiver for homework activities			
The researcher explains the reflection activity to the caregiver			
The researcher ends the day by thanking the caregivers			



<b>Communication</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
The researcher introduces the topic			
The researcher defines concepts			
The researcher explains the videos after showing the caregiver			
The researcher shows caregivers artefacts during training			
The researcher asks caregivers questions throughout presentation			
Caregivers are given opportunities to ask questions			
The researcher facilitates discussions with caregivers			
The researcher provides caregivers with feedback			



AAC	Yes	No	Comments
The researcher introduces the topic			
The researcher defines concepts			
The researcher explains the videos after showing the caregiver			
The researcher shows caregivers artefacts during training			
The researcher asks caregivers questions throughout presentation			
Caregivers are given opportunities to ask questions			
The researcher facilitates discussions with caregivers			



<b>Aided language input</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
The researcher introduces the topic			
The researcher defines concepts			
The researcher explains the videos after showing the caregiver			
The researcher shows caregivers artefacts during training			
The researcher asks caregivers questions throughout presentation			
Caregivers are given opportunities to ask questions			
The researcher facilitates discussions with caregivers			
The researcher provides caregivers with feedback			
The researcher explains what is expected of the caregiver during activities			



<b>Contingent responding</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
The researcher introduces the topic			
The researcher defines concepts			
The researcher explains the videos after showing the caregiver			
The researcher shows caregivers artefacts during training			
The researcher asks caregivers questions throughout presentation			
Caregivers are given opportunities to ask questions			
The researcher facilitates discussions with caregivers			
The researcher provides caregivers with feedback			
The researcher explains what is expected of the caregiver during activities			



APPENDIX P

P1 Training Booklet (English)

Caregiver Training Programme



THIS BOOKLET BELONGS TO:



## P2 Training Booklet (Tshivenda)

### Mbekanyamushumo ya u Pfumbudza Mulondoti



UKWU KUBUGWANA NDI KWA:

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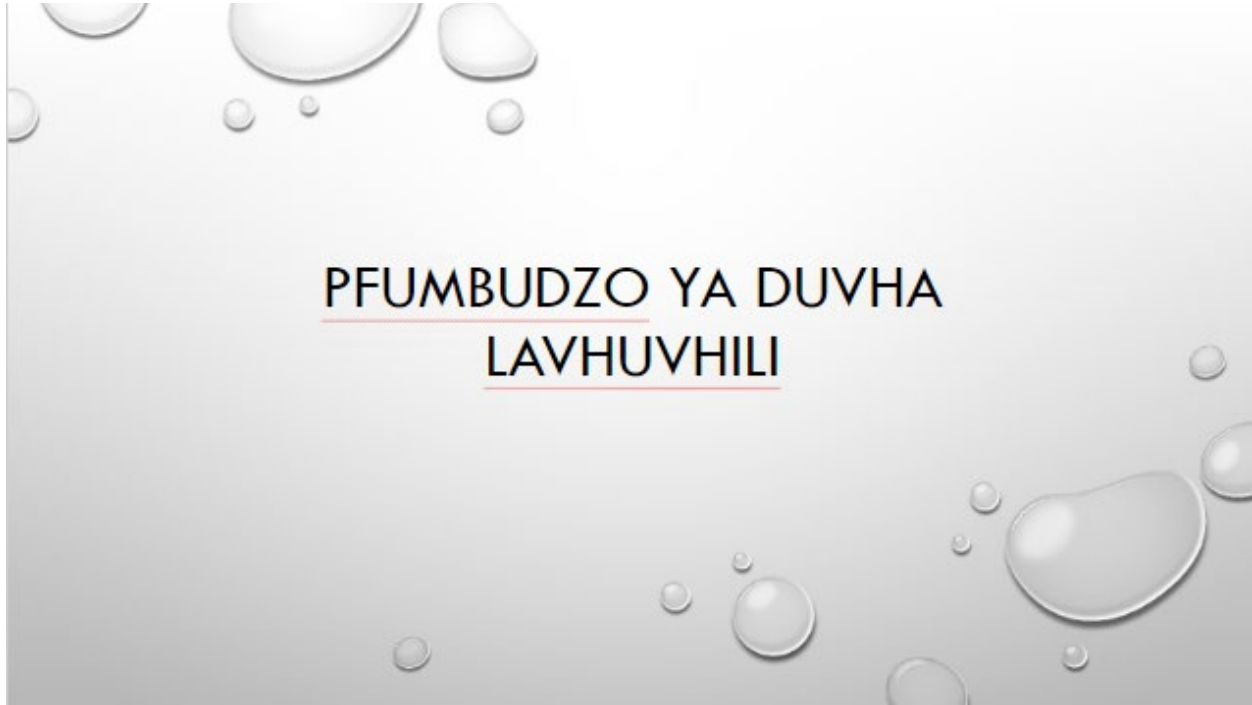
## APPENDIX Q

### Q1 Day 2 Training Presentation (English)



**For the complete set of training slides, please go to :**  
**[https://drive.google.com/file/d/1o6t\\_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share\\_link](https://drive.google.com/file/d/1o6t_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share_link)**

## Q2 Day 2 Training Presentation (Tshivenda)



**For the complete set of training slides, please go to :**  
**[https://drive.google.com/file/d/1o6t\\_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share\\_link](https://drive.google.com/file/d/1o6t_GwFN10H1ynOonGHmfBc4jEod5pE4/view?usp=share_link)**

### Q3 Day 2 Training Procedural Fidelity Script

**Participant ID:**

**Date:**

General	Yes	No	Comments
Setting up equipment			
Greetings			
Scheduling of the day			
Discussion about previous day's presentation			
Homework activity discussion			
Re-cap of the previous day topics			
Objectives of day 2 strategies explained			
The researcher explains what is expected of the caregiver for homework activities			
The researcher ends the day by thanking the caregivers			



<b>Offering communication opportunities</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
The researcher introduces the topic			
The researcher defines concepts			
The researcher demonstrates strategies to the caregivers			
The researcher explains the videos after showing the caregiver			
The researcher asks caregivers questions throughout presentation			
Caregivers are given opportunities to ask questions			
The researcher facilitates discussions with caregivers			
The researcher provides caregivers with feedback			
The researcher explains what is expected of the caregiver during activities			



<b>Mnemonic</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
The researcher introduces the mnemonic to the caregiver			
The researcher facilitates discussions with caregivers			
The researcher provides caregivers with feedback			
The researcher demonstrates strategies to the caregiver			
The researcher explains the videos after showing the caregiver			
The researcher asks caregivers questions throughout presentation			
Caregivers are given opportunities to ask questions			

## APPENDIX R

### Verbal Rehearsal of Strategy Recording Form

Participant ID:

	Yes	No
Offering communication opportunities was explained		
Examples for offering communication opportunities provided		
Modelling Aided language input was explained		
Examples provided		
Waiting for the child to respond for 6-8 seconds was explained		
Responding to the child's communication behaviour was explained		
Examples of how caregivers can respond to a child		
If the child does not respond mentioned		
The caregiver will prompt the child on how to respond		
The caregiver will respond to the child's prompted respond		

<b>Total number of Yes responses</b>	
<b>Total number of items</b>	10
<b>Percentage</b>	%



**APPENDIX S**

**Guided Practice With Feedback Session Procedural Script**

**Participant ID:** \_\_\_\_\_ **Session:** \_\_\_\_\_

	<b>Correctly completed</b>	<b>Omitted or incorrectly completed</b>
The researcher plays the video of the intervention probe back to the caregiver on her laptop.		
The researcher provides the caregiver with feedback based on the discussion.		
- By asking them what they did well		
- provide feedback		
- ask what they could improve upon		
- provide feedback		
- replay the video to demonstrate		
- provide feedback		

<b>Total number of items correctly completed</b>	
<b>Total number of items</b>	7
<b>Percentage</b>	



APPENDIX T

T1 Post Intervention Survey

Participant ID:

Statements	Strongly agree <i>Ndi kho tenda nga maanda</i>	Agree <i>Ndi khou tenda</i>	Not sure <i>A thina vhutanzi</i>	Disagree <i>Ndi khou hanedza</i>	Strongly disagree <i>Ndi khou dadadza</i>
1. I clearly understood all aspects of the training. <i>Ndo pfesesa zwothe zwe nda pfumbudziwa ngazwo</i>					
2. The training helped me gain knowledge about communicating with my child. <i>U pfumbidziwa hanga zwo nthusa u vha na zwa u davhidzana na nwana wanga</i>					
3. The training helped me gain skills in communicating with my child. <i>U pfumbidziwa hanga zwo nthusa u guda zwikili zwa u davhidzana na nwana wanga</i>					
4. As a result of the training my child's communication has improved. <i>Nga murahu ha musu ndo pfumbudziwa, huna tshanduko kha kudavhidzanele kwa nwana wanga.</i>					
5. If I use these strategies daily, my child's communication skills will improve. <i>Nda nga shmisa mbekanya-maitete hedzi duvha linwe na linwe zwi do ita uri kudavhidzanele kwa nwana wanga kwu khwinifhale</i>					
6. Offering communication opportunities is an acceptable strategy for me to use when communicating with my child. <i>Mbekanya-maitete ya netshedza nwana zwickhala zwa u udavhidzana ndi ya kwayo musu ndi kho davidzana na nwana wanga</i>					
7. Point talking is an acceptable strategy for me to use when communicating with my child. <i>Mbekanya-maitete ya u amba nga u sumba kwa nwana ndi ya kwayo musu ndi kho davidzana na nwana wanga</i>					



Statements	Strongly agree <i>Ndi kho tenda nga maanda</i>	Agree <i>Ndi khou tenda</i>	Not sure <i>A thina vhutanzi</i>	Disagree <i>Ndi khou hanedza</i>	Strongly disagree <i>Ndi khou dadadza</i>
8. Responding to my child is an acceptable strategy for me to use when interacting with my child. <i>Mbekanya-maitele ya kufhindulele kwa nwana ndi ya kwayo musi ndi kho davidzana na nwana wanga</i>					
9. I am willing to continue using the strategies I learnt in the training. <i>Ndo di imisela u isa phanda na u shumisa mbekanya-maitele dze nda guda.</i>					
10. I am willing to teach other family members to use the strategies I learnt in the training. <i>Ndo di imisela u gudisa vhanwe vha mirado ya muta wahashu mbekanya-maitele dze nda guda.</i>					
11. Using the strategies that I learnt will take too much of my time. <i>U shumisa mbekanya-maitele dze nda guda zwi do nlela tshifhinga tshinzi.</i>					
12. Using the strategies that I learnt will disrupt my family. <i>U shumisa mbekanya-maitele dze nda guda dzi do disa pfudzungule mutani wa hashu</i>					
13. Using the strategies that I learnt will easily fit into my daily routine. <i>Zwi do leluwa u shumisa mbekanya-maitele hedzi dze nda guda kha maitele a divha na divha.</i>					
14. Using these strategies can have negative effects on my child. <i>U shumisa mbekanya-maitele hedzi zwi nga vha na masiandaitwa asi a vhudi kha nwana wanga.</i>					
15. Using these strategies can make my child uncomfortable. <i>U shumisa mbekanya-maitele hedzi dzi nga ita uri nwana asi dzudzaneye.</i>					
16. My child and I interacted less before the training. <i>Nne na nwana wanga ro vha ri sa davhidzani nga maanda ndi saathu pfumbudziwa.</i>					
17. My child and I interact more after the training. <i>Nne na nwana</i>					



Statements	<b>Strongly agree</b> <i>Ndi kho tenda nga maanda</i>	<b>Agree</b> <i>Ndi khou tenda</i>	<b>Not sure</b> <i>A thina vhutanzi</i>	<b>Disagree</b> <i>Ndi khou hanedza</i>	<b>Strongly disagree</b> <i>Ndi khou dadadza</i>
<i>wanga ri vho davhidzana nga maanda nga murahu ha musu ndo pfumbudziwa.</i>					

18. What did you like about the training? *Ndi mini zwe vha zwifunesa nga u pfumbudziwa nga mbekanya mushumo iyi?*

19. What would you want to change about the training? *Ndi mini zwine vha tama u shandundukisa maitete a u pfumbudziwa nga ha mbekanyamushumo iyi?*






20. Do you think there could be any positive consequences when you use the strategies learned? Why? *Vha vhona ungari hu nga vha na masiandaitwa avhudi musu vha tshi shumisa mbekanya-maitete dze vha guda? Ndi nga mini vha tshi ralo?*

21. Do you think there could be any negative consequences when you use the strategies learned? Why? *Vha vhona ungari hu nga vha na masiandaitwa asi avhudi musi vha tshi shumisa mbekanya-maitete dze vha guda? Ndi nga mini vha tshi ralo?*

22. How Satisfied were you with the training ? I was... (*Vho fushea zwingafhani nga u pfumbudziwa?*)

Very satisfied ( <i>Fushea nga maanda</i> )	
Satisfied ( <i>Ndo fushea</i> )	
Neutral ( <i>vhukati</i> )	
Unsatisfied ( <i>a thingo fushea</i> )	
Very unsatisfied ( <i>a thongo fushea na luthihi</i> )	

## T2 Post Intervention Survey Likert Scale Flashcards

<b>Strongly agree</b> Ndi kho tenda nga maanda 	<b>Agree</b> Ndi khou tenda 	<b>Not sure</b> A thina vhutanzi 	<b>Disagree</b> Ndi khou hanedza 	<b>Strongly disagree</b> Ndi khou dadadza 
--	---	--	--	---

## APPENDIX U

### Post intervention Commitment Statement Template

**Vision (bono):** *A big plan for the future*

**Mission:** what will you do in order to achieve your vision? What are your goals that you would want to achieve (eg. In the next 4-6 months)

#### Example

**Vision:** *I would like to improve communication between caregivers and their children living in south Africa by providing caregiver training in groups of at least 10 caregivers at a time in their CP and/or neurodevelopmental clinics in the nine provinces.*

#### Mission

*In order to realize the vision, will have to train caregivers in their district and regional hospitals. The researcher will train the caregivers district by district. In each hospital the researcher will:*

- Raise awareness of AAC in the respective hospitals*
- train caregivers on how to provide communication opportunities to their children*
- train caregivers on how to respond to their children's communicative behaviours and actions*
- teach caregivers the importance of waiting 6-10 seconds during communication for the child to respond*
- teach caregivers how to model point talking with their children using communication boards (with PCS, objects and/or tactile symbols)*

**APPENDIX V**

**Timed Event Recording Form**

CCD \_\_\_\_ Session \_\_\_\_ Date \_\_\_\_\_

	<b>Research assistant /Researcher</b>	<b>Research assistant /Researcher</b>	<b>Research assistant /Researcher</b>	<b>Research assistant /Researcher</b>	<b>Research assistant /Researcher</b>
<b>Time stamp/ DV</b>	<b>Contingent responding</b>	<b>Modelling Aided language input</b>	<b>Providing communication opportunities</b>	<b>Child communication turns</b>	<b>Child using augmented output</b>
5 <sup>th</sup> (5:00-5:59)					
6 <sup>th</sup> (6:00-6:59)					
7 <sup>th</sup> (7:00-7:59)					
8 <sup>th</sup> (8:00-8:59)					
9 <sup>th</sup> (9:00-9:59)					
10 <sup>th</sup> (10:00-10:59)					
11 <sup>th</sup> (11:00-11:59)					
12 <sup>th</sup> (12:00-12:59)					
13 <sup>th</sup> (13:00-13:59)					
14 <sup>th</sup> (14:00-15:00)					





## APPENDIX W

### W1 Expert Panel Information Letter and consent form



#### Faculty of Humanities

Fakulteit Geesteswetenskappe  
Lefapha la Bomotheo

Centre for Augmentative and  
Alternative Communication



July 2021

Dear \_\_\_\_\_

Re: Invitation to participate in an expert input panel

My name is Vuledzani P. Madima. I am PhD student at the Centre for Augmentative and Alternative Communication, University of Pretoria. My supervisor is Associate Professor K. Tönsing and my co-supervisor is Professor J. Bornman. I will be conducting research at hospitals in Vhembe district municipality that offer Speech-Language therapy services for children aged 2-6 years. This project is about identifying, developing and testing a training programme aimed at caregivers of young children with complex communication needs who require other forms of communication (also called augmentative and alternative communication or AAC). I would like to invite you, as a speech-language therapist working with children with complex communication needs and their families in Vhembe district of the Limpopo Province, to provide expert feedback on the developed training programme.

**Title of the study:** Augmentative and Alternative Communication in early childhood intervention: Development and evaluation of parental training in a low-income rural context of South Africa.

#### Why is this study important?

When children cannot speak, they need other forms of communication to help them to learn, communicate with others, and have friends. Caregiver training programs have helped parents and children in other countries to use these other forms of communication. For this study I have developed a caregiver training programme that I want to implement and evaluate with VhaVenda caregivers and their children with CCN from the Vhembe district.

#### Overview of the study and how the programme was developed

The current study has three phases. In Phase 1 (exploratory phase) I conducted a review of the literature to identify the nature of caregiver training programmes developed to train caregivers of children with CCN to implement AAC strategies. I also conducted interviews with VhaVenda cultural stakeholders and parents of VhaVenda parents of children with CCN to understand typical interactions between caregivers and children under the age of 6 years; beliefs and perceptions about communication disability; as well as determining the appropriateness and relevance of proposed intervention strategies for VhaVenda. From the two studies in Phase 1 a preliminary custom-made caregiver training programme was developed in Phase 2 (development phase). As part of this phase of the study, I would now like to receive your input on the training programme before implementing and testing it in Phase 3 (evaluation phase).

#### What is expected of me as an expert?

I would like to get your input on the practicality, usability and cultural and contextual appropriateness of the developed caregiver programme's training logistics, content and material that will be used for the intervention. Your input is valuable for this study as you work closely with the caregivers and children with CCN in the Vhembe district.

I will email you an invitation to the Google drive shared folder once you have signed the nondisclosure agreement on page 3 of this document. You will be expected to familiarise yourself with the programme content shared via the folder and then comment using the feedback table (see separate document attached to this email) within 3-5 days of having received the Google drive invitation.

Centre for Augmentative and Alternative Communication  
Communication Pathology Building  
Lynwood Road, Hatfield  
University of Pretoria, Private Bag X20  
Hatfield 0028, South Africa  
Tel: +27 (0)12 420 2001 | Fax: +27 086 910 0641  
Email: [saak@up.ac.za](mailto:saak@up.ac.za) | Web address: [www.caac.up.ac.za](http://www.caac.up.ac.za)



Should you wish, you will be reimbursed with 1GB of data for you to access the documents and respond to the questions.

**What will I as an expert benefit from participating in this study?**

Although you may not directly benefit, your participation and input will help with making necessary changes to the material that will increase cultural and contextual relevance for the caregiver training programme. Your input will improve my understanding of how the caregiver training program can work in your context. Furthermore, this will help me to better understand how we can support parents and children with CCN to communicate better.

**What ethical considerations are in place?**

No harm: you will not be exposed to any harm and/ discomfort when participating in the expert review.

Confidentiality: Your name will not be disclosed in any publication relating to the study, but will be replaced by a number. The documents with your input will be deidentified and kept in a password protected computer and in a folder that will not link you to any input.

Honesty and privacy: I will write up the data as it is. You are requested to not divulge any information about the programme or use the programme with your patients before completion of the study. This is important as this study is still underway and not yet completed.

Data storage and dissemination: The data for this study will be stored at the Centre for AAC at the university of Pretoria for 15 years. Results from this study will be shared with the research community in the form of a paper-based and/or electronic thesis. The National Health Research Database will also keep records of the study. Participants will receive a summary of the results upon request. Furthermore, results of this study will be published in journals and also disseminated through conference presentations.

Should you agree to participate in the expert review, kindly complete and sign the non-disclosure agreement on the following page and return to me by 13 July 2021.



Researcher

Supervisor



## Faculty of Humanities

Fakulteit Geesteswetenskappe  
Lefapha la Bomocho

Centre for Augmentative and  
Alternative Communication



### Non-disclosure agreement

Declaration statements	Yes	No
As an expert I have read and understood the ethical considerations pertaining to the potential participants of this study.		
As an expert I understand that I have access to privileged information pertaining to the caregiver training programme developed for this study.		
I understand that the researcher has only revealed this information to me and other experts.		
I understand that the researcher revealed the programme material to me because she trusts that I will make an effort to maintain confidentiality. That is why it is important not to mention anything about the contents of the programme to anyone.		
I declare that I will keep all information that is shared with me as confidential by not discussing or sharing this information verbally or in any format with anyone other than the researcher.		
I will ensure the security of this information about the caregiver training programme while it is in my possession.		
I will not make copies of these documents unless given written permission by the researcher and supervisors.		
I will delete all the information in my possession after the expert review process has been finalised.		

Full Names: \_\_\_\_\_

Signature: \_\_\_\_\_

HPCSA no: \_\_\_\_\_

I would like the researcher to reimburse me with 1GB. I herewith provide my service provider

name (network) and cell number : \_\_\_\_\_

## W2 Expert Panel Question Template

### Instructions to experts

This training programme is intended for Vhavenda caregivers living in and receiving SLP services in the hospitals in Vhembe district.

Kindly familiarise yourself with the material and also the proposed training procedure. Then complete the tables here below to provide feedback on (a) the training procedure and (b) the content of the proposed training programme.

You are able to access all training materials on Google drive shared folder. You will receive an email with an invitation to the Google drive.

#### A. Training procedure

Kindly comment on the feasibility and appropriateness of the logistics and procedures proposed. Please provide any comments and suggestions for change in the appropriate columns.

Intended training procedure	Comments	Suggestions for changes
<ul style="list-style-type: none"> <li>• Caregivers will be met individually at their homes and children will be screened. Suitable days for training will be agreed upon.</li> <li>• Training will be done individually by the researcher at each caregiver's homes over the course of two days.</li> <li>• The caregiver will be provided with a training booklet (see included)</li> <li>• A PowerPoint presentation will be played and the researcher will explain the topics. Caregivers will be able to follow in the training booklets. Caregivers will have the opportunity to ask questions at any time.</li> <li>• Activities will be conducted as indicated on the power point and the training booklet. Breaks will be taken as appropriate. The total training time per day is expected last 3,5 hours.</li> </ul>		

**B. Content and material**

Kindly comment on the content and material. You will be asked to comment specifically on

- 1) The objectives for each day
- 2) The content (section by section)
- 3) The activities proposed for each section
- 4) Videos embedded on specific slides
- 5) The proposed strategies that the caregivers will learn
- 6) The communication boards.

In each case, please consider specifically the clarity and also the appropriateness for the target population (Vhavenda caregivers with at least a Grade 4 literacy level).

Aspect to be evaluated	Comments	Suggestions for changes
Day 1: Power point and training booklet pp. 3-17		
<b>Day 1: Objectives</b> (Slide 3)		
<b>Day 1: Session 1a: Communication</b> (Slides 5 to 15) (Booklet: pp. 3 – 7) <i>Please comment on content in general.</i>		
<b>Activities</b> (Slide 6 & 15)		
<b>Day 1: Session 1a: AAC</b> (Slides 16 to 35) (Booklet: pp. 8- 12) <i>Please comment on content in general.</i>		

Aspect to be evaluated	Comments	Suggestions for changes
<b>Video</b> (Slide 18 & 19)		
<b>Day 1: Session 1a: Point talking</b> (slides 31-35) (Booklet: pp. 13 – 15) <i>Please comment on content in general and appropriateness of the strategy.</i>		
<b>Demonstration</b> (Slide 35)		
<b>Video</b> (Slide 34)		
<b>Day 1: Session 1b: Responding to your child's communication.</b> (Slides 36-44) (Booklet: pp16 – 17) <i>Please comment on content in general and appropriateness of the strategy.</i>		
<b>Activities</b> (Slides 43-44)		
<b>Video</b> (Slide 42)		
Day 2: Power point and training booklet		
<b>Day 2: Objectives</b> (Slide 3)		
<b>Day 1 Recap</b> (Slides 5-11) <i>Please comment on content in general.</i>		
<b>Activities:</b> (Slides 6,7,& 9)		

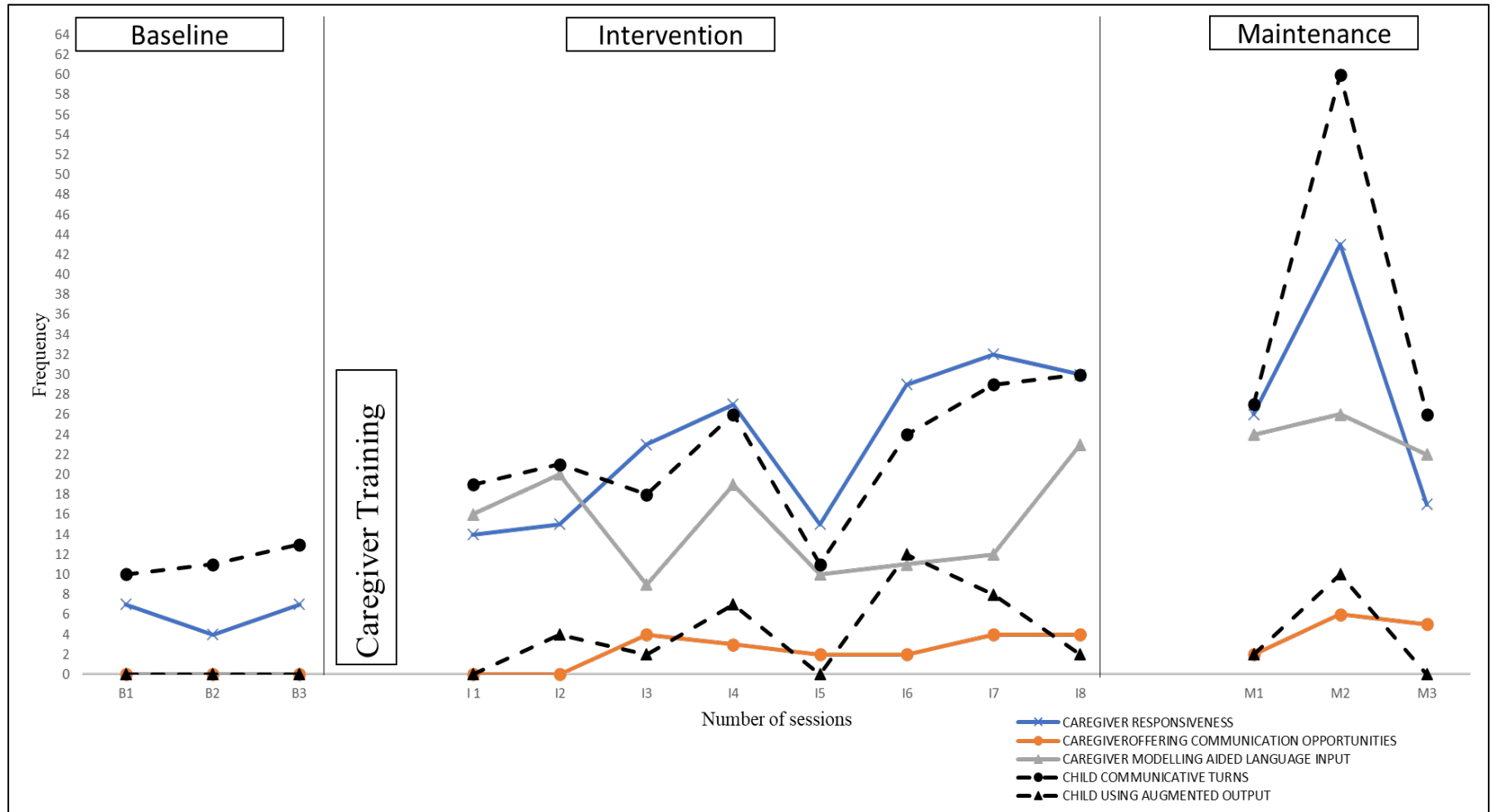
Aspect to be evaluated	Comments	Suggestions for changes
<b>Video(s) :</b> (Slides 10-11)		
<b>Day 2: Session 1a Offering opportunities for communication</b> (Slides 12-24) (Booklet: pp. 18 – 20) <i>Please comment on content in general and appropriateness of the strategy.</i>		
<b>Activities:</b> (Slides 17, 21, 24)		
<b>Video(s) :</b> (Slides 15,16, 22)		
<b>Waiting for your child to communicate</b> (Slides 26-28) (Booklet: pp. 20-22) <i>Please comment on content in general and appropriateness of the strategy.</i>		
<b>Day 2: Session 1b: Putting it all together</b> (Slides 31 -32) (Booklet: pp. 23 -27) <i>Please comment on content in general.</i>		
<b>Activities:</b> (Slides 33-34)		
<b>Communication boards</b>		
Dressing /undressing		
Morning routine (brushing and washing face)		
Entertainment activity		
Mealtime activity (for training)		

Kindly reflect on the practicality and usability of the proposed programme within your context:

Kindly provide any further comments or reflections on the proposed training programme.



### APPENDIX X Pilot Study – Graph of Results



## APPENDIX Y

### Y1 SLP Recruitment Email

Dear Colleagues

My name Vuledzani Ndanganeni (Madima), I am a PhD student at the University of Pretoria. My supervisors are Professors Tonsing and Bommman. As per our telephone conversation, i would like you to assist me with recruitment for participants in your workload for my study.

#### **A brief Summary of the intended caregiver programme:**

The programme i have developed is aimed at training caregivers of children with complex communication disorders (little or no functional speech) to implement 3 strategies during interaction with their children to facilitate communication using augmentative and alternative communication. The strategies i chose for the programme include:

**Offering communication opportunities:** This means that the parent can encourage the child to communicate by asking a question, letting the child choose between things or by arranging the environment in such a way that the child is tempted to ask for something. For example, the parent can give the child a little bit of food, like a small piece of a biscuit, or fruit and then not giving the child more until the child asks. Another example is putting something the child really wants where the child can see but not reach it. For example, some food can be in a see-through container that is tightly closed.

**Contingent responding:** This means a parent expects a child to communicate and reacts to the child's behaviour as if the child is communicating or speaking. So, for example, if the child points to something the parent will give it to the child, as if the child asked for it. Responsiveness also means that the parent pays attention to what the child is looking at or doing, and comments on it. The parent may also imitate what the child is doing.

**Modelling aided language input:** It involves the caregiver pointing to pictures on a communication board while speaking. Parents will be given picture boards like the one I sent you. I will teach them to point to pictures as they are talking to the child. In this way they can teach the child to also point to pictures.

Details of the training are included in the caregiver letter

#### **Inclusion criteria:**

The inclusion criteria for participants of my study includes: caregivers of children with little or no functional speech associated with developmental disorders; they should be caregivers of children aged 2-6 years of age; they should speak Tshivenda as their home language; they children should have adequate hand movement in order to point on a communication board; they should have corrected or adequate vision and hearing; the children should be able to recognise pictures.



**What I would like assistance with:**

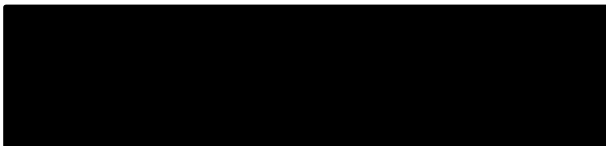
Please provide the caregivers with an overview of the study as per the letter attached. If you could please get consent from them for you to share their phone numbers with me so that i can explain the study in detail for them to decide if they would be interested in participating. The caregivers will get an information letter in a language they understand (Tshivenda) for them to be able to give informed consent to participate. The aim of this exercise i for you to

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just highlight what the study os about and request for permission to share their telephone numbers with Me so i can do the actual recruitment.

I aim to recruit 6 participants from the 5 hospitals that i got permission from which are: Tshilidzini, Donald Fraser, Musina, Louis Trichadt Memorial and Elim Hospitals.

**Kind Regards**



## Y2 Caregiver Information Letter With Consent Form (English)



### Faculty of Humanities

Fakulteit Geesteswetenskappe  
Lefapha la Bomotha

Centre for Augmentative and  
Alternative Communication



Centre for AAC  
University of Pretoria  
Lynnwood road  
Pretoria  
0001

Dear Parent

31 May 2021

### RE: INVITATION TO PARTICIPATE IN A RESEARCH STUDY

My name is Vuledzani P. Madima. I am PhD student at the Centre for Augmentative and Alternative Communication, University of Pretoria. My supervisor is Associate Professor K. Tönsing and my co-supervisor is Professor J. Bornman. I am conducting a research study at hospitals in Vhembe District municipality that offer Speech-Language therapy services for children aged 2-6 years. This project is about developing and testing a parent programme to train parents of young children who need other forms of communication (also called augmentative and alternative communication or AAC) and have difficulties speaking and communicating (also called complex communication needs or CCN).

#### Title of the project:

Augmentative and alternative communication in early childhood intervention: Development and evaluation of a caregiver training programme for a low-income rural context in South Africa

#### What is the purpose of this study?

In this phase of the study I want to implement this program and assess its effectiveness in training parents to help their children to communicate better.

#### Why is this study important?

When children cannot speak, they need other forms of communication to help them to learn, communicate with others, and have friends. Parent training programs have helped parents and children in other countries to use these other forms of communication. I have developed a programme to train parents like yourself to communicate better with their children who cannot talk. This can help parents and children to feel less frustrated and can also help children to learn communication skills that are important for school and later life.

### **How will this study be conducted?**

The study will have five steps. The times and days on which sessions take place will be arranged beforehand with the parents to make sure that they suit the parents.

#### *Step 1: Interviewing and screening*

When you agree to participate in this study, I will meet with you and the child at your home on a day that suits you. COVID-19 protocols of wearing a mask, maintaining social distancing and sanitizing of hands will be followed throughout. I will observe your child to understand how the child communicates. I will also ask you questions about you and your child to make sure I understand how you interact. These sessions will be recorded. You parent will also be asked to identify an activity that you do on a regular basis with your child that will be used for the training. All these activities will take about 2 hours and 30 minutes.

#### *Step 2: Observing how you communicate with your child*

I will come into your home and take a 15-minute videos of you and your child interacting in a routine that you would have chosen in Step 1. These videos will be taken every day for about 3-5 days until I arrange for a time to do the training. At the end of the observation, I will then provide you with tablets for use during the study. I will then conduct a training on how to use the tablets.

#### *Step 3: Training*

The training will take two days. I will come to your home every day during the training. I will discuss communication methods with you and show you videos of how one can interact with children who struggle to speak. You will be provided with booklets with information on the training. There will be activities that we will carry out during training.

If there are lockdown restrictions during that time, I will use the tablet to connect with you to do the training.

#### *Step 4: Observations and feedback*

I will come back to observe you and your child interacting 5-8 times after the training has been completed. These observations will be scheduled in the 5 to 8 days following the training (excluding weekends). Each time I come to observe, I will take a 15-minute video recording of you and your child interacting in the activity that you will have chosen. Thereafter you and I will go through the videos together to identify if you managed to implement aspects of the training when interacting with your child. I will then provide you with ideas on how to further improve their interactions. The daily sessions will take a total of about an hour. A day after the last sessions, I will come back to interview you to find out on how you experienced the training, if you have any suggestions to improve the training and also recommendations about the training as well as your overall satisfaction with the training.

**Step 5: Check-up**

Three weeks after the last observation and feedback session are completed, I will again come to the house for 3-5 days to videotape you and your child interacting in the chosen activity. These videos will be taken in the same way as during Step 2.

**What is expected of me if I choose to take part?**

If you agree to take part in this study, you will be expected to participate in all the sessions that have been outlined above. Sessions will only be scheduled on weekdays. If you want to schedule sessions on a Saturday as well, we can do so. In summary, this will mean:

Step 1: 2 hours and 30 minutes on one day

Step 2: 15- 30 minutes for 3-5 days

Step 3: Morning session and afternoon session per day of about 2 hours 30 minutes for 2 days

Step 4: 1 hour for 5-8 days

(3-week break)

Step 5: 15-30 minutes for 3-5 days

You will be expected be available for all these times and also to take part in the activities.

**What will I benefit from participating from this study?**

The training programme is designed to help you communicate better with your child who cannot talk. We hope that, by taking part in the programme, you will be able to learn strategies that will make communication with your child easier. We also hope that your child will learn to communicate more, which will help him or her to develop and participate more. Your participation will also help me to test if the training program is working. It will help me to see if I need to change anything about the programme before it can be used with other parents.

**What will happen to the information I will share in the study?**

The information will be recorded using a video and audio recorder. Only the research assistants, my supervisors and I will look at the videos and listen to the recordings. We will use them to check if the programme has helped you. When we write about the recordings, we will remove your name and your child's name and replace it with a number. All the personal information about you and your child will be kept confidential. All of the recordings and written information will be stored on the computer locked by a password. All hard copy information will be stored in a locked cabinet in a locked room. The information on the computer and the hard copy information will be kept at the University of Pretoria for 15 years.

We will not share the recordings with anyone unless we have your written permission. We may share what we have written about recordings with other researchers but the names of you and your child and other personal information will not appear on what we share.



I plan to share the results of the study with others by writing a thesis and articles for scientific journals, and also by presenting them at conferences nationally and internationally. I will never mention your name or your child's name or share any personal information about you or your child when I share the results of the study. I will send you a copy of the results if you would like to receive them.

**What steps will be taken to protect me when I decide to participate in this study?**

You will be treated with respect and dignity. You will not be discriminated against in any way.

You will be given information about the study in Tshivenda before we start with the training. I will read and explain the contents of this information letter to you. You will have the chance to ask questions about anything you do not understand. You can then choose to take part in the study or not by filling in the consent form attached to this letter.

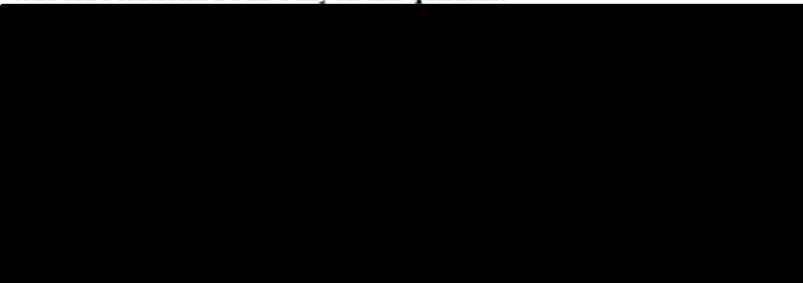
You may freely choose to take part in the study or not to take part. If you decide not to take part, nothing bad will happen to you or your child. You will continue to receive all the services at the hospitals that you are currently receiving.

You will be allowed to stop participating in the study at any given time. Stopping will not have any negative consequences for you or your child. Once again, you will continue to receive all the services at the hospitals that you are currently receiving.

Participating in the study will not harm you in any way, and will not put you at risk. I will ensure that you are not subjected to embarrassment. When I interact with you, I will always treat you with respect.

Any personal information shared with me will be kept confidential. I will also maintain honesty when engaging with you at all times. You will not be deceived in any way.

**Who can I contacted if I have any further questions?**

 7 or 012-  
visor on

Researcher

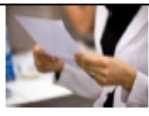






Supervisor

### Y3 Consent Form

<b>CONSENT FORM-REPLY SLIP</b>
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**Name of the project:**

Identifying, adapting and evaluating a programme aimed at training caregivers of young children with complex communication needs (CCN) to implement augmentative and alternative communication (AAC) in a low-income rural context of South Africa.

	I have read the letter about the study mentioned above OR Someone read the letter about the study to me.  Yes <span style="margin-left: 200px;">No</span>
	I understand what will be expected of me if I choose to take part in this study.  Yes <span style="margin-left: 200px;">No</span>
	I understand I can choose to take part in this study or not to take part.  Yes <span style="margin-left: 200px;">No</span>
	I understand that I can stop when I want to.  Yes <span style="margin-left: 200px;">No</span>
	Do you have any questions?  Yes <span style="margin-left: 200px;">No</span>
	Are you happy with the way your questions were answered?  Yes <span style="margin-left: 200px;">No</span>
	I give the researcher permission to record the group discussion.  Yes <span style="margin-left: 50px;">No</span>
I want to be part of this study.  Yes <span style="margin-left: 200px;">No</span>	

Participant's initials and surname: \_\_\_\_\_

Participant's signature: \_\_\_\_\_

Participant's contact number: \_\_\_\_\_

Date \_\_\_\_\_