ASSISTIVE TECHNOLOGY IN THE CLASSROOM FOR STUDENTS WITH CEREBRAL PALSY: “THE TEAM APPROACH, THE NUMBER ONE KEY TO MAKING IT SUCCESSFUL”

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Doctor of Philosophy

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University of Western Sydney
Dedication

Many people think inclusive education is only about making schools more physically accessible for students with disabilities. But inclusion is more complicated than that. It involves all parts of young people’s education experiences, and requires a continuous process of making big and small changes. These changes should help more young people to attend school, to participate in learning and social activities, and to achieve to the best of their abilities.

(The Atlas Alliance, 2008, p. 3)

I dedicate this study to all those students, parents, teachers, teaching assistants and allied health professionals who participate in making big and small changes every day, bringing assistive technology into the classroom.
Acknowledgements

This is a brief and certainly incomplete list of people to whom I want to send blessings and gratitude.....

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To my family, thank you for cheering me on from the other side of the world.

And last but not the least....

To my divine guidance, for your unwavering love and support during my life on this beautiful planet called Earth, thank you!
Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution.

Petra Karlsson
Publications and Conference Presentations

The theoretical and empirical work arising from this doctoral research study has resulted in the following international, national and state peer-reviewed conference presentations with published conference papers and abstracts by the candidate (in reverse chronological order):

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and assistive technology in the classroom

New thesis title: Assistive technology in the classroom for students with
cerebral palsy: “The team approach, the number one key to making it successful”
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<td>AAC</td>
<td>Augmentative and Alternative Communication</td>
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<tr>
<td>AT</td>
<td>Assistive technology</td>
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<tr>
<td>CFCS</td>
<td>Communication Function Classification System</td>
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<td>GMFCS</td>
<td>Gross Motor Function Classification System</td>
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<td>GYV-20</td>
<td>Give Youth a Voice- 20</td>
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<tr>
<td>ICF</td>
<td>International Classification of Functioning, Disability and Health</td>
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<tr>
<td>ICF-CY</td>
<td>International Classification of Functioning, Disability and Health – Children and Youth</td>
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<td>MACS</td>
<td>Manual Ability Classification System</td>
</tr>
<tr>
<td>MPOC</td>
<td>Measures of Processes of Care</td>
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<td>MPOC-20</td>
<td>Measures of Processes of Care for Parents-20</td>
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<td>MPOC-SP</td>
<td>Measures of Processes of Care – Service Providers</td>
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<td>UNESCO</td>
<td>Universal Declaration of Human Rights</td>
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Abstract

Background

Little research has been conducted to date on the effective uptake of assistive technology for students with cerebral palsy. Available research indicates that these students experience considerable challenges (Copley & Ziviani, 2004, 2007; McMillan, 2008; Raghavendra, Olsson, Sampson, McInerney, & Connell, 2012). With client-centred and family-centred care widely recognised as a cornerstone for effective assistive technology service provision (Angelo, 2000; Parette & Brotherson, 2004), the current study was undertaken to investigate to what extent such approaches were used by schools when assistive technology assessments and implementation occurred in the classroom. Furthermore, the factors determining the students’ capability to access the curriculum to achieve classroom goals were examined. In exploring these issues, this study is the first in Australia to investigate the service provision of high-tech assistive technology in schools for students with cerebral palsy.

Methods

This two-phase sequential explanatory mixed methods study was designed to survey and interview all key stakeholders in the assistive technology provision process, in a multiple-case study design. The International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001) for Children and Youth (ICF-CY) (World Health Organization, 2007) was used as a framework to describe the facilitators and barriers in assistive technology provision in the classroom. A cross-sectional survey of: parents (n=76), students aged 7-18 years (n=22), occupational therapists (n=33), speech pathologists (n=32), assistive technology consultants (n=4), educators (n=26) and teaching assistants (n=5) was conducted to investigate their experiences of assistive technology service provision and the students’ ability to access the curriculum. Furthermore, to evaluate how client-centred and family-centred the service provision was perceived to be, parents completed the Measure of Processes of Care for Caregivers (MPOC-20) (King, King, & Rosenbaum, 2004). School staff and allied health professionals completed the Measure of Processes of Care for Service Providers (MPOC-SP) (Woodside, Rosenbaum, King, & King, 2001); and youth aged 13 years and older completed the Give Youth a Voice (GYV-20). Descriptive and non-parametric statistics were used for data analysis of the survey. Based on the results obtained, semi-
structured interviews and focus groups with parents (n=6), their children (n=6), educators (n=6) and allied health professionals (n=15) were conducted to further explore their experiences of service provision and use of assistive technology. These data were analysed using cross-case analysis.

Results
This study found that family-centred service and shared decision-making is not yet fully achieved in schools despite being endorsed in early intervention and disability services for over 20 years. When students, their parents, the classroom teacher and a teaching assistant are involved alongside allied health professionals, in the process of selecting and implementing assistive technology in the classroom, successful outcomes are more likely to occur. However, the findings from this study show that classroom teachers are often not involved in the initial stages of the assessment process. For students to access the curriculum it is essential that both allied health professionals and school staff are clear about their roles and set goals with the students and their families. It is also critical for them to be open to learn new skills, have time to meet with other team members, and feel comfortable with implementing the technology. Students' motivation and level of support and training from parents, school staff and allied health professionals played an integral part in the successful use of technology in the classroom. The study also demonstrated that ensuring adequate training and having a dedicated teaching assistant was perceived positively by parents, allied health professionals and school staff.

Conclusion
These findings offer directions for service provision, policy development and future research. To increase access to the curriculum, client-centred and family-centred service provision needs to be fully embraced by schools. To enhance the way technology is matched to the student and successfully implemented, classroom teachers need to be fully involved in the whole assistive technology process. Clear policy guidelines on how to access technology equipment and funding are required. For students to be able to show teachers what they know, it is critical that they have someone encouraging them to use their technology in the classroom. These findings have the potential to better provide opportunities for students to access the curriculum and, in doing so, enable them to exercise their right to a meaningful education.
Chapter 1: Introduction

“All students are entitled to rigorous, relevant and engaging learning programs drawn from a challenging curriculum that addresses their individual learning needs”.

(ACARA, 2013, p. 4)
Access to education on an equal basis is a fundamental human right, as stated in the Universal Declaration of Human Rights Act 26 (UNESCO, 2000). This is further cemented in the Convention on the Rights of Persons with Disabilities (2006). Internationally, schools are expected to accommodate all students with or without a disability and to provide inclusive education in mainstream schools (UNESCO, 1994). With the need to accommodate all students in the regular classroom, the use of assistive technology is often sought. Research indicates that children with disabilities, who experience difficulties in classroom activities such as writing and speaking, will be helped to access the school curriculum by using high-tech assistive technology. High-tech assistive technology is computer based equipment and speech-generating devices that aim to bridge the gap between the students’ need and their abilities (Borgestig, Falkmer, & Hemmingsson, 2013; Copley & Ziviani, 2004; Henderson, Skelton, & Rosenbaum, 2008; Rosenbaum & Stewart, 2004).

Once a need for assistive technology is identified, allied health professionals (generally not employed by the school) are most often responsible for the assessment, acquisition, training, implementation and evaluation of outcomes (Jones & Stewart, 2004). In Australia, students access high-tech assistive technology through multiple service systems including educational systems, state/territory government based funding bodies, charity organisations and the families themselves. The allied health staff typically liaise with the parent, school staff, student, assistive technology funding body and assistive technology supplier.

Understanding the complexities of cerebral palsy and assistive technology service delivery for each student requires a broader focus than just being seen as an isolated activity in the school setting. The family has a unique role, which is acknowledged in family-centred care, in the approach to service provision that is considered best practice in paediatric rehabilitation (King, Teplicky, King, & Rosenbaum, 2004). At the very core of family-centred care is the recognition that the family is the constant in a child’s life with a focus on the family’s role in decision-making (Rosenbaum, King, Law, King, & Evans, 1998). Therefore, partnerships between parents and professionals are critical (Hanna & Rodger, 2002; Rosenbaum et al., 1998). The collaboration between the family and service providers is integral to establishing goals and the plan of care (Viscardis, 1998). Consequently, family-centred care in assistive technology decision-making has been identified to be a cornerstone of collaborative partnerships with parents (Angelo,
However, accessing assistive technology and the required support to set it up in the classroom remains a complex challenge for families, school staff and allied health professionals (Copley & Ziviani, 2007; Raghavendra et al., 2012).

These challenges were furthered highlighted by the introduction of the Disability Standards of Education (Australian Government, 2005) and the Australian Curriculum, Assessment and Reporting Authority Act 2008 (ACARA) which were set up to ensure inclusive education and access to the national curriculum for all students with and without a disability. Further developments were published in 2013, when ACARA released the document *Student Diversity and the Australian Curriculum: Advice for principals, schools and teachers* (ACARA, 2013). In the Disability Standards of Education and ACARA it is argued for age appropriate material motivating students through engagement with personal interest, use of support staff and use of computer based technology and speech-generating devices (ACARA, 2013; Australian Curriculum Assessment and Reporting Authority Act, 2008; Australian Government, 2005). Despite this, many students’ needs are still not met (Copley & Ziviani, 2004; McMillan, 2008; Raghavendra et al., 2012). Although there have been significant research and development advances in the field of assistive technology, there has been little research to identify factors that facilitate the successful uptake and implementation of assistive technology in school settings for students with cerebral palsy.

**Problem statement**

Australian data show that 60%, of individuals with cerebral palsy, are non-verbal or have some speech impairment (ACPR Group, 2013). Communication can be further complicated by a range of motor severity associated physical disabilities, limited upper limb function and cognitive ability (Himmelmann, Lindh, & Cooley Hidecker, 2013). The limited research available in Australia shows that school students with disabilities, such as cerebral palsy, have inadequate support and uptake of assistive technology to compensate for their functional limitations (Copley & Ziviani, 2004, 2007; McMillan, 2008; Raghavendra et al., 2012). Consequently, device abandonment frequently occurs (Copley & Ziviani, 2004). This results in students missing out on education when left without an appropriate means to access the curriculum.
A combination of factors has been identified as barriers to the support and uptake of assistive technology (Copley & Ziviani, 2004). Whilst the literature suggests that many of these barriers can be dismantled by adopting collaborative practices, such as family-centred care in assistive technology provision (Angelo, 2000; Parette & Brotherson, 2004), Dunst (2002) suggests that the principles of family-centred care are rarely found in schools.

**Aim of the study**

This sequential explanatory mixed method study was undertaken to investigate to what extent client-centred and family-centred assistive technology approaches were used by schools in Australia. The study aimed to identify the perception by students, parents, school staff and allied health professionals of the factors contributing to the students’ abilities to access the curriculum using high-tech assistive technology.

**Research Questions**

The following research questions were the focus of this study:

**Phase I Quantitative: Survey**

1. To what extent do the assistive technology experiences of school staff and allied health professionals relate to each other?

2. How do the assistive technology experiences of school staff and allied health professionals relate to the students’ ability to achieve the classroom goals?

3. How do the families’ experiences of assistive technology relate to their child’s ability to achieve the classroom goals?

4. How does the student’s experience of support when the device/program was set up relate to their opportunity to demonstrate their knowledge and skills using high-tech assistive technology in the classroom?

5. How do the perceptions by families, school staff and allied health professionals of the achievement of classroom goals relate to the perceived helpfulness of the team members around the student, at the time of the assessment and at the set-up of the high-tech assistive technology?
6. How does parental attendance during the assessment and set-up stage of assistive technology in the classroom relate to how the parent experiences the provision of family-centred assistive technology?

7. How do the students’ experiences of being able to show the teacher what they are capable of in the classroom relate to their experience of receiving client-centred care?

8. How do the roles of the school staff and allied health professionals, their years of employment in their role and years of experience working with students with cerebral palsy, relate to how they perceive their ability to deliver family-centred care?

**Phase II Qualitative: Interviews and Focus groups**

1. What are the experiences of students with cerebral palsy from their involvement in the decision-making process of high-tech assistive technology?

2. What strategies have students, parents, school staff and allied health professionals found useful when introducing assistive technology in the classroom?

3. What are the experiences of students, parents, school staff and allied health professionals when assistive technology is implemented in the classroom?

4. Which individuals are influential in supporting assistive technology in the classroom?

**Theoretical Perspective**

In the present study the principles of the International Classification of Functioning Disability and Health (ICF) for Children and Youth (ICF-CY) were used to provide an overarching systematic framework for analysis. The ICF is a bio-psychosocial model developed to view health in one comprehensive approach, including biological, individual and social perspectives. Furthermore, it provides a language and framework for professionals from multiple disciplines to describe and classify aspects of health and health-related situations (World Health Organization, 2002). As shown in Figure 1, disability and functioning are seen as outcomes of the interactions between health
conditions and contextual factors. Functioning is an umbrella term that includes all body functions, activities and participation.

As a framework and model, school staff, allied health professionals and researchers around the world have adopted the ICF for its user-friendly language. The concepts are used to determine service needs that are easily translated across disciplines and cultures (Campbell & Skarakis-Doyle, 2007; Imms, 2006; Rosenbaum & Stewart, 2004). The ICF is often used both to structure and plan research in disability, as well as for the interpretation of results. It serves to make research findings comparable and easy to communicate (World Health Organization, 2002).

![Diagram](image)

**Figure 1.** Interactions between components of the International Classification of Functioning, Disability and Health Organization ICF/ICF-CY (World Health Organization, 2001, 2007)

In 2007, the ICF was further developed with the introduction of a children and youth version, the ICF-CY, in which the focus is on children’s participation in daily living at home, at school and in the community. The ICF-CY has been found to provide a structure to map and describe children’s and youth’s functioning in a meaningful way. The ICF-CY contains 1685 categories, which is an expansion of 231 codes. Compared to the ICF, the new ICF-CY codes reflect developmental factors required for
considering the needs of children and young people, from infancy through to adolescence (World Health Organization, 2007). One example of the extended categories can be found in the Environmental Factors, in which equipment such as assistive technology is used by children in schools for playing and learning. The impact of assistive technology on functioning can then be best understood by using both the ICF and the ICF-CY components: Body Structure and Function, Activity, Participation, Environment Factors and Personal Factors (Granlund, Björck-Åkesson, Wilder, & Ylven, 2008; Henderson et al., 2008; Raghavendra, Bornman, Granlund, & Björck-Åkesson, 2007).

The ICF/ICF-CY provides a holistic approach which facilitates clear identification of what level of function needs to be addressed (Simeonsson, Björck-Åkesson, & Lollar, 2012). It draws attention to ‘what’ needs to be measured (Schiariti, Selb, Cieza, & O’Donnell, 2014); an integral part of the process in providing appropriate interventions (Simeonsson et al., 2012). Furthermore, the ICF-CY manual also encourages the involvement of the parents and the children (World Health Organization, 2007), and complementing other frameworks such as a family-centred approach. In family-centred care, collaborative goal setting between families and providers is considered a key element (Brewer, Pollock, & Wright, 2014), and guides not only ‘what’ services are required but also ‘how’ these services are provided (Øien, Fallang, & Østensjø, 2009). Together, the components of the ICF and ICF-CY provide a systematic framework for analysis that includes the perspectives of all stakeholders in this study, not only the students. It is thus a vital element of the present study.

**Scope**

This study was concerned with high-tech assistive technology service delivery in the context of mainstream and special school settings across public, Catholic systemic and Independent schools from the perspectives of all key stakeholders. Participants were parents (guardians or the primary caregivers), school staff (classroom teachers, special educators, principals and other school staff), allied health professionals (occupational therapists, speech pathologists, assistive technology consultants) who in the previous 12 months have been supporting a student with cerebral palsy, and aged 7-18 years, to use assistive technology in their classroom. The time frame of 12 months for school staff and allied health professionals was set to ensure modern equipment was the focus of the study, as technology is rapidly changing. Selecting students aged 7-18 years ensured the
participants had engaged in the assessment, implementation and use of their assistive
technology equipment in the classroom and were capable of communicating their
experiences.

**Significance of the Study**

The present study is the first national study of its kind in Australia, in which the service
 provision of high-tech assistive technology, such as speech-generating devices and
alternatives to handwriting, has been investigated for school-aged students with cerebral
palsy.

In order for meaningful advances to be made in our understanding of the use of
assistive technology for students with cerebral palsy, this study sought to:

- Examine the perspectives of students, parents, school staff and allied health
  professionals.

- Identify the factors that may impact the student’s ability to access the curriculum
  and participate in the classroom.

- Determine the extent to which family-centred care exists in school settings for
  children with cerebral palsy who use assistive technology.

**Overview of the Thesis**

Chapter 1 provides the background and aims of this study. The gaps in the research into
assistive technology experiences of Australian students, their parents, school staff and
allied health professionals will be addressed in the research questions.

Chapter 2 presents a literature review of the practices of assistive technology for
students with disabilities. It draws upon the ICF to provide a framework to examine the
classroom use of assistive technology in the context of a family-centred approach.

Chapter 3 describes the methodologies including the epistemological assumptions and
research designs that have been used for data collection and analyses. Literature
substantiating the methodology for mixed methods, specifically on multiple-case study
design, is also examined. Furthermore, this chapter explains the study sites, the
participants, the instruments, the selection and justification for data analysis techniques
and the methods of data analysis.
Chapter 4 examines the results from three surveys on the assistive technology experience and level of perceived family-centredness for students with cerebral palsy in Australian classrooms. It provides insights into the experiences of the parents, students, school staff and allied health professionals.

Chapter 5 examines the findings from stakeholder interviews and focus groups. The common themes, as derived from the cross-case analysis of the participants’ assistive technology experience in the classroom by using the ICF/ICF-CY framework, are analysed and discussed.

Chapter 6 presents a new model for assistive technology decision-making for children and youth with cerebral palsy.

Chapter 7 combines the quantitative (surveys) and the qualitative (interviews and focus groups) research results to elucidate the key findings from this study. The chapter highlights the implications of the findings, considers recommendations for policy and practice, and addresses the study limitations.

Chapter 8 provides a conclusion of the study findings and suggests further use of the ICF-CY and family-centred care for application in the school setting for children with cerebral palsy. Suggestions for further research in this field are presented.
Chapter 2: Overview of Relevant Literature

“Communication is everything I think”

(Marshall & Goldbart, 2008, p.77)
Chapter 1 highlighted the importance of students receiving adequate support within a collaborative context, such as family-centred care, to enable them to access the curriculum using assistive technology (Angelo, 2000; Parette & Brotherson, 2004). Furthermore, Chapter 1 addressed the need for more research into the perspectives of the key stakeholders (students, parents, school staff and allied health professionals) and their assistive technology experiences to identify factors contributing to the students’ abilities to access the curriculum through participation in the classroom.

In Chapter 2 the literature published from 1990 to 2013, as sourced from medical and educational databases using Medline, Cinahl, PsychINFO and ERIC, is reviewed. This literature review encompasses several fields of inquiry. In order to synthesise the issues, three separate searches across fields of studies related to children with cerebral palsy and assistive technology were conducted. The first search was concerned with the literature in assistive technology service provision for school-aged children with disabilities, such as cerebral palsy. The second search addressed the issues around family-centred assistive technology provision for students with disabilities. The third search targeted studies looking at assistive technology service provision in the context of the International Classification of Functioning Disability and Health (ICF) for Children and Youth (ICF-CY).

The results from the three literature searches were synthesised and organised according to the ICF and the ICF-CY (Figure 2). Initially, the ICF offers a systematic means of classifying health; however, it can be used for a wide range of purposes. In service provision, practical issues at the Individual, Societal and Institutional level can be addressed. On the Individual level, the ICF can assist in assessments to determine the person’s level of functioning, and facilitate communication amongst health professionals, social workers and community agencies. At the Societal level, the ICF helps to identify the needs of persons with various levels of disability, impairments, activity limitations and participation restrictions. Environmental assessments can be used to identify facilitators and barriers to support a more accessible environment for the person (World Health Organization, 2002). At the Institutional level, the ICF can be used for a number of purposes including education and training, resource planning and development, and to identify ‘what’ services will be needed and ‘how’ useful are the services provided.
Furthermore, as the views of students as well as parents, school staff and allied health professionals were considered both the ICF and the ICF-CY were applied in this chapter. The ICF/ICF-CY framework illustrates how the components and functions are inter-related and contributes to the process and outcomes of assistive technology interventions in the context of the classroom. In the course of the literature review, research gaps will be identified and the research questions outlined in Chapter 1 will be posed.

**The ICF and the ICF-CY for research and practice**

The ICF offers a framework that not only considers an individual’s health but also the interaction between the individual’s physical and psychological functioning, daily activities and environmental factors, such as supportive relationships (World Health Organization, 2001). The ICF-CY was developed to capture children and youth’s functioning, as a response to the implementation of children’s rights in regards to health care, education and disability services. As such, a classification system addressing physical, social and psychological aspects, relevant to children and youth was needed. The development and expansion of the content in the ICF-CY was particularly concerned with issues related to cognition and language, play, disposition and behaviour. Consequently, the framework was introduced with an emphasis on the child in the context of the family, developmental delay, participation and the environment, in the context of the individual transitioning across the stages of infancy, early childhood, middle childhood and adolescence (World Health Organization, 2007).
The ICF and the ICF-CY describe 10 steps to determine the appropriate class and codes related to problems in children and youth. For the purpose of this literature review only the first five steps were utilised in a one-level classification. This meant that the literature was first defined and assigned to one of the four components in the ICF/ICF-CY: 1) Body Functions and Structures; 2) Activity and Participation, two components which are linked but ultimately separate; 3) Environmental Factors; or 4) Personal Factors. It should be noted that Personal Factors relates to factors that are not part of the individual’s health such as age, gender, coping styles, personality and lifestyle, and are generally not coded in the ICF/ICF-CY as they vary widely among cultures (World Health Organization, 2001, 2007). However, Personal Factors will be used here to categorise research findings related to the students’ own assistive technology experiences. Once the component was identified the appropriate chapter was located with the aim to integrate the literature findings across the different fields.

In the ICF/ICF-CY, a chapter refers to the heading level directly situated under the main three components. Figure 2 illustrates the chapters in this literature review. Body Functions and Structures include mental functions. Activities and Participation includes

*Figure 2. The ICF-CY and factors included in the literature review*
learning and applying knowledge, communication, mobility and major life areas. Environmental Factors includes products and technology services, support and relationships, attitudes, services, and systems and policies.

Firstly, a brief overview of cerebral palsy as the disability of focus in the present study will be provided; and secondly the literature on factors influencing assistive technology service delivery and use in the classroom will be presented.

Cerebral palsy in children and youth

Cerebral palsy is the most common physical disability in children and persists throughout their lives (Rosenbaum et al., 2007). In Australia, the reported incidence of cerebral palsy is approximately 2/1000 live births (ACPR Group, 2013).

As Rosenbaum et al. (2007) have noted, the definition and classification of cerebral palsy have been challenged since first reported by Little in 1861. Rosenbaum et al. (2007) acknowledged that Sigmund Freud and Sir William Osler provided valuable perspectives on the condition at the end of the 19th century with further developments being made when “the American Academy for Cerebral Palsy and Developmental Medicine” was founded in the mid-1940s in the United States of America and “the Little Club” in the United Kingdom. Amongst other things, their work inspired research, which helped the development of the description of cerebral palsy and service delivery.

Cerebral palsy has been defined as:

* a group of permanent disorders of the development of movement and posture, causing activity limitations, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition communication, and behaviour, by epilepsy, and by secondary musculoskeletal problems.

(Rosenbaum et al., 2007, p. 9)

Cerebral palsy is classified according to motor type: spastic, dyskinetic, or ataxic. Spasticity, the most common type, is present in up to 88% of individuals with cerebral palsy (Blair & Stanley, 1997; Odding, Roebroek, & Stam, 2006; Westbom, Hägglund, & Nordmark, 2007). Following a classification of motor type, typography is here described as hemiplegia, diplegia and quadriplegia. In people with predominantly spastic cerebral
palsy 62% have a diplegia, triplegia or quadriplegia and a further 39% are diagnosed with hemiplegia (ACPR Group, 2013).

Associated impairments such as epilepsy and intellectual disability (ACPR Group, 2009; Carlsson, Hagberg, & Olsson, 2003), visual, hearing (ACPR Group, 2009; Odding et al., 2006) and tactile impairments (Odding et al., 2006) are common amongst children with cerebral palsy and its impact on children’s performance varies widely.

Cerebral palsy and assistive technology in the classroom

Products and technology

The World Health Organization (2004) defines assistive technology as an umbrella term for any device or system that enables a person to perform a task that would otherwise be too hard to execute or that facilitates how a task can be performed. Assistive technology includes both low-tech devices and high-tech devices. Examples of low-tech devices are adapted equipment like picture boards, sign language and walkers. High-tech devices are devices such as electronic communication devices, using synthetic or digitized speech for Augmentative and Alternative Communication (AAC), micro switches to control computers, powered wheelchairs and environmental control (Bailey, Parette, Stoner, Angell, & Carroll, 2006).

Major life areas

Education is addressed in the ICF-CY as one of many major life areas in a child’s life (World Health Organization, 2007) and assistive technology has been seen as the “major innovation in their educational process” (Craddock, 2006, p. 26) facilitating student participation and learning in the school context. However, to be able to use the high-technology devices a combination of physical and cognitive skills are required (Bailey et al., 2006) which often calls for alternative access options, e.g., switches, alternatives to the keyboard or mouse (Murchland & Parkyn, 2010). High-tech assistive technology not only poses high demands on the user but also requires specialist skills and knowledge to support it; therefore the technology has been identified as challenging to both assess and implement (Benedict & Baumgardner, 2009; Marshall & Goldbart, 2008).

Educators have also found meeting the curricula requirements challenging: they have encountered difficulties with modifying the curriculum in combination with meeting the need of the students (Kent-Walsh & Light, 2003). A positive outcome from successful curriculum modification include educators reporting it not only benefited the student in
question but was advantageous for other students (Soto, Müller, Hunt, & Goetz, 2001). Finally, it has been reported that the student’s academic needs often receive less attention, compared to their social needs, due to the educators lacking the skills to evaluate the student’s progress.

Kent-Walsh and Light (2003) concluded that, without the ability to assess the student appropriately, educators do not feel competent to determine whether the student has made any educational gains. In addition, realistic academic goals have been identified as a critical issue relating to the curriculum and educational inclusion.

Less familiarity and lack of education about equipment would explain the lack of knowledge of school staff and families and their reduced ability to assist students with these items (Murchland, Kernot, & Parkyn, 2011). Craddock’s (2006) findings suggest that it can take up to 5 years before assistive technology may be working successfully in the classroom. Consequently, this finding suggests that students who are introduced to and use assistive technology prior to going to school are better prepared when it comes to using assistive technology in the classroom.

The empirical data on students with cerebral palsy and assistive technology have not been such that the results can be generalised (Carter, 2003; Clarke, McConachie, Price, & Wood, 2001; Garcia, Loureiro, Gonzales, Riveiro, & Sierra, 2011; Henderson et al., 2008; Huang, Sugden, & Beveridge, 2009; McNaughton et al., 2008; Soto et al., 2001; Sutherland, Gillion, & Yoder, 2005; Wright et al., 2006). The lack of studies using methodologies that collect generalisable data may be explained by the complexities due to the severity of and variation within cerebral palsy; these complexities often lead to the need for customised solutions. The effectiveness of implementation is therefore difficult to measure across a homogenous group of individuals with cerebral palsy.

Although children with cerebral palsy have been part of studies investigating participation, barriers to and use of assistive technology and using a team-approach (Copley & Ziviani, 2007; Murchland & Parkyn, 2010; Raghavendra et al., 2012), most research studies in Australia have not specifically studied service provision for students with cerebral palsy using high-tech assistive technology in the school setting. Recently, three Swedish studies have addressed computer use in children with disabilities in mainstream schools (Borgestig et al., 2013; Hemmingsson, Gustavsson, & Townsend, 2007; Lidström, Almqvist, & Hemmingsson, 2012). These studies identified that:
computer based technology was more frequently used than mobility equipment (Lidström et al., 2012); and training classroom teachers in disability, assistive technology and collaborative goal setting led to improved goal related computer use (Borgestig et al., 2013). Furthermore, without collaborations between the classroom teacher and allied health professionals, students are not receiving the assistive technology support they need in mainstream schools (Hemmingsson et al., 2007). These issues are areas that warrant further consideration.

To address limitations from previous research, this study aimed to include a large representative national sample of children with cerebral palsy and utilised a mixed method approach to answer the following questions:

- What are the experiences of students, parents, school staff and allied health professionals when assistive technology is implemented in the classroom?

- How do the assistive technology experiences of school staff and allied health professionals relate to the student’s ability to achieve classroom goals?

- How do students’ experiences of support, when the device or program was set-up, relate to their opportunity to demonstrate their knowledge and skills using high-tech assistive technology in the classroom?

**Attitudes**

Although the inclusive education movement is part of a broad human rights agenda, the literature suggests that educators lack the appropriate knowledge of how to support assistive technology in the classroom. Studies have suggested that attitudes towards assistive technology are influenced by confidence levels with mainstream technology (McNaughton et al., 2008), inadequate planning, and preparation and time constraints (Kent-Walsh & Light, 2003). Hemmingsson et al. (2007) have demonstrated that the initiative to implement assistive technology in the classroom often came from the parent, which as a consequence led to the classroom teacher having limited knowledge and interest in providing the necessary support. These findings led to the following research questions being posed:

- How do the perceptions of the achievement of classroom goals by the families, school staff and allied health professional, relate to the perceived helpfulness of
the team members around the student at the time of the assessment and the set-up of the high-tech assistive technology?

- To what extent do the assistive technology experiences of school staff and allied health professionals relate to each other?

**Communication**

In Australia, 60% of individuals with cerebral palsy are non-verbal or have some speech impairment (ACPR Group, 2013). A similar finding was reported in a Swedish population-based study in which 49% were found to have impaired speech (Himmelmann & Uvebrant, 2011). Speech ability has been found to be associated with cognitive and gross motor function (Andersen, Mjoen, & Vik, 2010). State-based population data from Victoria (Australia) and Western Australia (Australia) show that around 70% of persons with cerebral palsy have an intellectual impairment with 18% classified in the severe range (IQ<50) (ACPR Group, 2013).

Communication is often classified using the Communication Function Classification System (CFCS) (Cooley Hidecker et al., 2011; Rosenbaum, 2008). The classification scale describes communication function in five levels from level I (most functioning) to level V (most limited). Furthermore, gross and fine motor functions have also been found to be linked to communication. Despite the association between severe gross motor function and impaired communication, 18% of children with more severe gross motor function were found to be effective communicators with familiar partners (Himmelmann et al., 2013).

In contrast, Clarke and Kirton (2003) found that school-aged children most often do not use their speech-generating devices, instead they resort to using nonverbal modes of communication to quickly give “yes” or “no” responses using facial expression, body language and gestures to answer their peers’ questions. This finding was further supported in Raghavendra et al.’s (2012) study, where they found that Augmentative and Alternative Communication (AAC) was not used in the classroom, thereby limiting the student’s ability to participate and contribute academically. Specifically, they found that students using AAC only participated in a third of the activities compared to their peers. They state that this lack of participation will have consequences for their educational outcomes and should alarm educators, families of these children, service providers and others in the community (Raghavendra et al., 2012).
A recent study conducted in the United Kingdom identified that of the 75% of students aged 16–18 years who had been diagnosed with moderately or severely impaired speech, only one-third were accessing AAC (Cockerill et al., 2013). A similar finding was found in a Spanish study investigating the use of computers and AAC: among a sample of 30 children and youth with cerebral palsy they found that only 20% of those eligible used some form of communication device (Garcia et al., 2011). Parents participating in a population based follow-up study reported their adolescent children with bilateral cerebral palsy experienced frustration with delayed motor actions and controlling speech-generating devices, which often resulted in families communicating with their children without the devices (Cockerill et al., 2013). Although children most often find a way to communicate, there is no doubt that a communication device will provide much needed support (Rosenbaum, 2003), and lead to motivation to engage in daily activities (Majnemer, Shevell, Law, Poulin, & Rosenbaum, 2010). Promoting such devices must therefore be a primary focus in a school context, where students need to communicate on a daily basis.

**Mobility**

Students with cerebral palsy experience limitations in their ability to perform activities which in turn impacts on their school participation (Schenker, Coster, & Parush, 2005). Many students use a combination of technologies to bridge the gap between their physical disability and the task requirement (Murchland et al., 2011) and to access the school curriculum (Copley & Ziviani, 2004; Henderson et al., 2008; Rosenbaum & Stewart, 2004).

As a result of cerebral palsy being such a complex condition, with a wide variety of presentations (Imms & Dodd, 2010), classifications with a functional approach, such as the Gross Motor Function Classification System (GMFCS) and the Manual Ability Classification System (MACS) (Eliasson et al., 2006; Palisano et al., 1997), are used to describe gross motor and fine motor to gain a wider understanding of the person’s abilities. The classification systems describe five levels of functioning, from level I (most functioning) to level V (most limited). In addition, the classification systems provide a common language across parents, allied health professionals and researchers (Eliasson et al., 2006; McDowell, Kerr, & Parkes, 2007; Morris, Galuppi, & Rosenbaum, 2004; Morris, Kurinczuk, Fitzpatrick, & Rosenbaum, 2006; Plasschaert, Ketelaar, Nijnuis, Enkelaar, & Gorter, 2009).
Support and relationships

It is disconcerting that when working towards increased participation in school, students with multiple disabilities have described a lack of communication and collaborations between school staff and allied health professionals (Hemmingsson et al., 2007).

A supportive environment is critical for satisfaction with assistive technology use (Copley & Ziviani, 2007; Hemmingsson et al., 2007; Lidström et al., 2012). The education system often does not have formal mechanisms for assistive technology support. The support and training of individual educators to increase their knowledge and expertise in the use of assistive technology is critical for a successful experience (Craddock, 2006). In addition, an important role can be taken by assistive technology specialists (McNaughton et al., 2008), and teaching assistants who not only know the student well but have the ability to carry out curriculum adaptations (Kent-Walsh & Light, 2003; Soto et al., 2001; Wright et al., 2006).

Extensive research has been conducted on best practices when working with children and their parents, particularly in the field of early intervention and paediatric rehabilitation (Dunst, 2002; Hanna & Rodger, 2002; King et al., 2004; Rosenbaum et al., 1998; Trivette, Dunst, & Hamby, 1996). Collectively there has been a growing emphasis on adopting the principles of family-centred care.

Family-centred care describes how the interventions for children with disabilities are provided in a collaborative way; the philosophies, attitudes and approaches to care (Rosenbaum et al., 1998) and the approach to service delivery is considered best practice in paediatric rehabilitation (King et al., 2004). At the very core of family-centred care is the recognition that the family is the constant in a child’s life and as such the family is invited into a shared decision-making process around interventions for their child (Rosenbaum et al., 1998).

Family-centred care in assistive technology decision-making has been identified as the cornerstone for collaborative partnerships with parents (Angelo, 2000; Parette & Brotherson, 2004) and is well established in early intervention (Parette & Brotherson, 2004). However, in a review by Dunst (2002) the findings suggested that the term family-centred and its variants were rarely found in the school research literature. Identifying and evaluating the skills and behaviours of professionals that may facilitate a collaborative helping style may lead to a better understanding of how to enhance
training and practice; Summers and her colleagues (2005) suggested this is an important area to investigate further.

Family-centred service provision has both relational and participatory components and both need to be engaged for an intervention to be deemed family-centred (Dunst, 2002; Dunst & Trivette, 1996).

- The relational component includes practices associated with good clinical skills, e.g., active listening, compassion, empathy, respect, being non-judgmental, and professional beliefs about empowering attitudes toward families (Dunst, 2002; Dunst & Trivette, 1996).

- The participatory component includes practices that are individualised, flexible and meet the family concerns and priorities. It highlights the practice of providing families with opportunities to be actively involved in decision-making and an invitation to collaborate with the professionals to achieve desired goals and outcomes (Dunst, 2002; Dunst & Trivette, 1996).

Evidence as a whole has aligned parent-family involvement in schools with those that are termed family-allied (Dunst, 2002; Dunst & Trivette, 1996). Family-allied may be described as the practitioner’s attitudes and behaviours associated with the relational component of the family-centred model. However, a family-allied approach has been identified as one that does not include the participatory component for shared decision-making and collaboration. Hence, schools are not seen as engaging in behaviours aligned with a family-centred approach (Dunst, 2002; Dunst & Trivette, 1996; Espe-Sherwindt, 2008; McBride, Brotherson, Joanning, Whiddon, Demmitt, 1993).

Parents identified that they often need to take a leading role in not only accessing services but also in becoming proficient in both how to operate the device and how to instruct and support their child best to use the device (McNaughton et al., 2008). Furthermore, parents also stressed that it was a critical foundation for developing and maintaining collaborative teacher-parent relationships (Bailey et al., 2006; Huang et al., 2009; McNaughton et al., 2008).

Research has suggested that the outcomes of assistive technology service provision are complex to measure. For example, measures need to simultaneously consider the student’s physical and cognitive ability, the task itself, the type of technology as well as
the environment in which the technology is used and supported, as this will affect outcomes. King et al. (2004) found that perception is an outcome that can be measured more easily across settings and disorders. Consequently, measuring parents’ perception with a service has been found to be closely related to professionals’ behaviours that are collaborative and supportive. In such behaviours, the client-professional partnership and shared decision-making are pivotal (Dunst & Dempsey, 2007; King, Rosenbaum, & King, 1997; King et al., 2004).

Instruments developed to measure the perception of service delivery in a paediatric setting, and to be included in this study, are: the Measure of Processes of Care (MPOC-20) (King et al., 2003), the Measure of Processes of Care for Service Providers (MPOC-SP) (Woodside et al., 2001) and the Give Youth a Voice (GYV-20) (Gan, Campbell, & Snider, 2009). The MPOC-20, is a self-administered, parent-completed questionnaire that is a refined version of the Measure of Processes of Care (MPOC) and is reported to take 5 to 10 minutes to complete. The MPOC-SP has been developed to evaluate the family-centredness of children’s rehabilitation services (Woodside et al., 2001). Both measures have good test-retest reliability and good internal consistency (King et al., 2004; Woodside et al., 2001). Given that children and youth at times have different experiences from their parents to their school and disability services, it is helpful to get direct input from the youth themselves. The Give Youth a Voice (GYV-20) was developed by Gan and colleagues (2008) and is a further development of the MPOC.

Research findings have highlighted the challenges of allied health professionals and school staff adopting the model of family-centred care in the decision-making process around assistive technology provision (Bamm & Rosenbaum, 2008; Bose & Hinojosa, 2008; Dunst, 2002; Hemmingsson et al., 2007). Despite the centrality of the family in a family-centred model of practice, there has been little work done to identify the perceptions of students, families and service providers of family-centred assistive technology service provision in schools. The following questions will be answered by this study.

- How do the roles of school staff and allied health professionals, the number of years of employment in their role and of experience working with students with cerebral palsy relate to how they perceive their ability to deliver family-centred care?
What experiences do students with cerebral palsy have of involvement in the decision-making process of high-tech assistive technology?

Services, systems and policies
Implementing family-centred care has been suggested to be challenging. Studies have shown that in particular providing information about available services, the child’s individual situation and how families can get in touch with other families are areas that service providers and families find least satisfactory (Darrah, Wiart, Magill-Evans, Ray, & Andersen, 2010; Dyke, Buttigieg, Blackmore, & Ghose, 2006; Jeglinsky, Autti-Rämö, & Brogren Carlbert, 2011; Siebes et al., 2007; Woodside et al., 2001).

In reviews of family-centred service provision, organisational structures, policy and systems and service providers, the lack of necessary skills to build and maintain parent-professional partnerships or their failure to value such practices have been identified as the main barriers to a successful uptake of a family-centred approach (Bamm & Rosenbaum, 2008; Bose & Hinojosa, 2008).

Darrah et al. (2010) investigated how the concepts of family-centred care, functional therapy goals and coordination between programs occurred when a child changed their rehabilitation program or school. The study design comprised interviews and a survey of managers, occupational therapists and physiotherapists providing disability services to children with cerebral palsy. The parents’ views were collected through focus groups. The interviews revealed the parents often felt unprepared for the change of service delivery mode when their children become school-aged and began to receive more consultative services than the previous more hands-on therapy.

Furthermore, Darrah et al. (2010) concluded that having family-centred principles in a mission statement and parents on advisory boards did not necessarily ensure the provision of a family-centred service. Strategies used to implement family-centred care, functional therapy goals and coordination between services were predominantly informal; which corresponds with earlier studies (Bamm & Rosenbaum, 2008; Bose & Hinojosa, 2008).

Not only is family-centred care challenging to implement, research also suggests that, even with support, educational goals are difficult for the team to establish (Copley & Ziviani, 2007). A Swedish pilot study, conducted by Borgestig et al. (2013), found that collaborative goal setting improved the use of computers already available in the
classroom, and concluded that improved goal-related computer usage could be achieved with a collaborative planning meeting between the student and occupational therapists. Moreover, a small qualitative Australian study suggested that in addition to collaborative goal setting, having access to appropriate consultative services to ensure that the student’s needs were appropriately assessed was critical for a successful uptake of technology in the classroom (Murchland & Parkyn, 2010).

Not unlike the Borgestig et al. (2013) finding, mutually defined goals (Soto et al., 2001), with a collaborative assessment and planning process, has been reported throughout the literature to result in an increased awareness and recommended strategy for how assistive technology can be used (Borgestig et al., 2013; Copley & Ziviani, 2007; Kent-Walsh & Light, 2003).

Barriers to assistive technology are well documented in the literature. However, of the many barriers identified, funding has been reported to be perhaps the most critical when introducing assistive technology (Chmiliar, 2007; Copley & Ziviani, 2004; Murchland & Parkyn, 2010).

Another important factor influencing the successful introduction and implementation of assistive technology in the classroom is time. Time is often cited as a barrier to collaboration due to the pressures affiliated with preparing classes and special resources. In fact, many educators report circumstances where necessary adjustments were not put in place (Kent-Walsh & Light, 2003) or left to the teaching assistants (Hemmingsson et al., 2007) because of insufficient time. Furthermore, having different roles and not enough time to meet were acknowledged as barriers to collaboration between special educators and regular classroom teachers (Nochajski, 2001; Stowitschek, Lovitt, & Rodriguez, 2001), as well as between teachers and therapists (Prigg, 2002). When consistent methods for sharing information were not put in place, communication breakdowns between school teams and difficulties problem solving on an ongoing basis were often the results (Kent-Walsh & Light, 2003).

To investigate what factors were associated with students achieving access to the curriculum the following research questions were asked:

- How does parental attendance during the assessment and set-up stage of assistive technology in the classroom, relate to how they experience the provision of family-centred assistive technology?
• How do the families’ experiences of assistive technology relate to their child’s ability to achieve classroom goals?

• How do the assistive technology experiences of school staff and allied health professionals relate to their students’ abilities to achieve classroom goals?

Learning and applying knowledge

Students prefer to learn how to use assistive technology through one-on-one therapy and in an environment outside of the classroom (Clarke et al., 2001). This not only provides them with privacy to practise using the technology but they also perceive the sessions to be more individualised and client-centred (Clarke et al., 2001; Soto et al., 2001). Educators familiar with assistive technology have been reported to use a variety of strategies such as: modifying the lessons to ensure that the student can participate in the classroom activities; encouraging peer relationships; teaching peers how to assist their classmate; how to use the device; and encouraging the actual use and practice of the device in the classroom (Huang et al., 2009; Soto et al., 2001). Parents echo what students have reported and identify independent exploration, imaginary play, drill and practice as positive learning strategies for their child (McNaughton et al., 2008).

Parents also reported positive experiences with peer-mentoring (McNaughton et al., 2008). A peer-mentoring model has been suggested to be a useful educational approach in which competent communicators, using assistive technology, become role models for novice learners. Moreover, the mentors were also able to support their mentees and their families with technical and operational support (Ballin, Balandin, Stancliffe, & Togher, 2012); and break down one of the barriers recognised with the application of high-tech assistive technology. However, this approach has yet to be tested in a school environment.

Many educators report that they lack experience in managing assistive technology (Huang et al., 2009). A study from the United States of America reported that as many as 86% of teachers were dissatisfied with their current levels of assistive technology skills and knowledge. In fact, lack of knowledge amongst educators has been linked to delayed interventions and poorly matched technology (Borgestig et al., 2013; McNaughton et al., 2008). Therefore, the ongoing support and training opportunities for educators by skilled allied health professionals are critical strategies to facilitate student participation in classroom activities (Kent-Walsh & Light, 2003).
Research findings further suggest that when providing training in the use of high-tech assistive technology, either to the student or to the person supporting the student, the training should address both operational skills (Clarke et al., 2001; Jones & Stewart, 2004; Kent-Walsh & Light, 2003; Lund & Laber Mofett, 2006; McNaughton et al., 2008; Soto et al., 2001) and other language and academic skills (Clarke et al., 2001; Lund & Laber Mofett, 2006; McNaughton et al., 2008; Soto et al., 2001).

The following research questions were derived:

- What strategies have students, parents, school staff and allied health professionals found useful when introducing assistive technology in the classroom?

- Which individuals are influential in supporting assistive technology in the classroom?

**Mental functions**

It should be noted that in the ICF motivation is usually classified under Personal Factors (Raghavendra, Bornman, et al., 2007) but that with the introduction of the ICF-CY it is now a domain under the chapter including mental functions.

A lack of motivation can limit an individual’s ability to engage and participate in activities (Majnemer et al., 2010). Motivation is recognised as an important aspect of interventions, since highly motivated individuals have been found to optimise their motor ability (Lund & Laber Mofett, 2006).

In addition to motivation, self-esteem has also been identified to have a positive impact on the individual (Copley & Ziviani, 2004). A study showed that the students’ confidence and self-belief increased as they were able to show what they could accomplish, with the technology enabling them to contribute to their own learning (Craddock, 2006).

Peer-modeling is an intervention approach that has been suggested to enhance motivation (Majnemer et al., 2010). In an Australian study of youth with cerebral palsy who mentored other younger students with cerebral palsy in the use of their speech-generating devices, the mentors provided opportunities to model successful use of their technology and in turn increased the mentees’ motivation to use their devices (Ballin et al., 2012).
It is suggested that motivation is related to a number of factors such as cognition (Lund & Laber Moffett, 2006), level of activity limitation, behaviour problems, attitudes and the environment in which students receive support (Majnemer et al., 2010). Interestingly, students’ motivation to use their device has been found to be much higher at school compared to in their home. This difference has been explained by students’ motivation to participate in the same activities as their peers (Huang et al., 2009). Limitations in activity engagement and performance are not dependent on severity of motor or intellectual impairment alone. Environmental factors such as the presence of a teaching assistant or educational placement are also markers (Huang, Tseng, Chen, Shieh, & Lu, 2013). This research highlights the significance of not only involving peers with students using assistive technology in school settings, but also to assessing and taking into account the level of motivation the student possesses.

**Personal Factors**

For an individual with cerebral palsy, the successful use of assistive technology can have a profound effect on function as it allows the individual to control some of his or her own environment. Increased independence and communication competence are two of the most immediate benefits identified for users of Augmentative and Alternative Communication (Bailey et al., 2006). In addition, enhanced skill acquisition, increased social interactions and participation in the school and class environment have also been found to improve when assistive technology was successfully implemented (Copley & Ziviani, 2004; Schenker, Coster, & Parush, 2006). Despite reports on increased classroom participation, a review of assistive technology devices and their impact on the child and caregiver function conducted by Henderson, Skelton and Rosenbaum (2008) showed that a predominantly low level of quantitative evidence studies, such as single case studies, were conducted in the field. These study designs have implications on the potential for generalisation of the findings.

Prior research has established that overlooking family factors and the child’s own preferences may lead to the student abandoning the assistive technology device (Parette & Brotherson, 2004; Scherer & Craddock, 2002). Recognizing the views and perspectives of students as well as parents demands the use of assistive technology measures that are capable of identifying the correct technology and measuring the outcome. There are a range of client-centred assistive technology assessments, framework and outcome measures that have been developed such as: The *Communication
Supports Inventory – Children and Youth (CSI-CY) (Rowland, Fried-Oken, Steiner, & CCC-SLP, 2013), the Student, the Environment, the Tasks and the Tools (SETT) (Zabala, 2002), QUEST 2.0 (Demers, Weiss-Lambrou, & Ska, 2002); QUEST 2.1 Children’s version (Murchland et al., 2011), the Psychological Impact of Assistive Devices Scale (PIADS) (Jutai & Day, 2002), Matching Person and Technology (MPT) (Scherer & Craddock, 2002) and the Individually Prioritised Problem Assessment (IPPA) (Wessels et al., 2002). Despite these tools educators are not always involved in the goal setting process (Kent-Walsh & Light, 2003) and staff often fail to actively include parents in the collaborative process (Hanna & Rodger, 2002).

Interestingly, the only evidence-based assistive technology specific model developed to match the ICF and its checklist found in the literature is the MPT model (Bernd, Van Der Pijl, & De Witte, 2009; Scherer & Craddock, 2002). The MPT is the most published model that is specific to assistive technology assessment (Bernd, et al., 2009). It was developed to address the environment, the person and the technology factors that need to be considered when evaluating a person’s need for assistive technology (Scherer & Craddock, 2002). The MPT supports a collaborative partnership between the service providers and the user (Scherer, Sax, Vanbiervliet, Cushman, & Sherer, 2005). For families with children aged 0-5, an assessment form called Matching Assistive Technology and Child (MATCH) has been developed (Sherer, 1997). However, although the instruments are readily available they incur a cost that may act as a barrier for uptake into schools.

Strong evidence therefore points to the necessity of including the student in the assessment stage, to establish how best to support them to reach their potential. It is therefore imperative that the experiences and perceived needs of the students themselves are established.

The following research questions were therefore posed to explore these issues:

- What are the experiences of students with cerebral palsy during their involvement in the decision-making process of using high-tech assistive technology?
- How do students’ experiences of being able to show the teacher what they are capable of in the classroom relate to their experience of receiving client-centred care?
Summary

This chapter presented a review of the current literature on the practices of assistive technology and family-centred care in the school setting for students with cerebral palsy; and drew upon the ICF to provide a framework for the review.
“The nature of mixed methods research is … an intuitive way of doing research that is constantly being displayed through our everyday lives.”

(Creswell & Plano Clarke, 2011, p.1)
Chapter 2 presented the current literature on the practices of assistive technology for students with disabilities. It was noted that few studies have investigated the effect of collaborative service delivery models in the school context following the introduction of assistive technology to students with cerebral palsy. Chapter 3 outlines the mixed method approach adopted in this study and provides a rationale for this particular study design being adopted and the underlying epistemological assumptions. Furthermore, Chapter 3 provides details on the study sites, participants, instruments used, selection and justification for data analysis techniques, and the methods of data analysis.

**Epistemological assumptions**

The use of mixed methods as a research approach has been further developed in recent years (Denscombe, 2008), and is defined as the collection, analysis and integration of quantitative and qualitative data within one single study, with priority given to either one or both forms of data (Creswell, 2009; Creswell & Plano Clark, 2011). Although moving between the two philosophical perspectives of positivist (quantitative) and constructivist (qualitative) worldviews this study design was guided by the view of pragmatism (Tashakkori & Teddlie, 2003), the primary philosophy and research paradigm that embraces and promotes mixed methods (Johnson, Onwueguzie, & Turner, 2007). In a pragmatic worldview the world is not seen as an absolute unity. Truth is what is working at the time and both qualitative and quantitative methods are mixed (Creswell, 2009), with the belief that the researcher can incorporate the strength of both methodologies for a better understanding of the research question (Onwueguzie & Leech, 2005).

In this study, learning about the participants’ experiences and perspectives required both quantitative and qualitative approaches to provide a more comprehensive picture of the current situation of assistive technology in the classroom for students with cerebral palsy. First, a quantitative phase was chosen to provide a snapshot of the patterns of assistive technology service provision across states and territories in Australia. Second, a qualitative phase was conducted to provide a more in-depth understanding of the key stakeholders’ experiences of assistive technology in the classroom, through interviews and focus groups with parents, students, school staff and allied health professionals.
**Research Design**

The initial aim was to obtain information regarding the perspectives of parents, students, school staff and allied health professionals on service delivery when high-tech speech-generating devices and alternatives to handwriting are implemented in Australian general and special classrooms. In order to meet this aim, an Explanatory Sequential Design (Creswell & Plano Clark, 2011), was used to provide strategies to more accurately portray the experiences of the participants in this study. As already noted, the International Classification of Functioning Disability and Health (ICF) (World Health Organization, 2001) for Children and Youth ICF-CY) (World Health Organization, 2007) and a family-centred framework (Dunst, 2002; Rosenbaum et al., 1998) were also used to guide the study.

Following an Explanatory Sequential Design (Figure 3) in Phase I Quantitative, data were collected using a cross-sectional design (Nardi, 2003). The results from the cross-sectional survey used in Phase I to inform the interview and focus group questions developed for the Phase 2 Qualitative, where a case study design was adopted (Ellinger, Watkins, & Marsick, 2005; Stake, 2008).

To maximize the sample size and strengthen the study, a comprehensive ethics process was undertaken with the aim of recruiting participants from every state and territory in Australia, across disability organisations and public and private school systems. Equal priority was given to the quantitative and qualitative approaches, as both Phase I and II required extensive data collection from multiple sources (Creswell & Plano Clark, 2011).

Triangulation was used to further strengthen the study design. Patton (1990) acknowledged Denzin’s work in 1978 to identify four ways of achieving triangulation: 1) data triangulation, 2) investigator triangulation, 3) theory triangulation and 4) methodological triangulation. This study was designed to achieve data and methodological triangulation by mixing purposeful samples and including multiple sources, perspectives and methods within both the quantitative and the qualitative phases.
<table>
<thead>
<tr>
<th>Phases</th>
<th>Procedure</th>
<th>Product</th>
<th>Target groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st phase</td>
<td>Paper and online based survey (n=632 sites) Administered through postal, list-serves, schools and therapy services</td>
<td>Numeric data and text data</td>
<td>Parents Students with CP using AT in the classroom Allied health professionals Educators</td>
</tr>
<tr>
<td></td>
<td>PASW v.18 statistical software package. Quantitative analysis of survey results.</td>
<td>Descriptive, comparative and correlation statistics Results</td>
<td>Parents (n=94) Students (n=53) Allied health professionals (n=91) Educators (n=34)</td>
</tr>
<tr>
<td></td>
<td><strong>Interview and focus group guide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd phase</td>
<td>Face-to-face interviews with parents and students Focus groups (n=2) with health professionals. Face-to-face interviews with educators</td>
<td>Text data</td>
<td>Parents and students (n=6+6) Allied health professionals (n=16) Educators (n=3)</td>
</tr>
<tr>
<td></td>
<td><strong>Cross-case analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interpretation and explanation of quantitative and qualitative results</td>
<td>AT Decision-making model Discussion Implications Future research</td>
<td>Parents Students with CP using AT in the classroom Allied health professionals Educators</td>
</tr>
</tbody>
</table>

*Figure 3. Visual model for mixed methods procedures used in this study: sequential explanatory mixed methods design*

AT: Assistive technology
Phase I of the study involved three surveys: each survey consisted of two questionnaires. The first questionnaire was developed by the principal investigator and tailored to: 1) parents, 2) students and 3) school staff and allied health professionals (see Appendices A, B and C). The first section of the questionnaire consisted of general demographic questions about the participant and the student with cerebral palsy. The second section of the questionnaire addressed the participants’ perceptions about: a) perceived helpfulness of team members during the assessment and set up stage of the assistive technology provision; b) involvement of parents, students, school staff and allied health professionals during appointments and meetings; c) parent, school staff and allied health professional assistive technology experiences; and d) the student’s assistive technology outcome, that is the level of achieved independence and participation in the classroom.

The second part of the survey consisted of three standardised questionnaires as developed and frequently used in research to measure the extent to which service delivery was family-centred from the perspective of a parent, student, school staff or allied health professional (Gan et al., 2009; King, Rosenbaum, & King, 1996; Woodside et al., 2001) (see Appendices D, E and F).

Phase II of the study consisted of focus groups and interviews. Due to recruitment challenges where families and educators were not able to leave their homes or work sites to attend focus groups, interviews were held with these participants. Focus groups were carried out with allied health professionals as it provided for multiple perspectives on the issues to be discussed. Six parents and their children, six educators and 16 allied health professionals participated. Qualitative methodology was used to assess and analyse additional information regarding the participants’ experiences and what they believed were critical issues that could facilitate the implementation of assistive technology in Australian classrooms.

The surveys were anonymous and the interviews and focus groups were considered confidential for the purposes of this study. Information obtained from the interviews and focus groups (e.g., individual names or school districts) could potentially be traced back to the participant, therefore only non-identifying information was used in the final report.

**Ethics approval for Phase I**

To conduct Phase I, ethics approval was sought from the ethics committees of 31 disability, education and health organisations and departments. Of these, 25 Human
Research Ethics Committees, Education and Catholic Education Offices across Australia granted approval for the study. These were:

- Human Research Ethics Committee at the University of Western Sydney
- Cerebral Palsy Human Research Ethics Committee
- South Australia Health Human Research Ethics Committee
- Aboriginal Health Research Ethics Committee
- Novita Division of Research and Innovation
- The Royal Children’s Hospital Human Research Ethics Committee.
- Department of Education and Children’s Services South Australia
- Australian Capital Territory Department of Education and Training
- New South Wales Department of Education and Training
- Department of Education, Training and the Arts Queensland
- Department of Education Tasmania
- Department of Education and Early Childhood Development Victoria
- Western Australia Department of Education and Training
- Northern Territory Department of Education and Training
- Ethics approval was also given by the following Catholic Education Offices located in: Armidale, Brisbane, Canberra and Goulburn, Melbourne, Parramatta, Sale, Sydney, South Australia, Townsville, Toowoomba, Western Australia.

All respondents and participants received written information detailing the study (see Appendices G and H). It should be noted that some committees, departments and offices specifically requested the researcher to avoid comparisons between states and territories, or school systems. In addition, some committees declined approval due to the risk of their staff or students being overwhelmed by research invitations, or due to concerns about their students or staff not using assistive technology in the classroom. Furthermore, from December 2010 to April 2011 the states of Queensland and Victoria experienced extreme flooding as part of a large-scale natural disaster. Although the ethics approval was obtained prior to the flooding it was deemed inappropriate to approach schools affected by the natural disaster.
Phase I - Surveys

Researchers have repeatedly called for larger samples when studying assistive technology use in students with cerebral palsy (Henderson et al., 2008). However, as this study found, significant practical difficulties hampered the recruiting of sufficient numbers to make generalisations within one organisation, state or school system. In an attempt to address this limitation as identified in the literature, participants were recruited using a cross-sectional multi-centred survey distributed to disability organisations, public and private schools across all Australian states and territories.

Participants

The participants were parents (guardians or the primary caregivers), school staff (classroom teachers, special educators, principals and other school staff), allied health professionals (occupational therapists, speech pathologists, assistive technology consultants) and children aged 7-18 years with cerebral palsy who were using assistive technology such as a speech-generating device or a computer aid in their classroom. The students’ levels on the Gross Motor Function Classification System (GMFCS), the Manual Ability Classification System (MACS) (Eliasson et al., 2006; Palisano et al., 1997) and the Communication Function Classification System (CFCS) (Cooley Hidecker et al., 2011; Rosenbaum, 2008) were recorded and summarised (Table 1).

Setting

The students, school staff and allied health professionals attended or worked in regular, special or support classes in public, Catholic systemic and Independent schools, and included primary and secondary schools.

Sampling technique

It was anticipated that the sample would be too small to allow for a probability sampling technique, therefore the participants were recruited according to a purposive sampling strategy using homogeneous case sampling; it was important that the participants were demographically, educationally and professionally similar (Kemper, Stringfield, & Teddlie, 2003). This meant that a greater number of surveys were distributed to potential participants who may have met the inclusion criteria; a lower response rate was expected.
Table 1

**Inclusion criteria**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Inclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents</td>
<td>Parent to a child aged 7-18 years with cerebral palsy who is using high-tech assistive technology in the classroom</td>
</tr>
<tr>
<td>Students</td>
<td>Aged 7-18 years with cerebral palsy</td>
</tr>
<tr>
<td></td>
<td>Student using high-tech assistive technology in the classroom</td>
</tr>
<tr>
<td></td>
<td>GMFCS I-V</td>
</tr>
<tr>
<td></td>
<td>MACS I-V</td>
</tr>
<tr>
<td></td>
<td>CFCS I-V</td>
</tr>
<tr>
<td>School staff or Allied health professional</td>
<td>Who in the last 12 months had been working with a student aged 7-18 years with cerebral palsy, who is using high-tech assistive technology in the classroom</td>
</tr>
</tbody>
</table>

Gross Motor Functional Classification System (GMFCS) (Rosenbaum, Palisano, Bartlett, Galuppi, & Russell, 2008), Manual Ability Classification System (MACS) (Eliasson et al., 2006) and Communication Function Classification System (CFCS) (Cooley Hidecker et al., 2011)

**Instruments**

Three questionnaires were developed and individualised for: a) parents - *AT in the classroom – Parent and caregiver* (ATIC-P); b) students - *AT in the classroom – Student* (ATIC-S); and c) school staff and allied health professionals - *AT in the classroom – Service Provider* (ATIC-SP) (see Appendices A, B and C). The items in the surveys were evidence-based from articles and textbooks, including:

- Demographics
- Perceived helpfulness of team members during the introduction of assistive technology
- Participants’ experiences of assistive technology, including whether they felt supported by the environment when implementing assistive technology or gained new skills.
- Assistive technology outcomes for the student and their ability to access the curriculum through participation in the classroom: from the parent and service provider perspective.
• Assistive technology outcomes for the student and their ability to demonstrate their knowledge and skills: from the student perspective.

In addition to the core questionnaire items, three open-ended questions were posed. The open-ended questions gathered information on what the respondents would like to see changed to improve the provision of assistive technology, and the factors they deemed important for school staff and allied health professionals to know about assistive technology. The participants were given the opportunity to comment and add further information if they wished. A qualitative approach was used for analysing the open-ended questions. The themes derived from this analysis informed the interview and focus group questions in the second part.

The second part of the survey focused on the participants’ perception of receiving family-centred care using the standardised questionnaires: 1) the Measure of Processes of Care-20 (MPOC-20) (King et al., 1997; King et al., 2004); 2) the Measure of Processes of Care for Service Providers (MPOC-SP) (Woodside et al., 2001); and 3) and the Give Youth a Voice (GYV-20) (see Appendices D, E and F). The GYV-20 is designed to capture the special perspectives of adolescents’ experiences of family-centred care at age 13-21 years (Bamm & Rosenbaum, 2008; Gan et al., 2008). It should be noted that only students aged 13-18 years in this study were eligible to complete the GYV-20, younger students were asked to ignore this section of the survey.

**AT in the classroom – Parent, Student and Service Provider**

The items in the instruments ATIC-P and ATIC-SP consisted of general demographic information about the respondent who was the parent to, or working with, the student with cerebral palsy. Each participant was asked to indicate the student’s level of disability, type of assistive technology used, funding source, type of school, classroom and school year of the student with cerebral palsy. Participants were asked to indicate their total number of years of experience in their role and with working with students with cerebral palsy, and specify if they were school staff or an allied health professional. Parents were asked to indicate for how long their child had been using their assistive technology equipment.

Parents, school staff and allied health professionals were asked to indicate the level of helpfulness they experienced from the stakeholders involved in the assistive technology process (Table 2). The participants were asked to indicate the extent to which they agreed
or disagreed with 18 items, using a 6-point Likert-type rating scale (6=to a very great extent helpful, 1=not at all helpful).

Table 2

**ATIC-SP and ATIC-P Helpfulness Scale**

<table>
<thead>
<tr>
<th>Issue explored</th>
<th>Example item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement of health professionals and teachers in the assessment and planning stage</td>
<td>Think back to the assessment and planning stage of the assistive technology. How would you rate the involvement of the professionals?</td>
</tr>
<tr>
<td>Involvement of health professionals and teachers in the set-up stage</td>
<td>Think back to the set-up of the assistive technology. How would you rate the involvement of the professionals?</td>
</tr>
</tbody>
</table>

Parents, school staff and allied health professionals were asked to indicate the level to which they agreed (6=Agree strongly, 1=Strongly disagree) with statements involving their own assistive technology experience (9 items, Table 3 and Table 4) and the student’s assistive technology outcome in regards to their independence and participation in the classroom (8 items, Table 5). The reliability of the researcher-developed questionnaires was tested using Cronbach alpha. A small pilot study was conducted to determine if the wording represented the key constructs to be investigated. Face validity was established by firstly deriving the items from theory and literature. Secondly, presenting those items to a small group of parents and experts in the field, who confirmed the items measured what they intended. Test-retest reliability and content validity testing were considered but not deemed feasible since the questionnaires were delivered anonymously. Each of the instruments will be described in the following chapter.

The survey items in the instrument for students, ATIC-S, consisted of general demographic information, type of assistive technology used and school year to allow their survey to be matched with the parent survey, for those instances where a student survey was sent separately from the parent survey. Students were asked to indicate the extent to which they agreed or disagreed with 10 items, using a 6-point Likert-type rating scale (6=Agree strongly, 1=Strongly disagree) involving area of use, knowledge transition and level of collaboration (Table 6).
### Table 3

**ATIC-SP Assistive technology experience scale**

<table>
<thead>
<tr>
<th>Issue explored</th>
<th>Example item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy around assistive technology service delivery</td>
<td>My workplace offers clear guidelines around assistive technology</td>
</tr>
<tr>
<td>Goal setting</td>
<td>Established goals reflected the issue at hand</td>
</tr>
<tr>
<td>Involvement of team members</td>
<td>Time with teacher/therapist was easily arranged</td>
</tr>
<tr>
<td>Funding</td>
<td>Funding issues were addressed</td>
</tr>
<tr>
<td>Information and Skills</td>
<td>I felt comfortable implementing the device/program in the classroom</td>
</tr>
<tr>
<td>Information and Skills</td>
<td>I gained new skills during the assistive technology experience</td>
</tr>
</tbody>
</table>

### Table 4

**ATIC-P Assistive technology experience scale**

<table>
<thead>
<tr>
<th>Issue explored</th>
<th>Example item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information of specific information</td>
<td>Instructions and support were provided to me and my child</td>
</tr>
<tr>
<td>Goal setting</td>
<td>Goals were discussed with me</td>
</tr>
<tr>
<td>Involvement of team members</td>
<td>Time to meet with the teacher/therapist was easily arranged</td>
</tr>
<tr>
<td>Funding</td>
<td>Funding issues were addressed</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>The device met my expectations</td>
</tr>
</tbody>
</table>
Table 5

**ATIC-SP and ATIC-P Assistive technology student outcome scale**

<table>
<thead>
<tr>
<th>Issue explored</th>
<th>Example item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>Assist your student’s/my child’s participation in the classroom</td>
</tr>
<tr>
<td>Independence</td>
<td>Assist your student’s/my child’s independence in the classroom</td>
</tr>
<tr>
<td>Learning</td>
<td>Has a positive effect on your student’s/my child’s learning</td>
</tr>
<tr>
<td>Motivation</td>
<td>Has a positive effect on your student’s/my child’s motivation</td>
</tr>
</tbody>
</table>

Table 6

**ATIC-S Assistive technology student outcome scale**

<table>
<thead>
<tr>
<th>Issue explored</th>
<th>Example item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of use</td>
<td>Schoolwork, homework, talking to my family, talking to my friends outside the classroom.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>…helped me show the teacher what I know and can do in the classroom</td>
</tr>
<tr>
<td>Level of collaboration</td>
<td>…asked for my opinion</td>
</tr>
</tbody>
</table>

Measure of processes of care - Parents and Service Providers and Give Youth a Voice

As previously noted, the second questionnaire was also available in three versions: 1) for parents the MPOC-20 (King et al., 2003; King et al., 2004); 2) for school staff and allied health professionals the MPOC-SP (Woodside et al., 2001); and 3) for students the GYV-20 (Gan et al., 2009) (see Appendices D, E and F). The questionnaires had been designed to elicit the perception of the care received by the parent and student, and to measure how school staff and allied health professional rated their service provision. Permission to administer the questionnaires in an online format using Qualtrics survey software was sought and granted from the authors.
The MPOC-20 is a 20-item self-administered parent-completed questionnaire that is a refined version of Measure of Processes of care (MPOC) and is reported to take 5 to 10 minutes to complete. It was initially developed to evaluate the family-centredness of children’s rehabilitation services. MPOC-20 consists of five scales: 1) enabling/partnership; 2) providing general information; 3) providing specific information about the child; 4) coordinated and comprehensive care for the child and family; and 5) respectful and supportive care. The instrument has appropriate test-retest reliability and appropriate internal consistency (King et al., 1997; King et al., 2003; King et al., 2004).

The MPOC-SP was developed to evaluate the family-centredness of children’s rehabilitation services. This measure consists of 27 items and also has appropriate test-retest reliability and appropriate internal consistency (King et al., 2004; Woodside et al., 2001). Four scales are used in the MPOC-SP: 1) showing interpersonal sensitivity; 2) providing general information; 3) communicating specific information about the child; and 4) treating people respectfully (King et al., 1997; Woodside et al., 2001). In the MPOC-20 and the MPOC-SP a 7-point Likert-type rating scale is used (7=To a very great extent, 1=Not at all). High scores on items reflect stronger agreement to the respective item and subscale (Gan et al., 2009; King et al., 2003; Woodside et al., 2001).

The GYV-20, a 20-item self-administered tool is similar to the MPOC-20 and is a further development of the MPOC and a shortened version of the Give Youth a Voice (GYV). The GYV-20 is designed to capture the special perspectives of adolescents aged 13-21 years and their experiences of family-centred care (Bamm & Rosenbaum, 2008; Gan et al., 2008). The GYV-20 takes approximately 10 - 20 minutes to complete, depending on an individual’s level of physical disability (Gan et al., 2008; Siebes et al., 2007). Four scales are used in the GYV-20. These comprise: 1) supportive and respectful relationships; 2) information sharing/communication; 3) supporting independence; and 4) teen-centred services (Gan et al., 2009).

**Procedures**

The investigator-devised questionnaires were pilot tested on 10 allied health professionals, one student and one parent. The evaluation of the pilot led to minor adjustments and improvements being made to the instruments. The participants were recruited via email and due to recruitment challenges only a limited number of participants were available. A larger pilot was not possible due to recruitment difficulties. The pilot study was not included in the analysis for this study.
**Survey distribution**

The surveys were available both in paper format and online. The online option was developed to facilitate the surveys being administered via email, as well as to provide an alternate access option for students who were using assistive technology as an alternative to handwriting.

The survey was first administered to students and their families in the Australian Capital Territory, New South Wales, Victoria and South Australia through the relevant state-based Cerebral Palsy Register (CP Register) as shown in Figure 4. The CP Registers are confidential research databases of information on individuals with cerebral palsy who have previously consented to being contacted with research invitations. The aim of the CP Registers is to monitor the incidence and prevalence of cerebral palsy, gain further understanding about the causes of cerebral palsy, evaluate preventative strategies and assist in planning services for individuals with cerebral palsy. Students and families in Western Australia, Tasmania and Northern Territory were recruited through the public schools, as the CP Registers in these states and territories do not allow for research invitations. At the time of this study the CP Register in Queensland was not able to allocate time to identify potential participants and distribute a study invitation to families. As a result, families were not actively recruited in Queensland. The discrepancy between the number of parents, school staff and allied health professional contacted and the surveys received is testament to the difficulty of researching in this area as shown in Figures 4, 5, 6 and 7. For an overview of the survey distribution to parents and their children please see Figure 4.

![Figure 4](image)

*Figure 4. Survey distribution to families*

Australian Capital Territory (ACT), New South Wales (NSW), South Australia (SA), Victoria (VIC).
Figure 5. A cross-sectional survey distribution of families, allied health professionals and school staff

The schools were located in rural, regional and metropolitan settings of Australia. Surveys were administered predominantly in paper format to the principals in nominated public schools, identified by staff at the relevant state office of the Department of Education, or by the researcher from an online school directory. In the Australian Capital Territory, staff at the Department of Education forwarded the online version of the survey to principals who had students with cerebral palsy attending their school. The total number of public schools in the Australian Capital Territory invited to participate in the study is therefore unknown to the researcher, as their identities were withheld. The survey was also administered predominantly in a paper format to the principals of nominated Catholic systemic schools identified by staff at the Catholic Education Office, or by the researcher from an online school directory. Figure 6 provides an overview of survey distribution to school staff.
The survey was administered in an electronic format to allied health professionals in the two participating disability organisations. One organisation chose to email the study invitation to their allied health professionals; the other chose to advertise the study on the organisation’s intranet. School staff and allied health professionals were also recruited through electronic mailing lists with either a paediatric or assistive technology focus, namely: Australian Rehabilitation Assistive Technology Association (ARATA); Australian Group on Severe Communication Impairment (AGOSCI); Paediatric Occupational Therapists (PedOT); and Victorian Paediatric Occupational Therapists (VICPOT). Flyers were used as advertisements at conferences such as the ARATA Conference and Spectronics Inclusive Learning Technologies. A recruitment overview of allied health professionals is shown in Figure 7.
The data collection took place from March 2009 to March 2010. The participants were given an open deadline to return the survey; a follow-up opportunity was not possible. Completed paper surveys were mailed directly by each participant to the researcher in a provided prepaid envelope. The online survey site was closed in July 2010. Once the completed surveys were obtained, an identification number was assigned to each participant and the data were entered into a database by the researcher.

Challenges were associated with the online survey tool. Twenty allied health professionals initially experienced problems accessing their survey and failed to complete it in full. These entries were excluded from the analysis. To address the issue, a second invitation email was sent out to explain that the technical problem the participants had experienced was now resolved.
All respondents and participants received written information detailing the study (see Appendices G and H). Consent was inferred by the return of the questionnaires by the participants. The parents and students survey responses were matched. It was not possible to match the survey responses of the students and their parents with the school staff and allied health professionals. The nature of the survey assured the school staff, allied health professionals and families that their identity, school or workplace remained anonymous.

Non-participation

There are some likely reasons why students, their parents, school staff and allied health professionals may have chosen not to participate in the present study. The target age for this study for the students was seven to 18 years. At seven years not all students may have been able to use their assistive technology effectively to answer all of the survey questions on paper or online. Since students needed to have turned seven, and been seen by school staff or health professional in the last 12 months, some participants may have been ineligible, e.g., if they were working with younger students or had not been provided assistive technology services in the previous 12 months.

Some of the online surveys had only been partially completed, which implies that there was an initial interest in participating. It is possible that participants may have found it difficult to complete due to time constraints. Furthermore, families with children with disabilities have many commitments and filling out a survey may not be a priority.

As low respondents rates were anticipated, and since there is no register comprising detailed information on which clients in Australia may be using assistive technology such as speech-generating devices and alternative access options to handwriting, it was decided to send out the surveys to a large number of families, school staff and allied health professionals. The survey may, therefore, have been irrelevant to a large number of those to whom it was sent. Finally, it is possible that those who had already filled out the second part of the study (MPOC-SP) for their organisation or for other research projects were reluctant to participate because this research study focused on issues to which they had recently contributed (Dyke et al., 2006).

Meeting design challenges

A national approach was adopted for recruitment to gain methodological strengths in controlling for setting and environmental factors. Recruitment through multiple sites aimed to address the issues of sample size, control for participant selection and generalization of
findings. Phase I was complicated by the comprehensive ethics procedure, as well as difficulties identifying students with cerebral palsy using assistive technology due to the limited information available in CP Registers on school enrolment and the use of assistive technology in school. Therefore a high number of schools and families were invited to participate in the survey in an attempt to cover all potential participants.

The national approach in the study design was used to control for sampling bias and to make the sampling error as minimal as possible.

To compensate for weaker survey designs in other studies, measures were taken to strengthen the study by using triangulation. Multiple and different sources of data, as well as varied methodologies were sought to achieve triangulation (Patton, 1990). These measures were taken to verify the repeatability of an observation or interpretation, which may never be perfectly repeatable (Stake, 2008). To compensate for the difficulties in conducting survey follow-ups, controlling for non-respondents, missing data and for the anticipated low survey response rate, a qualitative phase recruiting participants represented in the survey was sought; this approach was in addition to the extensive survey recruitment.

Predictor and outcome variables

In this study the terms independent and dependent variables will be replaced with predictor and outcome variables. This is to be consistent with the assumption that variables in a cross-sectional study will make predictions about other variables without implying causality (Raghavendra, Murchland, Bentley, Wake-Dyster, & Lyons, 2007), these definitions were used to answer the quantitative research questions in this study.

Outcome variables

The outcome variables tested in this study were: 1) participants agreement with statements on their assistive technology experiences and the student’s ability to use assistive technology to achieve their classroom goals; 2) students perception of the client-centred focus of their service providers; 3) students perception of how the technology has increased their participation in the classroom; and 4) the participants perception of family-centred assistive technology service delivery measured by MPOC-20, the MPOC-SP and the GYV-20.
**Predictor variables**

The predictor variables tested in this study were: 1) professional role; 2) experience in role; 3) years of experience working with students with cerebral palsy; 4) type of assistive technology; 5) mothers’ level of education; 6) parental attendance during assessment and set-up stage; 7) survey items ATIC-SP and ATIC-P Helpfulness Scale; and 8) survey items in ATIC-SP, ATIC-P Assistive Technology Experience Scale such as time to meet with teacher/therapists, clear guidelines, established goals and trial of equipment. These predictor variables were measured using parent, student and school staff/allied health professional questionnaires.

**Data Analysis**

As the purpose of the study was to: 1) explore to what extent client-centred and family-centred assistive technology approaches were used by schools in Australia; 2) identify the perceptions of students, parents, school staff and allied health professionals of the factors contributing to students’ abilities to access the curriculum using high-tech assistive technology, a range of statistical procedures were required.

Analyses were chosen based upon statistical conventions, the type of research question, type of variables and whether or not the data met Levine’s assumptions for normality; enabling parametric calculations and percentages and frequencies of responses on the survey items to be calculated.

Utilising parametric testing is valid only when the data are normally distributed and when it comprises constant error variance where errors are independently distributed. The data yielded from this study did not adhere to these standard assumptions. The composition of the sample and their responses to the survey items resulted in negatively skewed data thereby violating the assumptions of normality. It would have been questionable to apply parametric testing especially when conclusions would be based on unreasonable assumptions raising doubt around the validity of the findings and masking the true differences, which would only be found with the appropriate method of analyses.

For continuous variables: average scores were determined by calculating a mean and standard deviation. For ordinal variables: median scores and inter-quartile ranges were calculated. To compare mean differences between groups: non-parametric Mann-Whitney calculations were conducted as the data were negatively skewed and violated the assumption of normality. In order to describe the relationship involved within the items as
indicated by responses to the survey items, the data were further analysed by calculating Spearman’s rho correlations. Comparisons between medians were calculated using Kruskal Wallis. Throughout the study, statistical significance was set at p<0.05, in line with standard conventions for social science research (Pallant, 2010). To determine the reliability of the investigator-devised surveys: Cronbach’s alpha coefficients were calculated.

Quantitative data in this study were stored both as electronic and hard copy files. The hard copy data were coded and analysed using SPSS for Mac, version 18 (SPSS Inc., 2009).

**Ethics approval for Phase II**

For Phase II, approval was sought and obtained from the Human Research Ethics Committee at the University of Western Sydney and Cerebral Palsy Alliance Ethics Committee. Ethics approval was not required from the Department of Education and Communities in New South Wales, as the school staff were not going to be recruited through the school or principal.

All respondents and participants received written information detailing the study. Prior to commencing the interview, parents and their children, and school staff were provided with an information sheet, and a dialogue sheet for the children, advising that their participation was voluntary and they could choose to withdraw at any time (see Appendices I, J and K). Consent was obtained from the parents and school staff (see Appendices L and M), parents provided signed consent on behalf of their children. The allied health professionals received a participant information sheet and participant consent form similar to the school staff (see Appendices M and N). All participants provided consent and were included in the study. None of the participants withdrew from the study.

**Phase II – Interviews and Focus groups**

A multiple case study design (Stake, 2008; Yin, 2009) was used to collect and analyse the data in Phase II. By exploring the participants’ views in depth, and building on the initial findings, a more detailed view was sought to develop and improve the accuracy of findings (Denscombe, 2008), and to facilitate the generalisation of the findings.

**Participants**

A case selection procedure was developed according to a purposive sampling strategy using homogeneous case sampling (Kemper et al., 2003), as described earlier in this chapter.
Setting

Recruitment for Phase II was limited to New South Wales.

Sample technique

The recruitment was separate to the Phase I Quantitative. However, most participants (students with cerebral palsy who were using assistive technology, their parents, school staff and allied health professionals) volunteered information that they had participated in the surveys from Phase I. Purposive sampling technique was used with 25 families being identified by the team leader at the technology department at Cerebral Palsy Alliance, (formerly known as the Spastic Centre, NSW). Technology solutions for computer Access, Seating and Communications (TASC) were used to ensure the invitations were only sent to the families whose children were diagnosed with cerebral palsy, were aged from seven to 18 years of age, and currently using high-tech assistive technology in the classroom. Allied health professionals were recruited across all 16 sites at Cerebral Palsy Alliance via an email invitation sent by the senior consultant occupational therapist and speech pathologist. Six educators in public and private schools were approached by the researcher on recommendations from colleagues of the educators, as the initial recruitment via advertisement and email had not resulted in any participants. Due to the recruitment challenges and the decision to make phase I survey anonymous, it was not possible to match educators and allied health professionals with each other and/or with the parents and their children. The sample overview is shown in Figure 8.

To get the most out of a multiple case study, Stake (2006) recommends selecting between four and 10 cases. In light of this recommendation, six cases were dedicated to individual interviews with families and another six cases were made up from interviews with school staff. To maximise the number of allied health professionals participating in this study, two focus groups were conducted with a total of 16 allied health professionals.

Instruments

Semi-structured interviews and focus groups offered the opportunity to discuss the participants’ unique experiences of service delivery around assistive technology when it was introduced in the classroom. The content of the interview and the focus group question guide was grounded in the quantitative results from Phase I of the study.
Interview guide

The interview guide had five main sections: 1) the device/program; 2) the situation when the device/program was assessed; 3) the introduction of the device/program in the classroom; 4) support required and difficulties to meet individual learning goals at school; and 5) what future hopes the use of the device/program brought to the participant.

The interview guide was pilot tested on one parent and student, who were purposefully selected from those who had completed the survey in Phase I and who, on their own initiative, indicated interest in participating in Phase II of the study. As a result, some additional probing questions were developed (Appendices O and P).

Focus Group Question Guide

The focus group question guide had four main sections: 1) referral types; 2) strategies for assessing; 3) implementing the device/program in the classroom; and 4) outcome measures that were being used. The focus group question guide was not pilot tested, however the questions were presented for review to research colleagues experienced in conducting focus group sessions prior to use (Appendix Q).

Procedures

Yin’s (2009) three principles guided the data collection procedure in Phase II. The principles are: 1) have multiple sources of evidence; 2) create a case study database; and 3)
maintain a chain of evidence. The principles were used with the aim of strengthening the construct validity and reliability of the case studies.

**Interviews**

Semi-structured interviews were conducted with parents, their children and educators to learn about their experiences of using assistive technology in the classroom, and to identify factors that contribute to a successful assistive technology implementation in the classroom. Consent to participate was gained from students through shared discussion with their parents. The interviews were conducted in a place of choice nominated by the participants. Four of the interviews with the families were conducted in the participants’ homes. Two interviews were conducted via telephone due to geographical distance; in these two cases, the voices of the students were merged with those of the parents. Five of the six interviews with the educators were conducted at their workplace; the other interview was conducted in a coffee shop. The interviews varied in length from 45 minutes to two hours.

A simplified version of the interview guide was emailed to the family prior to the interview. This allowed the family to prepare devices or material with vocabulary for the child to use in the interview and also to allow time to reflect on the topic and make an informed decision if they wished to participate in the study. The interview guide was not always used in detail and not all questions were asked in all interviews. This was especially the case if the participant had answered the question in their own narrative. The participants had their own personal focus in the interviews and as a result, there were variations in the breadth and depth of the interviews. At the end of the interview, the participants were invited to expand on the topic, clarify or provide additional comments. All interviews were audio-recorded for later verbatim transcription and analysis. A professional transcriber company transcribed the interviews into written text.

**Focus groups**

Focus groups were held with allied health professionals who worked closely with students with cerebral palsy. Focus group interviews were carried out with eight participants in each group and lasted an hour and a half. It has been recognised that group discussions can provide richness and a more detailed case description as the participants get to hear each other’s responses (Patton, 1990). Furthermore, this research method has been identified as being beneficial to identify key elements in a program’s implementation when developing action plans to improve service delivery (Latess, 2008).
**Case study database**

Field notes were written during and immediately following each interview and focus group to supplement and validate the audio-recordings. The field notes included the time and place of the interview, comments made by participants outside of the audio-recordings, and the non-verbal communication used by participants during the interviews, e.g., facial expression, gestures and emotional tone. Field notes were also taken during the focus groups interviews (Kvale & Brinkmann, 2009) to complement the data derived from the transcripts. The qualitative data were stored both in hard copy (field notes) and electronically (digital recording). The data collection took place from April 2011 to August 2011.

**Controlling threats to validity through the design**

Interviews are regarded as a powerful method of data collection and especially suitable to use with students who cannot read or write well (Tashakkori & Teddlie, 1998). Interviews have been found to provide good interpreter validity, in-depth information on most content of interest, as well as a useful tool for exploration and confirmation (Johnson & Turner, 2003). Semi-structured interviews and focus group interviews were therefore used in Phase II as a means of controlling the threats to validity.

To validate the themes and ensure the findings are representative, four approaches were used:

1) Triangulation - Semi-structured interviews and focus group interviews were used to explore the experiences of assistive technology from four perspectives: the parent, the student, the allied health professional and the school staff;

2) Member checking – getting feedback from the participants on the accuracy of their interviews;

3) Rich descriptions - to show the findings; and

4) External audit – two external researchers coded the text to ensure a high agreement across codes and themes.

**Data Analysis**

The qualitative data were read and analysed according to *Track II*, as described by Stake (2006) in which similar findings are merged. First, the data were read according to Ellinger
et al. (2005) with the data being coded for descriptive purposes to provide a holistic story. Then the data were read and coded from an analytic point of view to explore in detail the issues raised by the research questions in the study. Lastly, the reading was directed to interpret and explain the findings. The International Classification of Functioning Disability and Health (ICF) and for Children and Youth (ICF-CY) were applied as a framework to organise the themes that were derived from the analysis.

**Cross-case Analysis**

By using the interview and focus group guides, the data from the interview and focus groups were organised according to the research questions, as suggested by Patton (1990); and analysed using the cross-case analysis method recommended by Stake (2006). The worksheets provided by Stake (2006) were used to organise the data. The research questions were written down to be at hand for referencing while reading the cases. Themes were modified as the analysis developed. The cross-case procedure described by Stake (2006), in which similar findings are merged, was the chosen track for analysis. The text and themes were rated for expected utility for each of the themes and a matrix generated from the themes based on the quotes from the merged findings. The analysis was performed at two levels: within each case and across the cases (Stake, 2006). The first step generated 26 codes and 11 themes (see Appendix R).

**Summary**

To summarise, this chapter has outlined the explanatory sequential research design, and the use of a mixed method approach with surveys, focus groups and semi-structured interviews. The procedures and materials used for data collection and the subsequent statistical analysis were chosen to display and integrate the study findings. The following three chapters will present the research findings.
Chapter 4: Survey Results

“Wave a magic wand to make it easier for me to understand and use technology or wave a magic wand and have enough time to spend on this issue.”

- Special educator
Chapter 3 identified the specific methods that were selected in this study to determine the relationship between the experiences of parents, students, school staff and allied health professionals with assistive technology provision, and their reported perception of the assistive technology being used in the classroom. Chapter 3 described the epistemological assumptions, research design, ethics procedures and content in Phase I and II, how the design challenges and threats to validity were met and data analysis.

As previously stated, this study was designed around a sequential explanatory mixed method approach where survey research and interviews and focus groups were utilised to investigate the research aim. This chapter reports on the outcomes of the surveys conducted in Phase I of this study. General information regarding characteristics of the participants is presented first, followed by the frequencies of responses regarding device use and factors important for school staff and allied health professionals when introducing assistive technology in the classroom. Following the sample description and frequency comparison, analyses of the relationships between the outcome and predictive variables are presented.

Chapter 4 will address the following research questions:

- To what extent do the assistive technology experiences of school staff and allied health professionals relate to each other?

- How do the assistive technology experiences of school staff and allied health professionals relate to the student’s ability to achieve classroom goals?

- How do the families’ experiences of assistive technology relate to their child’s ability to achieve classroom goals?

- How do students’ experiences of support when the device/program was set-up relate to their opportunity to demonstrate their knowledge and skills using high-tech assistive technology in the classroom?

- How do the perceptions of the families, school staff and allied health professionals of the achievement of classroom goals relate to the perceived helpfulness of the team members around the student at the time of the assessment and the set-up of the high-tech assistive technology?
• How does parental attendance during the assessment and set-up stage of assistive technology in the classroom relate to how they experience family-centred assistive technology provision?

• How do students’ experiences of being able to show the teacher what they are capable of in the classroom relate to their experience of receiving client-centred care?

• How do the roles of school staff and allied health professionals, their years of employment in their role, and their years of experience working with students with cerebral palsy relate to how they perceive their ability to deliver family-centred care?

To answer the research questions in Phase I, two stages of data analysis were conducted. Firstly, descriptive statistics were calculated to summarise the data set. Secondly, inferential statistical methods were used. The survey data were analysed using the SPSS for Mac, version 18 (SPSS Inc., 2009). Descriptive statistics were calculated separately for the parents and school staff and allied health professionals.

**Descriptive statistics**

For the first part of the survey, participants provided general demographic information including their location, students’ current schooling arrangement, student disability and device use. School staff and allied health professionals provided information on their experience in the field. This chapter will begin by describing the participant response rate.

**Participants**

An unknown number of school staff and allied health professionals received a study invitation (see Figure 3, p. 33). Of the 142 *AT in the Classroom – Service Provider* (ATIC-SP) questionnaires that were returned, a total of 100 were eligible for analysis.

A total of 969 families, whose child might be using assistive technology, received a study invitation, of these 94 returned the *AT in the Classroom – Parent* (ATIC-P) questionnaire. This yielded a response rate of 9.7%. Of the 94 returned questionnaires, 18 were excluded from analysis as the person completing the form had not indicated what assistive technology the child was using. In total, 76 ATIC-P questionnaires were
analysed. Twenty-two students filled out the student questionnaire *AT in the Classroom – Student* (ATIC-S).

**The respondents’ gender, role and parent education**

The majority of the school staff and allied health respondents were female (92%). Allied health staff, occupational therapists (33%) and speech pathologists (32%), formed the majority of respondents. Special educators comprised 20% of the sample with classroom teachers accounting for 4%, teaching assistants 5%, assistive technology consultants 4%; with the remaining being unspecified 2%. For clarity in the reporting of the results special educators and classroom teachers will be referred to as educators. Special educators, classroom teachers and teaching assistants will from now on be referred to as school staff unless otherwise specified.

Sixty-five of the respondents to the parent surveys were mothers, eight were fathers and three were caregivers. Of the families participating in the survey the majority of the mothers (48%) were caring for their children fulltime, 39.5% were working part time and 10.5% reported working fulltime. The majority (70%) of the fathers were in fulltime paid work. A lower proportion of the mothers (27%) had either completed their primary or secondary school education than the fathers (34%). Of the families responding 32% of the mothers and 41% of the fathers had a Technical and Further Education (TAFE) qualification or certificate equivalent. Of the parents with a tertiary education, 39.5% were female and 21% were male.

**The gender and age of the students**

The students’ ages ranged from seven to 18 years. The mean school year for students with whom the school staff and allied health professionals were working was year 6 (SD ± 4 school year; range 1-12). The mean age of the students completing the survey was 11.83 years (SD ± 3.56 years), 63% were male and 37% female. The mean school year was 6 (SD± 3.35 grades/school year; range 1-12). This meant that parents of the students participating in the survey had children of similar age to those the school staff and health professionals reported working with.

**Caregiver annual income**

Ninety-five percent of the parents reported on their annual family income (n=72). The majority (59%) reported an annual income of $52,000 or more. The average income
from wages and salaries in Australia was $46,599 in 2008-2009 (Australian Bureau of Statistics, 2012). Parents’ reported annual income is presented in Figure 9.

Figure 9. Annual income of families

**Type of schools**

Eighty-eight percent of the school staff and allied health professionals worked in public schools, followed by Catholic systemic schools (10%), Independent schools (1%) and 1% did not complete the question. The school staff and allied health professionals were asked to indicate in which state and location they were currently working. Twenty-eight percent of school staff and allied health professionals reported working with students with cerebral palsy in a special school fulltime and 34% in a regular class fulltime. Of the respondents 16% reported having students in classes where they divided their time between regular and support class and 21% reported students attending a support class in a regular school fulltime.

The majority of the families (93%) reported that their children attended the public school system, 2.6% attended Catholic systemic schools and Independent schools 1.3%. Forty-two percent of the families reported their children attended a mainstream class fulltime, and 46.1% said their child attended a class in a special school fulltime. A further 10.5% of families reported receiving support from both mainstream and special schools. A majority of parents (85.5%) reported that their child had been allocated classroom support from a teacher assistant. Of these families, 53% reported that a teacher assistant was employed throughout the full school day.
**Setting**

The school staff and allied health respondents were drawn from seven states and territories in Australia. Sixty-seven percent of the participants worked in a metropolitan area; the next most populated area was regional (17%) followed by rural (15%). Frequencies and percentages of the total number of respondents in each state and territory and location are presented in Table 7.

The parents lived across four states and territories. Eighty-seven percent of the mothers and 76% of the fathers were born in Australia. In addition to English 14.5% of the families speak another language at home. Frequencies and percentages of the parents’ location are presented in Table 7.

Table 7

<table>
<thead>
<tr>
<th>State/Territory</th>
<th>School staff and allied health professionals</th>
<th>Families</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=100</td>
<td>N=76</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>New South Wales</td>
<td>41</td>
<td>31</td>
</tr>
<tr>
<td>South Australia</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Tasmania</td>
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<td>-</td>
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</tr>
<tr>
<td>Western Australia</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Queensland</td>
<td>20</td>
<td>-</td>
</tr>
</tbody>
</table>

**Community Setting**

<table>
<thead>
<tr>
<th></th>
<th>N=100</th>
<th>N=76</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
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<td>44</td>
</tr>
<tr>
<td>Rural</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Regional</td>
<td>17</td>
<td>19</td>
</tr>
</tbody>
</table>
School staff and allied health professionals experience in their professions

The survey sought to identify the level of experience of the respondents. The respondents’ years of experience in their current roles and working with students with cerebral palsy ranged from less than one year to more than 10 years (Table 8). Thirty-six percent had between one to five years of experience, 31% had five to ten years, and 29% had more than ten years of experience in their current role. A smaller number of people reported having less than one year of experience in their current role and working with students with cerebral palsy (4% and 8% respectively). Table 8 summarises the level of experience of school staff and allied health professionals in their current role and working with students with cerebral palsy.

Table 8

Participants’ years of experience in their current role and with students with cerebral palsy

<table>
<thead>
<tr>
<th>Years of experience</th>
<th>Work experience in current role</th>
<th>Experience working with students with cerebral palsy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=100</td>
<td>N=100</td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>1 - 4 years 11 months</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>5 - 9 years 11 months</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>29</td>
<td>27</td>
</tr>
</tbody>
</table>

Movement Impairment Severity

The majority of the school staff and allied health professionals reported working with students who had a severe physical disability, where students were dependent on wheelchairs and other people for mobility; as represented by levels IV and V on the Gross Motor Function Classification System (GMFCS) (29% and 50% respectively). The range of students’ disability is presented in Figure 10.

The majority of parents (72%) reported that their children were not able to walk independently, and another 38% of students were described as having difficulties communicating effectively with familiar partners. Sixty-three percent reported their
children as having limited hand function and needing alternative ways to access activities. The children’s diagnosis and impairment severity, as reported by the parents participating in the survey, is summarised in Figure 11.

**Figure 10.** Distribution of students’ disability classification, as reported by school staff and allied health professionals

Gross Motor Classification System (GMFCS), Manual Ability Classification System (MACS), Communication Function Classification System (CFCS)

**Figure 11.** Distribution of students’ disability classification, as reported by parents

Gross Motor Classification System (GMFCS), Manual Ability Classification System (MACS), Communication Function Classification System (CFCS)
The assistive technology equipment used by students in the study

The majority of students working with the school staff and allied health professionals were using the most common assistive technology in the study: a speech-generating device (Figure 12). School staff and allied health professionals reported that 69% of their students were also using alternative access methods such as switches, trackballs, joysticks and alternative keyboards.

Figure 12. Distribution of assistive technology used by students with whom the school staff and allied health professionals worked

Alternative access=adaptive keyboard, switches. Specialised software=word prediction, switch accessible etc.

The families reported fewer children using a combination of assistive technology equipment compared to those reported by the participating school staff and allied health professionals (Figure 13). However, the primary piece of equipment reported by the two groups was speech-generating devices. Fifty-seven percent of the parents reported that, in addition to their child using the assistive technology at school, the devices were also used at home. A further 9% also used the assistive technology in other environments such as in the community. This was especially common for those who were using a speech-generating device. The number of children having experience of assistive technology for up to three years and children having used the assistive technology for more than three years was comparable (48% and 47% respectively).
**Frequency of attendance by school staff and allied health professionals during the assessment and the set-up stage**

Of school staff and allied health professionals, 74.7% collectively reported attending the set-up stage and 67.5% the assessment stage. Of the three professional groups, the school staff reported being less involved in the assessment and set-up stage (Figure 14).

*Figure 13. Distribution of assistive technology for students of family participants*

*Figure 14. School staff and allied health professionals attendance during the assessment and the set-up stage*
Parents also reported the frequency of their child’s attendance at assistive technology assessment and set-up sessions. Parents’ attendance data are summarised in Figure 15.

Figure 15. Parent attendance during the assessment and the set-up stage

**Frequency of use of assistive technology assessment instruments**

Of school staff and allied health professionals, 52.6% reported never using an assessment instrument, and a further 25.3% were not sure if an instrument had been used to guide the decision-making around the assistive technology. The Student Environment Task Tool (SETT) (Zabala, 2002) assessment framework was used by 9.5% of the participants, whilst 11.6% reported using a variety of other tools not identified by the literature.

**Funding sources**

The families reported a variety of funding sources for the assistive technology; with the most frequently reported funding source being a state/territory funding body (28%), followed by schools (22%) and a combination between schools and families (15%). A range of financial support for families was reported. All funding sources reported by parents are presented in Figure 16.
Participants’ Score Profile on the Study Instruments

The outcome variables in focus for the first part of the questionnaire were the level of agreement on study participants’ experiences of assistive technology, such as: *my workplace offers clear guidelines around assistive technology, everyone was clear on their roles, the device/program assists my student to achieve classroom goals* and who the participants rated as most helpful during the assessment and the set-up stage. As mentioned previously, these outcomes were measured by the use of the questionnaires ATIC-SP and ATIC-P; as tailored to the participant groups of school staff, allied health professionals and parents. A further outcome variable was the extent to which the students themselves perceived the technology had increased their independence and participation in the classroom, as measured using ATIC-S. The fourth outcome variable was participants’ perception of family-centred disability services and measured using the MPOC-20, MPOC-SP and GYV-20.

Apart from collecting descriptive information in the instruments *AT in the Classroom – Service Provider* and *AT in the Classroom – Parent and caregiver* these questionnaires contained two scales: 1) the student outcome scale; and 2) the service providers and parents assistive technology experience scale. The first scale examined how parents, school staff and allied health professionals perceived the assistive technology to assist the student in
their learning and participation in the classroom. The second scale examined how school staff and allied health professionals perceived factors identified to play a role in assistive technology service provision, such as funding and time.

**Reliability of Student Outcome Scale Participant Scores for school staff and allied health professionals**

The ATIC-SP Student’s Outcome has very good internal consistency (6 items) according to the levels defined by Pavot, Diener, Randall Colvin, and Sandvik (1991) with Cronbach alpha .92. The mean inter-item correlation was .66, with values ranging from .50 to .77; suggesting a strong relationship among the items. The mean and medians were calculated for participants’ level of agreement with the statement regarding their assistive technology experience (Table 9).

**Table 9**

*ATIC-SP Assistive technology student outcome scale participant scores*

<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>IQR</th>
<th>Range ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>The device/program …</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>supports the student’s participation in the classroom</td>
<td>93</td>
<td>4.95</td>
<td>1.05</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>supports your student’s independence in classroom</td>
<td>93</td>
<td>4.65</td>
<td>1.16</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>has a positive effect on your student’s learning</td>
<td>92</td>
<td>4.96</td>
<td>.89</td>
<td>5.00</td>
<td>2.00</td>
<td>2-6</td>
</tr>
<tr>
<td>has a positive effect on your student’s social interactions</td>
<td>92</td>
<td>4.47</td>
<td>1.32</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>has an effect on your student’s motivation</td>
<td>92</td>
<td>4.72</td>
<td>1.04</td>
<td>5.00</td>
<td>2.00</td>
<td>2-6</td>
</tr>
<tr>
<td>assists my student to achieve classroom goals</td>
<td>92</td>
<td>4.80</td>
<td>1.08</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
</tbody>
</table>

¹Range 1=strongly disagree to 6= strongly agree
Reliability and Student Outcome Scale Participant Scores for parents

The Student Outcome Scale showed very good internal consistency across the 6 items on the ATIC-P (Pavot et al., 1991). In the current study, the Cronbach alpha was .92. The mean inter-item correlation was .65, with values ranging from .49 to .86. This suggests a strong relationship among the items. The mean and medians were calculated for participants’ level of agreement with the statements regarding their assistive technology experience (Table 10).

Table 10
ATIC-P Assistive technology student outcome scale participant scores

<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>IQR</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>The device/program …</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assists my child to achieve classroom goals</td>
<td>72</td>
<td>4.74</td>
<td>1.06</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>supports my child’s participation in the classroom</td>
<td>73</td>
<td>4.90</td>
<td>1.16</td>
<td>5.00</td>
<td>1.50</td>
<td>1-6</td>
</tr>
<tr>
<td>supports my child’s independence in the classroom</td>
<td>72</td>
<td>4.56</td>
<td>1.21</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>has a positive effect on my child’s learning</td>
<td>71</td>
<td>5.11</td>
<td>.95</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>has a positive effect on my child’s social interactions</td>
<td>70</td>
<td>4.51</td>
<td>1.33</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>has a positive effect on my child’s motivation</td>
<td>72</td>
<td>4.86</td>
<td>1.18</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
</tbody>
</table>

*Range 1=strongly disagree to 6= strongly agree

Reliability and Assistive technology experience scale for service providers

The ATIC-SP scale for school staff and allied health professionals’ own assistive technology experience showed moderate internal consistency across 10 items (Pavot et al., 1991). The Cronbach alpha was .79. The mean inter-item correlation was .28, with values ranging from .03 to .68; suggesting a weak relationship with a wide range of relationships among the items. To score the participants’ experiences of the assistive technology process the participants were asked to rate, on a 6-point Likert scale, to what extent they agreed to statements presented in the questionnaire. The Likert scale ranged
from 1=strongly disagree to 6= strongly agree. The mean and medians were calculated for participants’ level of agreement with the statement regarding their assistive technology experience (Table 11).

Table 11

ATIC-SP Assistive technology experience scale participant scores

<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>IQR</th>
<th>Range 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>My workplace offers clear guidelines around assistive technology</td>
<td>95</td>
<td>4.09</td>
<td>1.54</td>
<td>4.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Everyone was clear about their roles</td>
<td>94</td>
<td>4.14</td>
<td>1.14</td>
<td>4.00</td>
<td>1.25</td>
<td>1-6</td>
</tr>
<tr>
<td>Established goals reflected the issue at hand</td>
<td>94</td>
<td>4.32</td>
<td>1.22</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Time with the teacher/therapist was easily arranged</td>
<td>95</td>
<td>4.17</td>
<td>1.21</td>
<td>4.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>The device/program was available for trial</td>
<td>94</td>
<td>4.20</td>
<td>1.28</td>
<td>4.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Funding issues were addressed</td>
<td>92</td>
<td>4.23</td>
<td>1.27</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>I felt comfortable implementing the device/program in the classroom</td>
<td>95</td>
<td>4.48</td>
<td>1.15</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>The device/program met my expectations</td>
<td>94</td>
<td>4.49</td>
<td>1.06</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>I gained new skills during this assistive technology experience</td>
<td>95</td>
<td>4.97</td>
<td>1.08</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>You have gained more insight in your student/client abilities after having the device/program introduced in the classroom</td>
<td>92</td>
<td>4.87</td>
<td>1.07</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
</tbody>
</table>

1Range 1=strongly disagree to 6= strongly agree

Reliability and Assistive technology experience scale for parents

The scale of parent and caregiver assistive technology experience has good internal consistency across 9 items (Pavot et al., 1991). The Cronbach alpha was .82. The mean inter-item correlation was .34, with values ranging from .03 to .77; suggesting a weak
relationship with a wide range of relationships among the items. The mean and medians were calculated for participants’ level of agreement with the statement regarding their assistive technology experience (Table 12).

Table 12

ATAR-P Assistive technology experience scale participant scores

<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>IQR</th>
<th>Range 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions and support were provided to me and my child</td>
<td>71</td>
<td>4.65</td>
<td>1.23</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Everyone was clear about their roles</td>
<td>72</td>
<td>4.14</td>
<td>1.31</td>
<td>4.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Goals were discussed with me</td>
<td>72</td>
<td>4.58</td>
<td>1.22</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Time to meet with the teacher was easily arranged</td>
<td>73</td>
<td>4.15</td>
<td>1.62</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Time to meet with the therapists was easily arranged</td>
<td>73</td>
<td>4.37</td>
<td>1.42</td>
<td>5.00</td>
<td>1.50</td>
<td>1-6</td>
</tr>
<tr>
<td>The device/program was available for trial</td>
<td>71</td>
<td>4.14</td>
<td>1.62</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>Funding issues were addressed</td>
<td>72</td>
<td>4.15</td>
<td>1.54</td>
<td>5.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>The device/program met my expectations</td>
<td>71</td>
<td>4.54</td>
<td>1.24</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>The device/program has had a positive impact on me as a parent</td>
<td>71</td>
<td>4.48</td>
<td>1.32</td>
<td>5.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
</tbody>
</table>

1Range 1=strongly disagree to 6= strongly agree

Reliability and scale score of student’s own assistive technology experience of outcomes scale

The ATIC-S scale of individual students’ experience of assistive technology outcomes across five items showed good internal consistency (Pavot et al., 1991). In the current study, the Cronbach alpha was .81. The means and the medians of how the participants rated the agreement with the statement on how they perceive the impact their assistive technology has had on their classroom outcomes is shown in Table 13. Students reported their assistive technology sometimes helped them to show their teacher what they know and can do in the classroom, and reported that sometimes having the device/program has made it more fun to go to school.
There was a wide range of means across the survey items. This meant students’ perceptions ranged from experiencing *not at all* to *often* across all the items on the scale.

**Table 13**

*ATIC-S* Assistive technology student outcome scale participant scores

<table>
<thead>
<tr>
<th>Item scores</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>IQR</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>The device/program …</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>has helped me learn more easily</td>
<td>48</td>
<td>3.96</td>
<td>1.07</td>
<td>4.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>helped me show the teacher what I know and can do in the classroom</td>
<td>48</td>
<td>4.21</td>
<td>1.01</td>
<td>4.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>has made it more fun to go to school</td>
<td>48</td>
<td>3.85</td>
<td>1.13</td>
<td>4.00</td>
<td>2.00</td>
<td>1-6</td>
</tr>
<tr>
<td>lets me use some of the things I learn at school in other parts of my life</td>
<td>48</td>
<td>3.60</td>
<td>1.14</td>
<td>4.00</td>
<td>1.00</td>
<td>1-6</td>
</tr>
<tr>
<td>lets me use some of the things I learn at home and school</td>
<td>48</td>
<td>3.50</td>
<td>1.33</td>
<td>4.00</td>
<td>1.00</td>
<td>0-6</td>
</tr>
</tbody>
</table>

^1^Range 1=strongly disagree to 6= strongly agree

**ATIC-SP and ATIC-P Helpfulness Scale Participant Scores**

The mean and median indicate the participants’ rating of the level of helpfulness around the assistive technology process at the assessment and the set-up stage. To identify which team members play an important role in the assistive technology process the respondents were asked to rate, on a 7-point Likert scale, how helpful they perceived the other team members in the assessment stage. The Likert scale ranged from 0= *did not participate*, to 6= *to a very great extent helpful*. The occupational therapists, speech pathologists and parents had the highest mean score. The mean scores indicated that they were seen to be *to a moderate extent helpful*. A similar trend was seen during the implementation of the technology in the classroom (Tables 14 and 15).
Table 14

*ATIC-SP Helpfulness scale participant scores*

<table>
<thead>
<tr>
<th></th>
<th>Assessment stage</th>
<th>Set-up stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>Parent</td>
<td>94</td>
<td>4.27</td>
</tr>
<tr>
<td>Classroom teacher</td>
<td>91</td>
<td>3.34</td>
</tr>
<tr>
<td>Teaching assistant</td>
<td>94</td>
<td>4.00</td>
</tr>
<tr>
<td>Special educator</td>
<td>91</td>
<td>3.20</td>
</tr>
<tr>
<td>Principal</td>
<td>91</td>
<td>1.33</td>
</tr>
<tr>
<td>Consultant from the school</td>
<td>86</td>
<td>1.63</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>89</td>
<td>4.51</td>
</tr>
<tr>
<td>Speech pathologist</td>
<td>93</td>
<td>4.46</td>
</tr>
<tr>
<td>AT consultant</td>
<td>88</td>
<td>3.31</td>
</tr>
</tbody>
</table>

Assistive technology (AT)
The mean was the measure of how the participants rated their perception of the assistive technology service delivery. School staff and allied health professionals’ perception with the assistive technology services they provided showed great variation on the mean on most subscales. This meant school staff and allied health professionals’ perceptions ranged from experiences providing *a small amount of: showing interpersonal sensitivity, provision of general information, communicating specific information to a great extent* on most subscales of the MPOC-SP. On the last subscale *treating people respectfully*, a tighter agreement was found among the respondents. School staff and allied health professionals reported positive responses ranging from *a fairly great extent* to *a very great extent* with how they perceived they provided their assistive technology services. Figure 17 shows the mean distribution on the MPOC-SP.
The mean was the measure of how the youth 13-21 years old rated their perception of
client-centred assistive technology service delivery. Similar to the parents, the students’
perception of the assistive technology services received showed great variation in the
mean on all subscales. This meant student perceptions ranged from Never to A lot on all
subscales of the GYV-20: supportive and respectful relationships, information sharing and
communications, supporting independence and teen-centred services (Table 16).

The MPOC-20 Participant Scores

The mean was the measure of how the participants rated their perception with the
assistive technology service delivery. Parents perception of the assistive technology
services received showed great variation on the mean of all subscales. This meant parent
perceptions ranged from experiencing a small amount of: enabling/partnership, receiving
general information and specific information, having coordinated and comprehensive care and receiving
respectful and supportive care to a great extent on all subscales of the MPOC-20. The
distribution across the five subscales is presented in Figure 17 and Table 17.

Figure 17. MPOC-20 and MPOC-SP Participant Scores
Inferential Statistics

Analysis of Survey Result

Initial data analysis revealed the test of normality to be significant, with a trend toward being negatively skewed. Consequently, to determine the significance of the differences in scores for the self-developed and adopted questionnaires non-parametric data analysis was used to analyse differences amongst students, parents, school staff and allied health professionals.

Despite the MPOC-20, MPOC-SP and GYV-20 using an ordinal 7-point scale, King et al. (1996) argue that ordinal data can be analysed with parametric statistics unless severely skewed. Therefore, means were calculated using the syntax provided by the authors. However, as the rest of the data in this study were not normally distributed, any further examinations were done using non-parametric analysis to examine associations with demographic characteristics and other variables (Bellin, Osteen, Heffernan, Levy, & Snyder-Vogel, 2011).

Table 16

GYV-20 Participant scores

<table>
<thead>
<tr>
<th>Domain scores</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supportive and respectful relationships</td>
<td>19</td>
<td>5.16</td>
<td>1.22</td>
<td>3-7</td>
</tr>
<tr>
<td>Information sharing and communication</td>
<td>19</td>
<td>4.95</td>
<td>1.36</td>
<td>3-7</td>
</tr>
<tr>
<td>Supporting independence</td>
<td>19</td>
<td>4.59</td>
<td>1.62</td>
<td>2-7</td>
</tr>
<tr>
<td>Teen-centred services</td>
<td>19</td>
<td>5.42</td>
<td>1.26</td>
<td>3-7</td>
</tr>
</tbody>
</table>
### Table 17

**MPOC-20 and MPOC-SP scores for the families, school staff and allied health professionals**

<table>
<thead>
<tr>
<th>Domain scores</th>
<th>Families</th>
<th>School staff</th>
<th>Allied health staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n³</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Enabling/Partnership/Showing interpersonal sensitivity</td>
<td>68</td>
<td>4.72</td>
<td>1.58</td>
</tr>
<tr>
<td>Providing general information</td>
<td>65</td>
<td>4.19</td>
<td>1.58</td>
</tr>
<tr>
<td>Providing/Communicating specific information</td>
<td>69</td>
<td>4.97</td>
<td>1.62</td>
</tr>
<tr>
<td>Respectful and supportive care/Treating people respectfully</td>
<td>69</td>
<td>5.00</td>
<td>1.58</td>
</tr>
</tbody>
</table>

n³ varies due to missing data on specific domains
**ATIC-SP Assistive technology experience amongst service providers**

To determine whether school staff and allied health professionals’ assistive technology experiences are related to each other, a Kruskal-Wallis Test was performed (Table 18). The Kruskal-Wallis Test revealed a statistically significant difference across the assistive technology experiences of school staff, occupational therapists and speech pathologists on three items: 1) *My workplace offers clear guidelines around assistive technology*; 2) *I gained new skills during this assistive technology experience*; and 3) *…gained more insight in your student/client’s abilities after having the device/program introduced in the classroom.*

To explain the statistically significant differences a Mann-Whitney U Test was conducted. This revealed a statistically significant difference with a large effect size for the levels of experience between school staff and speech pathologists with regards to guidelines (U=200.5, z=-3.45, p=.00, r=.5); and a medium effect size on the item regarding gaining new skills of assistive technology (U=267, z=-2.49, p=.01, r=.3). A Bonferroni adjustment to the alpha level was set to .05 on items: *My workplace offers clear guidelines around assistive technology* and *I gained new skills during this assistive technology experience* as only one comparison per independent variable was carried out.

However, the Bonferroni adjustment to the alpha level was set to .025 when two comparisons were conducted on the independent variable…*gained more insight in your student/client’s abilities after having the device/program introduced in the classroom.* A Mann-Whitney U Test revealed a statistically significant difference with medium effect between school staff and occupational therapists in their experience of gaining more insights into the student’s abilities (U=272.5, z=-2.31, p=0.02, r=.3). Interestingly, it did not reveal a statistically significant result between school staff and speech pathologists (U=282, z=-1.98, p=.05, r=.3).

A Kruskal-Wallis Test, including teaching assistants in the analysis, revealed statistically significant differences on two of the three items (Table 19). These items are: *My workplace offers clear guidelines around assistive technology* and *I gained new skills during this assistive technology experience* across school staff, occupational therapists and speech pathologist.
Table 18

School staff and allied health professionals’ experience of assistive technology

<table>
<thead>
<tr>
<th>Item scores</th>
<th>School staff (^b)</th>
<th>Occupational therapists</th>
<th>Speech Pathologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>My workplace offers clear guidelines around assistive technology</td>
<td>n=26, (\chi^2)=11.10, (p=.00), Md=3.50</td>
<td>n=33, (\chi^2)=11.10, (p=.00), Md=4.00</td>
<td>n=32, (\chi^2)=11.10, (p=.00), Md=5.00</td>
</tr>
<tr>
<td>I gained new skills during this assistive technology experience</td>
<td>n=26, (\chi^2)=6.08, (p=.05), Md=5.00</td>
<td>n=33, (\chi^2)=6.08, (p=.05), Md=5.00</td>
<td>n=32, (\chi^2)=6.08, (p=.05), Md=5.00</td>
</tr>
<tr>
<td>…gained more insight in your student/client’s abilities after having the device/program introduced in the classroom</td>
<td>n=25, (\chi^2)=6.12, (p=.05), Md=5.00</td>
<td>n=33, (\chi^2)=6.12, (p=.05), Md=5.00</td>
<td>n=32, (\chi^2)=6.12, (p=.05), Md=5.00</td>
</tr>
</tbody>
</table>

\(n\) varies due to missing data for specific items. \(^b\)School staff excl. teaching assistants.
### Table 19

**Educators, teaching assistants and allied health professionals experience of assistive technology**

<table>
<thead>
<tr>
<th>Item scores</th>
<th>School staff</th>
<th>Occupational therapists</th>
<th>Speech Pathologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>My workplace offers clear guidelines around assistive technology</td>
<td>n=31 ((2,n=96)=9.00, p=.01) Md=3.50</td>
<td>n=33 ((2,n=96)=9.00, p=.01) Md=4.00</td>
<td>n=32 ((2,n=96)=9.00, p=.01) Md=5.00</td>
</tr>
<tr>
<td>I gained new skills during this assistive technology experience</td>
<td>n=30 ((2,n=96)=1.80 p=.05) Md=5.00</td>
<td>n=33 ((2,n=96)=1.80 p=.05) Md=5.00</td>
<td>n=32 ((2,n=96)=1.80 p=.05) Md=5.00</td>
</tr>
</tbody>
</table>

*n* varies due to missing data for specific items. *School staff excl. teaching assistants*
A Bonferroni adjustment to the alpha level was set to .05 as only one comparison was made on each of the independent variables: *My workplace offers clear guidelines around assistive technology and ...gained more insight in your student/client’s abilities after having the device/program introduced in the classroom.* In addition, a Mann-Whitney U Test on the item *My workplace offers clear guidelines around assistive technology* revealed statistically significant difference at a medium effect between school staff (Md=4, n=31) and speech pathologist (Md=5, n=32, U=275, \( z = -3.11, p = .00, r = .4 \)).

A further moderate statistically significant difference between school staff (Md=5, n=31) and speech pathologists (Md=5, n=32) was found on the item *...gained more insight in your student/client’s abilities after having the device/program introduced in the classroom* (U=325.5, \( z = -2.51, p = .01, r = .3 \)).

**Service providers’ Assistive Technology Experiences and Students’ Classroom Goals**

A series of correlations were performed to determine whether a relationship existed between school staff and allied health professionals’ perceptions of their assistive technology experiences and students’ ability to achieve classroom goals. The relationship between the students’ ability to achieve classroom goals and school staff and allied health professionals experience of assistive technology provision was investigated using a Spearman’s rho correlation coefficient (Table 20). Spearman’s rho was chosen because preliminary analysis indicated violation of the assumptions of normality. There were strong to moderate positive correlations between students’ ability to achieve classroom goals and school staff and allied health professionals experience of: *everyone being clear on their roles, when a goal was established, when time to meet other colleagues involved in the assessment technology process, when they felt comfortable implementing the device/program, when they were receptive to gaining new skills and when they identified that the assistive technology had provided them with further insights into the student’s abilities.* Whether the device was available for trial and if funding issues were addressed seemed to have less relevance to whether the device would assist the student to achieve classroom goals.
Parents’ Assistive Technology Experiences and Students’ Classroom Goals

A series of correlations were performed to determine whether a relationship existed between families’ experiences of assistive technology and their experiences of their child’s (student’s) ability to achieve classroom goals. The relationship between the student’s ability to achieve classroom goals and families’ experience of assistive technology provision was investigated using a Spearman’s rho correlation coefficient, as shown in Table 21. Spearman’s rho was chosen when preliminary analysis indicated violation of the assumptions of normality. There were strong to moderate positive correlations between student’s ability to achieve classroom goals and parents’ experience of: when instruction and support were provided to the family and the student, when time to meet the therapists involved in the assessment technology process was made, when they felt the device met their expectations and when the family experienced the device to have a positive impact on them as parents.
Table 20

The correlations of service providers' assistive technology experiences and student's classroom goal achievement

<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>1. The device/program assists my student to achieve classroom goals</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2. My workplace offers clear guidelines around assistive technology</td>
<td>.12</td>
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</tr>
<tr>
<td>3. Everyone was clear on their roles</td>
<td>.37**</td>
<td>.29**</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Established goals reflected the issue at hand</td>
<td>.44**</td>
<td>.30**</td>
<td>.69**</td>
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</tr>
<tr>
<td>5. Time to meet the teacher/therapist was easily arranged</td>
<td>.42**</td>
<td>.01</td>
<td>.23</td>
<td>.33**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The device/program was available for trial</td>
<td>.06</td>
<td>.05</td>
<td>.20</td>
<td>.08</td>
<td>.31**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Funding issues were addressed</td>
<td>.15</td>
<td>.28**</td>
<td>.27**</td>
<td>.27**</td>
<td>.34**</td>
<td>.55**</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>8. I felt comfortable implementing the device/program in the classroom</td>
<td>.33**</td>
<td>.15</td>
<td>.28**</td>
<td>.35**</td>
<td>.59**</td>
<td>.23</td>
<td>.37**</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>9. I gained new skills during the assistive technology experience</td>
<td>.34**</td>
<td>.32**</td>
<td>.19</td>
<td>.22</td>
<td>.10</td>
<td>.06</td>
<td>.16</td>
<td>.16</td>
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<td></td>
</tr>
<tr>
<td>10. …gained more insights in the student/client’s abilities after having the device/program introduced in the classroom</td>
<td>.67**</td>
<td>.24*</td>
<td>.22*</td>
<td>.34**</td>
<td>.19</td>
<td>.09</td>
<td>.13</td>
<td>.18</td>
<td>.56**</td>
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</tbody>
</table>

* p < .05, ** p < .001 (2-tailed)
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</thead>
<tbody>
<tr>
<td>1. The device/program assists my child to achieve classroom goals</td>
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<tr>
<td>2. Instructions and support were provided to me and my child</td>
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<tr>
<td>3. Everyone was clear about their roles</td>
<td>0.22</td>
<td>0.66**</td>
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<td></td>
</tr>
<tr>
<td>4. Goals were discussed with me</td>
<td>0.14</td>
<td>0.57**</td>
<td>0.51**</td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>5. Time to meet with the teacher was easily arranged</td>
<td>0.14</td>
<td>0.42**</td>
<td>0.49**</td>
<td>0.61**</td>
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<tr>
<td>6. Time to meet with the therapists were easily arranged</td>
<td>0.43**</td>
<td>0.61**</td>
<td>0.51**</td>
<td>0.48**</td>
<td>0.35**</td>
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<td></td>
</tr>
<tr>
<td>7. The device/program was available for trial</td>
<td>0.12</td>
<td>0.49**</td>
<td>0.44**</td>
<td>0.26*</td>
<td>0.14</td>
<td>0.51**</td>
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<tr>
<td>8. Funding issues were addressed</td>
<td>0.09</td>
<td>0.14</td>
<td>0.20</td>
<td>0.25*</td>
<td>0.15</td>
<td>0.28*</td>
<td>0.50**</td>
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<td></td>
</tr>
<tr>
<td>9. The device/program met my expectations</td>
<td>0.67**</td>
<td>0.31**</td>
<td>0.28*</td>
<td>0.16</td>
<td>0.12</td>
<td>0.36**</td>
<td>0.23</td>
<td>0.15</td>
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</tr>
<tr>
<td>10. The device/program has had a positive impact on me as a parent</td>
<td>0.63**</td>
<td>0.27*</td>
<td>0.23</td>
<td>0.20</td>
<td>0.17</td>
<td>0.34**</td>
<td>0.15</td>
<td>0.08</td>
<td>0.73**</td>
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</tr>
</tbody>
</table>

*p < .05, **p < .001 (2-tailed)
Students’ Assistive Technology Experiences and Ability to demonstrate their knowledge

The relationship between the students’ experience of support when the device/program was set-up and their ability to demonstrate their knowledge and skills using the device/program in the classroom was investigated using a Spearman’s rho correlation coefficient (Table 22). Spearman’s rho was chosen when preliminary analysis indicated violation of the assumptions of normality. The results showed a strong positive correlation between the students’ ability to show the teacher what they know and can do in the classroom when someone had been encouraging the use of the device in the classroom. No other statistically significant correlations were found.

Table 22

<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. The device/program has helped me show the teacher what I know and can do in the classroom</td>
<td>-</td>
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<tr>
<td>2. Someone at school talked to me about what assistive device/program I needed</td>
<td>.18</td>
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<tr>
<td>3. Someone at school asked for my opinion</td>
<td>.09</td>
<td>.64**</td>
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<tr>
<td>4. Someone at school showed me how the device/program worked</td>
<td>.19</td>
<td>.46**</td>
<td>.33*</td>
<td>-</td>
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<td>5. Someone at school encouraged me to use it in the classroom</td>
<td>.54**</td>
<td>.40**</td>
<td>.15</td>
<td>.42**</td>
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</tr>
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</table>

* p < .05, ** p < .001 (2-tailed)
Team members important for Students’ Classroom goals

The relationship between the perception of families, school staff and allied health professionals of achievement of classroom goals, and perceived helpfulness of the team members around the student at the time of the assessment and set-up of the device/program, was investigated using a Spearman’s rho correlation coefficient (Table 23a–23d). Spearman’s rho was chosen when preliminary analysis indicated violation of the assumptions of normality. The school staff and allied health professionals found the occupational therapist and speech pathologist the most helpful of all team members during the assessment stage to achieve students’ goals in the classroom. The families found the teaching assistant most helpful during the assessment stage but this was not a statistically significant finding.

The school staff and allied health professionals recognised that the occupational therapist, speech pathologist, classroom teacher and teaching assistants were most helpful of all team members during the set-up stage to achieve classroom goals for the student. In contrast, the families found only the occupational therapist to be the most helpful team members during the set-up stage.
Table 23a

The correlations of service providers perceptions of helpfulness during the assessment stage on student's achievement on classroom goals

<table>
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<tr>
<th>Items</th>
<th>1</th>
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<th>8</th>
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<tbody>
<tr>
<td>1. The device/program assists the student to achieve classroom goals</td>
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<tr>
<td>2. Parent</td>
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<tr>
<td>3. Classroom teacher</td>
<td>.15</td>
<td>-.02</td>
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</tr>
<tr>
<td>4. Teaching assistant</td>
<td>.13</td>
<td>.14</td>
<td>.19</td>
<td>-</td>
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<tr>
<td>5. Special educator</td>
<td>-.10</td>
<td>.01</td>
<td>.16</td>
<td>.34**</td>
<td>-</td>
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<tr>
<td>6. Principal</td>
<td>-.12</td>
<td>-.10</td>
<td>.17</td>
<td>.00</td>
<td>.23*</td>
<td>-</td>
<td></td>
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<td>7. Consultant from the school</td>
<td>-.06</td>
<td>.12</td>
<td>.12</td>
<td>.25*</td>
<td>.27*</td>
<td>.40**</td>
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<td>8. Occupational Therapist</td>
<td>.25*</td>
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<td>.10</td>
<td>-.11</td>
<td>-.18</td>
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<td>9. Speech Pathologist</td>
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<td>-.13</td>
<td>-.24*</td>
<td>.43**</td>
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<td>.13</td>
<td>.26*</td>
<td>.05</td>
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*p < .05, **p < .001 (2-tailed)
### Table 23 b

The correlations of service providers helpfulness during the set up stage on student’s achievement on classroom goals

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<tbody>
<tr>
<td>1. The device/program assists the student to achieve classroom goals</td>
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<tr>
<td>3. Classroom teacher</td>
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<td>-.01</td>
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<td>4. Teaching assistant</td>
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<td>5. Special educator</td>
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<td>.27*</td>
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* p < .05, ** p < .001 (2-tailed)
Table 23c

The correlations of families helpfulness during the assessment stage on student’s achievement on classroom goals

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<td>1. The device/program assists the student to achieve classroom goals</td>
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<tr>
<td>3. Teaching assistant</td>
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<td>.51**</td>
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<tr>
<td>4. Special educator</td>
<td>-.04</td>
<td>.42**</td>
<td>.58**</td>
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<tr>
<td>5. Principal</td>
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<td>.53**</td>
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<td>6. Consultant from the school</td>
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<td>8. Speech Pathologist</td>
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<td>.05</td>
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* p < .05, ** p < .001 (2-tailed)
Table 23 d

*The correlations of families helpfulness during the set up stage on student’s achievement on classroom goals*

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</tr>
</thead>
<tbody>
<tr>
<td>1. The device/program assists the student to achieve classroom goals</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Classroom teacher</td>
<td>.10</td>
<td>-</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Teaching assistant</td>
<td>.18</td>
<td>.35**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Special educator</td>
<td>-.04</td>
<td>.27*</td>
<td>.38**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Principal</td>
<td>-.07</td>
<td>.49**</td>
<td>.36**</td>
<td>.37**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Consultant from the school</td>
<td>-.01</td>
<td>.22</td>
<td>.33**</td>
<td>.57**</td>
<td>.54**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Occupational Therapist</td>
<td>.26*</td>
<td>.28*</td>
<td>.11</td>
<td>.03</td>
<td>.18</td>
<td>.121</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Speech Pathologist</td>
<td>.16</td>
<td>.42**</td>
<td>.13</td>
<td>.05</td>
<td>.16</td>
<td>-.06</td>
<td>.66**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9. Assistive technology consultant</td>
<td>.05</td>
<td>.12</td>
<td>.25*</td>
<td>.31*</td>
<td>.31*</td>
<td>.44**</td>
<td>.09</td>
<td>.83</td>
<td>-</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .001 (2-tailed)
Family-centred assistive technology service provision amongst service providers

To determine whether the perception of school staff and allied health professionals who are providing family-centred services are related to each other, a Kruskal-Wallis Test was performed. The Kruskal-Wallis Test revealed no statistically significant differences in how school staff and allied health professionals' roles, years of employment and years of experience working with students with cerebral palsy are related to their level of family-centredness. The results of the analysis are presented in Table 24.

Family-centred assistive technology service experience amongst families

To determine whether the attendance of families during the assessment and set-up stage of the assistive technology in the classroom is related to their experiences receiving family-centred assistive technology services, a series of Mann-Whitney U Tests were performed. A Mann-Whitney U Test revealed no statistically significant differences on the five MPOC-20 subscales for those parents attending the assessment stage. However, parents attending the set-up stage or both the assessment and the set-up stage scored the two subscales, Providing General Information and Respectful and Supportive Care, as statistically significantly lower compared to parents who did not attend the set-up stage.

A Mann-Whitney U Test revealed a significant difference with a medium effect on the subscale Providing General Information between parents who attended the set-up stage (Md=3.50, n=25) and those who did not (Md=5.67, n=43, U=335.50, z=-2.30, p=.02, r=.29). A statistically significant difference with large effect was shown on the subscale Respectful and Supportive Care between parents who attended the set-up stage (Md=4.10, n=26) and those that did not (Md=5.40, n=43, U=365.50, z=-2.43, p=.02, r=.05).
A further Mann-Whitney U Test revealed a statistically significant difference with a medium effect on the subscale *Providing General Information* between parents who attended both the assessment and the set-up stage (Md=3.60, n=23) and those who did not (Md=4.50, n=42, U=324.00, z=-2.18, p=.03, r=.27). A statistically significant difference with medium effect was also found on the subscale *Respectful and Supportive Care* between parents who attended both the assessment and the set-up stage (Md=4.20, n=23) and those that did not (Md=5.40, n=46, U=353.50, z=-2.24, p=.03, r=.27).

### Table 24

*Family-centred service provision compared amongst school staff and allied health professional respondents MPOC-SP*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Showing interpersonal sensitivity</th>
<th>Providing general information</th>
<th>Communicating specific information</th>
<th>Treating people respectfully</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td>School staff(^b)</td>
<td>n=24</td>
<td>n=21</td>
<td>n=24</td>
<td>n=24</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>n=25</td>
<td>n=26</td>
<td>n=26</td>
<td>n=26</td>
</tr>
<tr>
<td>Speech Pathologist</td>
<td>n=26</td>
<td>n=26</td>
<td>n=26</td>
<td>n=26</td>
</tr>
<tr>
<td>Years of employment in current role</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td>(n=75)=.18, p=.92</td>
<td>(n=74)=.53, p=.77</td>
<td>(n=76)=1.29, p=.53</td>
<td>(n=76)=.27, p=.87</td>
<td></td>
</tr>
<tr>
<td>1 - 4 years 11 months</td>
<td>n=29</td>
<td>n=29</td>
<td>n=29</td>
<td>n=29</td>
</tr>
<tr>
<td>5 - 9 years 11 months</td>
<td>n=24</td>
<td>n=23</td>
<td>n=24</td>
<td>n=24</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>n=22</td>
<td>n=22</td>
<td>n=23</td>
<td>n=23</td>
</tr>
<tr>
<td>Years of experience working with students with CP</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td>(n=71)=2.04, p=.36</td>
<td>(n=70)=.83, p=.66</td>
<td>(n=72)=2.36, p=.31</td>
<td>(n=72)=4.30, p=.12</td>
<td></td>
</tr>
<tr>
<td>1 - 4 years 11 months</td>
<td>n=28</td>
<td>n=28</td>
<td>n=28</td>
<td>n=28</td>
</tr>
<tr>
<td>5 - 9 years 11 months</td>
<td>n=24</td>
<td>n=24</td>
<td>n=24</td>
<td>n=24</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>n=19</td>
<td>n=18</td>
<td>n=20</td>
<td>n=20</td>
</tr>
</tbody>
</table>

\(n\) varies due to missing data on specific items. \(^b\)School staff excl. teaching assistants.
Client-centred assistive technology experience amongst students

The relationship between the student’s experience of being able to show the classroom teacher what he or she was able to do and perceived client-centred assistive technology services (as measured by GYV-20) was investigated using Spearman’s rho correlation coefficient. Survey responses from secondary students aged 13-18 years were only analysed in keeping with the instruments specified age range. There were no statistically significant correlations between the four subscales in GYV-20 with the students’ experience of being able to show their potential in the classroom when using assistive technology.

Summary

Parents reported higher agreement with their child’s ability to meet classroom goals when they felt included in the decision around the technology and when the staff took time to provide instructions and support.

The school staff and allied health professionals reported that the student’s classroom goals were achieved to a higher extent when: they felt that everyone was clear on their roles, when a goal was established, when there was time to meet with other colleagues involved in the assessment technology process and when they felt comfortable implementing the device/program.

Furthermore, occupational therapists, speech pathologists and parents were seen as helpful team members by parents, school staff and allied health professionals in the assessment and the set-up stage of assistive technology in the classroom. Parents, school staff and allied health professionals perceived the assistive technology service delivery as being to a fairly great extent family-centred.
Chapter 5: Case Study Findings

“I would work first with the teachers rather than trying to work with the teacher’s aides although they have been great- they don’t have the responsibility for the student’s education that the teachers do”.

- Allied health professional
Chapter 4 presented the results from Phase I comprising an Australian-wide cross-sectional survey, in which the participants were parents, occupational therapists, speech pathologists, special educators, classroom teachers, teaching assistants and assistive technology consultants. As stated in Chapter 3, the findings from the survey provided the basis for the questions raised in the interviews and focus groups, which comprised the qualitative Phase II of the study.

Chapter 5 addresses the following research questions:

- What experiences do students with cerebral palsy have of involvement in the decision-making process of high-tech assistive technology?

- What strategies have students, parents, school staff and allied health professionals found useful when introducing assistive technology in the classroom?

- What experiences do students, parents, school staff and allied health professionals have of the implementation of assistive technology in the classroom?

- Which individuals are influential in supporting assistive technology in the classroom?

This chapter sets out the findings of the cross-case analysis that was conducted in Phase II of this study. To achieve the objectives for Phase II, a cross-case analysis was conducted with 14 cases. Six parents and their children constituted the first six cases, and a further six educators, not matched with the parents and their children, formed an additional six cases; all were interviewed individually. Finally, two focus groups with allied health professionals constituted the final two cases (10 occupational therapists and six speech pathologists). Each focus group had both occupational therapists and speech pathologists represented as the disciplines often work concurrently with assistive technology support. The educators and allied health professionals shared their views and experiences of equipment, funding, collaboration and strategies when assessing and implementing specialist software, alternative access options and speech-generating devices.
Descriptive information on the case studies

Initially the interviews and focus groups consisted of information gathering on the type of assistive technology the participants were using or most involved in supporting. This was followed by how long the participant had been using the technology, their experiences of support during assessment and set-up, and what type of strategies they had found most useful. Participants were encouraged to elaborate on their responses through the use of prompts in the semi-structured interviews and focus groups. Finally, the participants were asked if they had any additional comments about their experiences of assistive technology (Appendices P and Q).

Participants

Twenty-five parents who had utilised an assistive technology service were invited to participate in Phase II of this study. Six families accepted the invitation. Four families invited the researcher to their home, and for two families a phone interview was conducted due to distance. Six educators accepted the invitation. All educator interviews were carried out at the participants’ workplaces. Sixty allied health professionals within a disability organisation were invited to participate in two focus groups. Ten occupational therapists and six speech pathologists accepted the invitation. Both focus groups were held at the education centre situated within the disability organisation.

The gender and role of parents, school staff and allied health professionals

The majority of the parents, school staff and allied health professionals were female. Table 25 describes the parents’ gender and their children. Table 26 provides details of the educators and allied health professionals who participated.

The gender, age, impairment severity and assistive technology of students in the parent cases

Four male and two female students participated in the interviews. The students’ ages ranged from 9 to 14 years, with mean age of 10 years. Table 25 describes the cases, gender and disability severity of these students. Three of the students were accessing speech-generating devices for an Augmentative and Alternative Communication and three used computer based access methods as an alternative to handwriting. Table 27 outlines the assistive technology used by these students.
Table 25

The parents’ gender and the student’s disability severity

<table>
<thead>
<tr>
<th>Cases (Pseudonym)</th>
<th>Gender</th>
<th>Student age (years)</th>
<th>GMFCS Level</th>
<th>MACS Level</th>
<th>CFCS Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prue Adam</td>
<td>Female</td>
<td>10</td>
<td>V</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Family 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jemma Mia</td>
<td>Female</td>
<td>14</td>
<td>V</td>
<td>IV</td>
<td>II</td>
</tr>
<tr>
<td>Family 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaitlyn Callum</td>
<td>Female</td>
<td>10</td>
<td>V</td>
<td>V</td>
<td>IV</td>
</tr>
<tr>
<td>Family 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jasmaine Simon</td>
<td>Female</td>
<td>14</td>
<td>V</td>
<td>V</td>
<td>IV</td>
</tr>
<tr>
<td>Family 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martin and Lani</td>
<td>Male and Female</td>
<td>14</td>
<td>II</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>Leo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jillian Kayla</td>
<td>Female</td>
<td>9</td>
<td>IV</td>
<td>IV</td>
<td>II</td>
</tr>
</tbody>
</table>

Type of schools

All parents had their children enrolled in the public school system. Three of the educators worked in independent schools, the other three worked in public schools. The allied health professionals worked across all types of schools, public, Catholic systemic and Independent.

Setting

All participants lived in New South Wales, three families lived in the metropolitan area and three lived in rural areas. The educators all worked in the metropolitan area. The allied health professionals worked across the metropolitan, regional and rural areas.

School staff and allied health professionals’ experience in their professions

The allied health professionals’ years of experience in their current roles and working with students with cerebral palsy ranged from 18 months to more than 10 years, see Table 26.
Table 26

*Allied health professional and school staff gender, type of school and work experience*

<table>
<thead>
<tr>
<th>Cases (Pseudonym)</th>
<th>Gender</th>
<th>Type of school</th>
<th>Experience in their role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educator 1</td>
<td>Rochelle</td>
<td>Female</td>
<td>Public</td>
</tr>
<tr>
<td>Educator 2</td>
<td>Fiona</td>
<td>Female</td>
<td>Public</td>
</tr>
<tr>
<td>Educator 3</td>
<td>Karen</td>
<td>Female</td>
<td>Independent</td>
</tr>
<tr>
<td>Educator 4</td>
<td>Larisa</td>
<td>Female</td>
<td>Independent</td>
</tr>
<tr>
<td>Educator 5</td>
<td>Laura</td>
<td>Female</td>
<td>Public school</td>
</tr>
<tr>
<td>Educator 6</td>
<td>Jane</td>
<td>Female</td>
<td>Independent</td>
</tr>
<tr>
<td>Focus group 1</td>
<td>Females</td>
<td>All types</td>
<td>18 months - &gt; 10 years</td>
</tr>
<tr>
<td>Focus group 2</td>
<td>Females and one male</td>
<td>All types</td>
<td>18 months - &gt; 10 years</td>
</tr>
</tbody>
</table>

Table 27

*Assistive technology equipment used by students in Phase II*

<table>
<thead>
<tr>
<th>Cases (Pseudonym)</th>
<th>Laptop/software</th>
<th>Alternative Access</th>
<th>AAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam</td>
<td>Clicker 5</td>
<td>-</td>
<td>Pathfinder</td>
</tr>
<tr>
<td>Mia</td>
<td>Clicker 4, Math Pad, Read &amp; Write, iPad</td>
<td>Joystick, mini keyboard</td>
<td>-</td>
</tr>
<tr>
<td>Callum</td>
<td>-</td>
<td>EyeMax</td>
<td>VMax</td>
</tr>
<tr>
<td>Simon</td>
<td>Laptop with specialised switch software</td>
<td>Switch</td>
<td>-</td>
</tr>
<tr>
<td>Leo</td>
<td>Laptop, Co Writer, Math Pad</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kayla</td>
<td>-</td>
<td>-</td>
<td>VMax</td>
</tr>
</tbody>
</table>

*Augmentative and Alternative Communication (AAC)*
Instruments

An interview guide and a focus group guide were developed based on the survey results in Phase I of this study. The guides were designed to explore the participants' experience of assistive technology, both during the assessment stage, as well as when it was set-up. The guides addressed aspects of collaboration between the team members around the student, the critical time points of when to introduce and review assistive technology, how barriers to implementation were addressed, how the piece of technology had impacted on classroom goals and what guidelines and assessment tools were in place. The full lists of questions are included in Appendices P and Q.

Multiple cross-case analysis

A multiple cross-case analysis was performed at two levels, within each case and across the cases (Stake, 2006). To facilitate a detailed analysis, the work of the World Health Organization (WHO) and particularly the components outlining the International Classification of Functioning, Disability and Health (ICF) and for Children and Youth (ICF-CY) (World Health Organization, 2007) were utilised to provide a thematic framework.

The first step in the cross-case analysis generated 26 codes. The 26 codes were organised under 11 themes relating to the ICF-CY categories: Body Functions, Activities and Participation and Environmental Factors (World Health Organization, 2007), see Table 28. The 11 themes were later collapsed into seven, as four themes showed commonalities and similarities with another theme. A full list of the codes is available in Appendix S. The ICF-CY categories will be introduced and the cases presented. The themes under each ICF-CY category will be expanded upon and illustrated with quotes from the cases.

The researcher’s two supervisors, who read three separate full interview transcriptions, independently checked the reliability of the researcher’s coding. The transcripts were coded against the initial code sheet, based on the ICF/ICF-CY. After the initial reliability test, it was established that further refinements were required. The revised code sheet, based on full transcripts that were randomly selected, entailed more detailed information in the definitions of the ICF-CY codes used in this study. The revised code sheet led to a high level of interscorer consistency (87%).
All participants were provided with transcripts for member checking as recommended by Kvale and Brinkmann (2009). The participants were asked to check the accuracy of the information in the transcripts, to add comments and to make changes or corrections. None of participants requested changes.

Table 28

*The ICF-CY components and chapters used in the analysis*

<table>
<thead>
<tr>
<th>Body Function and Structure</th>
<th>Activity/Participation</th>
<th>Environmental Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mental functions</td>
<td>• Learning and</td>
<td>• Products and</td>
</tr>
<tr>
<td></td>
<td>applying knowledge</td>
<td>technology</td>
</tr>
<tr>
<td>• Neuro-musculoskeletal and</td>
<td>• Communication</td>
<td>• Support and</td>
</tr>
<tr>
<td>movement-related functions</td>
<td></td>
<td>relationships</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Attitudes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Services Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and Policies</td>
</tr>
</tbody>
</table>

**Analysis of interviews and focus groups**

**Body Function - Mental functions**

General mental functions, in the context of the ICF-CY (World Health Organization, 2007) refer to the individual’s ability to produce the incentive to act, that the person is able to be assertive and view himself or herself in a light that is self-assured.

“I just put my mind to it” - Mia, student

The student’s own motivation and drive to learn how to use a particular piece of assistive technology equipment, whether it was a communication device, an adaptive keyboard or specialised software played an important role in the uptake of the technology. One therapist said: “Despite their disability they’ve got a really clear idea about what they want to do and how they want to use the technology”. Mia’s mother stated: “She has taught herself..., she is making her own pod casts”. What seemed to drive many students was the desire to be able to preserve and enhance their identity. One example of this was for the student to be able to personalise the device appearance in terms of colour, voice and
function. In addition, they wanted to be like their peers, to be able to explore the technology and to open up to social networking. Rochelle (educator) expressed her admiration for one of her students who showed just such a drive to master the device prescribed for her, so that she could participate in the classroom:

This is your key to letting people know that what’s in there can come out of there and this is it, this is the only way you can do it. And she was the most...she was wonderful. She had the most incredible patience and perseverance and tenacity to do...and once you knew that and could see what she was doing and how determined she was and how compliant she was. She never spat the dummy, she never complained...She just didn’t. She was incredible.

Students stated that they preferred to learn to operate their new technology, through play and self-exploration. For example Mia (student) said: “I taught myself by playing games and just having fun”. Many educators expressed the feeling of having the, at times, onerous task of trying to capture the students’ motivation by making the learning playful and interesting. Larissa (educator) said: “I’m often trying to find interesting ways for the students to access technology”. Many also identified that they only have a short window of opportunity to capture students’ interest and that this required the educator not only to be knowledgeable in the technology itself but also to have a good understanding of the student as a person, “you need to know what makes them tick” Jane concluded (educator).

However, having a motivated student alone did not mean that instant success was achieved. Knowledge, commitment and motivation from the people around the student were also identified as critical components. This was highlighted by one therapist who said:

But for younger students or the students who perhaps don’t have that degree of energy in advocating for themselves, there really is definitely a need for either a parent or a staff member or an Itinerant support worker or a teacher to actually go – We are going to work to make this happen, because I think we know that technology doesn’t sort of work itself out.

In addition, allied health staff found that they wanted to support the student to gain some competence and confidence in the equipment outside of the classroom, before the student was asked to use it in time pressured classroom activities. One therapist commented: “I always found that the child needed to have some competence and confidence in a situation that they were already knowledgeable of and comfortable in before extending it for different uses”.

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However, it was not only students who needed confidence and competence in the use of the technology. In order to be able to support the student and the set-up of the technology, parents, school staff and allied health professionals identified that they too found it easier once they themselves felt confident with the product. As Rochelle (educator) said: “Once I know how the program worked I could see what its potential was and that she could do that herself”. Kaitlyn (mother) described how her motivation to persist with training and support for her son was first reliant on whether she, as a parent, was able to master the technology: “Callum wouldn’t have access to it because if it’s too hard for me, I think well it must be too hard for him.”

The value of having parents, school staff and allied health professionals motivated and skilled to use and understand a specific piece of assistive technology equipment relevant to a particular student, appeared to be an important issue that, if left ignored, could lead to the student missing out on learning opportunities, not only in the classroom but also in a wider context. The allied health staff reported their concerns and as one therapist observed: “…we often see children who can operationally use their devices beautifully but people around them and they themselves actually don’t know the functional pragmatics of how to use their device”.

To summarise, from the interviews and focus groups it was clear that the students’ motivation to use the technology played an integral part in how successfully the technology was used. To ensure that the student’s voice was heard the participants acknowledged the importance of not excluding students from the decisions made around their technology. From a family-centred perspective, and as one of the core elements in such practice and service delivery, shared decision-making amongst the family, the school staff or allied health professionals needs to be taken into consideration and integrated in the assessment process.

The participants acknowledged, similarly to what have previously been identified in the literature (Copley & Ziviani, 2004; De Bortoli, Arthur-Kelly, Mathisen, Foreman, & Balandin, 2010), that when introducing assistive technology the key elements of feeling confident and skilled with not only the assistive technology, but also with the student and their strength and weaknesses, was important in order to be able to successfully support the technology. This leads us to the next theme of the support and relationships of allied health professional and school staff.
**Activities and Participation - Learning and applying knowledge**

Learning and applying knowledge according to the ICF-CY (World Health Organization, 2007) and the ICF (World Health Organization, 2001), addresses individuals who provide support to the student. Consequently, the skills and abilities of school staff and allied health professionals to apply the knowledge they have learnt about assistive technology, their thinking and ability to problem solve and make decisions will be addressed in this section.

> “Learning there is no point in learning if there’s no purpose, you have to have a purpose” - Rochelle, teacher

To facilitate scaffolding, which involves using a range of linguistic tools and technologies to support students in their learning, Larisa (educator) stated what parents, school staff and allied health professionals all said: “You need training in what it is you are trying to do”. In addition, Kaitlyn (parent) identified that a lot of the programming and set-up was supported in the student’s home and therefore emphasised that: “…the parents need to have that support and training for it to be successful”.

The content of what a desired training program should contain ranged from knowing the capabilities of the particular piece of technology, to strategies on how to set up the technology. Kaitlyn (parent) said: “Well they tried to use it, but the teacher, I don’t think she was real familiar with what was on there; she thought it was more like a teaching tool, not a communication device.” Another parent, Prue, said: “…you know so that it was the creativity of finding a way to involve him in things that - and involve that. The staff didn’t have the knowledge, or - so they really the - given some sort of help with that is always for the staff”.

The allied health professionals identified that the parents had a particular role to fulfil in regards to technology for the student. Allied health professionals reported that the parents, as a constant person in the student’s life, were the link between different agencies such as school and disability organisations as well as between changing teachers. As such, the parents are seen to have an important role in the success of the implementation. By providing information to the parents, the allied health professionals hoped that they could: “…show the next teacher of the next year how they can use it without making a new referral or things like that”.

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Although most parents took on this role and advocated for their child, making sure the staff got the right information, programmed the device and monitored it they, in turn, said that they often relied on the teaching assistants and found this relationship pivotal for the success of their child. The role of the teaching assistant is therefore important and, as such, vulnerable as the parent and student were reliant on the teaching assistant’s computer skills and motivation to learn new things. Parents said that they at times felt overwhelmed by the demands of keeping up with new technology, the time that it took to prepare the device for classroom activities and the ownership that was placed on them by the professionals. Prue (parent) said: “I mean she showed us a little bit, but it was really quite overwhelming...”. Kaitlyn (parent) also mentioned feeling overwhelmed and added that she felt supported when the school staff were skilled up on the technology and able to collaborate with the family. She commented:

...if they knew how to program it then and there, it’d take the pressure off the parents in the afternoon, having to do it all. And teacher’s aides don’t feel they are going to break the machine or bugger anything up, if they’ve been trained properly it’s second nature to them.

Apart from involving the parents in the assistive technology process, both parents and allied health professionals suggested creating a peer-learning environment as a strategy to demystify and aid the implementation of a device in the classroom. Allied health staff recognised that: “the peer learning environment is really powerful…and we could use it more with technology...”. Parents talked about how important it was that the peers in the classroom had an understanding of the technology, were not scared and gained a better understanding of the time it took the student to actually operate the technology. Kaitlyn (parent) explained:

The teacher can educate the other children in the class as well as – they might get a bit freaked out by it or not understand it but it’s her and the teacher’s aide’s job to really embrace the device and make the other kids comfortable when he is using it.

Other suggestions to improve learning and applying knowledge were to re-label the word training as it was recognised that its purpose may at times imply something different to what the intended purpose of the activity. One therapist said: “I think we should come up with another word for that because there’s a connotation with training and for some people they’re positive and for others it’s negative but actually it’s about the coaching that goes with implementation”
The need for ongoing support and training as identified earlier was stressed in the context of what the technology could provide. As one therapist concluded: “The technology doesn’t actually take a person from being disabled to being equally able to their peers so there still needs to be other supports in place and ongoing support…So how much the gap the technology actually bridges is really important”.

The participants acknowledged that support and training were important for both parents and staff working with students who use assistive technology. The type of support discussed in the interviews and focus groups was primarily direct support in the form of face-to-face assistance and support from another person more knowledgeable in the area of technology.

To facilitate the work for principals and educators, the Australian Curriculum, Assessment and Reporting Authority (ACARA) (ACARA, 2013) published a document that sets out the core knowledge, understanding and skills required by all Australian students. In addition, ACARA provides an overview of what curriculum, instructional and environmental adjustments the principals and educators can make to ensure students with a disability are able to participate in the curriculum. In regards to environmental adjustments ACARA acknowledges, like the parents and allied health professionals in this study, the positive outcome of peer assistance, use of support personnel, use of technology and providing physical access to the teaching and learning environment.

**Activities and Participation - Communication and Mobility**

Communication and Mobility refers to receiving and producing messages and using communication devices and techniques, or being able to manipulate objects and move around according to the ICF-CY’s definition (World Health Organization, 2007).

“All that’s been our biggest hurdle, is trying to overcome them physical reflexes and trying to minimise all these other things that are going on to get the best out of what’s inside there, what’s going on in that head” - Kristy, parent

Allied health professionals emphasised the fact that each child was unique and that their needs were often changing over time and that there was a need to revisit the particular piece of assistive technology equipment along with re-assessing the context in which the technology was going to be used, one therapist said:
Each child comes with their own individualised formula of what needs to be in there, so it’s never – I mean often there is a key person, but it is never just one person. So it’s always A plus B, plus C times time and function of this you know? To actually make it work and as the child grows the formula changes with them so different elements get different weight as they go through different contexts.

Some of the physical challenges were related to time, when the equipment was not calibrated properly, or when the technology did not match the physical abilities of the student, which resulted in a slower performance. Spasticity or dystonia often hinders the student’s ability to speak or quickly move their body to access the technology. The parents often reported the use of adaptive strategies being used to compensate for some of the difficulties. Jemma (parent) said: “We are using just a board for speech so that it is quicker because people don’t listen”.

The students’ experiences of their motor abilities also seemed to be related to the educator’s knowledge of disability and technology. Some students reported being fully supported by their educator and teaching assistant whilst others had less positive experiences, where they reported being misunderstood and at times wrongly assessed. Jemma, Mia’s parent, explained:

The teachers said she can’t spell her name. “I said…why can’t you spell your name?” [the daughter said] “No delete switch, I can’t delete what I’ve written”.
If the teacher had asked her the same question she would have said, “I can’t delete it, it’s wrong I know it is wrong”. She couldn’t talk then so she couldn’t delete the work, so the teacher said she is intellectually delayed, forget it.

This scenario highlights the need for teachers to take time to get to know the student without making assumptions of the student’s abilities.

The parents shared various experiences in dealing with staff at their child’s school. Some parents report having very supportive staff around their child and expressed feelings of collaboration, mutual commitment to the student and sensitivity to the student’s needs. Jillian, Kayla’s mother said: “our school’s very flexible and, you know, they see the potential and they want her to display her potential and they know we’re right there behind them”. Whilst other parents and students expressed a lack of understanding from the school and Leo (student) said: “They actually did say to me, every week she …said - Well, I know you can’t open the laptop but you can always ask a friend to open the laptop for you. So eight times a day I’m going to go and say to my friends, - Can you open my laptop?” As a consequence, the student was left dependent on others when a different model of laptop would have left him independent and more on equal terms with his peers.
Allied health professionals explained: “Some teachers seem to pick things up really quickly and go with it and others really struggle with disability, particularly in mainstream settings”.

The allied health staff said that they found it difficult at times to argue for assistive technology at school meetings, to make it a priority, when other more basic needs were required to be met:

There are so many other kinds of almost emergency needs that sometimes accessing the curriculum becomes the last thing that you actually get time to focus on, which is extremely challenging and that’s the whole purpose of being at [laughs] school in the first place.

The students and the parents in particular, stressed the benefits of technology as a means of communicating basic needs, such as not feeling well or being able to attend spiritual practices. The technology became a bridge that closed the gap between communication and/or movement difficulties and the students’ desire for participation. For Mia, a student who aspires to be a poet when she grows up, assistive technology enabled her to participate in the classroom and be like her peers and to be able to “teach me how to write and teach me how to read a little bit more and draw properly without scribbles.”

The findings of the interviews and focus groups demonstrated that knowledge not only in the use of technology but also of the disability of the student impacted on the student’s classroom experience and ability to access the curriculum. The participants’ reports suggested that, particularly in mainstream settings, there was a need for support and guidance from a professional with knowledge of assistive technology who could also take a lead and guide staff in how to meet the student’s needs.

**Environmental Factors – Support and relationships**

The Support and Relationships chapter of the ICF-CY (World Health Organization, 2007) addresses the areas of caring for personal objects and assisting others. It encompasses situations in which a person is assisting someone with his or her learning, communication, self-care and movement within the home and outside, such as the school or wider community.

“The principal, a good principal set the tone of the school”.
- Justine, parent
Parents stressed the role of the principal and the influence the principal has on how
technology is handled by the school staff, which then impacts on the level of
collaboration the parents experience with the school. Martin (parent) said:

>I think the key difference was that because the Principal...somebody from
above was asking what was happening so there was a pressure to keep it
moving and that pressure isn't there now. That was just luck that the Principal
was happy to take up that role...That doesn't happen now.

Another example of the influence the principal had on teacher attitudes and students’
access to equipment was the following quote from an allied health professional:

>One school had before I came along had already sourced some funding for a
student and another school hadn't. And it was just amazing the difference in
attitude when I was starting to talk about all these different options, they're all
saying, one school’s saying — Oh sorry there's not money we're going to have to
look at free solutions or the family are going to have to support it and the other
school like — Yep, fantastic, we'll get that all right away and I know we are
only one month down the track and the school already has all the equipment
that we talked about in the assessment that looked beneficial and the other
school with a very similar student is basically sort of saying this is all too hard,
there's no money for it.

However, when asked whom the participants recognised as the person that played a key
role in the implementation of the technology, parents, school staff and allied health
professional all regard the teaching assistant as one of the more important people for a
successful technology outcome in the classroom. One therapist said: “I think the teacher's
aides are often the essential point for working with the child”.

Despite the workload, responsibility and expectations that often were put on the
teaching assistant, they were not always well matched with their skills and training. In
addition, some students reported difficulties when their teaching assistant did not
correctly scribe for them and wrote down a different answer to the one they had given.
Other issues arose when the teaching assistants found it too hard to use the technology
and left it sitting in the school bag or in the cupboard at school. Laura (educator)
explained:

>...with a teacher aide those who take on a lot of responsibility, that sometimes
they almost do become teachers and they’re really not...and in some instances
we give our hardest, well we do, we give our hardest kids to untrained people.

Situations like this call for immediate intervention from the school management so that
appropriate support can be provided to both the student as well as the school staff.
Otherwise, the school fails in their commitment to provide education for all students.
Those families that had the opportunity to have a teaching assistant who had stayed with their child for a couple of years emphasised, along with the allied health professionals, that the teaching assistant had an important role. The teaching assistant often knows the student’s strength and weaknesses better than most of others at the school. Hence, the teaching assistant often becomes an important mediator between the classroom teachers as well as a point of contact for the families and disability organisation. One therapist said: “The cases I’ve seen that have been the most successful has been when there’s been consistency between who the aide is and who is giving support”.

Next to teaching assistants, parents also found assistive technology specialists very helpful and emphasised how they appreciated the training they have received from them. Educators on the other hand, identified the consultant provided by the school as someone whose role is important as that person often takes on the role of assisting the educators with resources, providing knowledge and being a sounding board. As well they were someone who talked the same language, listened to their challenges and presented solutions to the situation at hand. Fiona (educator) said: “She will listen to teachers, she will listen to teacher’s aides and she’s really good at getting hold of, networking and having therapists to work when we need stuff…”.

Some parents were members of parent networks where they were able to discuss service providers, get tips and ideas on how to program and set up the technology equipment. Jillian, Kayla’s parent, explained: “Sometimes as a parent I find the biggest issue with the devices is having probably the imagination of how it is best to set it up”.

This section highlighted the experiences parents, school staff and allied health professionals had of support and relationships and how they assist others and how others assist them with technology in the classroom. The principal and the teaching assistant emerged as having key roles, the principal often from a financial and leadership point of view and the teaching assistant with everyday hands-on assistance. The dual role of support person and educator that many teaching assistants take on or are forced into without adequate qualifications is alarming. This research reveals that untrained staff will often determine the student’s level and educational needs. Further consideration on how to support and fund educators, to have both the time and skills to take a more active role in the education of many students with disabilities is warranted.
Environmental Factors - Products and technology

Assistive technology, in the ICF-CY (World Health Organization, 2007), is referred to as a product, instrument, equipment or technology adapted or specifically designed for improving the functioning of a person with a disability.

“The piece of equipment’s got to be recommended to know what to use” - Laura, educator

The school staff recognised that electronic text was the most effective and efficient mode and wished more books were readily available in online or electronic format. Educators expressed a frustration over the lack of age appropriate resources for students who were still acquiring skills at a lower age level. Educators reported that they were often forced to create their own material to meet the needs of the student. Jane (educator) said: “I mean there are some good books there, really good and there’s some good resources for younger kids, but…similar topics need to be covered for the older kids, but at the moment nobody writes them.”

To summarise, to assist educators in their work with older students who need resources at a younger year level, an investment in age appropriate resources is needed.

Environmental Factors - Services, systems and policies

In the ICF-CY (World Health Organization, 2007), services refer to programs designed to meet the needs of an individual. Systems are thought to organise, control and monitor services that are provided. Lastly, policies and guidelines govern the systems that order the services.

“The team approach, the number one key to making it successful”
- Kristy, parent

To enhance access to technology in schools, not only in how to use the technology but also in terms of physical access to devices and programs, there seemed to be a need for clearer guidelines to access help for technology assessment and approach different funding options, facilitate collaboration amongst schools, disability organisations and equipment providers. In addition to not relying solely on equipment providers, in particular in terms of trials, there also seemed to be a call for a resource pool of equipment and more uniform regulations around access to technology in schools. The
allied health professionals often experienced difficulties with different guidelines at different schools. This meant that some schools had clear pathways in terms of knowing who to access for support, were collaborating with support educators and had guidelines for how to access funding. Other schools did not have these pathways.

Other aspects that were different between schools were students being allowed to take the technology home to complete homework. Further, inconsistencies were evident, e.g., whether a piece of technology could move with the student if they changed schools and if the school had provided part or all of the funding for the equipment. Due to these complications one therapist explained: “We generally try if the family can get them to fund as much as they can. Because if they own the technology they have a lot more control over it and it goes back to the child…” and Kaitlyn (parent) explained: “…we said that we would pay for the assessment and everything done so we didn’t have to wait for funding…” Lastly, Jemma, Mia’s parent, talked about a successful funding application outside of the school: “…which came through Starlight foundation as a wish.”

The topic of funding was also mentioned in the context of a barrier to accessing the equipment in a timely manner. One therapist stated: “Funding is probably to me the most inconsistent things around”. Allied health professionals talked about the benefits of having a scheme set-up where equipment could go on loan and be trialed for longer time periods. They also wished such a scheme could be set-up to allow the family to keep the equipment that was on trial if it turned out to be successful. In this way the chain of both support and training in the use of the technology was less likely to be broken.

A further aspect of funding in relation to the student was the funding for the teaching assistants. It transpired that in order for the educators to attend meetings such as assistive technology assessments, some of the funding for teaching assistants could be used to release the educator from the classroom to attend meetings. However, that was then at the cost of less teaching assistant hours for the student, which often meant that the educator was not able to be released. Rochelle (educator) said: “Her budget, her funding was to provide her with an aide”.

Parents and allied health professionals also talked about the lack of clear guidelines for collaboration and costs between agencies and school staff, which led to inconsistencies across the state in how training and set up were carried out. Allied health staff: “…there doesn’t seem to be adequate systemic processes that are consistent and reliable across the state for how
therapists...teachers, can work with IST [Itinerant teachers] to make sure that the teacher doesn’t only get trained on what the device is but that implementation.”

The allied health staff expressed concerns about the yearly change of educators and at times also the teaching assistant as this often lead to a break in the communication chain. If the student’s new support staff were less skilled in using technology there were concerns that allied health professional were not always invited back to update the new staff member to ensure a continuity of learnt skills. This also has a flow on effect for the student to achieve classroom goals in a timely manner. Allied health professional: “There’s absolutely again no carry over from year to year, so that’s a huge issue”.

Similar to the parents, the allied health staff raised issues about the current structure where educators were changing from school year to school year and where as a consequence it was difficult to plan ahead and provide important information on disability. They recognised that changes in teaching staff had a critical impact on the families and their opportunities to collaborate with the school staff. One therapist said:

...people don’t know who the teacher will be. Schools don’t give out the information or they haven’t worked out yet who will teach certain classes. So in the lead up to wanting to get something in place you know, the parent or the carer hasn’t got a point of contact in terms of who to give information to for that next school year.

Even though some school staff were reported to be very enthusiastic and willing, system barriers often placed hurdles in the way for them to communicate with their students. This situation was especially highlighted when it came to exams and number of teaching assistant hours. Allied health professionals expressed their concern on challenging attitudinal barriers:

That’s an attitude of the Board of Studies [NSW] that students who have laptops to do their exams,...have an unfair advantage over other students sitting that exam. I think there’s a lot of that overload. It’s really sort of prejudice in a way that has to be confronted by the Department of Education.

One parent, Martin, expressed his surprise when he first brought his son to the school:

We came into the school having read all the literature beforehand and everything else we got from the Department of Health about inclusion and things like that and nobody had never heard of it when we got to the school it was all still integration – everything was still about integration.

School staff using outdated terms in conversations with parents may lead to parents experiencing a lack of trust, especially if the parents perceived a lack of school
engagement, with nothing eventuating after school meetings. Martin (parent) said: “I think fundamentally the problem is that the school doesn’t want to take responsibility for the system, the district doesn’t want to take responsibility for it and the state-wide department per se doesn’t want to.”

Allied health professionals looked at themselves as the link bringing families and schools together by putting a focus on a more person-centred approach, as well as bringing a different aspect to disability and the concept of integration: “Sometimes we can just unpack a little bit more from the student or the family because possibly a criticism that I would have occasionally of the Department of Education is they tend to be a little bit insular and they’ll talk to teachers, teachers will talk to teachers aides and teachers aides will talk to other teachers and the teacher will talk to the principal and … they sort of forget — well what does the student really want out of this?”

The educators in this study showed that this was not consistent across all schools as Fiona (educator) said: “I think that’s really important, as soon as possible to get them involved in that, because I think that’s the problem, is so often if you’re not careful it’s done around them and not with them in consultation.” However, some parents and students shared the experiences of the allied health staff, where they felt let down when they were included in meetings but no action afterwards signalled that what they had said had been heard. Martin (parent) said: “…they listened to what he had to say and that kind of stuff which was good, but it was kind of nebulous and there wasn’t any identifiable sort to outcomes that I can recall.” Kaitlyn, parent said:

I think the biggest thing everyone needs to work as a team. There needs to be - say I'm not involved. Then his teacher's aide, the teacher and the kids need to be educated as well. So it's a whole range of people and they need to be educated as well. So it's a whole range of people and they need their own little job virtually to make it all successful.

In regards to team work from the perspective of the school staff and the implications of what it may take to implement technology in the classroom; Larisa (educator) said:

It's constant working as a team...Having it set-up, having a knowledge of what it is. You know, it's very difficult in terms of other staff in the room, if they may not be as - I find that hard, when they are not - I might be quite knowledgeable about technology, but they're not as knowledgeable, so to leave another staff member to work on something with a student when they don't have the knowledge...I always have to still go back and check what's going on...so it's very hard, we need a lot of support to really be able to implement it.

To summarise, the school staff should never underestimate that parents may have a high level of awareness of educational legislation and the jargon used. As an example, the difference between inclusion and integration raised by Martin in one of the parent interviews, shows that some schools are not conscious of what message they send to
families, when outdated terminology is used. For staff to be up to date on the implications of services and policies, such as ACARA, the Educational standards (2005) and also more local frameworks like the New South Wales (Australia) initiative “Every Student, Every School” will not only enhance the communication with the parents but also build trust between the parties and establish a healthy foundation for future collaboration.

**Activities and Participation - General tasks and demands**

This section pertains to the ICF-CY (World Health Organization, 2007), how tasks and demands are carried out, organised and how individuals manage their time, set-up routines and handle stress.

We were talking about the technology being the magic solution or expected to be a magic solution. But there are not many teachers or teacher’s aides who will actually wait for a student to respond with an action to activate a device. There’s a time element in that as well.

- Allied health professional

Time seems to be the key component of both training and support of the technology. It was acknowledged that the school staff and allied health professional could be well trained and supportive, but that if time for meetings, planning and set-up were not scheduled, it could easily fall apart.

Five different aspects pertaining to time were identified in the analysis, all of which influence the success of the uptake of the technology. The first aspect related to the time invested in collaborating with other colleagues within or between organisations. One therapist said: “I think everybody’s so time poor, therapists and teachers, that there’s not that adequate communication perhaps with all relevant parties about how something should be used”.

The second aspect, which caused considerable frustration amongst school staff and allied health professionals, involved long waiting lists for trialing the recommended piece of equipment. This was reported to be further complicated with receiving too short notice from the supplier, leaving them with only a short window to rearrange and clear their diary from prior plans with other clients. When the equipment finally arrived the trial period usually only lasted two weeks, which at times fell during school holidays and resulted in an even shorter trial period. This aspect was almost unanimously seen as frustrating by all participants. However, Jane, an educator who worked in a special
school with easy access to technology described the ideal scenario that the other participants wished for:

Once we get the equipment, I mean we just make sure there’s lots of time allowed for trial and lots of time allowed for practice and focus on that, because communication really for our kids is absolutely crucial. That’s the thing that changes really how they manage.

Continuing this further, personal commitment is the third aspect raised amongst parents, school staff and allied health professionals. Larisa (educator) said: “You generally have to do it in your own time, you know, learning how to use the technology...you know the whole trial and error, or spending time at home doing it in the holidays”. Many described long hours of programming and other types of preparation. Parents sat up at night to work things out, while staff used their own time to meet with other colleagues around a student or to learn about the technology with which they were supporting the student.

The fourth aspect relates to time impacting on the outcomes for the student and specifically how time pressure affects how the use of the equipment is supported in the classroom. As an example, this would include whether the device was prepared in terms of being fully charged, removed from the school bag, placed on the desk or tray of the student and prepared with adequate vocabulary to enable the student to participate and give answers on the topic introduced in the classroom. Kaitlyn (parent) summed it up with: “You’ve gotta be organised” and the time it takes to set-up the equipment is reported as influencing whether the activity actually is happening or not. Larisa (educator) said: “So having it set up, having a plan of actually what they’re going to be doing with that technology before they start doing it, keeping them on task...it’s important to know the product”. Allied health professionals thought school staff at times struggled with finding the purpose of the technology: “I think the teachers don’t often see the link between the individual education plan and the use of technology”. If staff supporting the student are not clear on the purpose of the technology, then taking time to wait for a reply from the student may be compromised and impact on the outcome and classroom experience of the student. Prue expressed that when asking her son: “…you think once people know that you need a little bit of time, people are much better now knowing that at school?”

Finally, the timing of the training and introduction of the technology was raised by parents and Prue summarised what many reported by stating: “I think at the beginning of a school year, it’s very important for the new teacher to have some understanding about the speech device that the child has and that even if they can’t use it, they know there is a role for it and it can be
integrated in and the creativity aspect.” When asked when assistive technology should initially be introduced, with the sometimes lengthy assessment and funding process in mind, both the parents and the allied health professionals expressed similar views and as Jasmaine (parent) said: “I think the earlier you can get it happening, probably the easier it is”. Many of the participants wanted the technology in place for milestone events such as the school start or even earlier. Jillian, Kayla’s mother said: “You know, first day at kindy, [she] had her hand up to ask questions, the Dynavox in front of her. That’s what you want, that sort of confidence”.

Summary

In summary, participants brought up a wide range of barriers and facilitators to implementing assistive technology in the classroom. Students’ motivation played an integral role in how successfully assistive technology was used. However, students were dependent on the knowledge and skills of the team members supporting them in their classroom. Participants acknowledged that the parent played a critical part in initiating, organising and driving the use of the assistive technology for the student. The parents identified that a helpful teaching assistant who was comfortable with technology and who transitioned with their child across the school grades was valuable for them. However, the participants reported that often the teaching assistants were not fully supported by the classroom teacher and at times took an educational responsibility for the student beyond their qualifications. It was also reported that some classroom teachers lacked basic knowledge in disability and, as such, not only failed to assess and support their student appropriately but also cause frustration amongst students and their families. This was predominately because school staff were perceived to have attitudes towards the students that at times come across as disrespectful. As a consequence the principal was identified as having a critical role in overseeing the responsibilities and policies for their staff. In addition, further assistive technology training and support in not only its operational use but also in how to implement it into classroom activities were expressed by the participants as a necessary means to increase confidence and skills amongst the team supporting the student. An orientation to available funding options may also facilitate the uptake of assistive technology in schools as it was reported that many students otherwise have to wait an unreasonably long time before they can get access to tools that will enable them to access the school curriculum.
Chapter 6: Integration of Survey Results

and Case Study Findings

We often thought that it would have been better to have a team available to do some short term intensive, in situ implementation work with this student. If this had been incorporated more readily some of the issues that arose with the technology could have been problem solved in a more timely manner. If there had been more education staff available for the aide/teacher to problem solve around curriculum modification this may have sped up the uptake and use of the device. Having access to the device for a longer time trial would have also enabled us to tweak some of the issues earlier and allow the set up to be have been more effective from day one of provision of the AT.

- Allied health professional
Chapter 4 reported on the survey results from Phase I and Chapter 5 set out the findings of the cross-case analysis that was conducted in Phase II of this study. The two chapters describe the participants’ experiences of assistive technology. The findings show that school staff are often not as involved as allied health professionals in the assistive technology process. However, for students to effectively access the curriculum it is essential that both school staff and allied health professionals are collaborating and include the student and their family in the process. The principal has a critical role in overseeing the responsibilities and policies for their staff. However, the participants reported a lack of guidelines around the provision of assistive technology. The data further suggest that in addition to clear guidelines it was critical for school staff and allied health professionals to be clear of their roles and to set goals around the assistive technology with the student.

The findings in this study point to the imminent need for an instrument tailored for students with cerebral palsy in the school setting. Chapter 6 will present an assistive technology decision-making model that aims to guide school staff and allied health professionals in provision of assistive technology.

The International Classification of Functioning Disability and Health (ICF) and for Children and Youth (ICF-CY) (World Health Organization, 2007) offers a framework to guide and integrate the complex factors of assessment and implementation for assistive technology. Assessments and implementations based on the ICF-CY for students with cerebral palsy will provide a common language for both school staff and allied health professionals. As such, the ICF-CY has the potential to promote family-centred care in schools by providing a framework for collaborative practices across agencies with shared decision-making and goal setting. Due to the complexities around assistive technology, and the individual needs of students with cerebral palsy, no one instrument will be able to provide an evidence-based assistive technology service delivery.

What is needed is a model that will: 1) guide school staff and allied health professionals to introduce assistive technology into students’ educational plans; 2) use evidence-based assistive technology assessment and outcome measures; and 3) support parents, school staff and allied health professionals to achieve shared assistive technology decision-making. This chapter will introduce a new model for assistive technology decision-making.
The Assistive Technology Best Practice Guidelines - for children and youth with cerebral palsy

Long, Huang, Woodbridge, Woolverton, and Minkel (2003) explained that because assistive technology provision is complex, a framework is needed that sets out how client-specific models can be implemented. The Assistive Technology Best Practice Guidelines - for children and youth with cerebral palsy (AT Guidelines for CP) shown in Figure 18 and Table 29 outlines the steps involved in the assistive technology service provision. The development of the AT Guidelines for CP aspires to facilitate school staff and allied health professionals to address the assistive technology needs of students with cerebral palsy.

The AT Guidelines for CP was inspired by the Consortium model, a 10-step procedure that explains the assistive technology provision for therapists (Long et al., 2003), and the AT Guidelines for CP developed for occupational therapists to classify and prioritise interventions on daily activities (Törnquist & Sonn, 1994). The Consortium model is based on an outcome-driven system in which intervention strategies aim to enable the individual to reach their full potential and desired outcomes (Long et al., 2003). The ADL Taxonomy, was developed from the principles of the World Health Organization system of International Classification of Impairments, Disabilities and Handicaps (ICIDH), the genesis of the ICF and from the belief that there needs to be an order of actions.

The AT Guidelines for CP aims to classify the process for the assistive technology assessment and implementation. It sets out to guide the user to consider the different objectives that school staff and allied health professionals need to set for students with cerebral palsy, who need assistive technology to access the school curriculum. It is hoped that the AT Guidelines for CP will provide a guideline that can promote assessment and implementation of the appropriate assistive technology equipment, and as such be a complement to the Communication Supports Inventory – Children and Youth (CSI-CY) (Rowland et al., 2013) which aims to assist educators and allied health professionals in setting educational plans and facilitate goal setting for students with complex communication needs.
Figure 18. Assistive Technology Best Practice Guidelines - for children and youth with cerebral palsy
Table 29

**Assistive Technology Best Practice Guidelines— for children and youth with cerebral palsy**

<table>
<thead>
<tr>
<th>Step</th>
<th>Individual level</th>
<th>Societal level</th>
<th>Institutional level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use the appropriate outcome measure to identify any concerns: COPM; IPPA; SETT; MPT; LAPUE; QUEST v2.1 child, CSI-CY</td>
<td>Identify key stakeholders that will be involved in the assessment process.</td>
<td>Identify available assistive technology services.</td>
</tr>
<tr>
<td>2</td>
<td>Determine: Communication Function Classification System (CFCS), Manual Ability Classification System (MACS) and Gross Motor Function Classification System (GMFCS). Identify leisure /sports activities requirements.</td>
<td>Identify available assistive technology services.</td>
<td>Identify curriculum requirements.</td>
</tr>
<tr>
<td>3</td>
<td>Determine and use the appropriate measure to identify strengths and limitations within • Mental function (DMQ; GMDS) • Sensory functions (visual and auditory test) • Voice and speech functions (DEAP; VMPAC; CELF 4)</td>
<td>Identify key stakeholders that will be involved in the assessment process.</td>
<td>Identify available personnel resources or referral pathways.</td>
</tr>
<tr>
<td>4</td>
<td>Identify personal support, personal relationships and peers along with stakeholders’ attitudes towards assistive technology.</td>
<td>The availability of products and technology in the educational setting or at suppliers. Establish a plan to trial and fund the equipment.</td>
<td>Identify funding policies &amp; systems, classroom layout.</td>
</tr>
<tr>
<td>5</td>
<td>Determine and use the appropriate documentation for goal setting with the student, parents, educators and allied health professionals. GAS, CSI-CY</td>
<td>Identify key stakeholders, from the student’s home, school and disability organisation, to be involved in the goal setting.</td>
<td>Identify training needs to support the implementation of the assistive technology.</td>
</tr>
<tr>
<td>6</td>
<td>Identify how the student is to be provided with opportunities to respond and practice using their assistive technology equipment. Identify the key person responsible to oversee the implementation of the assistive technology.</td>
<td>Identify what modifications/programming are required on the students’ assistive technology equipment.</td>
<td>Identify training needs to support operational skills.</td>
</tr>
<tr>
<td>7</td>
<td>To evaluate outcomes and re-visit the outcome measure used to identify the concern: GAS; COPM; IPPA; SETT; MPT; LAPUE</td>
<td>Identify key stakeholders that will be involved in the evaluation process</td>
<td>Identify training needs to support academic skills.</td>
</tr>
<tr>
<td>8</td>
<td>Identify the student’s own experience of assistive technology, its use and satisfaction level. Identify the parent’s satisfaction of the student’s use of assistive technology at home and in the community.</td>
<td>Identify the parent’s satisfaction of the student’s use of assistive technology at home and in the community.</td>
<td>Identify the assistive technology use in the educational setting.</td>
</tr>
</tbody>
</table>

CSI-CY=Communication Supports Inventory – Children and Youth; COPM=Canadian Occupational Performance Measure; IPPA=Individually Prioritised Problem Assessment; SETT=Student, the Environment, the Tasks, and the Tools; MPT=Matching Person and Technology; LAPUE=Lifespace Access Profile Upper Extension; QUEST v2.1=Quest v2.1 children’s version; DMQ=The Dimension of Mastery Questionnaire; GMDS=Griffiths Mental Developmental Scales; DEAP=Diagnostic Evaluation of Articulation and Phonology; VMPAC=Verbal Motor Production Assessment for Children; CELF=Clinical Evaluation of Language Fundamentals; PROM=Passive Range of Motion.
The *AT Guidelines for CP* consists of three levels: 1) the Institutional level; 2) the Societal level; and 3) the Individual level. Each level corresponds to the levels with the same name in the ICF-CY. Furthermore, the process consists of eight steps: 1) Identify concerns; 2) Assess Activity and Participation; 3) Assess Body Functions and Body Structures; 4) Identify Contextual factors; 5) Goal setting and negotiation of the implementation plan; 6) Implementation plan; 7) Evaluate outcomes; and 8) Revisit outcomes.

Each step is divided into the previously mentioned three levels: the Institutional, the Societal and the Individual. At the Institutional level strategic issues related to the educational system, its policies and its procedures are described. These may contribute to professional development and provide the foundation for quality standards and an outcome evaluation. At the Societal level the current regulatory mechanisms and the impact of the existing assistive technology policies, the support and relationships are described. The Individual level is concerned with factors directly related to the student’s physical and mental functions, such as their body function and structure, activity and participation levels. These factors will predominantly determine the type of assistive technology that best matches each individual.

The steps involved in the *AT Guidelines for CP* are considered to encompass the information needed in the assistive technology decision-making process. They consist of a group of actions to consider in the form of: recommended assessments, outcome measure instruments and contextual aspects. The ICF-CY chapter further defines these actions, which are in particular related to Products and Technology, Support and Relationships, Learning and applying Skills.

What distinguishes the *AT Guidelines for CP* from previous models is that, in parallel with outlining each step of the technology process, the best current available evidence and tools are presented to assist school staff and allied health professionals to identify what information they have and what information needs to be sought, within or outside of the organisation in which they work.

*The AT Guidelines for CP* was developed by the researcher as a response to the lack of a clinical decision-making framework being used in the school setting. However, as this study was not initially designed and set out to devise a model for assistive technology...
service provision, the model is yet to be tested. A brief description of the content within each step and a case study using the model will now follow.

Step 1: Identify Concerns

*Individual level*

Parents, school staff and allied health professionals often initiate the need for assistive technology to compensate for difficulties in activity performance in the classroom. The appropriate assistive technology measure is identified, which will depend upon the age of the student and the issue at hand. The following assessments are currently considered to be most suitable for school aged students:

- Individually Prioritised Problem Assessment (IPPA)
- Canadian Occupational Performance Measure (COPM)
- Student, the Environment, the Tasks and the Tools (SETT)
- QUEST 2.1 Children’s version
- Matching Person and Technology (MPT)
- Lifespace Access Profile Upper Extension (LAPUE)
- Communication Supports Inventory – Children and Youth (CSI-CY)

*Societal level*

To ensure that a comprehensive assessment is provided, key stakeholders in the student’s home and school setting are identified. Other key individuals, who are supporting the student’s development and use of assistive technology outside the home and school, may be staff members working at respite homes or in the context of sports and leisure.

*Institutional level*

If the school does not employ allied health staff a referral to disability services, such as occupational therapy, speech pathology and physical therapy, may be needed to initiate an assistive technology intervention. In doing so, the school needs to identify the available assistive technology services that can provide specialised assistive technology
assessments and provide access to assistive technology consultants, assistive technology equipment and resources.

Step 2: Assess Activity and Participation

*Individual level*

As cerebral palsy is such a complex condition with a wide variety of presentations, the functional approach uses classifications to describe gross motor, fine motor and communication function to gain a wider understanding of the person’s abilities.

Determine:

- Gross Motor Function Classification System (GMFCS)
- Manual Ability Classification System (MACS)
- Communication Function Classification System (CFCS)

*Societal level*

For students who will be using the assistive technology equipment outside the standard classroom, the activities in which the equipment will be used needs to be identified. Hence, the assessment process needs to consider the relevant leisure and sports activity requirements.

*Institutional level*

At the Institutional level the curriculum requirements will need to be established with all key stakeholders. To assess what adjustments and modifications to curriculum activities will be required within the classroom, the student with access to assistive technology needs to be identified and documented.

Step 3: Assess Body Functions and Body Structures

*Individual level*

In order to match the assistive technology device with the student’s needs, further information of the student’s mental function, sensory functions, voice and speech and movement related functions may be required. The following assessments are frequently used with students with cerebral palsy:

Mental function

- The Dimension of Mastery Questionnaire (DMQ)
- Griffiths Mental Developmental Scales (GMDS)

**Sensory functions**
- Visual and auditory test

**Voice and speech functions**
- Diagnostic Evaluation of Articulation and Phonology (DEAP)
- Verbal Motor Production Assessment for Children (VMPAC)
- Clinical Evaluation of Language Fundamentals 4th Ed (CELF-4)

**Movement related functions**
- Passive and active range of motion

**Societal level**
Depending on the type of information needed and staff available, a referral to a specialist, school consultant, special educators, speech pathologist, occupational therapist, or physiotherapist may be required to carry out the assessments. At this step and level the appropriate key stakeholders who will be involved in the assessment process are identified.

**Institutional level**
The assistive technology guidelines available within the school system are reviewed at this level. In the case of no formal guidelines, the available personnel resources or referral pathways are identified. Any assessment should be documented and made available to the student, their family, school staff, allied health professionals and all other stakeholders who will be involved in the assistive technology service provision process.

**Step 4: Identify Contextual factors**

**Individual level**
The student’s prior knowledge and experience of assistive technology needs to be established to determine what type of support will best meet the student’s needs.
Furthermore, personal support, personal relationships and peers, as well as stakeholders’ attitudes towards assistive technology are critical to be identified and established.

**Societal level**

Prior to purchasing a piece of assistive technology equipment, a trial period is essential to determine what product and technology is best suited to meet the student’s needs. An inventory to establish the availability of products and technology within the educational setting, disability organisations and suppliers is essential. It is critical to consider and identify the time frame on potential waitlists in which the technology and technology services will be made available. At this stage, it is important to identify individuals who can support the trial, organise the purchase of the equipment and document these individual plans/recommendations for future reference in the student’s assistive technology or school plan.

**Institutional level**

To secure funding for assistive and assistive technology services, identify the school and disability systems’ funding policies and application procedures. Other contextual factors to consider for the student an assessment of the classroom layout to determine if the student has adequate light, can see and hear the classroom teacher and their peers, and can easily get to and from the desk with easy access to their required assistive technology equipment.

**Step 5: Goal set and negotiate plan**

**Individual level**

When the assistive technology equipment has been funded and delivered, the appropriate documentation for goal setting needs to be determined with the student, parents, educators and allied health professionals. Some examples are: Individualised Education Plan (IEP) or Individualised Family Service Plan (IFSP) or the Communication Supports Inventory – Children and Youth (CSI-CY) developed for individuals with complex communication needs. The use of the Goal Attainment Scaling in a SMART goal format (Specific, Measurable, Achievable, Realistic and Timed goal) or the Individually Prioritised Problem Assessment (IPPA) may be considered. The GAS and IPPA are two instruments that have been found to be sensitive to change and are likely to identify the progress of the assistive technology service provision.
**Societal level**

As in the previous steps the key stakeholders, from the student’s home, school and disability organisation should be invited to take part to ensure a shared-decision making process that can be supported by all key stakeholders around the student.

**Institutional level**

In the goal setting procedure, the additional training needs of the individuals who are going to assist the student in using the assistive technology equipment may have been identified. It is critical to re-assess and establish further training requirements that need to be addressed in order to ensure a successful implementation of assistive technology.

**Step 6: Implement Plan**

**Individual level**

It is critical to identify how the student will be provided with opportunities to respond and practise using their assistive technology equipment. To establish and document a dedicated person responsible to oversee the implementation of the assistive technology will be beneficial.

**Societal level**

To implement the goals identified in the previous step the modifications/programming that are required on the student’s assistive technology equipment will need to be established and assessed. Further training needs for the family and peers may be required to facilitate them supporting the student in specific situations. The training needs that are critical to be considered not only by school staff and allied health professionals but also amongst family and peers include how to support operational, strategic, linguistic and social idea skills when using the assistive technology equipment.

**Institutional level**

In order to support the student’s academic needs through the curriculum adjustments and modifications, school staff and allied health professionals will need to address the operational, strategic, linguistic and social skills when using the assistive technology equipment.
Step 7: Evaluate Outcomes

**Individual level**
To evaluate outcomes it is recommended to identify concerns using the previously used assessment or outcome measure (GAS, COPM, IPPA, SETT, MPT and LAPUE). It should be emphasised that the student’s experience needs to be heard.

**Societal level**
As in the previous steps, the key stakeholders from the student’s home, school and disability organisation should be invited to take part to ensure a shared-decision making process that can be supported by all the key stakeholders around the student.

**Institutional level**
If the desired assistive technology outcome is reached, it is recommended to regularly evaluate the outcomes. This will ensure that the student’s needs are met as demands change throughout the school years.

If the desired assistive technology outcome was not reached, the appropriate step to re-visit the assistive technology process needs to be assessed and determined with all key stakeholders around the student.

Step 8: Re-visit outcomes

**Individual level**
To evaluate outcomes after a set timeframe, it is recommended to re-visit the outcome measure used to identify the concern using the previously used assessment or outcome measure (GAS, COPM, IPPA, SETT, MPT and LAPUE). Furthermore, the student’s own experience of assistive technology use and satisfaction is critical to capture.

**Societal level**
To ensure that the assistive technology device is meeting the student’s need in all relevant settings, the parent’s satisfaction of the students’ assistive technology use at home and in the community are important to assess.

**Institutional level**
If the desired assistive technology outcome was reached, it is recommended to again determine a time to re-visit the outcome. This will ensure that the student’s needs are met with changing demands throughout the school years.
If the desired assistive technology outcome was not reached, the appropriate step to revisit the assistive technology process needs to be assessed and determined with all key stakeholders around the student.

**Case Study**

The process of identifying and selecting assistive technology can be time consuming. This study, including the literature review, has identified that the process is often complicated with barriers in the environment, as well as the lack of skills and confidence in those individuals who are supporting the student in implementing the technology in the classroom.

Assessments of performance on the Individual level and available resources in the Societal and Institutional level can be presented in a circular model (Figure 18). The colours assigned to describe the level of barriers are: 1) red for severe and complete barriers; 2) yellow for moderate barriers; 3) green for mild barriers; and 4) blank for no barriers. To indicate full ability or no barriers, the corresponding section of the circular chart is left blank. If it has been identified that the person will require an assessment but that a referral to an assistive technology consultant is required, that particular piece of information gets allocated a colour, which corresponds to the level to which it is perceived to be a barrier. As an example, if the staff member is unfamiliar with where to turn for help the corresponding field may be assigned the colour red. This result should prompt the staff to address the barrier with the school principal, who in turn will need to action the request. However, if the workplace has clear guidelines and there is no resistance in finding the information the field is left blank.

Leo, who was interviewed for this study together with his parents, will provide the case study to describe how *AT Guidelines for CP* can be used (Figure 19).

**Step 1: Identify Concerns**

Leo and his family identified that he needs help compensating for his poor handwriting due to his ataxia and to be able to keep up with the increased demand of producing text in the classroom. Leo had previously had interventions from an occupational therapist at a disability organisation. After a meeting at his school where Leo’s need for assistive technology was brought up, Leo’s family was asked to organise an assessment through this disability organisation as there were no staff members at the school skilled in assistive technology. At the disability organisation a COPM was administered by the
Step 2: Assess Activity and Participation

The occupational therapist classified Leo’s gross motor function and fine motor function as well as his communication (GMFCS II, MACS II and CFCS II). It was established that Leo was going to need to use an alternative to handwriting in most classes at school in order to keep up with the writing tasks (mild barrier).

Step 3: Assess Body Functions and Body Structures

Further assessments of Leo’s mental functions, verbal, speech and language functions, sensory and movement related functions were not required. Leo had earlier that year been assessed by allied health professionals at a yearly check-up by the disability organisation. It was established that he experienced some difficulties in being understood and in keeping up with writing tasks at school (mild barrier).

Step 4: Identify Contextual factors

School staff did not feel confident in assessing the appropriate alternative to handwriting so the family was asked to liaise with the disability organisation for an assistive technology to be recommended. It was established that Leo would benefit from access to a laptop. Leo’s parents and his occupational therapist went to a supplier to trial different models. It was established that Leo would be able to independently operate a mainstream laptop if the laptop was built so that Leo could independently open and close the lid. The occupational therapist summarised the assessment, the trial of laptops and highlighted the critical feature in a report, which was made available for the funding body at Leo’s school.

Step 5: Goal set and negotiate plan

The goals for the use of the laptop for Leo were formalised around his access to the curriculum. Leo wanted to be able to participate on similar terms as his peers. A laptop was approved. However, since the initial assessment made by the occupational therapist the school had gone ahead and purchased a range of laptops and assigned one to Leo. The laptop that was assigned to Leo did not meet the minimum criteria of Leo being able to open and close the lid to the laptop by himself.
**Step 6: Implement Plan**

Despite this minimum criteria not being met, the laptop was implemented in the classroom. Consequently, Leo was not able to operate the laptop himself. He had to ask for assistance from a peer at the beginning and end of every class to open and close his laptop.

**Step 7: Evaluate Outcomes**

At the time of the interview Leo had asked to have his laptop reviewed as he felt very embarrassed by having to ask his friends for help every day. Leo did not feel supported by school staff and did not have access to a teaching assistant. His parents were not satisfied with the overall outcome.

**Step 8: Revisit outcomes**

The COPM revealed that satisfaction with his handwriting performance had improved but the overall experience was compromised due to the fact that Leo had to ask for help opening his laptop at the start of every class.

Figure 19 demonstrates how the *AT Guidelines for CP* may look like for a student like Leo. The *AT Guidelines for CP* could be used by the family, the school staff and the allied health professionals to argue for a revision of the assistive technology provision. Depending on the issue at hand, the revision may take the key stakeholders back to the first step in the *AT Guidelines for CP* process, or to the step where the key stakeholders identified the assistive technology provision process broke down. The key stakeholders in Leo’s case may identify that the type of technology is appropriate but a different brand of laptop with a more accessible lid that Leo can operate independently is required. This will take Leo’s parents, school staff and allied health professionals forward to step 4, in which funding and suppliers for a new laptop need to be sought.
Summary

In summary, this chapter reported on a proposed new assistive technology decision-making model *The Assistive Technology Best Practice Guidelines - for children and youth with cerebral palsy (AT Guidelines for CP)* (Figure 18). A case study, based on one of the participants in Phase II, was utilised to describe the 8-step process encompassed by the *AT Guidelines for CP.*
Chapter 7: Discussion

“Listen to parents, they will achieve more than any paid therapist likely will – their child’s life depends on it!”

- Parent
Chapter 6 reported on a proposed new assistive technology model, the Assistive Technology Best Practice Guidelines - for children and youth with cerebral palsy (AT Guidelines for CP) (Figure 18). The AT Guidelines for CP was derived after the research findings from Phase I and Phase II were reviewed and the researcher identified that the field lacked a collaborative assistive technology decision-making framework to support students with cerebral palsy in their use of assistive technology.

Chapter 7 will draw together the quantitative and qualitative findings and discuss the statistically significant results in relation to the research questions and relevant literature. This chapter will outline recommendations for practice and policy and discuss study limitations. Recommendations for future research will be provided in the final and concluding chapter.

Collaborative practices among parents, school staff and allied health professionals are critical aspects of assistive technology service delivery. Collaborative service delivery models such as client-centred and family-centred care are the two dominant approaches recommended throughout the literature (Dunst & Dempsey, 2007; King et al., 1997; King et al., 2004). However, as already discussed there has been little research focusing on its implementation in an Australian school setting. Existing evidence suggests that schools are not generally seen as family-centred, as shared decision-making around the students’ needs between school staff and family is often not found (Copley & Ziviani, 2007; Dunst, 2002; McNaughton et al., 2008). The challenges of implementing collaborative models that take into account the student’s need at school, as well as in their homes, may be explained by the complex coordination of various services across agencies. School staff often need to liaise with allied health professionals outside of the school setting in matters related to assistive technology provision. However, evidence indicates that without the appropriate support, the likelihood of technology abandonment is ever present (Parette & Brotherson, 2004). Most importantly, without the appropriate technology students are left without the means to participate in the classroom and access the curriculum.

The purpose of this thesis is to identify and understand to what extent assistive technology service delivery is family-centred in Australian schools. This has long been the recommended practice in early intervention and is seen as the most effective model. The study also sought to identify factors contributing to students’ ability to access the curriculum through participation in the classroom. Finally, the unique contribution that
this thesis makes to the existing literature is that the perspectives of all key stakeholders in the assistive technology process are captured, using a mixed method design and are analysed within the framework of the International Classification of Functioning Disability and Health (ICF) (World Health Organization, 2001) and the International Classification of Functioning Disability and Health for Children and Youth (ICF-CY) (World Health Organization, 2007).

As noted, the sequential explanatory mixed method design as illustrated in Figure 3, p. 33, allowed for a wide range of parents, allied health professionals and school staff, to be surveyed across disability organisations and school systems in all Australian states and territories. Additionally, parents, allied health professionals and school staff in New South Wales, the most populous state in Australia, were interviewed to illuminate the key findings from the survey.

The International Classification of Functioning Disability and Health (ICF) (World Health Organization, 2001) and the International Classification of Functioning Disability and Health for Children and Youth (ICF-CY) (World Health Organization, 2007), were used in conjunction with a family-centred framework (Dunst, 2002; Rosenbaum et al., 1998) to guide the study. The ICF and the ICF-CY not only provided a framework for the literature review and qualitative data analysis, but also lent clarity to the complex issues surrounding the assistive technology service provision for students with cerebral palsy.

Although the ICF was not specifically developed to guide assistive technology assessment, the literature shows that the ICF and the ICF-CY codes lend themselves as a descriptive model for the assistive technology assessment process. Power, Anderson, and Togher (2011) and Threats (2006) have suggested how the ICF could be used as a framework to elicit questions that could guide assessment and planning. Indeed, Threats (2006) described a program in which the ICF framework had been used with inpatients in a rehabilitation unit and pointed out that by using the capacity qualifiers of the activity and participation component, the ICF can be used to evaluate the progress of an intervention. Furthermore, by observing interventions on the Environmental Factors such as assistive technology, in addition to systematically evaluating Personal Factors, it was suggested that more individualised goals were achieved. By using the ICF framework in this way communication amongst the staff, patients and their families was enhanced. Threats (2006) also found that the ICF as a framework
increased the participants’ participation in the actual goal setting. This is in line with what the World Health Organization (2001) stated. The use of the ICF brings individuals together and leads to better communication, thereby suggesting that the framework lends itself to being used across agencies and professions.

The ICF captures the complex aspects of the impact of assistive technology and its service delivery process and can assist professionals in collaborative goal setting and assistive technology decision-making (Bernd, Van Der Pijl, & De Witte, 2009). As a result, the ICF framework has been used to good effect in this study to not only organise the existing body of knowledge but also to frame the study results, thus facilitating the communication of the study findings. Its benefits have therefore been demonstrated and, if the uptake of the ICF as a framework and assessment tool was to increase, it would facilitate the implementation of assistive technology in schools, lead to greater understanding of disability and enable the creation of a supportive environment for students using assistive technology in the classroom. This, in turn, has the potential to break down some of the barriers associated with implementing assistive technology.

**Overview of significant findings**

The findings in this study hold a number of implications for allied health professionals, school staff, policy makers and researchers. For a successful assistive technology implementation in the classroom, the student, their family, allied health professional and school staff are mainly reliant on Environmental Factors, according to the ICF-CY. However, the findings point to strategies for enabling students with cerebral palsy using assistive technology to achieve classroom goals and a shared assistive technology decision-making, and thus ensuring a family-centred approach in schools.

This study identified the following key findings:

1. Family-centred service provision and shared decision-making are not yet fully achieved in schools, despite it being endorsed in early intervention and disability services for over 20 years.

2. Allied health professionals view parents as a critical link between schools and disability organisations, especially in situations when staff changes occur at schools.
3. School staff, such as classroom teachers and special educators, need to be fully involved in the whole assistive technology process with clear guidelines on how to access technology equipment and funding.

4. The allied health professionals, classroom teachers and teaching assistants all have important roles in the technology process and in supporting the student at different stages.

5. For students to achieve classroom goals, it is essential that the allied health professionals and school staff are clear on their roles have set goals that reflect the issue at hand, are open to learn new skills, have time to meet with other team members and feel comfortable implementing the assistive technology equipment.

6. To best implement assistive technology into classroom activities, parents, allied health professionals and school staff require the opportunity to be provided with mentoring and training opportunities.

7. Students find that they are able to show the teacher what they know when someone encourages them to use their assistive technology.

8. The level of motivation in students and the person supporting students are perceived to play key roles in the success of the assistive technology outcome.

9. A collaborative assistive technology decision-making model that incorporates key aspects of the assistive technology process may assist school staff and allied health professionals to assess and implement assistive technology for students with cerebral palsy.

Key findings and recommendations for practice and policy

Key finding 1

Family-centred service provision and shared decision-making are not yet fully achieved in schools, despite it being endorsed in early intervention and disability services for over 20 years.

Parents reported having positive interactions with school staff and allied health professionals, but wished they had been more involved in decision-making. The parents
reported higher agreement in the domain *being treated respectfully* and to a lesser extent on factors related to *enabling/partnership* as measured on the *Measures of Processes of Care for Caregivers* (MPOC-20) (King et al., 1996). Overall, these findings suggest parents were satisfied with the individuals working with their family. This finding is in contrast to what was reported in the study conducted by Dunst, Trivette, and Hamby (2007).

School staff and allied health professionals rated their ability to *provide a respectful service delivery* the highest rating and *providing general information* the lowest rating, which is consistent with what has been reported elsewhere (Darrah et al., 2010; Dyke et al., 2006; Jeglinsky et al., 2011; Raghavendra et al., 2007; Wilkins et al., 2010; Woodside et al., 2001). As Law et al. (2003) have previously stated family-centredness has been found to be related to improved outcomes for children. An ongoing commitment to family-centred service across agencies will therefore facilitate an enhanced experience of assistive technology service provision for both the children and their families.

Furthermore, even though the MPOC-SP was specifically developed for paediatric health care settings and has not been used in the school context, this study showed that responses from school staff and allied health professionals were comparable. This indicates that the two groups of professionals were both working with similar aspects around the child. These findings are similar to those of Raghavendra, Murchland, et al. (2007) and Woodside et al. (2001) who demonstrated that there were similarities in the scale scores on the MPOC-SP between disciplines in the same disability organisation whose professionals were working on similar aspects of the child’s development. It was therefore seen that although the MPOC-SP was not originally developed to be used with staff in school settings, its use with school staff could be explored.

Consistent with the student survey and the interviews in this study, the findings indicate great variation of perceived client-centred behaviours in schools with some students feeling very supported by their classroom teacher and teaching assistant, whilst others experienced challenges where staff were not confident in the use of their technology. Consequently, staff were unable to support them in the classroom. Further, students were not always fully involved in the decisions made concerning their device/program and this resulted in ill matched equipment and a barrier to their participation. As already stated, one student reported that he was asked to use a laptop that he could not open by himself and was encouraged to ask his friends before every class to open his laptop for him. To reiterate, he said: “So eight times a day I’m going to go and say to my friends - can you
open my laptop?” – Student. There is a clear need for continuing professional development for school staff to raise disability awareness.

**Recommendation**

The quantitative and qualitative data in this study have extended the current understanding of the student’s perspective, in which the importance was highlighted of further working towards including both the perspective of the students and the educators. Increased access to the curriculum can best be achieved by including students in the assistive technology process and working on goals that are equally important to the student, as they are to educators and parents.

To break down some of the barriers identified in the interviews and focus groups, relatively simple things like transparency of guidelines around exams are needed. It’s also important to make the schedule of educators available well ahead of time for the coming school year, so that both teachers, families and allied health professionals have an opportunity to meet, plan and establish potential training needs. Furthermore, it is necessary for support from the school board and principals who acknowledge that collaboration is essential to everyone around the student with the right tools at the right time to enable successful access to the school curriculum.

To facilitate the implementation of a family-centred approach, it is recommended that family-centred behaviour be taught and encouraged in pre-service training and in modules offered for post-graduation professional development, with the aim to influence the culture in schools and disability organisations. Previous studies have pointed to the immediate and long-term benefits in attitudinal change and skills amongst pre-service professionals who were introduced to family-centred principles in their coursework (Murray & Mandell, 2004, 2006). Furthermore, the use of a clearly structured process in a client-centred and family-centred framework for assistive technology assessment and implementation will guide the development of educational goals using assistive technology.

**Key finding 2**

Allied health professionals view parents as a critical link between schools and disability organisations, especially in situations when staff changes at schools occur.
Allied health staff have raised concerns around the lack of continuity of educators with the student’s classroom teacher often changing annually. Consequently, both allied health professionals and parents expressed concerns around the potential loss of knowledge of the student’s needs and the challenges of providing timely information to relevant staff members. They noted that changes in teaching staff have placed a significant burden on families and that the ability to plan and collaborate with the school staff was often compromised. Furthermore, allied health staff expressed concerns that the annual change of educators, and often teaching assistants, frequently led to a communication breakdown. At times, these circumstances led to the allied health professional and school staff feeling less confident with the technology and this resulted in the technology not being used. This difficulty was identified in earlier published work (Bailey et al., 2006; Copley & Ziviani, 2004; Egilson & Traustadottir, 2009; Nicolson, Moir, & Millsteed, 2013). Moreover, if the student’s new support staff were less interested in technology there were also concerns that the allied health professionals were left out and previous collaboration between agencies and families therefore broke down. In light of this, the allied health professionals identified that the parents had a crucial role to fulfil. The parents, as the constant person in the student’s life, were often seen as a link between the changing classroom environments as well as the link between the school and disability organisation.

**Recommendation**

To facilitate the continuity of information exchange between changing classroom teachers and teaching assistants the use of standardised documentation, ideally based on the ICF and family-centred principles, will not only provide the parents with a resource to point to when engaging with the new staff but also provide an overview of their child’s progress.

Detailed written guidelines in every school and disability organisation may also facilitate communication between agencies involved in the support of technology and alleviate some of the burden on staff in researching where to turn for assistance when technology has been identified as a recommended adjustment.

By mandating a standard way of recording every student’s learning goals, the transition process for students and their parents would be facilitated. This would lead to both schools and families gaining increased ownership around the important work of making sure that information is carried over to new school staff. This will also lead to shared-
decision making around the student’s goals. Ultimately, this would mean that families could be relieved, to some extent, from the onerous task of ensuring that everyone has the information they need to provide the best education possible for their child.

Key finding 3

Findings from this study show that issues related to the chapter Support and Relationship, as set out in the ICF and the ICF-CY, are critical. Classroom teachers in particular, were not always present when the technology was matched to the student, whom the teachers were later going to support. If classroom teachers and school staff are not actively involved in the assessment and decision-making process with the student and their family, it is likely that the student’s outcome will be jeopardised. If the classroom teachers’ knowledge and expertise are not utilised there is a risk that interventions are put in place that might not be aligned with the student’s needs in the classroom. Similar findings were reported by Robinson and Sadao (2005).

The findings also showed that occupational therapists thought that they gained more insights into the student’s abilities after implementing technology than did the school staff. This may further suggest that school staff already have a good understanding of the skills of the student and as such are important collaborators and team members to have present at the assessment stage.

Many participants also pointed to either the lack or inconsistency of guidelines around funding options for school staff wishing to access technology assessment. The degree of organisation and the use of guidelines were reported to impact on the length of time the student had to wait for equipment. In some cases students went without much needed computer programs or devices for up to a year whilst the school researched funding options. Other issues raised in Phase II were that schools were inconsistent around where students were allowed to use the school-funded technology and which equipment could be taken home for homework or could go with the student when they changed schools. Timing was critical, if the transition to the new school was not carefully planned the student did not have access to the curriculum and was at risk of falling behind. For the new classroom teacher this meant that they were often unable to assess
the student’s knowledge and hence not able to provide the student with the appropriate educational material.

The survey in Phase I of this study showed that there was no relationship between the student achieving classroom goals and whether the equipment had been available for trials. Furthermore, no relationship was demonstrated between the student achieving classroom goals and the workplace having a clear process and guidelines in place for the assistive technology process. These results were not consistent with either the interviews or focus group findings; nor previous research on funding and time as identified by Copley and Ziviani (2004) in their literature review. This may be due to respondent bias, as well as the fact that two thirds of the respondents were allied health professionals who were not employed by a school and hence were responding with respect to the disability organisation providing their employment.

**Recommendation**

There is urgency for schools and disability organisations to have clear policies and guidelines on how to enable school staff to participate in the assistive technology process as well as access funding for students to obtain assistive technology. The support and provision of assistive technology assessment tools in schools would facilitate a greater awareness and encourage increased participation of school staff in the initial stages of the assistive technology process. Furthermore, a minimal level of funds made available for each student with a disability could provide an important start while waiting for further funds to be made available. A minimal and specific funding budget for students will not bring down the current challenges many schools and individuals face with accessing funding in a timely manner. However, it may make the process more efficient for school staff and allied health professionals and potentially generate increased access to funds made available to the school.

**Key finding 4**

*The allied health professionals, classroom teachers and teaching assistants all have important roles in the technology process and are supporting the student at different stages.*

Parents stressed the influence the principal has on how technology was handled by the school staff. “*The principal sets the tone of the school*” one parent stated. However, the findings in this study suggest that parents found occupational therapists and speech
pathologists to be the most helpful in both the assessment and set-up stage of assistive technology. The school staff and allied health professionals found the allied health professionals and teaching assistants the most helpful team members during both the assessment and the set-up stage.

In studies by Kent-Walsh and Light (2003) and Smith and Connolly (2008) the teaching assistant was found to provide invaluable support for the inclusion of students using Augmentative and Alternative Communication. However, as previously mentioned, training and knowledge of technology are important in order for staff to feel comfortable in supporting the student in the use of the assistive technology. According to previous research, for the teaching assistant to be helpful they need to be: 1) trained; 2) actively involved with the student; 3) employed to cover most school hours; and 4) be one consistent person (Kent-Walsh & Light, 2003).

To have one dedicated contact person knowledgeable in assistive technology from whom it was easy to get support was something that parents, allied health professionals and school staff found essential for the successful introduction of a new piece of equipment. This was consistent with what previously had been reported in the literature (Kent-Walsh & Light, 2003). The data showed that parents and allied health professionals turned to assistive technology specialists for further support and education whilst educators, on the other hand, identified the consultant provided by the school as someone with whom they felt comfortable when trouble shooting was needed. The role of the school consultant was acknowledged to facilitate critical learning for school staff as they were able to negotiate adequate support and thus meet the individual student’s needs by applying their understanding of curriculum requirements and knowledge about the student’s disability. As technology advances, it will be beneficial to have someone in a dedicated role whom will facilitate the implementation of the technology in the classroom.

**Recommendation**

School staff and allied health professionals have a pivotal role in supporting the student at different stages throughout the assistive technology process. As such, it seems that processes that clearly identify the team members’ roles around the student will be not only beneficial but more efficient. In addition, clearly documented records of the student’s assistive technology journey would further facilitate handover when students receive a change of school staff or allied health professionals. This ensures that students
continue to receive adequate support and prevents delays in their learning experience.

**Key finding 5**

> For students to achieve classroom goals, the findings suggests that it is essential that the allied health professionals and school staff are clear on their roles, have set goals that reflect the issue at hand, are open to learn new skills, have time to meet with other team members and feel comfortable implementing the assistive technology equipment.

A combination of Environmental Factors, according to the ICF-CY, such as attitudes, services and systems can be attributed to aspects identified as influencing students’ abilities to achieve classroom goals. Allied health professionals and school staff report a lack of both goal setting and formal assessment instruments which suggests a general lack of assessment, planning and systems that fail to support the professionals. In addition to the lack of a formal assessment instrument, Hemmingsson et al. (2007) suggested that a barrier and challenge for professionals trying to collaborate across agencies lies in them not sharing the same policies, goals, perspectives and as a consequence priorities.

Many mainstream classroom teachers and allied health staff reported that they often felt they had insufficient time, were not provided with professional development, nor time to learn, plan or set-up the piece of assistive technology equipment. Consequently, they often resorted to preparing classes and resources outside of work hours. Most allied health professionals and school staff want to assist the student, with whom they work, to achieve their full potential. Unfortunately, the school system in particular seemed to rely on the willingness of their staff to create systems within the system to meet the student’s need. This can hardly be a sustainable solution as the situations eventually become too challenging and may result in burnout.

Previous research has established that students’ academic needs do not receive enough attention and that allocated time is required to learn to use a device and to plan for activities in the classroom (Kent-Walsh & Light, 2003). Furthermore, not unlike previous studies (Nochajski, 2001; Stowitschek et al., 2001), this study identified the importance of collaborations in which clear role expectations and time to meet were essential (Prigg, 2002).
**Recommendation**

It is recommended that systems and policies are in place that would facilitate scheduled meeting and planning opportunities, during work hours, for both the classroom teacher and the student’s teaching assistant. This would further facilitate collaboration amongst the team members around the student. In addition, a system that allows the classroom teacher to be released for meetings with allied health professionals and parents would not only facilitate collaboration between agencies but also enable the school staff to engage in assessments.

**Key finding 6**

Parents, allied health professionals and school staff need to seek mentoring and training opportunities in assistive technology, in particular: how to implement assistive technology into classroom activities.

The findings from the interviews and focus groups demonstrated that school staff’s knowledge, not only of the use of technology but also of disability, impacts on the student’s classroom experience and ability to access the curriculum. The participants suggest that, particularly in mainstream settings, there is an increased need for support and guidance from someone with greater depth of knowledge on how to meet the student’s needs.

The participants emphasised the need for ongoing training opportunities as both the technology and the student evolve and needs change. The findings from this study support earlier research that found that without sufficient training and support the staff supporting the student were less likely to feel confident and comfortable implementing a device, which will affect important student outcomes such as increased participation (McMillan, 2008). As documented elsewhere (Hawley, O’Neill, Webb, & Roast, 2002), the service provision of assistive technology is complex. Parents, allied health professionals and school staff need assistance to find ways to collaborate through the assessment and the set up stage. Furthermore, the findings also suggest that staff would benefit, in an educational context, from receiving mentoring and training opportunities. In particular, training opportunities in how to implement assistive technology in classroom activities and how to establish academic goals using assistive technology equipment are required. Goals that clarify the aim of the technology and team members’
roles may not assist the staff in their immediate work but would most likely lead to staff identifying training needs and asking for training opportunities. These training opportunities could also be shared with parents.

Assistive technology equipment for children with disabilities often requires preparation and planning (Nicolson et al., 2013). This study showed that many educators emphasised the need for age appropriate material to engage students in academic tasks. According to the educators, age appropriate and electronic material was not easily accessed and therefore most resources had to be individually prepared for each student by the educator. Furthermore, parents reported spending a large amount of their time programming and setting up their child’s device and equipment, which on many occasions lead to stressful experiences. Even though research has shown these factors to be critical, it continues to be an issue. Alternatives for providing training and support are needed.

**Recommendation**

The ongoing need for training and support in assistive technology provision and disability calls for expert support in operational, strategic, linguistic and social skills. Access to the availability of assistive technology consultants and to local school consultants to access the required assistive technology up-skilling could improve the procedures for implementation and goal setting.

To address the lack of time available for training, programming and other support activities around assistive technology, dedicated administrative support is crucial. Furthermore, in the absence of more commercial alternatives, it would be valuable to support school libraries in storing adapted electronic material to make resources available for both mainstream and special school staff. If administrative support was made available, such material would assist the many time poor educators who in their work with older students sometimes need resources designed for a younger year level.

**Key finding 7**

*Students find that they are able to show the teacher what they know when someone encourages them to use their assistive technology.*

Students report that their ability to show the teacher what they know and can do increased when someone had encouraged the use of the device in the classroom. These
findings were echoed in studies by Majnemer et al. (2010) and MacTurk, Morgan, and Jennings’s (1995), which also suggested that students’ intrinsic motivation may potentially be influenced by family and contextual factors. This further suggests that it is imperative that students feel supported and are being encouraged to use their devices in the classroom.

Apart from involving the student and their parents in the assistive technology process both parents and allied health professionals suggested creating a peer-learning environment as a strategy to demystify and aid the implementation of a device in the classroom.

**Recommendation**

It is recommended that allied health professionals and school staff allow time for students to practise and explore their assistive technology equipment in order to build confidence in its use. It is also recommended that students be provided with opportunities for one-on-one sessions with a therapist targeting operational skills. Furthermore, to build the students confidence in using the assistive technology, the students should be offered guided training opportunities before introducing the technology in more demanding contexts. These recommendations are echoed from earlier studies by Clarke et al. (2001) and Smith and Connolly (2008).

**Key finding 8**

*The level of motivation in students, and the person supporting students, plays a key role in the success of the assistive technology outcome.*

In this study most students who were interviewed demonstrated high levels of motivation, a likely artifact of volunteering to participate. However, both educators and allied health professionals pointed to the fact that some students did not inherently have high levels of motivation and required increased support and guidance. Majnemer et al. (2010) found in their study of school-aged children with cerebral palsy that positive social behaviours were associated with high motivation. Compared to typically developing peers, their findings suggested that students with a more severe level of cerebral palsy generally showed lower levels of motivation.
Students’ motivation to use the technology played an integral part in how successfully the technology was used. Moreover, the school staff and allied health professionals recognised that their own motivation to support the student was heightened when they saw the student succeed using their technology equipment. Similar to the findings reported by McNaughton et al. (2008), the participants in this study reported that they felt they required key elements of confidence and skill not only with the assistive technology but also in understanding the student’s strength and weaknesses. These results are consistent with two other Australian studies (Copley & Ziviani, 2004; De Bortoli et al., 2010).

**Recommendation**

As previously noted, to build confidence and skills students, parents, school staff and allied health professionals need ongoing support and opportunities to practise operational, strategic and linguistic skills with the assistive technology equipment. Furthermore, it is recommended that schools and disability services may adopt peer-to-peer, or peer-mentoring strategies, as alternative training strategies. Emergent findings suggest that these strategies have a positive effect on increasing the student’s motivation to demonstrate what can be achieved with assistive technology. For students with a more severe cerebral palsy, schools staff and allied health professionals may need expert support to accommodate activities to meet the need of the student.

**Key finding 9**

*A collaborative assistive technology decision-making model that incorporates key aspects of the assistive technology process may assist school staff and allied health professionals to assess and implement assistive technology for students with cerebral palsy.*

Allied health professionals and school staff aim to achieve the best outcome for the students. For students with cerebral palsy, educators and allied health professionals often make big and small changes to the student’s environment to optimise their engagement in the classroom activities. This is often achieved by bringing assistive technology into the classroom. However, it is apparent that despite previous recommendations on how to support assistive technology (Copley & Ziviani, 2007; Hemmingsson et al., 2007; Raghavendra et al., 2012; Rowland et al., 2012) barriers to successful assessment and implementation are still evident. The challenges of time...
constraints, lack of collaboration amongst families, school staff and allied health professionals in addition to poor assistive technology guidelines calls for a model that can easily be used across disciplines, to complement the assessment and documentation procedures already available for assistive technology decision-making.

**Recommendation**

To facilitate a common language among students, parents, school staff and allied health professionals, a proposed model has been developed, the *Assistive Technology Best Practice Guidelines – for students and youth with cerebral palsy*. Further tests of the utility of the *AT Guidelines for CP* are needed to determine the degree to which the model will assist students, parents, school staff and allied health professionals to achieve shared assistive technology decision-making.

**Study Limitations**

This study focused on key stakeholders from all states and territories in Australia across the three different school systems, public, Catholic systemic and Independent and the disability sector and was both a strength and a limitation of this study. Whilst the findings of this study are not generalisable, the study is unique in that it provides a picture of the current assistive technology service provision from the perspectives of parents, students, school staff and allied health professionals.

Despite extensive efforts to obtain a large number of respondents, this study could have been strengthened with a larger sample size and with the opportunity to match the students, their families, school staff and allied health professionals. As previously noted it was not deemed feasible because of resource constraints to send out a reminder letter to all sites that initially had been contacted. Thus, this limitation likely impacted on the response rate, a complication previously reported on in the literature (Fowler, 1993).

As outlined in Chapter 4, due to the issues of potential non-participation in the national survey, the sample size was likely to be compromised. Although the CP Registers across Australia were very supportive in the recruitment, the lack of follow-up together with the challenge of the CP Registers not yet collecting data on client’s use of assistive technology made it difficult to gauge an expected reasonable response rate. It may be that the respondents may be part of a biased sample if they were very satisfied or very unsatisfied with the services they had received.
The smaller sample of parents, students, classroom teachers and allied health professionals who participated in the interviews and focus groups included families that lived in rural, regional and metropolitan areas of Australia. The educators worked in two of the three school systems. However, a larger cross section of the participants in addition to including principals and policy makers could potentially provide further insights into how some of the barriers to implementing assistive technology in the classroom can be addressed.

This study employed new questionnaires, which provided valuable information about the respondents’ assistive technology experience. However, there were some limitations to the development and use of the questionnaires. In particular, the sample size of 100 school staff and allied health professionals, resulting in 65 parents and 22 students who completed the survey, placed some limitations in psychometric testing of the scales within the instrument as well as analysing the data.

Furthermore, the study used the instruments MPOC-SP and MPOC-20, which up until now have mostly been used as measures of family-centred behaviour in staff in paediatric settings. Some of the wordings on the questionnaires may have been foreign and possibly not fully applicable in the context of schools. However, the findings indicate that school staff and allied health professionals reported similar behaviours, which may imply that similar constructs were measured. Indeed, only a couple of families indicated that they had preferred to fill out two separate MPOC-20s, indicating that they found the services received by the disability organisation provided a different level of support to them compared to the school in which their child was enrolled. However, as the focus of the study was to understand the assistive technology service provision in the classroom it was deemed more informative to have only one MPOC-20 questionnaire.

Summary

This study extends the literature on assistive technology service provision for students with cerebral palsy using assistive technology in the classroom, by identifying the extent to which client-centred and family-centred assistive technology approaches are used by schools in Australia. The study describes a reality in which family-centred service and shared decision-making is not yet fully achieved in schools. The findings point to the need for classroom teachers to be more involved in the early stages of the assistive
technology process, and be skilled and supported in how to implement and set academic goals for the student whilst using the assistive technology in classroom activities. However, policy, lack of guidelines, assistive technology skills and time constraints can prevent school staff and allied health professionals from being able to fully engage in a more collaborative approach with students and their families.

On the other hand, this study also identified factors contributing to students’ abilities to access the curriculum, such as allied health professionals and school staff having clear responsibilities, students’ motivation, students being encouraged to use their technology and the use of peer-to-peer approaches.
Chapter 8: Conclusion

“Everyone has the right to education”

In Chapter 7, nine significant findings were discussed and recommendations for practice and policies were presented, and the limitations of this study were outlined. Chapter 8 will conclude the main contributions of this study and present recommendations for future research.

This study has been concerned with establishing to what extent client-centred and family-centred assistive technology approaches are used in schools in Australia. The study also aimed to identify the perceptions of students, parents, school staff and allied health professionals of the factors contributing to students’ abilities to access the curriculum and foster participation in the classroom.

These issues were analysed within the framework of the International Classification of Functioning Health and Disability for Children and Youth (ICF-CY). This framework provides a contemporary approach and perspective on the complex factors related to the service provision of assistive technology for school-aged children with cerebral palsy. Addressing the factors in this way extends previous work that has typically examined high-tech technology for students with disabilities in the context of the classroom.

**Overview of significant study contributions**

This study contributes to the current body of knowledge of family-centred care as an evidence-based service delivery model in assistive technology for students with cerebral palsy. Furthermore, it describes factors contributing to a successful uptake of assistive technology and these factors in relation to school-aged children’s ability to achieve classroom goals and participation. In addition, the views of all key stakeholders are presented including the students, their parents, the school staff and allied health professionals across many agencies, school systems, states and territories in Australia. Finally, the participants in this study identified the individuals who have a key role in supporting and encouraging the student in using the prescribed equipment.

This study employed a mixed method study with a sequential explanatory design. A quantitative Phase I was followed by a qualitative Phase II, with equal priority given to the two phases. These two phases provided a number of important perspectives on the participants’ experience of involvement in shared decision-making and factors related to the technology process. The results in Phase I supported earlier findings that reported parents and allied health professionals were most satisfied with those aspects of family-
centred care that reflect interpersonal relationships and least satisfied with the provision of general information. There were no statistically significant differences in the perceptions of providing family-centred care between the roles of school staff and allied health professionals, the years of experience in their role or experience in working with students with cerebral palsy. Moreover, the findings point to the significance of family and student involvement, with the support of allied health professionals, in the process of selecting and implementing assistive technology in the classroom. Furthermore, for students to achieve classroom goals, it is essential that the allied health professionals and school staff are clear on their roles, are setting goals, are open to learn new skills, have time to meet with other team members and feel comfortable implementing the assistive technology equipment. This study has also shown that school staff, such as the classroom teachers, are yet to be fully involved in the assistive technology process.

As a response to these findings on the reported lack of time and assistive technology guidelines, an assistive technology decision-making model applicable across disciplines is proposed.

Findings from Phase II showed that students’ motivation, level of support and training from parents, school staff and allied health professionals played an integral part in how successful the technology was used in the classroom. This study demonstrated that ensuring adequate training and having a dedicated teaching assistant are perceived very positively by the parents, the school staff and allied health professionals.

Taken together, the qualitative data also grounded the quantitative findings with a more personal account and provided richer detail on the participants’ experiences of assistive technology and its impact on the students’ classroom activities. However, the results from this study should be generalised with caution due to the sample size in phase I.

In conclusion, this study:

1. Provides an extension to the assistive technology research, by specifically looking at high-tech Augmentative and Alternative Communication and alternative to handwriting equipment for school-aged children in the context of the classroom.

2. Provides further information on the family-centred and client-centred care within Australian schools, as measured by the Measures of Processes of Care for
Caregivers (MPOC-20), the Measures of Processes of Care for Service Providers (MPOC-SP) and the Give Youth a Voice (GYV-20), and adds to the small body of work on high-tech assistive technology in Australian schools.

3. Provides an identification of factors that impact on students’ ability to achieve classroom goals and increased participation when using assistive technology.

4. Establish that classroom teachers and teaching assistants have key roles in supporting students but that system barriers prevent them from fully engaging in the assistive technology process, which may impact on academic outcomes for the student.

5. Provides an extension to the existing research suggesting further use of the ICF-CY as a framework for modeling the selection of assistive technology devices.

6. Provides an example of organising the qualitative findings from a cross-case analysis under the relevant sections of the ICF-CY and extends the current research using the ICF-CY as a framework to describe research findings.

7. Proposes an assistive technology decision-making model, the Assistive Technology Best Practice Guidelines – for children and youth with cerebral palsy.

This study has synthesised the findings describing the views of students, parents, school staff and allied health professionals regarding the implementation of high-tech assistive technology systems and services. It is argued that this can provide helpful data to inform intervention studies and outcome measures and that if taken together will provide an extension to the current body of knowledge of assistive technology for school-aged children with cerebral palsy.

Enhancing the understanding of how a family-centred service delivery model can work in schools may facilitate the implementation of assistive technology and has both policy and practice implications. The barriers to implementing assistive technology, raised by many researchers throughout the last 20 years, appear to go beyond what the individual parent, school staff or allied health professional is able to work around. The introduction of the Australian Curriculum, Assessment and Reporting Authority (ACARA) is a promising advancement. However, the initiative may need to be backed up with research on how educators can best include all students in the classroom, using
modified classroom activities, according to the recommendations outlined in the ACARA.

To facilitate the implementation of the recommended practices of client-centred and family-centred care and the framework of the ICF-CY, a new model is needed to ensure that these components are reflected in the assistive technology service delivery process. The proposed model, *Assistive Technology Best Practice Guidelines – for children and youth with cerebral palsy* aims to address this need and will require further research to test the utility of the model.

**Recommendations for future research**

One of the key concepts identified from the findings in this study was the need for students to be encouraged to use their technology in the classroom. Consistent with the information found in the literature (Batorowicz & Shepard, 2011; Copley & Ziviani, 2007), the research findings of the current study demonstrate that the use of a team approach is positive as different stakeholders take on different roles throughout the assistive technology process. This study showed that in addition to having a team, it is critical to have someone knowledgeable in assistive technology taking the lead and guiding the assessment and implementation process.

Future research directions might include investigating how best to guide school staff in the level of assessment and planning that is required to support students who use assistive technology (Copley & Ziviani, 2007). In particular it would be advisable to assess student outcome and participation in the classroom instruments based on the ICF/ICF-CY approach. Whilst assistive technology assessment instruments based on the ICF are available to purchase online, the World Health Organization provides a free ICF checklist that can provide the framework for a quality low cost assessment tool, and is suitable for both school and allied health staff. Further research may investigate what additional guidelines and instructions are needed to optimise the uptake of such a resource as some challenges exist in using the check-lists which have a high number of items.

In addition, further research could investigate how to establish cost effective and efficient strategies to implement assistive technology. Most importantly, it should determine how to provide peer-to-peer mentoring or supervision, when a student has received his or her technology, as the work with implementing the equipment in the
classroom begins. Web-based videoconferences and teleconferences could possibly provide an avenue for parents, assistive technology consultants, consultants provided by the school system, and other professionals with knowledge of the assistive technology device to discuss issues and to provide training and resources.

Enhanced assistive technology provision may benefit from investigation into a cost effective model in which technology can be accessible for loan and where a training package for staff and families could be purchased, or be part of a funding program. No device should be delivered without training support and resources.

Research focusing on strategies for making educators available for assistive technology assessment sessions is a further research topic that needs elucidation. In particular, research is needed into cost-effective release models to enable educators to participate and contribute their knowledge in the initial stages of the assistive technology process, as well as the later stage when the technology is being implemented.

More information in any of these areas could increase opportunities for not only more confident staff, but also increased student participation and achievement. Partnerships between researchers, policy makers, service providers and families must be developed to address system barriers.

**Summary**

A proposed assistive technology model specific for school-aged children with cerebral palsy, the *Assistive Technology Best Practice Guidelines – for children and youth with cerebral palsy*, tailored for visual presentation to both allied health professionals and school staff, suggests a way to promote the use of a common language for school staff and allied health professionals.

Taken together, the findings in this study hold implications for researchers examining how to best assess and implement assistive technology in the classroom. The findings are relevant for policy makers and educational practitioners operating within the school context in which students are trying to use their assistive technology. Only through the considered engagement of all stakeholders will assistive technology allow students to be able to access the curriculum to obtain an education that increases their potential to have a vocation upon leaving school and allow their participation in the community. A collaborative team approach is the key.
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Appendices

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ASSISTIVE TECHNOLOGY IN THE CLASSROOM - PARENT AND CAREGIVER MEASURE OF SATISFACTION QUESTIONNAIRE

PART 1: INFORMATION ABOUT YOUR FAMILY

1. Who is filling out this form? Please tick

☐ Mother ☐ Father ☐ Caregiver

2. Where do you and your child live? Please tick

☐ ACT ☐ NSW ☐ NT ☐ SA ☐ TAS ☐ VIC ☐ WA ☐ QLD

☐ Metropolitan ☐ Rural ☐ Regional

3. Does anyone use a language other than English at home? Please tick

☐ Yes ☐ No

If ‘No’ please go directly to Question 6.

4. If yes, what language is spoken at home? (It can be more than one)

__________________________________________________________________________________

5. How often do you and your child speak English in your family? Please tick

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

6. What is your household’s total annual income, before taxes? * Please tick

☐ Less than $31,199 ☐ $31,200 to $51,999 ☐ $52,000 to $83,199 ☐ More than $83,000

* This question will help us understand equipment ownership and the government grants system. Your answer will be confidential and anonymous like all your answers in this questionnaire. You do not need to answer this question if you do not feel comfortable doing so.

PART 2: INFORMATION ABOUT THE MOTHER OF THE FAMILY

1. In which country was the child’s mother/caregiver born?

__________________________

2. The mother/caregiver is…. Please tick

☐ Working full-time for pay ☐ Working part-time for pay ☐ Caring full time for family ☐ Other

3. What is the highest level of education attended? Please tick only one

☐ Primary ☐ Secondary ☐ TAFE or certificate qualifications ☐ Tertiary
PART 3: INFORMATION ABOUT THE FATHER OF THE FAMILY

1. In which country was the child’s father/caregiver born? _________________________

2. The father/caregiver is……..Please tick

☐ Working full-time for pay  ☐ Working part-time for pay  ☐ Caring full time for family  ☐ Other

3. What is the highest level of education attended? Please tick only one

☐ Primary  ☐ Secondary  ☐ TAFE or certificate qualifications  ☐ Tertiary

PART 4: INFORMATION ABOUT YOUR CHILD

1. Is your child? Please tick

☐ Male  ☐ Female

2. How old is your child today?

[ ] Year  [ ] Months

3. How many brothers and sisters does your child have?

[ ] Brothers  [ ] Sisters

4. What grade is your child in?

[ ] Grade

5. Does your child have a teacher’s aide? Please tick

☐ Yes  [ ] If yes, how many hrs/week? [ ]  ☐ No

6. What type of school is your child enrolled in? Please tick

☐ Public  ☐ Catholic systemic  ☐ Independent

7. What type of class does your child attend? Please tick

☐ Regular classroom – full time  ☐ Support class in regular school – full time  ☐ Time split between regular and support class  ☐ Part time in regular class with resource support  ☐ Full time Special School

8. How long has your child used assistive technology in the classroom? Please tick

☐ 0-3 months  ☐ 4-6 months  ☐ 7-12 months  ☐ 1-3 years  ☐ More than 3 years

9. Where does your child use the device/program? Please tick all that apply

☐ School  ☐ Home  ☐ Other: (please specify)

10. Who funded the equipment, used in the classroom? Please tick all that apply

☐ School  ☐ State/territory government based funding body  ☐ Family  ☐ Other funding body e.g Lions and Rotary
PART 5: INFORMATION ABOUT YOUR CHILD’S DISABILITY

1. What type of cerebral palsy does your child have? You may tick more than one

<table>
<thead>
<tr>
<th>Spasticity</th>
<th>Dyskinesia</th>
<th>Ataxia</th>
<th>Hypotonia</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Left Hemiplegia</td>
<td>☐ Mainly Athetosis</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>☐ Right Hemiplegia</td>
<td>☐ Mainly Dystonia</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>☐ Diplegia</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Triplegia</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Quadriplegia</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Spasticity</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Ataxia</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Hypotonia</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Do not know</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you do not know, how many limbs are affected?

2. My child communicates by:  
(Please tick all that apply)

- ☐ Speech
- ☐ Sounds (such as an “aaaah” to get a partner’s attention)
- ☐ Eye gaze, facial expressions, gesturing, and/or pointing (e.g., with a body part, stick, laser)
- ☐ Manual signs
- ☐ Communication book, boards, and/or pictures
- ☐ Voice output device or a speech-generating device
- ☐ Other:

3. In everyday situations my child communicates...

- ☐ Level 1  
  Effective Sender and Receiver with unfamiliar and familiar partners.
- ☐ Level 2  
  Effective but slower paced Sender and/or Receiver with unfamiliar and/or familiar partners.
- ☐ Level 3  
  Effective Sender and Receiver with familiar partners.
- ☐ Level 4  
  Inconsistent Sender and/or Receiver with familiar partners.
- ☐ Level 5  
  Seldom Effective Sender and/or Receiver even with familiar partners.

(Please see CFCS sheet for further information)

4. In everyday situations my child handles objects...

- ☐ Level 1  
  Handles objects easily and successfully.
- ☐ Level 2  
  Handles most objects but somewhat reduced quality and/or speed of achievement.
- ☐ Level 3  
  Handles objects with difficulty; needs help to prepare and/or modify activities.
- ☐ Level 4  
  Handles limited selection of easily managed objects in adapted situations
- ☐ Level 5  
  Does not handle objects and has severely limited ability to perform even simple actions.

(Please see MACS sheet for further information)

5. In everyday situations my child walks, move, transfer...

- ☐ Level 1  
  Walks without limitations.
- ☐ Level 2  
  Walks with limitations
- ☐ Level 3  
  Walks using a hand-held mobility device.
- ☐ Level 4  
  Self-mobility with limitations; may use powered wheelchair.
- ☐ Level 5  
  Transported in a manual wheelchair.

(Please see GMFCS sheet for further information)
### PART 6: YOUR CHILD’S DEVICE OR COMPUTER PROGRAM

1. Which of these speech generating devices or computer access options does your child currently use in the classroom? Please tick. It can be more than one device/program

<table>
<thead>
<tr>
<th>Device/Program</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Allora</td>
<td><img src="image1.png" alt="Allora Image" /></td>
</tr>
<tr>
<td>☐ DynaVox (Vmax, E, M, Serie4, MightyMo &amp; MiniMo)</td>
<td><img src="image2.png" alt="DynaVox Image" /></td>
</tr>
<tr>
<td>☐ DynaWrite</td>
<td><img src="image3.png" alt="DynaWrite Image" /></td>
</tr>
<tr>
<td>☐ Eye control</td>
<td><img src="image4.png" alt="Eye Control Image" /></td>
</tr>
<tr>
<td>☐ LightWRITER</td>
<td><img src="image5.png" alt="LightWRITER Image" /></td>
</tr>
<tr>
<td>☐ Optimist/Tablet PC (Vanguard, Vantage &amp; Eco)</td>
<td><img src="image6.png" alt="Optimist/Tablet PC Image" /></td>
</tr>
<tr>
<td>☐ Pathfinder</td>
<td><img src="image7.png" alt="Pathfinder Image" /></td>
</tr>
<tr>
<td>☐ Polyana 4</td>
<td><img src="image8.png" alt="Polyana 4 Image" /></td>
</tr>
<tr>
<td>☐ Polyana 4</td>
<td><img src="image9.png" alt="Polyana 4 Image" /></td>
</tr>
<tr>
<td>☐ Say-it! Sam</td>
<td><img src="image10.png" alt="Say-it! Sam Image" /></td>
</tr>
<tr>
<td>☐ Tango</td>
<td><img src="image11.png" alt="Tango Image" /></td>
</tr>
<tr>
<td>☐ The Grid</td>
<td><img src="image12.png" alt="The Grid Image" /></td>
</tr>
<tr>
<td>☐ VS Communicator</td>
<td><img src="image13.png" alt="VS Communicator Image" /></td>
</tr>
<tr>
<td>☐ Discover Pro</td>
<td><img src="image14.png" alt="Discover Pro Image" /></td>
</tr>
<tr>
<td>☐ Clicker 4 or 5</td>
<td><img src="image15.png" alt="Clicker 4 or 5 Image" /></td>
</tr>
<tr>
<td>☐ EZ Keys</td>
<td><img src="image16.png" alt="EZ Keys Image" /></td>
</tr>
<tr>
<td>☐ Math’s program</td>
<td><img src="image17.png" alt="Math’s program Image" /></td>
</tr>
<tr>
<td>☐ Rate enhancement/Word prediction program</td>
<td><img src="image18.png" alt="Rate enhancement/Word prediction program Image" /></td>
</tr>
<tr>
<td>☐ VoiceRecognition</td>
<td><img src="image19.png" alt="VoiceRecognition Image" /></td>
</tr>
<tr>
<td>☐ Mounting systems for device or switch</td>
<td><img src="image20.png" alt="Mounting systems for device or switch Image" /></td>
</tr>
<tr>
<td>☐ Other high-tech device/program</td>
<td><img src="image21.png" alt="Other high-tech device/program Image" /></td>
</tr>
</tbody>
</table>

Please specify: __________

2. Is your child using alternative access equipment? Please tick

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, please tick the category. It can be more than one.</td>
<td></td>
</tr>
<tr>
<td>☐ Alternative keyboard</td>
<td>☐ Head mouse</td>
</tr>
<tr>
<td>☐ Head mouse</td>
<td>☐ Joystick</td>
</tr>
<tr>
<td>☐ Joystick</td>
<td>☐ Switch</td>
</tr>
<tr>
<td>☐ Switch</td>
<td>☐ Trackball</td>
</tr>
</tbody>
</table>
### PART 7: YOUR EXPERIENCE OF THE ASSISTIVE TECHNOLOGY YOUR CHILD IS CURRENTLY USING IN THE CLASSROOM

1. Think back to the assessment and planning stage of the assistive technology. How would you rate the involvement of the professionals involved? Please tick

<table>
<thead>
<tr>
<th>Professional</th>
<th>Present</th>
<th>Not very helpful</th>
<th>Not helpful</th>
<th>Somewhat unhelpful</th>
<th>Somewhat helpful</th>
<th>Helpful</th>
<th>Very helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher’s aide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Education teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultant provided by the school system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Therapist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech Pathologist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistive technology Consultant/s from disability agency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Please specify</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

2. Think back to the set up of the assistive technology in the classroom. How do you rate the involvement of the professionals involved? Please tick

<table>
<thead>
<tr>
<th>Professional</th>
<th>Present</th>
<th>Not very helpful</th>
<th>Not helpful</th>
<th>Somewhat unhelpful</th>
<th>Somewhat helpful</th>
<th>Helpful</th>
<th>Very helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher’s aide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Education teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultant provided by the school system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Therapist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech Pathologist</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistive technology Consultant/s from disability agency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Please specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Which sessions did you attend/or were involved in? Please tick

- [ ] The Assessment and Planning
- [ ] The Set up in the classroom
- [ ] Did not attend any sessions
- [ ] Other, please specify:

---

2009, Karlsson
The University of Western Sydney.
Assistive technology in the classroom – Service provider measure of satisfaction questionnaire

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172
4. Think back to the initial planning, set up and outcome of the assistive technology in the classroom..........

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree Strongly</th>
<th>Disagree Somewhat</th>
<th>Disagree Somewhat</th>
<th>Agree Somewhat</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>... Instructions and support were provided to me and my child</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Everyone was clear about their roles</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Goals were discussed with me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Time to meet with the teacher were easily arranged</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Time to meet with the therapists were easily arranged</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program was available for a trial</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Funding issues were addressed</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program assists my child to achieve classroom goals</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports my child’s participation in the classroom</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports my child’s participation outside the classroom (school ground/leisure time)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports my child’s independence in the classroom</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports my child’s independence outside the classroom (school ground/leisure time)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has a positive effect on my child’s learning</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has a positive effect on my child’s social interactions</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has a positive effect on my child’s motivation – increased enjoyment in school</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program met my expectations</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has had a positive impact on me as a parent</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
PART 8: RECOMMENDATIONS TO ENHANCE FUTURE ASSISTIVE TECHNOLOGY SERVICE DELIVERY

1. If you could change any thing about the experiences you had when your child was receiving the device/program, what would that be?

2. What 3 things would you like a teacher and therapist to know to be able to support assistive technology in the classroom?

1.

2.

3.

3. Is the anything else that you would like to add?

Thank you for completing this questionnaire

Please return your and your child’s questionnaires in the provided stamped envelop to:

Petra Karlsson
PhD Candidate
University of Sydney
Locked Bag 1797
Penrith South, DC, NSW, 1797

If you like you can fill out the questionnaire online, please follow this link:

http://uwseducation.qualtrics.com/SE?SID=SV_enyv7mJ2M6hEXfm&SVID=Prod

ASSISTIVE TECHNOLOGY IN THE CLASSROOM – STUDENT MEASURE OF SATISFACTION QUESTIONNAIRE

Your parents have in the previous section of this questionnaire let us know what type of speech generating device or computer aide you are using. Now we would like to hear from you about what you think about your device/program/equipment.

When you answer the following questions it is important that you circle/mark/or colour in the box that indicates your answer.

For example, if you strongly agree with the following statement, please answer it like this:

<table>
<thead>
<tr>
<th>EXAMPLE</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither disagree nor agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The best thing about school is seeing my friends</td>
<td>![Smiley face]</td>
<td>![Neutral face]</td>
<td>![Neutral face]</td>
<td>![Happy face]</td>
<td>![Very happy face]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE</th>
<th>Not helpful at all</th>
<th>Not helpful</th>
<th>Does not make a difference</th>
<th>Helpful</th>
<th>Very helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>How helpful is a pencil to do your homework with?</td>
<td>![Neutral face]</td>
<td>![Happy face]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test question. Are you using any form of assistive technology such as a speech generating device or a computer aid?

☐ Yes ☐ No

1. Where do you live?

☐ ACT ☐ NSW ☐ NT ☐ SA ☐ TAS ☐ VIC ☐ WA ☐ QLD

Postcode: ___________

Please write your postcode so that to help me understand and match yours and your parents answers, if one of you is using the online format.
2. Are you? Please tick
☐ Male ☐ Female

3. How old are you today?
☐ Years ☐ Months

4. Which of these speech generating devices or computer access options do you use in the classroom? Please tick. It can be more than one device/program.

☐ Allora
☐ DynaVox (Vmax, E, M, Serie4, MightyMo & MiniMo)
☐ DynaWrite
☐ Eye control

☐ LightWRITER
☐ Optimist/Tablet PC
☐ Pathfinder (Vanguard, Vantage & Eco)
☐ Polyan 4

☐ Say-it! Sam
☐ Tango
☐ The Grid
☐ VS Communicator

☐ Discover Pro
☐ Clicker 4 or 5
☐ EZ Keys
☐ Math’s program

☐ Rate enhancement/Word prediction program
☐ VoiceRecognition
☐ Mounting systems for device or switch
☐ Other high-tech device/program

Please specify:

______________

A warm thank you to Spectronics - www.spectronicsinoz, Technability - www.technability.com.au, and Liberator Pty Ltd - www.liberator.net.au for allowing me to use their website photos to demonstrate the equipment above.
5. Do you agree that your device/program is helpful for the things you use it for? Please also state what you do not use your device for.

Please circle/mark/tick or colour in your answer.

**Do you agree that the device/program is helpful?**

<table>
<thead>
<tr>
<th>No, I do not use it for:</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Disagree or Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>School work</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Home work</td>
<td></td>
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<tr>
<td>Talking to my family</td>
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</tr>
<tr>
<td>Talking to my friends in the classroom</td>
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<tr>
<td>Talking to my friends outside the classroom</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Texting</td>
<td></td>
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</tr>
<tr>
<td>Controlling the TV, stereo etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Surfing the internet</td>
<td></td>
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<tr>
<td><strong>Other:</strong> <em>(Please say what it is)</em></td>
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</tr>
</tbody>
</table>
6. How much do you agree or disagree with the following statements
Please circle/mark/tick or colour in your answer.

The device/program..... | Strongly Disagree | Disagree | Neither disagree nor agree | Agree | Strongly Agree
---|---|---|---|---|---
... has helped me learn more easily
... helped me show the teacher what I know and can do in the classroom
... has made it more fun to go to school
... lets me use some of the things I learn at school in other parts of my life
... lets me use some of the things I learn at home at school

7. How much do you agree or disagree with the following statements
Please circle/mark/tick or colour in your answer.

Someone at school... | Strongly Disagree | Disagree | Neither disagree nor agree | Agree | Strongly Agree
---|---|---|---|---|---
...talked to me about what assistive device/program I needed
...asked for my opinion
...showed me how the device/program worked
...encouraged me to use it in the classroom
8. What 3 things would you like a teacher and therapist to know to be able to make it easier to use a speech generating device or computer aide in the classroom?

1. 

2. 

3. 

9. Is there anything else that you would like to add?

10. One last question. Did you have help answering this survey?

☐ Yes  ☐ No

Thanks for completing this survey, I really appreciate your time and help.

Thank you for completing this questionnaire

Please return your and your parents questionnaires in the provided stamped envelop to:

Petra Karlsson
PhD Candidate
University of Sydney
Locked Bag 1797
Penrith South, DC, NSW, 1797
If you want to submit your questionnaire online, please go to link:

ASSISTIVE TECHNOLOGY IN THE CLASSROOM – SERVICE PROVIDER MEASURE OF SATISFACTION QUESTIONNAIRE

Have you worked with a student with cerebral palsy who uses assistive technology, in the last 12 months?
☐ Yes  ☐ No
If ‘NO’ please stop here, and thank you for your time.

PART 1: INFORMATION ABOUT YOURSELF

1. Are you: Please tick
☐ Male  ☐ Female

2. What state/territory and location are you currently working in? Please tick
☐ ACT  ☐ NSW  ☐ NT  ☐ SA  ☐ TAS  ☐ VIC  ☐ WA  ☐ QLD

☐ Metropolitan  ☐ Rural  ☐ Regional

3. What is your current professional role? Please tick
☐ Classroom teacher  ☐ Speech Pathologist  ☐ Special Ed. Teacher  ☐ Teacher aide  ☐ Occupational Therapist
☐ Assistive technology consultant  ☐ Other:(please specify) …………………

4. How many years of experience do you have in your current role? Please tick
☐ Less than 1 year  ☐ 1-4 years 11 months  ☐ 5-9 years 11 months  ☐ More than 10 years

5. For how long have you been working with children with cerebral palsy? Please tick
☐ Less than 1 year  ☐ 1-4 years 11 months  ☐ 5-9 years 11 months  ☐ More than 10 years

PART 2: INFORMATION ABOUT YOUR STUDENT/CLIENT’S DISABILITY

Please think about one student with cerebral palsy with whom you have worked with in the past year who uses a speech generating device or computer aids in the classroom. Answer the following questions with that student in mind.

1. How long have you worked with your student/client and his/her family? Please tick
☐ 1-6 months  ☐ 7-12 months  ☐ 1-4 years 11 months  ☐ 5-9 years 11 months  ☐ More than 10 years

2. What type of school are you working in? Please tick
☐ Public  ☐ Catholic systemic  ☐ Independent

3. What type of class does your student/client attend? Please tick
☐ Regular classroom – full time  ☐ Support class in regular school – full time  ☐ Time split between regular and support class
☐ Part time in regular class with resource support  ☐ Full time Special School

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The University of Western Sydney.
Assistive technology in the classroom – Service provider measure of satisfaction questionnaire
4. What grade is your student currently in? Please tick ________

5. What type of cerebral palsy does your student have? You may tick more than one

<table>
<thead>
<tr>
<th>Spasticity</th>
<th>Dyskinesia</th>
<th>Ataxia</th>
<th>Hypotonia</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Left Hemiplegia</td>
<td>☐ Mainly Athetosis</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>☐ Right Hemiplegia</td>
<td>☐ Mainly Dystonia</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>☐ Diplegia</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>☐ Triplegia</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>☐ Quadriplegia</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

If you do not know, how many limbs are affected? ________

6. My student/client communicates by: (Please tick all that apply)

☐ Speech
☐ Sounds (such as an “aaaah” to get a partner’s attention)
☐ Eye gaze, facial expressions, gesturing, and/or pointing (e.g., with a body part, stick, laser)
☐ Manual signs
☐ Communication book, boards, and/or pictures
☐ Voice output device or a speech-generating device
☐ Other: ________

7. In everyday situations my student/client communicates...

☐ Level 1 Effective Sender and Receiver with unfamiliar and familiar partners.
☐ Level 2 Effective but slower paced Sender and/or Receiver with unfamiliar and/or familiar partners.
☐ Level 3 Effective Sender and Receiver with familiar partners.
☐ Level 4 Inconsistent Sender and/or Receiver with familiar partners.
☐ Level 5 Seldom Effective Sender and/or Receiver even with familiar partners.

(Please see CFCS sheet for further information)

8. In everyday situations my student/client handles objects...

☐ Level 1 Handles objects easily and successfully.
☐ Level 2 Handles most objects but somewhat reduced quality and/or speed of achievement.
☐ Level 3 Handles objects with difficulty; needs help to prepare and/or modify activities.
☐ Level 4 Handles limited selection of easily managed objects in adapted situations
☐ Level 5 Does not handle objects and has severely limited ability to perform even simple actions.

(Please see MACS sheet for further information)

9. In everyday situations my student/client walks, move, transfer...

☐ Level 1 Walks without limitations.
☐ Level 2 Walks with limitations
☐ Level 3 Walks using a hand-held mobility device.
☐ Level 4 Self-mobility with limitations; may use powered wheelchair.
☐ Level 5 Transported in a manual wheelchair.

(Please see GMFCS sheet for further information)
PART 3: YOUR STUDENT/CLIENT’S DEVICE OR COMPUTER PROGRAM

1. Which of these speech generating devices or computer access options does your student currently use in the classroom? Please tick. It can be more than one device/program

- Allora
- DynaVox (Vmax, E, M, Serie4, MightyMo & MiniMo)
- DynaWrite
- Eye control
- LightWRITER
- Optimist/Tablet PC
- Pathfinder (Vanguard, Vantage & Eco)
- Polya 4
- Say-it! Sam
- Tango
- The Grid
- VS Communicator
- Discover Pro
- Clicker 4 or 5
- EZ Keys
- Math’s program
- Rate enhancement/Word prediction program
- VoiceRecognition
- Mounting systems for device or switch
- Other high-tech device/program

Please specify:


2. Is your student/client using alternative access equipment? Please tick

- Yes
- No

If yes, please tick the category. It can be more than one.

- Alternative keyboard
- Head mouse
- Joystick
- Switch
- Trackball
3. Who funded the equipment, used in the classroom? Please tick all that apply

☐ School  ☐ State/ territory government based funding body  ☐ Family  ☐ Other funding body e.g. Lions and Rotary

4. Where does your student/client use the device/program? Please tick all that apply

☐ School  ☐ Home

PART 4: YOUR EXPERIENCE OF THE ASSISTIVE TECHNOLOGY YOUR STUDENT/CLIENT IS CURRENTLY USING IN THE CLASSROOM

1. Think back to the assessment and planning stage for the introduction of the assistive technology device. How would you rate the involvement of the people involved? Please tick

<table>
<thead>
<tr>
<th>Did not participate</th>
<th>To a very great extent helpful</th>
<th>To a great extent helpful</th>
<th>To a moderate extent helpful</th>
<th>To a small extent helpful</th>
<th>To a very small extent helpful</th>
<th>Not at all helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/Caregiver</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Classroom Teacher</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teacher’s aide</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Special Education teacher</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Principal</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Consultant provided by the school system</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Occupational Therapist</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Speech Pathologist</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Assistive technology Consultant/s from disability agency</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other: Please specify</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
</tr>
</tbody>
</table>

2. Did you use any assistive technology assessment tools such as: (Please tick)

☐ Life Access Profile  ☐ SETT  ☐ No, none  ☐ Not sure  ☐ Other, please specify:

3. What sessions did you attend/or were involved in? Please tick

☐ The Assessment and Planning  ☐ The Set up in the classroom  ☐ Did not attend any sessions  ☐ Other, please specify:

4. Your student/client was present at: Please tick

☐ The Assessment and Planning  ☐ The Set up in the classroom  ☐ Other, please specify:
5. Think back to the set up of the assistive technology in the classroom. How would you rate the involvement of the people involved? Please tick

<table>
<thead>
<tr>
<th>People involved</th>
<th>Did not participate</th>
<th>To a very great extent helpful</th>
<th>To a great extent helpful</th>
<th>To a moderate extent helpful</th>
<th>To a small extent helpful</th>
<th>To a very small extent helpful</th>
<th>Not at all helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/Caregiver</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Classroom Teacher</td>
<td>☐</td>
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<td>☐</td>
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<tr>
<td>Teacher's aide</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
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<tr>
<td>Special Education teacher</td>
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<td>☐</td>
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<tr>
<td>Principal</td>
<td>☐</td>
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<tr>
<td>Consultant provided by the school system</td>
<td>☐</td>
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<tr>
<td>Occupational Therapist</td>
<td>☐</td>
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<tr>
<td>Speech Pathologist</td>
<td>☐</td>
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<td>☐</td>
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<td>☐</td>
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</tr>
<tr>
<td>Assistive technology Consultant/s from disability agency</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Other: Please specify</td>
<td>☐</td>
<td>☐</td>
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</tr>
</tbody>
</table>

6. Think back to the initial planning, set up and outcome of the assistive technology in the classroom. To what extent do you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Some-what Disagree</th>
<th>Some-what Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>...My workplace offers clear guidelines around assistive technology</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>...Everyone was clear about their roles</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>... Established goals reflected the issue at hand</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Time with the teacher/therapist was easily arranged</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>... The device/program was available for a trial</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... Funding issues were addressed</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>... I felt comfortable implementing the device/program in the classroom</td>
<td>☐</td>
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<td>☐</td>
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<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program met my expectations</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
</tr>
<tr>
<td>... I gained new skills during this assistive technology experience</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
7. Think back to the outcome of the assistive technology, for the student/client. To what extent do you agree or disagree with the following statements. Please tick

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>... The device/program supports the student's participation in the classroom</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports your student's participation, outside the classroom (school ground/leisure time)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports your student's independence in the classroom</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program supports your student's independence outside the classroom (school ground/leisure time)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has a positive effect on your student's learning</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has a positive effect on your student's social interactions</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program has an effect on your student's motivation – increased enjoyment in school</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... The device/program assists my student to achieve classroom goals</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>... You have gained more insight in your student/client's abilities after having the device/program introduced in the classroom</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**PART 5: RECOMMENDATIONS TO ENHANCE FUTURE ASSISTIVE TECHNOLOGY SERVICE DELIVERY**

1. If you could change any thing about the experiences you had when your student/client was getting the device/program, what would that be?
2. What three things do you consider important for a teacher and therapist to know in order to be able to support assistive technology in the classroom?

1.

2.

3.

3. Is there anything else that you would like to add?

---

Thank you for completing this questionnaire

Please return your questionnaires in the provided stamped envelop to:

Petra Karlsson  
PhD Candidate  
School of Education  
University of Western Sydney  
Locked Bag 1797  
Penrith South, DC, NSW, 1797
MEASURE OF PROCESSES OF CARE
(MPOC-20)

We would like to understand and measure the experiences of parents who have a child with a disability. In particular we wish to know about your perceptions of the care you have been receiving over the past year from the health care organization that provides services to your child. This may be your local children's treatment (rehabilitation) centre, your community care access centre, or another organization.

The care that you and your child receive from this organization may bring you into contact with many individuals. The questions on this form are grouped by who these contacts are, as described below.

PEOPLE: refers to those individuals who work directly with you or your child. These may include psychologists, therapists, social workers, doctors, teachers, etc.

ORGANIZATION: refers to all staff from the health care organization, whether involved directly with your child or not. In addition to health care people they may include support staff such as office staff, housekeepers, administrative personnel, etc.

The questions are based on what parents, like yourself, have told us about the way care is sometimes offered. We are interested in your personal thoughts and would appreciate your completing this questionnaire on your own without discussing it with anyone.

For each question, please indicate how much the event or situation happens to you. You are asked to respond by circling one number from 1 (Not at All) to 7 (To a Very Great Extent) that you feel best fits your experience. Please note that the zero value (0) is used only if the situation described does not apply to you.

When answering these questions, we would like you to think about the organization from which you first found out about this study. For easy reference, the name of that organization is:

PEOPLE: refers to those individuals who work directly with you or your child. These may include psychologists, therapists, social workers, doctors, teachers, etc.

<table>
<thead>
<tr>
<th>IN THE PAST YEAR, TO WHAT EXTENT DO THE PEOPLE WHO WORK WITH YOUR CHILD...</th>
<th>Indicate how much this event or situation happens to you.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To a Very Great Extent</td>
</tr>
<tr>
<td>1. ...help you to feel competent as a parent?</td>
<td>7</td>
</tr>
<tr>
<td>2. ...provide you with written information about what your child is doing in therapy?</td>
<td>7</td>
</tr>
<tr>
<td>3. ...provide a caring atmosphere rather than just give you information?</td>
<td>7</td>
</tr>
</tbody>
</table>

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CanChild Centre for Childhood Disability Research, McMaster University

MPOC-20(R)0.04

page 1
187
| IN THE PAST YEAR, TO WHAT EXTENT DO THE PEOPLE WHO WORK WITH YOUR CHILD... | Indicate how much this event or situation happens to you. |
|---|---|---|---|---|---|---|---|
| 4. ...let you choose when to receive information and the type of information you want? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 5. ...look at the needs of your whole child (e.g., at mental, emotional, and social needs) instead of just at physical needs? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 6. ...make sure that at least one team member is someone who works with you and your family over a long period of time? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 7. ...fully explain treatment choices to you? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 8. ...provide opportunities for you to make decisions about treatment? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 9. ...provide enough time to talk so you don't feel rushed? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 10. ...plan together so they are all working in the same direction? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 11. ...treat you as an equal rather than just as the parent of a patient (e.g., by not referring to you as "Mom" or "Dad")? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 12. ...give you information about your child that is consistent from person to person? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 13. ...treat you as an individual rather than as a "typical" parent of a child with a disability? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 14. ...provide you with written information about your child's progress? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 15. ...tell you about the results from assessments? | To a Very Great Extent | To a Great Extent | To a Fairly Great Extent | To a Moderate Extent | To a Small Extent | To a Very Small Extent | Not at All | Not Applicable |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
ORGANIZATION: refers to all staff from the health care organization, whether involved directly with your child or not. In addition to health care people they may include support staff such as office staff, housekeepers, administrative personnel, etc.

<table>
<thead>
<tr>
<th>IN THE PAST YEAR, TO WHAT EXTENT DOES THE ORGANIZATION WHERE YOU RECEIVE SERVICES...</th>
<th>Indicate how much this event or situation happens to you.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To a Very Great Extent</td>
</tr>
<tr>
<td>16. ...give you information about the types of services offered at the organization or in your community?</td>
<td>7</td>
</tr>
<tr>
<td>17. ...have information available about your child's disability (e.g., its causes, how it progresses, future outlook)?</td>
<td>7</td>
</tr>
<tr>
<td>18. ...provide opportunities for the entire family to obtain information?</td>
<td>7</td>
</tr>
<tr>
<td>19. ...have information available to you in various forms, such as a booklet, kit, video, etc.?</td>
<td>7</td>
</tr>
<tr>
<td>20. ...provide advice on how to get information or to contact other parents (e.g., organization's parent resource library)?</td>
<td>7</td>
</tr>
</tbody>
</table>
We would like to understand and measure the experiences of youth who have a cognitive or physical disability. In particular, we wish to know about what you think of the services you have received over the past year from your Rehabilitation Centre.

The questions in this section are based on youth, like yourself, have told us about the way services are sometimes offered. We would like you to indicate how much the event or situation happens (or doesn't happen) to you at your Rehabilitation Centre. You are asked to answer each question on a scale from 7 (A Lot) to 1 (Never).

The following is an example of the kinds of questions you will be asked. This example also shows what your answer could mean.

<table>
<thead>
<tr>
<th>How much do the people who give you questionnaires...</th>
<th>A lot</th>
<th>Sometimes</th>
<th>Never</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>... provide you with clear instructions on how to complete them?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

If you circled #7 (A lot), it means that the people who give you questionnaires provide very clear instructions in what they ask you to do.

If you circled #4 (Sometimes), it means that the people who give you questionnaires are clear in what they want you to do some of the time, and some of the time the instructions are not clear.

If you circled #1 (Never), it means that although you have received questionnaires, the instructions are never clear.

If you circled #0 (Does not apply to me), it means that you have never received a questionnaire and so you cannot answer the question.

GYV-20 (version 1.2), © Bloorview Kids Rehab, 2008
We would like you to think about your experiences with ______________________ (name of program or service) over the past year. We are interested in your personal thoughts and would appreciate your own answers to the questions below.

For each question, please indicate how much the event or situation happens to you by circling one number (from 1 to 7) that you feel best fits your experience. When answering these questions, we would like you to think about ______________________ (name of program or service).

PEOPLE refer to those individuals who work directly with you. These may include teachers, psychologists, therapists, social workers, doctors etc.

### IN THE PAST YEAR

<table>
<thead>
<tr>
<th>Indicate how much the event or situation happens to you.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How much do the people who work with you...</strong></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>1. ... give you enough time when you need to make choices in treatment?</td>
</tr>
<tr>
<td>2. ... make sure you have a chance to say what is important to you?</td>
</tr>
<tr>
<td>3. ... help you feel more sure of yourself?</td>
</tr>
<tr>
<td>4. ... tell you details about your treatment, such as the reasons for it, what is being done, and for how long?</td>
</tr>
<tr>
<td>5. ... talk to you honestly?</td>
</tr>
</tbody>
</table>
### IN THE PAST YEAR

Indicate **how much** the event or situation happens to you.

*How much do the people who work with you...*  

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>Sometimes</th>
<th>Never</th>
<th>Does not apply to me</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. ... treat you as a young adult rather than a child?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>7. ... trust that you know yourself best?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>8. ... recognize that you and your family have the final say when making decisions about your treatment or services?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>9. ... show an understanding of your feelings?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>10. ... show they care about you?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>11. ... inform you of how treatments might harm you or help you?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>12. ... look at all of your needs (e.g. cognitive, emotional, and social needs), as well as your physical needs?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>13. ... treat you as an individual rather than like all other youth with a disability?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>14. ... answer your questions?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>
### IN THE PAST YEAR

Indicate how much the event or situation happens to you.

*How much do the people who work with you...*  

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>Sometimes</th>
<th>Never</th>
<th>Does not apply to me</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. ... seem aware that your needs change as you get older?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>16. ... get along well with youth?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>17. ... give you a chance to say what you want to get out of treatment?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>18. ... explain what they are doing?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>19. ... make you feel that you can trust them?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>20. ... offer you useful information about how you are doing?</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>
PLEASE TELL US ABOUT YOURSELF!

Are you a male ___ or female ___? (check one)

How old are you? ____________________________________________________________

Did you have any help reading or filling out this questionnaire? _____________

Length of time to fill out questionnaire: _______________ minutes

ANY OTHER COMMENTS ABOUT THE SERVICE YOU RECEIVED?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

PLEASE CHECK THAT BOTH SIDES OF ALL PAGES ARE COMPLETED

CONFIDENTIAL WHEN COMPLETED

THANK YOU!!
MEASURE OF PROCESSES OF CARE
FOR SERVICE PROVIDERS
(MPOC-SP)

We would like to understand and measure the actual experiences and behaviours of service providers who work with children with long-term health or developmental problems and their families. In particular, we wish to know about your perceptions of the service you have been providing over the past year. The term “service provider” includes clinicians, therapists, social workers, early childhood educators, resource teachers, nurses, etc.

These questions are based on what parents have told us about the way services are sometimes offered to their families. Specifically, each question asks you to indicate to what extent you actually do each of the behaviours described, on a scale from 1 (Not at All) to 7 (To a Very Great Extent). Please note that the zero value (0) is used only if the situation described does not apply to you.

For each question, we would like you to think about the degree to which you displayed each of the behaviours described in this questionnaire. The rating you select should NOT represent the frequency with which you engaged in each particular behaviour, but rather your level of involvement and investment in practicing it.

The services that you provide may bring you into contact with many individuals within a family. We have provided a list of who those family members may be.

CHILD: refers to the child with a long-term health problem (e.g., cystic fibrosis or diabetes) or developmental problem (e.g., cerebral palsy).

PARENTS: refers to the parents or legal guardians of the child with a long-term health or developmental problem.

FAMILY: generally refers to the child with a long-term health or development problem and his/her parents. Family may also include siblings, grandparents, etc.

IMPORTANT INSTRUCTIONS:

1. We would like you to describe your “actual” behaviour, rather than what you feel would be “ideal” service. We recognize that professionals may be unable to display behaviour to the extent they might wish, due to caseload size, policies, and other constraining factors. Please be assured that your confidential responses will not be viewed as a judgment of you or how you provide services.

2. Please recognize that just because a behaviour is addressed by this measure it DOES NOT mean that it is necessarily an important behaviour for all professions or to all professionals. Thus, do not feel that selecting a low number is equivalent to giving yourself a poor evaluation.

3. We would like you to think about your experiences as a service provider with children with long-term health or developmental problems, and their families, over the past year. We are interested in your personal thoughts and would appreciate your completing this questionnaire on your own without discussing it with anyone.
### IN THE PAST YEAR, TO WHAT EXTENT DID YOU...

<table>
<thead>
<tr>
<th></th>
<th>Indicate how much this event or situation happens to you.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To a Very Great Extent</td>
</tr>
<tr>
<td>---</td>
<td>------------------------</td>
</tr>
<tr>
<td>1.</td>
<td>...suggest treatment/management activities that fit with each family’s needs and lifestyle?</td>
</tr>
<tr>
<td>2.</td>
<td>...offer parents and children positive feedback or encouragement (e.g., in carrying out a home program)?</td>
</tr>
<tr>
<td>3.</td>
<td>...take the time to establish rapport with parents and children?</td>
</tr>
<tr>
<td>4.</td>
<td>...discuss expectations for each child with other service providers, to ensure consistency of thought and action?</td>
</tr>
<tr>
<td>5.</td>
<td>...tell parents about options for services or treatments for their child (e.g., equipment, school, therapy)?</td>
</tr>
<tr>
<td>6.</td>
<td>...accept parents and their family in a nonjudgmental way?</td>
</tr>
<tr>
<td>7.</td>
<td>...trust parents as the “experts” on their child?</td>
</tr>
<tr>
<td>8.</td>
<td>...discuss/explore each family’s feelings about having a child with special needs (e.g., their worries about their child’s health or function)?</td>
</tr>
<tr>
<td>9.</td>
<td>...anticipate parents’ concerns by offering information even before they ask?</td>
</tr>
<tr>
<td>10.</td>
<td>...make sure parents had a chance to say what was important to them?</td>
</tr>
<tr>
<td>11.</td>
<td>...let parents choose when to receive information and the type of information they wanted?</td>
</tr>
<tr>
<td>12.</td>
<td>...help each family to secure a stable relationship with at least one service provider who works with the child and parents over a long period of time?</td>
</tr>
<tr>
<td>IN THE PAST YEAR, TO WHAT EXTENT DID YOU...</td>
<td>Indicate how much this event or situation happens to you.</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>To a Very Great Extent</td>
</tr>
<tr>
<td>13. ...answer parents’ questions completely?</td>
<td>7</td>
</tr>
<tr>
<td>14. ...tell parents about the results from tests and/or assessments?</td>
<td>7</td>
</tr>
<tr>
<td>15. ...provide parents with written information about their child’s condition, progress, or treatment?</td>
<td>7</td>
</tr>
<tr>
<td>16. ...tell parents details about their child’s services, such as the types, reasons for, and durations of treatment/management?</td>
<td>7</td>
</tr>
<tr>
<td>17. ...treat each parent as an individual rather than as a “typical” parent of a child with a “problem”?</td>
<td>7</td>
</tr>
<tr>
<td>18. ...treat parents as equals rather than just as the parent of a patient (e.g., by not referring to them as “Mom” or “Dad”)?</td>
<td>7</td>
</tr>
<tr>
<td>19. ...make sure parents had opportunities to explain their treatment goals and needs (e.g., for services or equipment)?</td>
<td>7</td>
</tr>
<tr>
<td>20. ...help parents feel like a partner in their child’s care?</td>
<td>7</td>
</tr>
<tr>
<td>21. ...help parents to feel competent in their roles as parents?</td>
<td>7</td>
</tr>
<tr>
<td>22. ...treat children and their families as people rather than as a “cases” (e.g., by not referring to the child and families by diagnosis, such as “the spastic diplegic”)?</td>
<td>7</td>
</tr>
</tbody>
</table>
The next set of questions asks “to what extent did you (or your organization)…”. By “organization” we mean the facility or agency from or through which you provide services. “Organization” could therefore refer to a Children’s Treatment/Rehabilitation Centre, a Community Care Access Centre, a School Health Support Services program, Home Care, Community and Social Services, Clinic Program, Mental Health Service, etc. If you do not work at an “organization”, please answer for your program, team, or yourself.

<table>
<thead>
<tr>
<th>IN THE PAST YEAR, TO WHAT EXTENT DID YOU (OR YOUR ORGANIZATION)…</th>
<th>Indicate how much this event or situation happens to you.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To a Very Great Extent</td>
</tr>
<tr>
<td>23. ... promote family-to-family “connections” for social, informational or shared experiences?</td>
<td>7</td>
</tr>
<tr>
<td>24. ... provide support to help families cope with the impact of their child’s chronic condition (e.g., informing parents of assistance programs, or counselling how to work with other service providers)?</td>
<td>7</td>
</tr>
<tr>
<td>25. ... provide advice on how to get information or to contact other parents (e.g., through a community’s resource library, support groups, or the Internet)?</td>
<td>7</td>
</tr>
<tr>
<td>26. ... provide opportunities for the entire family, including siblings, to obtain information?</td>
<td>7</td>
</tr>
<tr>
<td>27. ... have general information available about different concerns (e.g., financial costs or assistance, genetic counselling, respite care, dating and sexuality)?</td>
<td>7</td>
</tr>
</tbody>
</table>
INFORMATION SHEET FOR PARTICIPANTS FAMILIES AND CAREGIVERS

Project title: Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom

Investigator: Petra Karlsson, PhD Candidate, School of Education, University of Western Sydney.

Contact Persons: University of Western Sydney, School of Education
Petra Karlsson, PhD Candidate, Occupational Therapist

Phone: 02-4736 0879

Help us improve the delivery of assistive technology to children with cerebral palsy

Assistive technology (AT), such as speech generating devices and computer aids, can be the difference between non-participation and participation in a classroom situation for a child with cerebral palsy. It is therefore essential that when a device is introduced, it is done well. I would therefore like to explore the experiences of students with cerebral palsy, their parents, teachers and therapists when high-tech assistive technology is introduced in the classroom.

Is your child currently using a type of high-tech assistive technology device? (Examples are listed in the attached questionnaire.) If so, with your assistance, I can collect valuable information about your experiences when your child began to use the device. This will help us assess, improve and plan service delivery around assistive technology.

Description of study - methods and demands
I am asking you and your child to complete the two questionnaires which are attached.

The questionnaires should not take more than 15-20 min each to complete and are anonymous and confidential, so please do not write your name on the paper.

Benefits
This study should tell us how best to help and work with families and young people when introducing assistive technology.

Confidentiality
All aspects of the study, including results, will be confidential and only the researcher will have access to the information provided in the questionnaires. Because the questionnaires are anonymous, your name and address will not be known to the researcher or to anyone else.

The data collected will only be used and analysed to produce a doctoral thesis, generalised reports, and publications in scientific journals. You may tell other people about the study by providing them with the chief investigator’s contact details.

The study has been approved by the University of Western Sydney Human Research Ethics Committee. The approval number is H7341. This study has also been approved by the Spastic Centre Human Research Ethics Committee. The approval number is 2009-08-01. Consent form version 1.0.
Withdrawing from the project
Your participation is voluntary and all information that you provide will be kept completely confidential.

Complaints or reservations
This study has been approved by the University of Western Sydney Human Research Ethics Committee. (Approval No. H7341). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Office of Research Services on Tel 02-4736 0883 Fax 02-4736 0013 or email humanethics@uws.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome. The Spastic Centre Human Research Ethics Committee has also approved this study. If you have any complaints or reservations about the ethical conduct of this research you may contact the Ethics Committee on (02) 9479 7200 or ethics@tscnsw.org.au. The approval number is 2009-08-01. Consent form version 1.0.

Further information
If you would like to know more about the study, please feel free to contact Petra Karlsson on 02-4736 0879 or at p.karlsson@uws.edu.au or Assoc. Prof. Christine Johnston, on 02-4736 0782 or at c.johnston@uws.edu.au

The findings of this study will be available at the end of 2011.

Finally, you should be aware that this letter and the questionnaires have been sent to you by the CP Institute to ensure your details are kept confidential. If you would like to receive a summary of the findings please send your address details separately to the CP Institute. Please return the questionnaires in the envelope provided. No stamp required.

If you or your child wants to submit your questionnaires online, please go to the following links:

Parent and caregiver questionnaire: http://uwseducation.qualtrics.com/SE?SID=SV_do51KPTiEJF9iQI&SVID=Prod

Student questionnaire: http://uwseducation.qualtrics.com/SE?SID=SV_enyv7mJ2M6hEXfm&SVID=Prod

We greatly appreciate your time in reading this.

Yours sincerely,

Petra Karlsson
PhD Candidate
Appendix H
Human Research Ethics Committee
Office of Research Services

SERVICE PROVIDERS INFORMATION SHEET

<table>
<thead>
<tr>
<th>Project title:</th>
<th>Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigator:</td>
<td>Petra Karlsson, PhD Candidate, School of Education, University of Western Sydney.</td>
</tr>
</tbody>
</table>
| Contact Persons: | University of Western Sydney, School of Education  
Petra Karlsson, PhD Candidate, Occupational Therapist  
Assoc Professor Christine Johnston, Principal supervisor |
| Phone: | 02-4736 0879 02-4736 0782 |

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Is your student/client currently using a type of high-tech assistive technology device? (Examples are listed in the attached questionnaire.) If so, with your assistance, I can collect valuable information about your experiences when your child began to use the device. This will help us assess, improve and plan service delivery around assistive technology.

Description of study -methods and demands
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Your participation is voluntary and all information that you provide will be kept completely confidential.

**Complaints or reservations**
The University of Western Sydney Human Research Ethics Committee has approved this study. (Approval No. H7341). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Office of Research Services on Tel 02-4736 0883 Fax 02-4736 0013 or email humanethics@uws.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome. The Spastic Centre Human Research Ethics Committee has also approved this study. If you have any complaints or reservations about the ethical conduct of this research you may contact the Ethics Committee on (02) 9479 7200 or ethics@tscnsw.org.au. The approval number is 2009-08-01. Consent form version 1.0.

**Further information**
If you would like to know more about the study, please feel free to contact Petra Karlsson on 02-4736 0879 or at p.karlsson@uws.edu.au or Assoc. Prof. Christine Johnston, on 02-4736 0782 or at c.johnston@uws.edu.au

The findings of this study will be available at the end of 2011.

Finally, you should be aware that this letter and the questionnaires have been sent to you by the CP Institute to ensure your details are kept confidential. If you would like to receive a summary of the findings please send your address details separately to the CP Institute. Please return the questionnaires in the envelope provided. No stamp required.

**If you want to submit your questionnaires online, please go to link:**


We greatly appreciate your time in reading this.

Yours sincerely,

Petra Karlsson
PhD Candidate
Appendix I

Human Research Ethics Committee
Office of Research Services

University of Western Sydney

Participant Information Sheet (General)

Project Title: Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom.

Who is carrying out the study?
Petra Karlsson, PhD Candidate. The research will form the basis of Doctor of Philosophy at the University of Western Sydney under the supervision of Associate Professor Christine Johnston, from the School of Education.

What is the study about?
Findings solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy, can better help children who use speech generating devices and computer aids in the classroom.

What does the study involve?
You and your child are invited to participate in an interview. The study involves a series of questions to you and your child about the time when your child received his/her assistive technology equipment and how it is working today. The interview will be audio-recorded and the transcripts presented to you for comments.

How much time will the study take?
It is estimated that the interview will take about an hour and a half.

Will the study benefit me?
It is not expected that the study will provide direct benefit to you. However, this study should tell us the best way to help and work with young people and families when introducing assistive technology in the future.

Will the study involve any discomfort for me?
The questions are very unlikely to cause any discomfort.
How is this study being paid for?
The study is being sponsored by the University of Western Sydney and The Spastic Centre, NSW as part of a PhD Scholarship program.

Will anyone else know the results? How will the results be disseminated?
All aspects of the study, including results, will be confidential and only the researchers will have access to information on participants. The study will be published as a thesis and a report of the study will be submitted for publication, and presented at national and international conferences. Your and your child's participation will not affect the services that you and your child may receive from the Spastic Centre, NSW as everything you and your child say is confidential and will not be reported back to any of the teachers or therapists that your child may have.

Can I withdraw from the study?
Participation is entirely voluntary. You and your child can withdraw at any time without giving any reason and without any consequences and without affecting your relationship with the Spastic Centre, NSW.

Can I tell other people about the study?
Yes, you can tell other people about the study by providing them with the chief investigator's contact details. They can contact the chief investigator to discuss their participation in the research project and obtain an information sheet.

What if I require further information?
When you have read this information, Petra Karlsson will discuss it with you further and answer any questions you may have. If you and your child would like to know more at any stage, please feel free to contact Petra Karlsson on 02-4736 0879.

What if I have a complaint?
This study has been approved by the University of Western Sydney Human Research Ethics Committee. The Approval number is H7341.

The Spastic Centre Human Research Ethics Committee has also approved this study. If you have any complaints or reservations about the ethical conduct of this research that you want to address to the Spastic Centre, you may contact the Ethics Committee on (02) 9479 7200 or ethics@tscnsw.org.au. The approval number is 2009-08-01.

If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Office of Research Services on Tel 02-4736 0883 Fax 02-4736 0013 or email humanethics@uws.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

If you agree to participate in this study, you may be asked to sign the Participant Consent Form.
Dialogue Sheet

Project Title: Mixed Methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom.

Who is carrying out the study?
Petra Karlsson, PhD Candidate, School of Education, University of Western Sydney.

What is the study about?
Finding solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy can better help children use speech generating devices and computer aids in the classroom.

What does the study involve?
For you and your parent to be interviewed and asked questions about the time when you got your assistive technology equipment, and what you think about it now. The interview will be audio-recorded and the transcripts presented to you and your parent for comments.

How much time will the study take?
The interview will probably take around an hour and a half.

Will the study benefit me?
We do not think that the study will provide direct benefit to you. However, this study should tell us the best way to help and work with young people and families when introducing assistive technology in the future.

Will the study have any discomforts?
The questions are very unlikely to cause you discomfort.

How is this study being paid for?
The study is being sponsored by the University of Western Sydney and The Spastic Centre, NSW as part of a PhD Scholarship program.

Will anyone else know the results? How will the results be disseminated?
The results will be published in a thesis, and in peer reviewed journals. Everyone participating in this study will be anonymous, no one will be identified. Your participation in this project will not affect your services that you may receive from The Spastic Centre, NSW as everything you say is confidential and will not be reported back to any of the teachers or therapists that you may have.

What if I have a concern?
This study has been approved by the University of Western Sydney Human Research Ethics Committee. The Approval number is H7341. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Office of Research Services on Tel 02-4736 0883 Fax 02-4736 0013 or email humanethics@uws.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

The Spastic Centre Human Research Ethics Committee has also approved this study. If you have any
complaints or reservations about the ethical conduct of this research that you want to address to the Spastic Centre you may contact the Ethics Committee on (02) 9479 7200 or ethics@tscnsw.org.au. The approval number is 2009-08-01.

Can I withdraw from the study?
Yes, at any point in time. You just let me know that you want to stop, and we will stop recording and talking.

Ask the students if they have any further questions before commencement.
Project Title: Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom.

Who is carrying out the study?
Petra Karlsson, PhD Candidate.

The research will form the basis of Doctor of Philosophy at the University of Western Sydney under the supervision of Associate Professor Christine Johnston, from the School of Education.

What is the study about?
Finding solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy, can better help children who use speech generating devices and computer aids in the classroom.

What does the study involve?
You are invited to participate in an interview where you will be asked to discuss the strategies you have found work best when introducing assistive technology in the classroom as well as what tools, policies and guidelines are available at your workplace. The interview will be audio-recorded and the transcripts presented to you for comment.

How much time will the study take?
It is estimated that the interview will take about an hour.

Will the study benefit me?
It is not expected that the study will provide direct benefit to you. However, this study should tell us the best way to help and work with young people and families when introducing assistive technology in the future.

Will the study involve any discomfort for me?
The questions are very unlikely to cause any discomfort.

How is this study being paid for?
The study is being sponsored by the University of Western Sydney and The Spastic Centre, NSW as part of a PhD Scholarship program.
Will anyone else know the results? How will the results be disseminated?
All aspects of the study, including results, will be confidential and only the researchers will have access to information on participants. The study will be published as a thesis and a report of the study will be submitted for publication, and presented at national and international conferences.

Can I withdraw from the study?
Participation is entirely voluntary. You can withdraw at any time without giving any reason and without any consequences.

Can I tell other people about the study?
Yes, you can tell other people about the study by providing them with the chief investigator's contact details. They can contact the chief investigator to discuss their participation in the research project and obtain an information sheet.

What if I require further information?
When you have read this information, Petra Karlsson will discuss it with you further and answer any questions you may have. If you and your child would like to know more at any stage, please feel free to contact Petra Karlsson on 02-4736 0879.

What if I have a complaint?
This study has been approved by the University of Western Sydney Human Research Ethics Committee. The Approval number is H7341.

The Cerebral Palsy Alliance Human Research Ethics Committee has also approved this study. If you have any complaints or reservations about the ethical conduct of this research that you want to address to the Cerebral Palsy Alliance, you may contact the Ethics Committee on (02) 9479 7200 or ethics@tscnsw.org.au. The approval number is 2009-08-01.

If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Office of Research Services on Tel 02-4736 0883 Fax 02-4736 0013 or email humanethics@uws.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

If you agree to participate in this study, you may be asked to sign the Participant Consent Form.
Participant Consent Form for Parents/Caregivers

Project Title: Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom

I, ..................................., give consent for me and my child ..................................... to participate in the research project titled "Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom".

I acknowledge that:

I have read the participant information sheet and have been given the opportunity to discuss the information and my involvement and that of my child in the project with the researcher.

The procedures required for the project and the time involved have been explained to me and my child, and any questions we have about the project have been answered to our satisfaction.

I have discussed participation in the project with my child and my child agrees to their participation in the project.

I understand that my involvement and that of my child is confidential and that the information gained during the study may be published but that no information about me or my child will be used in any way that reveals our identity.

I understand that my participation and that of my child in this project is voluntary. We can withdraw from the study at any time, without affecting our relationship with the Spastic Centre, NSW.

I understand that the interview will be audio-recorded and that we will be sent a transcribed copy of the interview to review. The transcribed copy can be discussed in person with the researcher or returned with or without comments via mail.

Signed (Parent/caregiver): ___________________________ Signed (child): ___________________________

Name: ___________________________ Name: ___________________________

Date: ___________________________ Date: ___________________________

Petra Karlsson
PhD Candidate
University of Western Sydney
School of Education
Participant Consent Form

Project Title: Mixed Methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom

I, ........................................................................................................... consent to participate in the research project titled Mixed Methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom.

I acknowledge that:

I have read the participant information sheet and have been given the opportunity to discuss the information and my involvement in the project with the researcher.

The procedures required for the project and the time involved have been explained to me and any questions I have about the project have been answered to my satisfaction.

I understand that my involvement is confidential and that the information gained during the study may be published but that no information about me will be used in any way that reveals my identity.

I understand that my participation in this project is voluntary. We can withdraw from the study at any time, without affecting my relationship with the researcher now or in the future.

I understand that the interview will be audio-recorded and that we will be sent a transcribed copy of the interview to review. The transcribed copy can be discussed in person with the researcher or returned with or without comments via mail.

Signed: ...........................................................................

Name: ...........................................................................

Date: ...........................................................................

Return Address: Petra Karlsson, PhD Candidate
University of Western Sydney, School of Education, Penrith Campus, Locked Bag 1797, Penrith South, DC, NSW, 1797
Participant Information Sheet (General)

Project Title: Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom.

Who is carrying out the study?
Petra Karlsson, PhD Candidate.

The research will form the basis of Doctor of Philosophy at the University of Western Sydney under the supervision of Associate Professor Christine Johnston, from the School of Education.

What is the study about?
Finding solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy, can better help children who use speech generating devices and computer aids in the classroom.

What does the study involve?
You are invited to participate in a focus group where you will be asked to discuss the strategies you have found work best when introducing assistive technology in the classroom as well as what tools, policies and guidelines are available at your work place. The focus group will be audio-recorded and the transcripts presented to you for comment.

How much time will the study take?
It is estimated that the focus group will take about an hour and a half.

Will the study benefit me?
It is not expected that the study will provide direct benefit to you. However, this study should tell us the best way to help and work with young people and families when introducing assistive technology in the future.

Will the study involve any discomfort for me?
The questions are very unlikely to cause any discomfort.

How is this study being paid for?
The study is being sponsored by the University of Western Sydney and The Spastic Centre, NSW as part of a PhD Scholarship program.
Will anyone else know the results? How will the results be disseminated?
All aspects of the study, including results, will be confidential and only the researchers will have access to
information on participants. The study will be published as a thesis and a report of the study will be
submitted for publication, and presented at national and international conferences.

Can I withdraw from the study?
Participation is entirely voluntary. You can withdraw at any time without giving any reason and without any
consequences.

Can I tell other people about the study?
Yes, you can tell other people about the study by providing them with the chief investigator's contact
details. They can contact the chief investigator to discuss their participation in the research project and
obtain an information sheet.

What if I require further information?
When you have read this information, Petra Karlsson will discuss it with you further and answer any
questions you may have. If you and your child would like to know more at any stage, please feel free to
contact Petra Karlsson on 02-4736 0879.

What if I have a complaint?
This study has been approved by the University of Western Sydney Human Research Ethics Committee.
The Approval number is H7341.

The Cerebral Palsy Alliance Human Research Ethics Committee has also approved this study. If you have
any complaints or reservations about the ethical conduct of this research that you want to address to the
Cerebral Palsy Alliance, you may contact the Ethics Committee on (02) 9479 7200 or ethics@tscnsw.org.
au. The approval number is 2009-08-01.

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Ethics Committee through the Office of Research Services on Tel 02-4736 0883 Fax 02-4736 0013 or
email humanethics@uws.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the
outcome.

If you agree to participate in this study, you may be asked to sign the Participant Consent Form.
Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom

**Interview guide**

**Introduction**
Thank you for taking the time to speak with me today. As I mentioned earlier, in the information sheets, this project is about finding solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy, can better help children who use a speech-generating device and computer aid in the classroom. I would like to hear about your experiences to get a better understanding of what’s in place for positive outcomes and also how we can find ways around some of the barriers that have been identified.

I am now going to turn on the audio recorder, please let me know if you want me to turn it off at any time. I will also be taking some notes, just to help me remember better.

**About you and your device (ice breaker)**

**Child**
- So tell me, how long have you had your device/program for?
- What do you like best about it?
- Is there anything that you don’t like about it?
- What is the best piece of advice you have been given about the device/program?

**Parent**
- How did your family found out about assistive technology options for the classroom?

**Introduction to the device/program**
I am interested in learning more about what happened when your device/program was matched to you.

**Parent**
Thinking back to the sessions around deciding on a device, if I were there what would I see happening?
- Where did it take place? (School, at home, somewhere else)
- Who was there?
- Was there anyone else you wished had been there? And if so, why?

**Child**
- Who was the most important person for you at these sessions?
- Did people ask for your opinion about the device?

**Parent**
- How long did you have to wait for the device to arrive?
- When would you say the critical time points are to start planning assessments and follow up of assistive technology for your child? (if we looked at it on a timeline)
Implementing the assistive technology
Some students have asked to have their programming and training made a bit more fun and interesting.

Child
- How have you found it? (if the child finds it difficult to answer open ended question a likert scale with faces is shown)
- Have you any tips on how the grown-ups can make programming and training a bit more fun? (if the child finds it difficult with open ended questions, examples of picture/text on examples, such as; with a peer, with a mentor, by my self, with my family, with my siblings, to facilitate Yes and No answer)

Parent
- Some parents have asked how they best can implement the assistive technology at home - have you found any good strategies that have worked in your family?

Individual outcomes/challenges
Alternative one; for families where the child is using a speech-generating device in the classroom.
Some students said that they wanted their teacher to know that people can be clever, even if they can’t talk. That they just need time to answer or ask questions.

Child
- How do you find it? (if the child finds it difficult to answer open ended question a likert scale with faces is shown)
- What do you think people who work with you need to know about you, to help you with your device? (if the child finds it difficult with open ended questions, examples of picture/text on examples of; my humour, my CP, my interests, my device, my ...(parent fill in).......will be shown to facilitate Yes and No answer.)

Parent
- What is your experience in terms of to what degree the device is part of your child’s learning goals at school?
- Have you as a parent noticed any changes in XXXXX since receiving the device?

Alternative two; for families where the child is using a computer aid in the classroom.
Some students said that their device/program have made it easier, that they are happier with the look of their work.

Child
- What do you think? (if the child finds it difficult to answer open ended question a likert scale with faces is shown)
- What do you think people who work with you need to know about you, to help you with your assistive technology? (if the child finds it difficult with open ended questions, examples of picture/text on examples of; my humour, my CP, my interests, my device, my ...(parent fill in).......will be shown to facilitate yes no answer.)

Parent
- What is your experience in terms of to what degree the device is part of your child’s learning goals at school?
- Have you as a parent noticed any changes in XXXXX since receiving the technology?
The future
Parent/Child
What are your hopes for the future, what do you hope the device/program will enable you to do?

Conclusion
That was all my questions, thank again for your time. Anything else that you want to say or comment on that we have or haven’t talked about?
Teacher interview guide

Introduction
Thank you for taking the time to speak with me today. As it is mentioned in the information sheets, this project is about finding solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy, can better help children who use a speech-generating device and computer aid in the classroom.

I would like to learn from you, what you experienced was aligned or in place when you have had positive AT outcomes and also how we can find ways around some of the barriers that we may face.

I am now going to turn on the audio recorder, please let me know if you want me to turn it off at any time. I will also be taking some notes, just to help me remember better.

About you and the devices you have experience with.
Tell me a little about the student or students you currently work with that use assistive technology, what technology are they using?

Did you have experience of AT before this student?

How have you learnt about CP?

If you have a new student with a disability that needs assistive technology what processes are in place at your school to assess and perhaps make a referral for trial of equipment etc.?

Introduction to the device/program
In your experience what does a successful AT assessment look like for students with CP?

What q do you want answered to make decisions about what AT to prescribe?

What guidelines or assessment tools are available to you when assessing and matching a device/program to a student?

How have you been able to work around barriers that may have risen during the process?

Implementing the assistive technology
In your experience what does a successful AT implementation look like for students with CP?

Who do you think is a key person in many cases in order for the AT to be successful?
To what extent are you able to involve the student in the process?

To what extent are you able to involve the family/parents/carers/other teachers/teachers aide?

- How often is AT part of an IFSP and IEP from your experience?
- How often is the principal involved in some extent or other?

The student’s motivation to use a program or device has shown to have a huge impact on the success of the uptake of a device. Have you seen any good examples of how to capture a student’s interest and motivation when introducing something new to a student or do you yourself have a trick you want to share?

- What other strategies have you found work best when implementing assistive technology in the classroom?

Time to meet with other therapists and teachers has in the literature been identified as one of the barriers to why it sometimes is hard to collaborate across agencies, what is your experience?

- How have you been able to work around potential barriers?

With quite high cost for some of the equipment, funding may be a critical issue for many families, what is your experience of funding and trial options?

- How have you been able to work around potential barriers?

How much time do you have allocated to learn and individualise the device/program or set it up in the classroom?

- Do you recognise training needs for you, families and teachers?

If the student has a teacher’s aide, how much support are you able to provide?

**Individual outcomes/challenges**

How do you measure the student’s individual outcomes from using the device/program?

If we looked at a timeline, from the child’s birth to end of school, when do you think would be good time markers to start an AT assessment to be ready for a school start and when would it be timely to review the current system?

**Conclusion**

That was all my questions. Anything else that you want to say or comment on that we have or haven’t talked about? Thank you for your time.
Mixed methods: Collaborative practices, children with cerebral palsy and assistive technology in the classroom

Focus group question guide

Introduction
Thank you for taking the time to speak with me today. As it is mentioned in the information sheets, this project is about finding solutions to how educators, occupational therapists, speech pathologists and other professionals working with children with cerebral palsy, can better help children who use a speech-generating device and computer aid in the classroom.

I would like to learn from you, what you experienced was aligned or in place when you have had positive AT outcomes and also how we can find ways around some of the barriers that we may face.

House keeping rules: before talking shall we say our name, so that those on the other side of the line can easier recognise who it is? Feel free to jump in, if you want to elaborate on something someone else have talked about or write down an idea you get if you want to come back to it later.

I am now going to turn on the audio recorder, please let me know if you want me to turn it off at any time. I will also be taking some notes, just to help me remember better.

About you and the devices you prescribe with.
Therapists - What type of referrals are you mostly receiving for assistive technology in the classroom?

If I ask you to think of AT for school-aged children with CP, you will probably think of 3-4 of your clients, maybe more. What AT does these clients use? And would you say that these clients represent the typical type of AT referrals you receive?

One thing that has come through my questionnaire is that educators often don’t seem to have a clear understanding of CP, do you find that you have to talk to educators and the school staff about CP and it’s implications for a particular student?

Teachers - How and to whom do you make referrals for assistive technology for a student? What is the process of receiving AT for a student at your school?

Introduction to the device/program
In your experience what does a successful AT assessment look like for students with CP?

What q do you want answered to make decisions about what AT to prescribe?

What guidelines or assessment tools are available to you when assessing and matching a device/program to a student?
How have you been able to work around barriers that may have risen during the process?

**Implementing the assistive technology**
In your experience what does a successful AT implementation look like for students with CP?

Who do you think is a key person in many cases in order for the AT to be successful?

To what extent are you able to involve the student in the process?

To what extent are you able to involve the family/parents/carers/teachers/teachers aide?

How often is AT part of an IFSP and IEP from your experience?

How often is the principal involved in some extent or other?

The student’s motivation to use a program or device has shown to have a huge impact on the success of the uptake of a device. Have you seen any good examples of how to capture a student’s interest and motivation when introducing something new to a student or do you yourself have a trick you want to share?

What other strategies have you found work best when implementing assistive technology in the classroom?

Time to meet with other therapists and teachers has in the literature been identified as one of the barriers to why it sometimes is hard to collaborate across agencies, what is your experience?

How have you been able to work around potential barriers?

With quite high cost for some of the equipment, funding may be a critical issue for many families, what is your experience of funding and trial options?

How have you been able to work around potential barriers?

How much time do you have allocated to learn and individualise the device/program or set it up in the classroom?

Do you recognise training needs for you, families and teachers?

If the student has a teacher’s aide, how much support are you able to provide?

**Individual outcomes/challenges**
How do you measure the student’s individual outcomes from using the device/program?

If we looked at a timeline, from the child’s birth to end of school, when do you think would be good time markers to start an AT assessment to be ready for a school start and when would it be timely to review the current system?

**Conclusion**
That was all my questions. Anything else that you want to say or comment on that we have or haven’t talked about? Thank you for your time.
BODY FUNCTIONS AND BODY STRUCTURES

1. MENTAL FUNCTIONS
   a. Orientation to self (The role of the student)
   b. Motivation (Student motivation)
   c. Confidence (Student confidence)

2. NEUROMUSCULOSKELETAL AND MOVEMENT-RELATED FUNCTIONS
   a. Control of voluntary movement functions

ACTIVITIES AND PARTICIPATION

1. LEARNING AND APPLYING KNOWLEDGE
   a. (ICF-CY) Acquiring skills (Training needs for students to understand how the AT works)
   b. (ICF) Acquiring skills Health professionals and other professionals (Teaching skills)
   c. (ICF) Acquiring skills Health professionals and other professionals (AT knowledge/skills)
   d. (ICF) Acquiring skills Health professionals and other professionals (Training needs in disability – CP specific)

   a. The students’ awareness of their own identity.
   b. Mental functions that produce the incentive to act.
   c. Mental functions that produce personal disposition that is self-assured, and assertive.

   a. Difficulties in controlling movement, fluctuating abilities in which assistive technology is hoped to bridge the gap between disability and ability, but where it is most often poses great challenges for the student and everyone involved to find reliable access methods to technology.

   a. Learning to use certain actions or tasks to carry out a skill such as manipulating a speech-generating device or adapted computer based technology.
   a. Methods and techniques that educators, and allied heath professionals us in order to accomplish certain goals.
   b. Awareness of assistive technology, it’s use and application.
   c. Identified need for further professional development or parent training in cerebral palsy.
2. **COMMUNICATION**
   a. Communication - unspecified
   b. Using communication devices and techniques, unspecified (AT matched to physical disability)

3. **MOBILITY**
   a. Mobility - unspecified
   b. Maintaining a body position, unspecified (The importance of equipment supporting posture before access to AT can be assessed)

**ENVIRONMENTAL FACTORS**

4. **PRODUCTS AND TECHNOLOGY**
   a. Products and technology, unspecified (Design features to consider)
   b. Assistive products and technology for education/technology for communication (Device integration into classroom activities)
   c. Assistive products and technology for personal use in daily living (Device integration into everyday life)

5. **SUPPORT AND RELATIONSHIPS**
   a. Immediate family (The role of the parents)
   b. Immediate family (Training needs in AT for parent)
   c. Immediate family (Parent becoming a teacher, parent

   a. Communication difficulties in which assistive technology is hoped to bridge the gap between disability and ability.
   b. Adapted and non-adapted technology chosen to compensate for a physical disability.

   a. Mobility difficulties in which assistive technology is hoped to bridge the gap between disability and ability.
   b. Carrying out actions in order to ensure posture is controlled for before further technology assessments.

   a. Design, construction, light, sound, time-related changes and aspects to consider in a technology product. Device limitations.
   b. How the technology product is used in the classroom
   c. How the technology product is used at home

   a. Parent involvement in the assessment and implementation of the assistive technology.
   b. Identified need for further professional development or parent training in assistive technology
d. Immediate family (Proactive parents)
e. Community members (Advice from other parents/parent support network)
f. Health professional (The role of allied health professional)
g. Other professionals (The role of educators)
h. Personal assistant/teaching assistant (The role of the teaching assistant)
i. Health professionals and other professionals (The role of the key person for the assessment of the technology)
j. Health professionals and other professionals (The role of the key person for the set up/implementation of the technology)
k. Health professionals and other professionals (Team approach/work)
l. Friends (Peers)

6. ATTITUDES
   a. Individual attitudes of immediate family members (Sensitive to child’s needs)
b. Individual attitudes of health professionals and other professionals (Sensitive to student’s need)
c. Individual attitudes of immediate family members (Sensitive to changing needs of the child)
d. Individual attitudes of health professionals and other professionals (Sensitive to changing needs of the student)
e. Attitude, unspecified

   c. Parent’s who take on decision-making responsibilities and gain more knowledge than other team members around the student.
d. Parents who foresee what needs to action on to assess and implement assistive technology.
e. Parent’s gaining mutual trust and support from other parents
f. Occupational therapists’ involvement in the assistive technology.
g. Classroom teachers, Special educators’ involvement in the assistive technology.
h. Teaching assistants’ involvement in the assistive technology.
i. The person who were driving the assistive technology assessment
j. The person who were driving the implementation of the
k. Individuals (parents, school staff and allied health professionals) working together to implement assistive technology in the classroom.
l. Classmates
   a. Parents who listen or recognize the student’s abilities and limitations and work towards finding a solution that will work for the student.
b. School staff and allied health professional who listen or recognize the student’s abilities and limitations and work towards finding a solution that will work for the student.
c. Parents who recognize that the student’s need for technology and type of technology is not static but rather dynamic.
d. School staff and allied health professional who recognize that the student’s need for technology and type of technology is not static but rather dynamic.
e. General and specific opinions, beliefs, motivation and
6. **ATTITUDES**

   a. Individual attitudes of immediate family members (Sensitive to child’s needs)
   b. Individual attitudes of health professionals and other professionals (Sensitive to student’s need)
   c. Individual attitudes of immediate family members (Sensitive to changing needs of the child)
   d. Individual attitudes of health professionals and other professionals (Sensitive to changing needs of the student)
   e. Attitude, unspecified

7. **SERVICES, SYSTEMS AND POLICIES**

   a. (Special) education and training services (Individual service plan/IEP)
   b. (Special) education and training services (AT resources/support)
   c. (Special) education and training services (The importance to be organised)
   d. (Special) education and training services (Time)
   e. Health services (Time)
   f. Education and training policies (Funding)
   g. Health services (Critical time points to investigate AT options)
   h. Health services (The importance to revisit AT as technology advances and needs changes)
   i. Health systems (Collaboration between different agencies)

Adapted from ICF and ICF-CY 2007 AT (assistive technology)