EFFECTIVE USE OF COMPUTERS FOR LEARNERS WITH VERY HIGH NEEDS:

Teachers' beliefs and experiences.

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

Master of Education (Special Education)

Massey University

New Zealand

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2006

ABSTRACT

The purpose of this study is to examine the effective use of computers by learners with very high needs. A mixed methodology approach (i.e. quantitative and qualitative) would examine teachers' attitude towards computers, the barriers they faced , training ,their beliefs and perceptions as possible correlates of their level of technology use. Perspectives of special education teachers' would clarify the issues surrounding the integration of computers into the classroom and curriculum.

The convenience sample used in the quantitative analysis of this study consisted of special education teachers employed in special schools in New Zealand. Each teacher filled out a survey which sought to explore their attitude towards the computer, their training, learners' needs and their perception. The qualitative analysis used a purposeful sample of 13 special education teachers who had previously filled out the survey. Results showed that majority of the sampled special education teachers used computers in class either individually or with the children to master skills just taught, help children express themselves, and to practice skills not learned well. In addition, teachers who reported higher levels of self efficacy were more likely to use the computer. The Majority of the interviewees thought that using computers with these children was beneficial; however, they also felt that it depended on learners' ability and level. Those teachers who did not feel so positive about using computers in the classroom were apprehensive towards using the technology. The lack of training did not significantly relate to teachers' computer use with children. Furthermore, technical issues prevented teachers from fully utilizing all aspects of computers. Despite this, the teachers used those computer programs that functioned properly.

ACKNOWLEDGEMENTS

I have been supported and assisted by my friends, relatives, and colleagues in the completion of this thesis, which made the same, a pleasurable and knowledgeable experience. Many thanks to -

- Alison Kearney, for patiently supervising me throughout the process of writing this thesis. She made me realize the importance of building upon underlying values and beliefs as they are the foundation for change.

- Mandia Mentis, my second supervisor, for her encouragement and feedback, and the 3 way conversations that made my work better.

- The teachers who took time to complete the questionnaire. Thank you for deciding, even though you were busy, that you wanted to contribute to something that would help other teachers.

- I would like to thank Massey University library for their energy and support in obtaining and supplying the reading materials.

- My father S.V.Krishnamurthy, mother Rajalakshmi Krishnamurthy, and brother Shriram Bharathwaj for their support.

- My husband Umapathy Ananthanarayanan, who backed me up-without you I couldn't have done this; my wonderful daughters, Ankita Umapathy and Anandita Umapathy for being so patient and understanding, love you both.

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Chapter 1

INTRODUCTION

1.1 INTRODUCTION

Learning and teaching in classrooms has largely rested upon long held assumptions about how children learn (Wenger, 1998). It is about time to question these assumptions and consider ways of thinking about learning and teaching in the classroom. The purpose of the study was to use mixed research methods to examine the use of computing technology in the classroom, by special education teachers for learners with very high needs. Surveying the full range of assistive technology devices would be too broad for this study, so computers, which are used by students in special and general education, was taken. By assessing the current use of computing technology in special education classrooms, decisions can be made to improve and maintain their effective use.

Mixed research methodology was used to uncover the beliefs and attitudes of teachers working with learners with very high needs using computers. This methodology is acknowledged in the literature as a field of research in which researchers could obtain a more complete picture of human behaviour and experience (Feuer, Towne, & Shavelson, 2002; Morse, 2002; Teddlie &Tashakkori, 2002).

This chapter identifies the aims of this study and the issues surrounding the effectiveness of using computers for learners with very high needs, followed by an explanation of how my personal experience has shaped this study.

1.2 RESEARCH AIMS AND CONTEXT

This study aims to examine how computers are used to cater to the needs of learners with very high needs in special schools, and in particular, the beliefs,

experiences and practices of teachers about the effectiveness of using computers as a tool for learners with very high needs.

Technology can be defined as human innovation in action, or a body of knowledge and the systematic application of resources using a systematic approach to produce outcomes in response to human needs and wants (Wright, 1999). The main objective of technology is to extend human capability (Paige, 1999). Students with disabilities need every possible support that can assist them in extending their capabilities. Assistive Technology has played a vital role in this area (Male, 1997), and support of assistive technology has been crucial in helping students under different categories of disabilities to augment their capabilities.

The customary types of assistive technology are wheelchairs for students with mobility impairment: communication boards, speech synthesizers and other augmentative communication devices for students with speech and communication disorders; hearing aids and devices for students with hearing impairments; visual aids and devices for students with visual impairments; and computing technology for all students with disabilities.

The use of computers and technology to instruct children with severe or multiple disabilities is a phenomenon that is so recent that there is very little information available to guide teachers in their attempts along these lines (Fields, 1999). Information and research to help educators and students take full advantage of these tools is desperately needed. Research studies with specific focus on teachers' use of computers in special education classrooms are needed to collect data that can influence changes enhancing classroom integration of computing technology.

Considering the limited availability of information in the area of computing technology in special education, it would be beneficial to conduct studies in special education on teachers' use of computers, exploring the variables relating to barriers teachers face due to insufficient time, training, lack of hardware, software, and technical support.

New Zealand Information and Communication Technologies (ICT) strategies for schools-Interactive Education (Ministry of Education (MOE), 1998) and Digital Horizons (MOE, 2002) are encouraging teachers to develop new ways of learning and teaching. For instance, an e-Learning Action Plan for School 2006-2010 (MOE, 2006) is charged with the intended outcomes for each goal and the actions that are required to achieve goals. Furthermore, it is about exploiting technologies in everything we do and using ICT effectively across the curriculum to connect schools and communities. These initiatives provide fertile ground for teachers to question their taken-for-granted practices and the perspectives that underpin them, and to move towards developing their classrooms as learning communities (Alton-Lee, 2005).

Researchers agree that students with special needs benefit from technology access (Bryant, Erin, Lock, Allen & Resta, 1998; Lewis 2001; Scadden 1998). Despite the perceived benefits of technology for students with special needs and the increased access to computers, it seems that still a number of teachers do not use technology on a regular basis (Friedrichsen, Dana & Zembal-Saul, 2001; Judge, 2001). These findings show that teaching practices take time to change, and that sustained support is needed for success.

1.3 PERSONAL HISTORY

I have been working in the education field for twenty-one years of which six years have been in, in special education. As a special education teacher, I have had the opportunity to spend time in many schools, and talk to many teachers. Conversation has turned to use of computers for learners with very high needs, and concerns that teachers have had over these learners. Some of the points of discussion have included reluctance based on factors like 'getting it wrong', and an uncertainty that learners will be able to benefit using computers. Such discussions, coupled with my own experiences in the class, led to an interest in exploring the issue further, with a desire to document the beliefs, experiences and attitudes of special education teachers working with learners with very high needs. Thus this thesis emerged because of my passion for ICT and education, particularly computers and learners with very high needs. I want to understand the *how*, *who* and the *what*. That is, *how*

can it be made effective? *Who* could do it and *what* steps must be taken to achieve, enhance and maintain their effective use? It is not the intention of this study to criticise teacher practices, but to develop an understanding that could lead to progress and guidance for the future.

1.4 THESIS OVERVIEW

Chapter one establishes the foundations upon which this study builds by providing theoretical, methodological and personal factors that justify my interest in computers and learners with very high needs. The thesis continues in the following sequence. The literature review in Chapter Two outlines past reviews and current approaches to technology research in special education and various uses of computer are also debated. The teacher's role, attitude, and belief are outlined, along with factors like software and adaptive devices. The potential barriers to ICT teaching and learning and other issues are looked at. Mixed method approach has been used for this research and this methodology is detailed in Chapter Three. The results of the questionnaire and the interviews are outlined in Chapter Four and Five. Chapter Six discusses the findings of both the phases of research in relation to the literature. Chapter Seven completes this thesis by presenting the conclusions and implications for practice as well as recommendations for future research.

The reader is reminded that this research is merely a small part of a continuous journey for constant improvement in effective use of computers for learners with very high needs.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

This chapter looks at the research literature available on the use of computers for learners with special needs and the role of the teacher in implementing it.
Various topics were highlighted when reviewing the literature. These are:

- The justifications for using computer by learners with very high needs.
- Situations where computers are used by learners with very high needs.
- The role played by computers in meeting the needs of students with very high needs.
- The benefits and drawbacks of using computers by learners with very high needs.
- The teacher's role in implementing use of computers for learners with very high needs.
- Issues involved in use of computers by students with very high needs.

These topics will be highlighted in order to set the context for the current research

There is considerable debate on questions like how and why ICT teaching and learning should take place. Eadie (2001) points out that, "readers will already be well aware of the desirability of integrating computer use seamlessly into the school curriculum" (p.6). The Technology curriculum document (MOE, 1995) includes ICT as one of the seven main areas of the Technology Curriculum. This document suggests that technological learning should be woven throughout the technological areas and school curriculum. However, there is flexibility for teachers to choose how they will deliver the curriculum. A "whole school approach" is discussed as a means of integrating ICT into curriculum and the "potential of ICT to encourage whole school innovation... and outcomes across the curriculum" is emphasized (MOE,2002, p.6-8).

The New Zealand Ministry of Education ICT Strategy- Digital Horizons (2003) attempts to distinguish between Information technology (IT) and Communication Technology (CT).The definition of IT is divided into hardware and software and CT as "telecommunications equipment" including "computers". Looking at both the definitions it seems that CT is already included in IT under the term 'hardware'.

Most authors seem to be referring to the use of computers and related software when discussing ICT. Definitions reveal that the term ICT can refer to a very narrow definition, computer applications, to a much wider definition including a variety of technologies and the use of them. For the purpose of this research, the term ICT will refer to computer technology as well as the related skills and knowledge required for their use.

Introducing technology into education gives the impression of innovation and effectiveness for no other reason than that technology is involved (Malouf, 2001). He further states that aspects of "appropriate implementation" and proof of "effectiveness" are overlooked (p.1).

2.2 REVIEWS OF TECHNOLOGY RESEARCH IN SPECIAL EDUCATION

The studies included in past reviews involve the assumption that technology's primary use was to teach content material or basic skills; that is, in those studies, technology was used as an electronic tutor, and the software was best categorized as Computer Aided Instruction (CAI). Schmidt, Weinstein, Niemic, and Walberg (1985, cited in Woodward &Cuban,2001) generally supported CAI as a means of increasing academic performance for students with disabilities, but this was based on global comparisons of CAI and traditional forms of instruction. Ellis and Sabornie (1986, cited in Woodward & Cuban, 2001) reflected hypotheses or expectations for CAI that were widely held beliefs about the potential benefits of technology use in special education. Content areas like mathematics, spelling, reading and other subject areas were used as a

framework by Shiah, Mastropieri, and Scruggs (1995, cited in Woodward & Cuban, 2001) to examine the impact of CAI on them, and their findings supported the potential of CAI for raising academic achievements. This was supported by Fitzgerald and Koury (1996, cited in Woodward & Cuban, 2001) with a similar review of the literature on students with mild and moderate disabilities.

However, these positives reflect three fundamental problems (Woodward, Gallagher, & Reith, 2001). First, the comparisons offered are too global in scope and there was confusion about medium (software) and instructional principles (such as, feedback, explicit strategies, and motivation) that led to the benefits (Okolo, Bahr, & Reith, 1993, cited in Woodward & Cuban, 2001). Many earlier researchers implied that medium alone produced significant instructional or cognitive benefits, but Clark (1983, cited in Woodward & Cuban, 2001) argued that it was the curriculum designs and the specific instructional principles in the software that more likely contributed to academic outcomes and not the medium.

The underlying hypotheses that CAI should lead to cognitive gains that are superior to traditional instructional methods poses the second problem. Okolo et.al (1993) disagrees with this assumption: " Because students with disabilities can be expected to learn at slower rates, have longer histories of academic failure, and need more intensive instruction than their non-disabled peers, short term interventions hardly can be expected to produce significant changes" (p.4)

Finally, most reviews of technology research in special education ignore research in which the technology is used in assessment, rather than in instruction.

2.3 CURRENT APPROACHES TO TECHNOLOGY RESEARCH

Woodward, Gallagher and Reith (2001) have clearly stated that the marked differences between the researcher's carefully articulated design and use of computers and how they are actually used by practitioners or students has become a source of deep concern for many in the field. There has been a shift in

thinking; many researchers have come to believe that technology will reform education incrementally, and not in the way it was predicted in the early 1980s. Giving teachers high-quality programs and some kind of in service training on how to use the technology is not enough, as teachers are constrained by a host of day-to-day variables (Cuban, 1993).

Assumptions of how technology should be used in classrooms have changed. Many teachers have understood that computers could be used as a 'tool' to the 'tutor' (Woodward, et.al 2001, p.17). Technology is not thought to be the sole factor that makes an educational difference, rather it is how it is used as a tool, and fits with the teacher's spontaneous and informal decision making, that leads to increased learning.

Woodward et.al (2001) acknowledges that the history of technology-based research in special education suggests that simple answers to the question of instructional effectiveness are not easy to achieve. The issue is further complicated by the move of technology from tutor to tool. They further concede that more research is needed on the variations in how teachers adopt technology and associated innovations.

This kind of research could provide important insights for special education teachers who are already beginning to ask how technology can help students with disabilities in their learning. It can also help to put together the variables that facilitate or impede its effective use for students with disabilities.

Research and development of technology in special education has focused on the needs of students with mild cognitive disabilities or those with sensory impairments. With the increasing use of technology in society, and in schools in particular, interest has been shown in technological solutions to environmental access and communication needs of students with a variety of severe physical and cognitive disabilities too (Todis,2001).

2.4 WHY USE COMPUTERS?

The big question is why use computers for learners with very high needs. Some authors seem to be looking at ICT to improve outcomes in all curriculum areas and essential skills (Cuban, 2001). Burbules and Callister (2000) point out that the key issues which surround computer uses are, "how they are used, by whom and for what purpose" (p.1).

In today's world, computer technology can help learners with very high needs to overcome barriers they experience. Semmel and Lieber (1990 cited in Harris & Boyd, 1998, p.170) assert that an important goal of technology is to "provide severely disabled individuals with the means for controlling and mediating aspects of their physical and social environments so as to assure maximal adaptability". Jonassen (2000) believes that, "learning from computers" through computer-assisted instruction is of limited benefit and raises the question: "why not let learners assume responsibility for setting their own goals, and monitoring their own learning" (p.4-6). Ryba and Selby (1995) asserted that, "The idea of using a computer as an empowering tool to give students control over their learning is widely accepted" (p.157).

Since the first half of the 1980's personal computers have been used to support the education of children with profound and multiple learning disabilities in the UK. The use of computer technology can enable children with disabilities to successfully explore the world around them, to communicate their needs to others, and to make choices about their world. Computer applications can serve as an equalizer for a child with disabilities so that he or she can function in the same settings and in similar activities engaged in by typical young children (Hutinger, 1996).

Appropriate technology applications and adaptations can provide many children with disabilities a means of opening the door to a range of learning opportunities

that was previously unavailable to them. However, descriptions of how computers are actually used in classrooms are less clear than if computers are being used at all. The use of computer technology will prepare learners for life in an information and technology based society and this makes computers a necessity. Hutton (1997) questions this benefit on the basis of "little research in New Zealand on this topic" (p.19).

Three major areas in which technology can assist learning by enhancing environmental interactions are communication, environmental control and environmental manipulation. Multiple impairments, particularly those involving both cognitive and sensory impairments, need intensive and systematic strategies to implement an effective educational intervention. Computers can be vehicles for this approach to educational intervention.

Using computers supports the idea of Wolfensberger's (1983) social valorization, where the learners with very high needs are socially valued and this helps to enhance their 'social image' and 'competencies'. Vygotsky (2006) also discussed the significance of student's interactions with surrounding culture and social agents, such as parents and peers.

Glaser and Hasselbring (2000) pointed out that many people applaud the integration of computer-based technologies into the classroom for typically functioning students, but very few individuals recognize the great number of benefits this technology may afford children with disabilities.

In spite of the tremendous positive impact that has been reported in regard to the use of computer technology with young children with disabilities, most professionals use these technologies in traditional ways, including drills in basic skills and instructional games, especially for lower functioning children (Haugland, 1999). Educators and learners can exercise a great deal of choice thanks to today's technologies, but these technologies are most effective when

they are shaped to meet a student's particular learning needs, not when they are used as a mere enhancement to learning (Scherer, 2000).

Although we may not have had a long history with technologies in education when compared to teaching and instruction, we have a fairly good idea about what works and what does not. Technology is just another tool, and it is not what technology does to education but how wisely we use it.

Having computers for use by a learner with very high needs will not in itself be of any advantage, because technology alone does not promote effective learning (Kearney, 2000). Students require skilled and caring teachers who view technology as a tool, not a replacement, for teaching (Edyburn & Gardner, 1999). Ryba and Selby (1995) agree, "Technology provides a means of communication and information for students that enable them to become capable learners" (p.156). Ryba and Selby, outline that a child has to have skills in four areas-motor skills for control of input, sensory skills to recognize feedback, cognitive skills for understanding cause and effect, and social skills to interact with others in the environment. Skill synthesis and generalization often requires specific instructional strategies to facilitate its occurrence (Cook, Tessier, & Klein, 2000). Curzon, Selby and Ryba (2005) highlight that it takes the drudgery out of the effort required to interact and opens channels of communication for all individuals, including those who require adaptive assistance.

In special education there is an even greater need for competence with computers, as the use of computers can empower learners with special needs to accomplish incredible feats that would be impossible without such computer assistance. "Without question, computers are indispensable in our lives-both personal and professional", i.e. computer skills are essential for today's teachers (Ulman, 2005, p.1).

2.5 USE OF COMPUTERS:

A key feature of ICT use in education has been the way technology can serve as 'intellectual amplifier' (Ryba & Selby, 2004), i.e. they provide a vehicle for collecting, representing, structuring and processing information. These devices can enhance the learning strengths of students in educational setting. Computers can play a number of roles in the education of learners with very high needs. Burgstahler, (1998) stresses that they can help assure equal opportunities in education and facilitate the transition to work and community living. They help as a teaching and learning tool, a communication tool, a socializing tool, and as a motivational tool (Curzon, Selby & Ryba, 2005).

Some examples of how computers can be used by children with disabilities are:

2.5.1 Socializing Tool

Clements and Nastasi (1988, cited in Curzon, Selby & Ryba, 2005) highlighted that the computer not only promotes interpersonal skills (e.g. working alongside other students and able to wait for their turn) for social development, but also provides a basis for intellectual growth. Computers also promote co-operative learning, which in turn helps students to understand interdependence i.e. positive ways of depending on one another. Respondents involved in Macomb Projects' longitudinal research study on technology's effectiveness for children with multiple disabilities reported that their children showed greatest gains in areas of social and emotional behaviours, "including enhanced self concept, independence, social interaction, cooperation, and exploratory play."(Hutinger, Johanson, Stoneburner, 1996, p. 26).

2.5.2 Compensatory Tool

Children with disabilities can use computers as compensatory tools to overcome functional limitations imposed by their disabilities. Burgstahler, (1998) pointed out that it can be used to increase sensory input, enhance mobility, perform as prosthesis, and facilitate receptive and expressive communication, e.g. a portable computer equipped with speech output can be used as a 'voice' in class

discussions for a child who cannot speak. Computers make it possible to perform tasks for themselves without being dependent on others. It holds a promise of unlocking a communicative and cognitive potential that would be otherwise inaccessible (Todis, 2001). This leads to new activities that are open to disabled students and the amount of time that it takes to complete their work can be reduced. Application of appropriate technology early in life is better as it enables children to control their environment, thus preventing helplessness.

2.5.3 Teaching tool: Computer Assisted Instruction

A computer helps students to participate independently in learning activities and thereby reducing the impact of their disabilities on acquisition and use of skills and concepts. Ward (2002) points out that CAI brings with it several potential benefits as a teaching/learning medium. These include self-paced learning, self-directed learning, the exercising of various senses and the ability to represent content in a variety of media. Humans are multi-sensory animals. The more senses through which we receive information, the easier it is to remember. According to Fletcher (1990, cited in Ward, 2002), people remember 20% of what they hear, 40% of what they see and hear and 75% of what they see, hear and do. The fact that the computer can exercise various senses and present information in a variety of media can enhance the learning process. Any teacher of children with special needs knows that the more senses are involved; the more learning is likely to occur (Barry & Wise, 1996).

Drill and practice, tutorial, simulation, word processing, problem-solving, and other software programs give these students learning opportunities that would not be available in other ways. For example, where the computer provides multi-sensory experiences, interaction, positive reinforcement, individualized instruction, and repetition can be useful in skill building for children with specific learning disabilities. Various studies (Entwistle, 1981; Ford & Chen, 2001; Schmeck 1988, cited in Ward, 2002) have shown that when learners can learn in

a way that suits them, improvements in the effectiveness of the learning process normally develops.

Special software can even teach children who are severely and multi disabled, the concept of cause-effect by demonstrating that their actions (e.g., hitting a switch) have an impact on their environment (e.g., a picture is created, music is played, or a toy is activated). Computers offer infinite patience, learner control, immediate feedback, branching capabilities, multi-sensory interaction, and a non-threatening learning environment. The work of Capper and Copple, 1985 (cited in Cotton, 1991) led them to the conclusion that CAI users sometimes learn as much as 40 percent faster than those receiving traditional, teacher-directed instruction. Some of their qualities that teachers of exceptional children have found to be particularly powerful include their ability to hold attention, increase motivation, and enhance self-concept.

2.5.4 Access to Information

'Universal access' is the ultimate goal i.e. all information and communication technologies should be accessible to everyone (Curzon, Ryba, & Selby, 2005, p.209). Information sources on networks, CD-ROM, and other media provide opportunities to independently read publications on their computer screens. Computer technology can also assist in the process of media conversion (Burgstahler, 1998). For example, a blind student who has the technology to access newspapers and journals on-line can use adaptive software and hardware to read the materials aloud or print them in Braille. Equipped with appropriate technology, students have access to a wealth of resources without assistance which reduces the necessity to move about. Despite the advances that have been made, the conventional means of communicating with a computer presents a major barrier to many people with disabilities. This can be minimized to large extent with the help of assistive technology devices.

2.5.5 Communication tool

Telecommunications is a powerful mode of communication (Burgstahler, 1998). Those with hearing and speech impairments who have a personal computer, modem and appropriate software can communicate with others on electronic networks. By stimulating and enhancing interactions with peers, electronic communication can also facilitate social and language development. The communications revolution is defining what our students will need in adult life and work. The computer and its related technologies have been established as the essential tools. What we do or fail to do with these tools will make a profound difference in our students' lives (Barry, & Wise, 1996).

2.5.6 Motivational tool

Motivation plays a very important part in learning. Motivational problems have adverse effects on student's achievement. Most of these problems arise through negative attitudes that build up through experiences of failure which leads to students becoming less motivated or getting switched off. This is well summarized in the following quote cited in Curzon, Selby and Ryba, 2005, " Once children have entered the 'swamp' of negative expectations, lowered motivation, and limited practice, it becomes increasingly difficult to get them back on the road of proficient reading". (Spear-Swerling & Sternberg, 1994, p.91)

In an ICT environment teachers and students work as partners with the result that they complement each other and this helps in easy adaptation of teaching and learning processes to meet the student's needs. This will assist students to develop a positive self-system.

2.6 THE TEACHER

2.6.1 Role

MacArthur and Malouf (1991) point out that the role of the teacher is important because they are the ones that determine whether to use computers at all and use it for formulating goals and curricula that use computers as a tool. Again, the

teachers modify instructional activities to fit their beliefs, the instructional and management routines in their classrooms.

Researchers have stressed that a major variable to successful computer use by learners with special needs is the teacher (Au, 1996; Derer, Polsgrove &Reith, 1996; Langone, Wissick, Langone& Ross, 1998). Teachers who worked with special needs students felt that computer was just the tool and they were the key to its effective use (Kearney, 2000).

When innovations fail, teachers often receive a share of the blame for being resistant to change. But resistance to change is a simplistic notion that does little to explain why teachers do not embrace technologies and what needs to be done to achieve this. MacArthur (2001) highlights that studies indicated that teachers in the 1980s had substantial discretion about how to use computers in instruction and whether to use them at all. He further says that though more curriculum support is given nowadays, the extent and nature of computer use in classrooms is still determined by the individual teacher's decisions.

Access to technology was in general more limited than it is today. Nonetheless, the claims about the potential impact of technology on education is still the same now as it was then: Computers would motivate students to learn; make instructions in basic skill more efficient; and encourage student centred problem solving approaches to learning if only teachers would use them effectively (MacArthur,2001). Despite the considerable changes in the hardware and software available to teachers now, the findings of the studies done 10 years ago still remain relevant in terms of the issues faced by teachers in deciding how to integrate technology with curriculum.

Computers are freedom-givers to teachers, by simplifying decision-making processes through the use of computerized instructional planning (Scherer, 2003). Several barriers inhibit more widespread use of these applications and

devices. In spite of the tremendous positive impact that has been reported in regard to the use of computer technology with young children with disabilities, most professionals use these technologies in traditional ways, including drills in basic skills and instructional games, especially for lower functioning children (Fallon & Wann, 1994; Haugland, 1999).

2.6.2 Training and Technical assistance

Teacher familiarity, confidence, and skill in choosing software and integrating technology into the curriculum are dependent upon teacher training and time for self-directed exploration and learning. Lack of technology training and support services has been reported as a major barrier to utilizing computer technology (Glaser & Hasselbring, 2000; Lesar, 1998,). McCarthy (1995) (cited in Harris & Boyd, 1998) in her study of teachers of students with special needs in Wellington, found that teachers "do not receive sufficient training to suit individual needs" (p.22). This included their knowledge and confidence in using computers, and relating software programs that the students use.

How teaching, learning and assessment takes place is a decision primarily left to the teacher. Although the student determines how actual learning occurs, the teacher is the gatekeeper to the learning experiences each student may have (Cuban, 2001). Brown (1998) points out that 'teachers make the difference' and is therefore the key to ICT learning.

Lack of adequate teacher training has an especially strong impact on students with disabilities because technology is often a critical component in planning and implementing an educational program for these students (Glaser & Hasselbring, 2000). The classroom teachers must have a deep understanding of what they are trying to accomplish and how technology can help them achieve their goals (White, & Fredrickson, 1998), moreover classroom teachers are not fully attuned to individual student abilities or adept at selecting good educational software and customizing it for an individual student (Scherer, 2003). Thus, to meet the needs

of students with disabilities, teachers need training in how technology can be used and the technical skills to carry out a plan of action.

Balandin and Sweep (2005) stress that teachers require ongoing training and support to ensure that they can use technology and facilitate the student's participation in the academic and social environment of the school as student's needs may change with experience, maturation or with developments in the fields of technology. Savidan (2003) stresses 'integration' rather than 'insertion' of ICT into the curriculum, however, insertion of ICT will ensure that teachers gain basic skills and knowledge. Jonassen (2000) acknowledges that "some knowledge of any tool is required in order to use that tool" (p.8).

The role of teacher has been continually evolving. Muffoletto (2001) discussed "decentring of the teacher as a voice of authority" (p.3). This is supported by Savidan (2003) who further stresses that teachers have now moved from being advisor/demonstrator to facilitator and now moving to being a co-learner. Schuck (2001) refers to teachers as an "expert learner",(p.4) which is inclusive and acceptable as the teacher is still thought of as an expert, at the same time they will be continually learning. Technology will continue to evolve and therefore, teachers will need to keep abreast with the changes.

2.6.3 Confidence and Competence

Teachers today face a number of challenges as they begin integrating technology into their classrooms, which include a lack of specific ideas about how to organize and manage integrated classrooms, as well as a lack of confidence for implementing these new types of ideas and roles. Even as they are gaining more computer skills, they continue to report feeling unprepared to use technology in the classroom and lacking in knowledge to successfully implement computers into their classrooms (Tyler-Wood, Putney & Cass, 1997).

McCarthy furthermore stresses that the "teachers' knowledge of school and Ministry of Education policy relating to special needs students' computers was limited" (1995, p.22). Research suggests that when students use computer based instruction, teachers must adopt new and different roles, and know how to choose and use right technology for a specific educational goal, and how best to incorporate technology into curriculum (Edyburn & Gardner, 1999, Ertmer, 2000).

With regard to computer use, self-efficacy is influenced by a synergy of confidence and skill (Joo, Bong, & Choi, 2000); that is, it is difficult to be confident in using CT without a given skill level, and it is difficult to acquire a high CT skill level without some degree of confidence.

2.6.4 Pre-service and in-service Teacher Training

Lack of appropriate technology training in pre service and in-service teacher education programs is the most commonly cited barrier to use of technology in the classroom.

Multiple research studies have indicated that not enough attention has focused on the education of classroom teachers in how to utilize and integrate technology into their curricula (Fisher, 2000). Continually, studies report that teachers rate practicality and relevance as their highest priority when evaluating professional development. Teachers require real examples of successful technology integration that illustrate both the problems encountered and suggest a variety of feasible solutions. They require access to positive experiences that link with their current practice and reflect the equipment they have available to them.

The Ministry of Education (1997b, cited in Savidan, 2003) states that "...quality teachers can be seen as having ....the ability to use ICT effectively as an aid to teaching". (p.21) However, Bracewell and Evans (1998, cited in Savidan, 2003) point out that until 1998 there was..." no compulsory requirement to train student teachers in IT" (p.13).

Savidan (2003) points out that some teacher training institutes are continuing to graduate teachers "who cannot incorporate ICT into their classroom practice" (p.133). She also believes that effective use of ICT should be modelled by those training the teachers, " If training and modelling effective use of ICT does not happen during teacher training, how can one expect the teachers to gain these skills, so that, they in turn ,model them for their students". (p.133). Recent survey data suggested that the teacher education faculty still do not feel that technology use is being effectively modelled for our future teachers (Schrum, 1999).

Fisher (2000) agreed that integrating technology use into students' teaching field experiences early in the pre-service teacher training program helps to provide a means for the students to develop their own perspective regarding its value in their own teaching methods. This also allows students to support educational technology solutions with their own instructional objectives, pedagogy, and assessment.

A good in-service training program will address both the basic skills required for teachers to operate technology and provide them with opportunities to explore integration with the curriculum. Step by step handouts should be available for teachers to consult after the training session.

2.6.5 Attitudes and Beliefs

Earlier studies suggest that teachers' educational beliefs play an important role in how they choose to appropriate and make use of technologies in their classrooms in that for teachers whose beliefs are more traditional, there exist different and more complicated barriers to adoption (Honey & Moeller, 1990). Furthermore, the results of a recent study by Firek (2003) remain disappointingly consistent with Becker's 1999 study which revealed that a majority of teachers are not using the technologies available to them.

Teachers also need to be convinced of the value of technology as a tool to supplement and improve classroom practice. Technology, which is well integrated into the curriculum, rather than merely added to it, may be a means by which teachers may develop positive beliefs about the role of technology as a tool for learning.

Ertmer, Conklin, and Lewandowski (2003) pointed out that even the best ideas about using technology will remain unused unless and until teachers believe that they are capable of implementing them in the classroom. In particular, teachers' beliefs about their ability to use computers in instruction may be the key in determining behaviour. "Self-efficacy has repeatedly been reported as a major factor in understanding the frequency and success with which individuals use computers" (Eachus & Cassidy, 1999, p. 2). Hence, teachers who have high levels of efficacy for teaching with technology are more likely to participate more eagerly, expend more effort, and persist longer on technology-related tasks

2.6.6 Time constraints

Finding the time to keep abreast of the rapid growth of computer technologies and effective strategies to use them was mentioned frequently by teachers (Judge, 2001).

Time must be allowed for individual teachers to gain familiarity with applications before classroom implementation is expected. General centrally provided courses are not sufficient to meet these needs. MacArthur (2001) highlights that staff development in any innovation, including technology, needs to be responsive to the complexities of teachers' professional lives and the constraints they face in resources, expertise, and instructional and planning time.

Vannatta and Fordham (2004) who found that teacher attributes of time commitment to teaching, an openness to change, and professional development opportunities best predicted technology integration. When not enough time is

provided, teachers often resort to what is already known, and so fail to try new methods to teach students.

The newer computer products are more complex and sophisticated and often require more time for teachers to use them effectively. Teachers need opportunities for training, time to experiment with new techniques, technical support, and a plentiful supply of suitable software.

2.7 SOFTWARE

Most researchers have found that special education teachers have used computers and software for teaching functional and academic skills, as well as drill and practice (Babbit & Miller, 1996; Gleason, Carnine, & Boriero, 1990; Okolo, Bahr, & Reith, 1993; Russell, Corwin, Mokros, & Kapisovsky, 1989; Stevens, Blackhurst, & Slator, 1991). The software used for these purposes tends to be very structured, controlled, and sequenced (Bottge & Hasselbring, 1993). Because of these characteristics, most software programs leave little room for the teacher to decide where these software programs fit in the curriculum. However, it is possible to make computer-based, flexible learning tools that can be easily integrated into a curriculum and that facilitate effective concept instruction.

2.7.1 Teacher- made Computer resources

Students with special needs, such as learning disabilities, intellectual disability and behavioural problems often struggle when attempting to understand abstract concepts. These students also require more extended practice to master concept understanding (Olson & Platt, 2000). Attention deficits and motivational factors can further complicate the teaching and learning process (Hickson, Blackman, & Reis, 1995). The teachers are often challenged by the task of designing instruction that will facilitate concept understanding and developing activities that will reinforce and maintain learning. With new computing technologies,

instructional tools can be developed that are not only effective and flexible, but also motivating to students (Lindsey, 2000).

The computer has been an effective tool in motivating students and is very compatible with effective instruction for students with disabilities. However, much of the computer-based instructional software currently available focuses on one of two areas: providing drill and practice activities on skills; or following a specific curriculum sequence that may or may not relate to the goals and objectives determined by the classroom teacher and/or the student (Brown & Miller, 2001). Ryba (2005) points out that when students are given computer and appropriate enabling software, students with disabilities are able to perform at a higher level than expected.

2.7.2 Software Categories

Ivers (2003) has pointed out several categories of programs:

Applications: They allow users to create things (e.g.) Microsoft works and Multimedia. These programs for younger children differ from those designed for adults in their simplicity and design.

Tutorials: These help to teach students new concepts or skills. After the program provides instruction, it generally checks students' understanding by asking questions or providing practice before moving to the next level.

Drill and Practice: These are designed to reinforce concepts and skills that have already been taught. Students receive positive reinforcement for correct answer and opportunities to try again and correct their incorrect answers.

Stimulation: Provides opportunities to react in different environments. The decisions and actions of the student affect the outcome of the simulation.

Instructional games: These may be competitive and include game format to teach or reinforce instructional content.

Problem-solving: These engage students in reasoning, critical thinking. These are not generally content dependent. (e.g.) puzzles, jigsaws.

2.7.3 Software selection

Computers have been called 'freedom-givers' because well designed software programmes are truly interactive and can provide students with individual attention and continuous feedback (Scherer, 2003). Thus in addition to appropriate goals for computer use and sufficient staff training, beneficial use of computers is dependent upon appropriate software selection. Choosing good software from the vast array that is available depends upon the salient features of the software, the goals planned for computer use, and the children who will be using it. Hence, it is important that teachers take time to evaluate the software they plan to use.

Specialized software is now bridging the gap between regular software and special requirements. Educators can now create, individually tailored learning resources if they are equipped with a digital camera, regular multimedia software, patience and ingenuity. As a result, the demand for commercial specialized packages appears to be declining (Curzon, Selby & Ryba, 2005).

2.7.4 Evaluation method of software

Although there is a wealth of information in the literature focusing on integrating computer technology into all aspects of the curriculum, there are areas for which there is a dearth of information (Cuban, 2001; Perkins, 1995; Sivin-Kachala, Bialo, & Langford, 1997). These are software evaluation from the perspective of summative evaluation (e.g., student achievement outcomes) and formative evaluation of the software (e.g., appropriateness of instructional design elements such as content, interface, and degree of computer mediation) and how it is used in classrooms (Mills, 2001; Sugar, 2001).

Teachers rely on experts to produce quality instructional materials for classroom use with the assumption that these commercial products have been properly designed, developed, and evaluated. However, this is not necessarily the case (Shiratuddin & Landoni, 2002; Sugar, 2001)

A simple method of evaluating software is needed. Teachers need a means of sharing basic information about the current software and the circumstances under which they found it to be of benefit to the student. This will help in avoiding the 're-inventing the wheel' (Hardy, 2000) of evaluation by every one, which becomes even more impossible when the number of software items in an institution grows.

2.7.5 Checklists to review software

Before using a piece of computer software, educators must look at the following criteria: Ivers (2003, p87-89) developed the following lists indicating that software may be considered appropriate when it answers the following criteria. They are:

1. How will it be used to meet the desired learner outcomes?

- Does the program have objectives?
- Are assessment features built into the software?

2. Is the software appropriate for the students?

- Is the design appealing and motivating to the students?
- Does the program provide appropriate feedback? Students should not be encouraged to make incorrect answers nor should they be scolded or degraded for incorrect answers.
- Does the program include both text and audio directions and feedback?
- Does the program have Access features allowing touch screens, modified keyboards, or other devices to be used?

3. Is the software instructionally sound?

- Are the instructions easy to follow?
- Can student return to a previous screen?

4. They must examine the layout and functionality of the program too.

- Is the program easy to use?
- Is it visually appealing?
- Can student work at his/her own pace?
- Do sound and other media elements enhance or detract from instruction?
- Will the program work on the class computers as not all computers are alike?

5. Can the program be customized?

- Does the program allow educator to enter their own information?
- Can the educator adjust the difficulty level?
- Does the program track the progress of the student?
- Is technical support available?

Many assistive technologies are readily available for use by individuals with different types of disabilities and are already providing many students with special needs an opportunity to be educated alongside their nondisabled peers. With expanded options available, it has made choices possible, but on the other hand it has made product selection complex. Teachers need an active introduction to the available options and practice in using them.

2.8 ASSISTIVE TECHNOLOGY

'Assistive Technology' is the term used to describe a wide range of information and communication technologies to overcome disability and special education barriers. The US Assistive Technology Act of 1998 defines assistive technology as "...products, devices or equipment, whether acquired commercially, modified or customized, that are used to maintain, increase or improve the functional capabilities of individuals with disabilities...." (Section 3, Definition & Rules). The wise use of assistive and computer technologies can significantly reduce the

impact of disability at levels, like, impairment, activity and participation (Curzon, Selby, & Ryba, 2005).

Kelker (1997) developed the following list indicating that assistive technology may be considered appropriate when it does any or all of the following things:

- Enables an individual to perform functions that can be achieved by no other means
- Enables an individual to approximate normal fluency, rate, or standards--a level of accomplishment which could not be achieved by any other means
- Provides access for participation in programs or activities which otherwise would be closed to the individual
- Increases endurance or ability to persevere and complete tasks that otherwise are too laborious to be attempted on a routine basis
- Enables an individual to concentrate on learning or employment tasks, rather than mechanical tasks
- Provides greater access to information
- Supports normal social interactions with peers and adults
- Supports participation in the least restrictive educational environment.

The National Education Guidelines of New Zealand (revised 2002) outlines that assistive technology can play a key part in removing barriers to educational achievement and have given a commitment to identify and provide learners with appropriate technology where it is needed to improve educational opportunities.

The role of technology in education for students with disabilities has two focuses: 1) assistive technology with individual and social implications and b) access, instructional implications. The interactivity and interconnectivity they offer make them a new resource in the teaching and learning (Scherer, 2003). Roblyer and Edwards (2000) identify some of the current issues that apply to special education and technology. "Hardware/software compatibility problems seem

even greater for adaptive devices and special needs software than for other products." (p309).

Another problem with teachers assuming most of the responsibility for AT devices is their lack of training and supervision in providing training and evaluating student progress. This could be because after the training session with AT specialist, they may not be available for follow-up or to answer teacher's questions. With so little support available, 'training' could mean a period of time where the teacher practices using the device. Unless, it is well designed, this time will not only be wasted but also prove counterproductive and punishing to the student (Todis, 2001).

2.9 BENEFITS OF USING COMPUTERS

A student's potential functioning is very often misjudged because of a presence of a 'disability'. Students with disabilities are often considered by others to be less capable than they really are. A computer has had a major role to play in demonstrating and celebrating the ability of these students rather than their disability.

Paveley (1999) proffers a concise list of educational benefits. ICT can

- provide a focus for language development activities
- provide a medium for differentiated activities
- make writing more accessible
- make information more accessible
- enable pupils to practice skills in an enjoyable way.

Technology gives excellent opportunities for students to learn together, they learn better when interacting with one another and computer than interacting with computers alone. Social development can be linked directly to the curriculum regardless of the extent and type of disability that the student has (Ryba &Selby, 1995), thus acting as an empowering tool, tool for social development.

Learners with disabilities are frequently dominated and controlled by other people; hence, the student learns to be helpless. They see no relation between effort and attainment of a particular goal as the end and means are not in their control. Ryba, 1988 (cited in Ryba & Selby, 1995) concurs that computers could help overcome passivity and helplessness by assisting students to see the relationships that exist between their actions and success or failure in learning.

The highly interactive nature of the computer provides a good medium to retrain students to take control of their learning, which will boost their level of expectations and rate of success. They also help in enhancing adaptive behaviour, and promoting thinking skills and social skills (Ryba & Selby, 1995). Male (1988 cited in Ryba & Selby, 1995) highlighted that recognition and support received in the computer situation can help to enhance self-esteem, self-confidence, and motivation, all of which are transferable to other learning situations.

Computers, in their own way, can have infinite patience. They can act as cognitive prostheses while motivating the student in a risk-free environment. One aspect of computers which should not be under-valued is its motivational effect. Children who have difficulty concentrating for even short lengths of time on one task may spend hours doing it on the computer (Edwards & Mynatt, 2000). Working at the computer had a calming effect on some potentially disruptive children. For the majority of children working with the computer is a positive and rewarding experience.

Technology can help improve student motivation (Marr, 2000), self-confidence, higher self-esteem (Sivin-Kachala & Bialo, 2000; Wishart, 2000) and exhibit on-task behaviour (Sivin-Kachala & Bialo, 2000). It also gives students an opportunity to learn and apply real-world skills (Ivers & Barron, 2002).

VanSlyke (2003) pointed out that Prensky in a two-part series entitled *"Digital Immigrants, Digital Natives,"* (2001) presents a number of examples of computer games being used to teach students skills and knowledge, and it appears that tutorials modelled on video games are the answer to tomorrow's educational challenges. Jonassen (2000) asserts that the computer is a tool to learn with rather than something we learn from.

2.10 BARRIERS

The effectiveness of computers in schools depends on a variety of contextual variables which include the teacher, individual's interests and the tasks that have to be performed at that point of time. Student-computer-teacher interaction is critical (Okolo, Bahr & Rieth, 1993).

Not knowing how technology can benefit them or their students can cause some teachers to misuse or ignore it. They settle in a comfort zone of familiarity, unwilling or afraid to explore new instructional tools. It is important that "learner outcomes drive the use of technology, not vice-versa" (Ivers, 2003, p.38)

A good teacher always looks at the abilities of the students rather than disabilities, computers also helps to focus attention in the same direction. The National Curriculum Council Policy (cited in Hawkridge & Vincent, 1992) states that an "essential principle" of this educational technology is to "magnify abilities that are there, bypassing as much as possible cognitive, emotional, physical, and sensory disabilities" (p.28).

Hutton (1997) describes that successful use of computers can be hindered by lack of training of classroom teachers, a lack of funds to buy software and computer peripherals, a lack of maintenance, and too little regard for children's educational use of computers. Harris and Boyd (1998) emphasize that to integrate the technology into the classroom requires specific teacher training and

regular updating of software, so that the child will not be bored with too much repetition, and will continue to advance educationally and academically.

A 2-year study in United States involving 14 children with multiple disabilities concluded by outlining the issues that must be addressed when using computers to assist with their learning:

> But can we say these [educational] benefits actually occur in 'real life' with real children and families? The answer is '*yes, but it depends…..*'on the child, on the resources of the educational program, on belief in technology benefits, on the technology competence of the child's educational staff, and on the interest, resources and persistence of families (Huntinger, Johanson, & Stoneburner, 1996, p.35).

The dynamic nature of classroom activities i.e. teaching and learning means that an intervention strategy may be effective at a particular time and for a particular student and may change at another time for the same student. This fits well with the model of Bronfenbrenner, (1979) that instead of focusing only on the individual child, relationships between each system must be analyzed both in terms of individual's adaptation to environment and in terms of the impact of environment on the child. Hence, in terms of computer use by learners with very high needs, it is not just the learner and the computer, but the complete ecosystem of the learner that must be considered (Cole & Chan, 1990) which, of course, includes the teacher. Gerritsen (1997) has emphasized that the most important step to achieve some success with the technology is by matching the right technology to a child's need.

Whether the teacher takes on the challenge of integrating ICT into the curriculum or facilitates student learning, they require support. This brings increased workload and stress for teachers (Brown & Murray, 2003). Time is needed for teachers to review the software (MacArthur, 2001; Stratford, 2000) and

professional development is also required in the areas of basic trouble-shooting skills and technical support staff must be provided (Savidan, 2003) which must be long term (MacArthur, 2001).

"Believing that implementation is a top-down approach also disempowers teachers". (Savidan, 2003, p.131). If teachers feel that they have no input into how implementation of proposed change will take place, they may be less likely to buy into it. As stated earlier, the teacher is the key to the integration of ICT.

Cuban (2001) suggests that it is possible that even with adequate access and support, the majority of teachers may still not appear to be successfully integrating ICT. He has identified alternative barriers which include cultural beliefs, cultures of teaching that may stem from teachers having observed their own teachers in the past and the teachers' individual knowledge and beliefs that all contribute to shaping classroom behaviour.

Hunter (2001) states that according to one teacher, "the most negative aspect of ICT may be that it creates an illusion of being easy" (p.29). Teachers own attitudes and perceptions could be a barrier too. He further says that poor time management and/or self management skills may also prove to be a barrier. Hence more information on the implications of choosing particular technologies and delivery systems for students with disabilities, needs to be available.

However, the downside to this is, the user can become very much attached to their computer and lose any interaction skills they may have as they do not get out and socialise physically with others. Confidence can be seriously eroded by staying behind the computer screen, as it is very easy to hide behind a screen and become anyone you would like to be (Praagh, 2003).

2.11 CONCLUSION

There is no doubt that technology has the potential to act as an equalizer by freeing many students from their disability in a way that allows them to achieve their true potential (Ulman, 2005). When computers and software programmes are helpful, they are used. But when they place more demands on the user, they can, indeed, be a source of anxiety and frustration. It is more often the poor quality of the design of the program or the system that causes the anxiety rather than the individual.

The idea of a 'continuum' or 'journey' of learning through the use of ICT is expressed by the Ministry of Education (2002, p.8) as learning about ICT, with ICT and then through ICT. Jonassen's belief is supported by Brown and Murray's (2003) claim that teachers' learning of ICT is not linear, but repetitive.

As stated earlier, ICT in this discussion has been used to mean computer technology, and the related skills and knowledge required for their use. There is a considerable support for use of ICT as a tool to assist students. There is an agreement that the teacher is the key in ICT learning and the role of the teacher has evolved who is now seen as 'expert learner'. The literature has indicated that obstacles to effective ICT learning environments exist.

The literature reviewed in this chapter reveals that more research is required. Abbott (2001) indicates that there would be value in an exploration into how young people are currently using ICT and into what is being taught and what should be happening in this area. Hence, the researcher has chosen to study the ways in which ICT could be used effectively for learners with very high needs, and in particular, the attitudes and beliefs of teachers who use ICT in their classroom.

Malouf (2001) acknowledges that special education technology will never be a field of dreams in which innovations can be cast to the winds to find widespread

and meaningful implementation. "Scaling up and sustaining these innovations always will be a challenging job, but one that also promises possibilities". (p. 2).

CHAPTER 3
METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the methodological approaches used in the study, and their limitations. It also presents the research questions, methods, and procedures employed in the two phases of the research. Discussions on ethical issues are also presented.

3.2 RESEARCH PROBLEM

A review of current literature shows a lack of serious discussion of the effective use of computers by students with very high needs in New Zealand Special Schools. In spite of the tremendous positive impact that has been reported in regard to the use of computer technology with children with disabilities, most of it is used for drilling in basic skills and instructional games, especially for children having very high needs (Fallon & Wann, 1994; Haugland, 1999). Clarification on 'how' to do it is still needed as teachers need information about how, as well as why, to use technology in meaningful ways. Lack of knowledge regarding either element can significantly decrease the potential impact that these powerful resources might have on student learning (Ertmer, Conkiln, & Lewandowski, 2000).

The role of the teacher is especially important because they are the ones that determine whether to use computers at all and formulate goals and curricula that use computers as a tool. The teachers modify instructional activities to fit their beliefs, and the instructional and management routines in their classrooms when and where necessary. In particular, teachers' beliefs about their *ability to use computers* in instruction may be the key, according to Bandura (1997), self-efficacy (personal beliefs about ability to be successful on task) is based, not solely on the level of skill possessed by an individual, but on judgments about what can be done with current skills.

Researchers in the area of self-efficacy (Bandura, 1997; Schunk, 2000) describe four primary sources of information that can influence judgments of efficacy: personal mastery (successful task completion), vicarious experiences (observing models), social persuasion ("I know you can do this!"), and physiological indicators (emotional arousal, relaxation). Next to personal mastery, vicarious experience is thought to provide the most valid information for assessing efficacy (Schunk, 2000). This leads to increasing self-efficacy for technology integration.

However, little is known about teacher's beliefs, values, experience and practices about using computers for learners with very high needs in special classroom and the researcher feels that there could be some link between teacher beliefs, values, experiences , practices and the successful (or otherwise) use of computers for students with very high needs.

3.3 RESEARCH AIMS AND OBJECTIVE

Aim

To examine how computers are used to cater for the needs of learners with very high needs in special schools, and in particular, the beliefs, experiences and practices of teachers about the effectiveness of using computers as a tool. The findings from this study could prove useful to teachers and learners by highlighting ways in which teacher, computer, and other associated accessories like assistive technology, relevant softwares might accommodate the learners with very high needs in accessing the curriculum. This study could also help to document the beliefs, values and practices of teachers who believe the computer is an effective tool for learners with very high needs.

Objectives

The aims are:

- To collect information and document teachers' beliefs, experiences and practices about using computers for learners with very high needs.

- To highlight the statistical information on present use of computers by learners with very high needs.
- To identify teachers who believe that computers could be used effectively by learners with very high needs, and document their beliefs and practices.

3.4 RESEARCH POPULATION

The target populations were teachers from Special Schools in New Zealand having at least one learner with very high needs who used computer.

Sample

The research population was drawn from the Ministry of Education data base of New Zealand Special Schools. Teachers who had at least one learner with very high needs who used a computer at school were invited to participate. This total was 36 schools, 39 teachers and 53 learners. Teachers were asked to select the student/s that had very high needs and used computer in their class.

Justification for sample

The aim of *Special Education 2000* (MOE, 1996, p.5) policy is "to achieve a world class inclusive education system that provides learning opportunities of equal quality to all children and school students". It is also consistent with the National Education Goals. It is shaped so that all students have fair access to a quality education environment to enable them to learn successfully and participate in society. The key objectives of *Special Education 2000*, as said in the Special Education policy guidelines (updated May 2006) are to:

- improve educational opportunities and outcomes for children with special education needs in the early childhood and school sectors
- ensure there is a clear, consistent and predictable resourcing framework for special education
- provide equitable resourcing for those with similar needs irrespective of school setting or geographic location

- assist in enabling schools to take ownership in meeting the full range of students' needs.

(MOE, 2003)

As a framework, *Special Education 2000* was designed to meet a continuum of need. It has many main components supported by initiatives which are:

- Professional development, training and information for the stakeholders.
- Eligibility requirements and terms for transport and equipment.
- Research, monitoring and evaluation.

High and very high needs students are supported by main components like The Ongoing and Reviewable Resourcing Scheme, the Supplementary Learning Support, the Severe Behaviour Initiative, the Speech-Language Initiative and the School High Health needs Fund. The students with moderate needs are supported by main components like The Special Education Grant, the Resource teachers (Learning and Behaviour, Literacy), and the Early Intervention Support.

Special Schools in New Zealand were selected as they cater to students ranging from moderate to high and very high needs and also to all areas of special needs. *Special Education 2000* has clearly indicated that Government is committed to provide learners with assistive technology where it is absolutely necessary to access the learning opportunities. However, having a technology by itself would not benefit learners unless and until students have skilled and caring teachers who view technology as a tool. This leads to the research questions. These schools, spread throughout the country, provide the researcher an opportunity to cover a broad geographical area.

3.5 RESEARCH QUESTIONS

Phase one of the research was based on the following questions:

1. How and why are computers being used in classrooms of Special Schools in New Zealand for learners with very high needs?
2. What are teachers' beliefs regarding the effectiveness of the use of computer for special need learners in general?
3. What are teachers' beliefs regarding the effectiveness of the use of computer for learners with very high needs?
4. What experiences do teachers perceive have shaped their beliefs and practices?
5. To what extent are teachers aware of the different assistive technologies available to support learners with special needs?

3.6 RESEARCH PARADIGM

Bateson (1972, cited in Lincoln & Denzin, 2000) point out that researchers are "guided by highly abstract principles" (p.320) and Schwandt, (2000) points out that these principles combine beliefs about ontology (what kind of being is the human being? What is the nature of reality?), epistemology (What is the relationship between the inquirer and the known?), and methodology (How do we know the world, or gain knowledge about it?).

The three approaches to social research, as defined by Neuman, (2006) include:

Positivist Social science:

> *"An organized method for combining deductive logic with precise empirical observations of individual behavior in order to discover and confirm a set of probabilistic casual law that can be used to predict general patterns of human activity"*(p.82)

Interpretive Social Science;

> *"Is the systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds"* (p.88).

Critical Social Science:

> *"A critical process of inquiry that goes beyond surface illusions to uncover the real structure in the material world in order to help people change conditions and build a better world for themselves"* (p.95).

Hence, there are competing approaches to research based on philosophical assumptions and the ideal-type approaches answer basic questions about research differently. Most researchers operate primarily within one approach, but many also combine elements from others.

Quantitative research is rooted in the positivist/post-positivist paradigm, which holds that the purpose of research is to develop our confidence that a particular knowledge claim about educational or psychological phenomena is true or false by collecting evidence in the form of objective observation of relevant phenomena (Gall, Gall, & Borg, 2003).

The qualitative approach is rooted in several rich philosophical traditions. The interpretive/constructivist and the phenomenological philosophical orientations underlie what is typically thought as qualitative research (Schwandt, 2000).

Tunmer (1999) stressed that these two competing approaches should be rejected as there is no strong pragmatic reason for viewing quantitative and qualitative approaches separately. He furthers stresses that the integration of these methods is possible and desirable.

The researcher has chosen to use mixed methodology to study the research problem, as mixed methods include both qualitative and quantitative features in the design, data collection, and analysis (Teddlie &Tashakkori, 2002).They further say that as techniques from both research traditions are incorporated, it can be used to answer questions that could not be answered in any other way.

Feuer, Towne, and Shavelson (2002) recognize the need for mixed methods. They wrote:

> *When properly applied, quantitative and qualitative research tools can both be employed rigorously and together often can support stronger scientific inferences than when either is employed in isolation. Again, the key to progress lies in the capacity and willingness of investigators from*

these different perspectives to constructively engage each other's differing perspectives around the common goals of advancing understanding (p.8).

Examining the philosophical assumptions underlying research, mixed method or not, can offer a better understanding of the complex social world in which special education operates. Teddlie and Tashakkori (2002) propose the use of pragmatism as philosophical orientation to guide mixed method researchers.

Morse (2002) describes the advantages to using mixed method this way:

> *By combining and increasing the number of research strategies used within a particular project, we are able to broaden the dimensions and hence the scope of our project. By using more than one method within a research study, we are able to obtain a more complete picture of human behavior and experience. Thus, we are better able to hasten our understanding and achieve our research goals more quickly (p.189).*

When looking at the quantitative versus qualitative debate and the advantages of using mixed method research in special education, the views of Reid, Robinson and Bunsen (1995) appear relevant.

> *What is needed for the survival of our field is a dialogue in which communicative ethics are allowed to promote openness to, and an incorporation of, new ideas and perceptive. Only if we learn to value diversity and to work together as special educators will we able to adapt to the needs of a changing world, to protect what is useful in our field, and to invent new policies and interventions that address needs and interests that incorporate the best from the scientific, interpretative, and critical traditions (p.139).*

This research project is based upon multiple paradigms or the third paradigm-mixed methods. This approach allows for multiple perspectives of respondents participating in the study in line with Interpretivism and critical social science paradigm.

3.7 METHOD

A mixed method approach, quantitative (survey) and qualitative (interview) were taken as the appropriate method of addressing research questions and a

confidential questionnaire and semi-structured interview was used to collect data. Survey research (quantitative) is generally rooted in the post-positivist tradition (Mertens, & McLaughlin, 2004)

Survey

Social survey is a method of obtaining large amounts of data, usually in a statistical form, from a large number of people in a relatively short time (McNeill & Chapman, 2005; Mertens & McLaughlin, 2004). It usually takes the form of a self-completion questionnaire; this may be handed to the respondent or sent through the post. The survey method is regarded as scientific because surveys are normally carried out under controlled conditions. They are organized in a logical and systematic fashion via questionnaire design (McNeill & Chapman, 2005).

Survey methods can and often do employ interviews. McMillan and Schumacher (1997) highlighted that the data gathered are used to describe characteristics of a certain population and to learn about the population's attitudes, values, and practices whereas Gomm (2004) pointed out that surveys are seen as artificial devices that produce artificial responses in that "approaching respondents like this creates a thoroughly unnatural situation, so whatever the results, they won't have much bearing on what respondents usually think, generally feel, normally experience, or really believe" (p.156).

This type of method was taken by the researcher even though there is some discrepancies in the literature, as explanations and information on material that is not directly accessible (perceptions, attitudes and values) are difficult to obtain by alternative methods. As the respondents have already expressed their views in the questionnaire the interviews were a method used by researcher for confirming and gaining more in-depth knowledge from the respondents.

3.8 DATA COLLECTION:

3.8.1 Phase One: Questionnaire

A questionnaire is a list of questions to be asked by the researcher. It is prepared in such manner that the questions are asked in exactly the same way of every respondent. The questionnaire is highly valued by researchers because it is standardized and so everybody who fills one in is subjected to the same stimulus. McNeill and Chapman (2005) point out those questionnaires that use closed questions are more reliable because the researcher would be able to repeat the questionnaire elsewhere on similar samples of people and get much the same sort of results.

Questionnaires are a reasonably quick way of conducting research especially if the questions are mainly of a closed type. They also involve minimal interaction with the researcher and therefore there is seen to be less opportunity for subjective bias caused by factors such as power relation to undermine the validity of data collected (McNeill & Chapman, 2005).

A questionnaire was developed to gather information on the research questions of first part of research. 37 schools were sent the questionnaire in the month of March. Participants were asked to return the questionnaire by a date 2-3 weeks from when they received the questionnaire. The questionnaire focused on a variety of questions, such as category, rank, quantity, closed and open ended questions, where participants could answer in a detailed form.

Why was this method chosen?

Questionnaires allow a confidential way of eliciting information from a large group of teachers regarding their experiences and practices with computers for learners with very high needs. As every participant had the same questions, the comparison was easier and selection for the second part of the research-interview posed no problem.

An initial draft of the questionnaire was reviewed by two professionals who are knowledgeable about computer technology for learners with very high needs. The questionnaire was redrafted using their feedback. Feedback resulted in minor revisions in organization, format and of the individual items.

Description of questionnaire

The prepared questionnaire had 32 questions and was divided into two parts- 1) Learner information and 2) Teacher information (see appendix C). Learner information was obtained from questions relating to background information, curriculum, software and hardware, and any Individual Educational Plan. Teacher information was acquired through questions related to background information, training and professional development, their perceptions about the benefits and drawbacks of using computers by learners with very high needs. Some closed questions used scaling devices such as the Likert Scale to produce a comparative set of data based on strength of feeling or belief.

Participants were also invited to participate in a follow up interview for the second part of the research. If they wished to be invited to participate in a follow up interview, they were asked to fill in their details of contact at the end of the questionnaire (Appendix C).

Procedure

All Special School Principals were sent a packet that included an introductory letter explaining the purpose of the study (Appendix A), an information Sheet for the participants (Appendix B), six questionnaires, and three addressed and stamped return envelopes. The information sheet had the rights of the participant outlined as in the Massey University Code of Ethical Conduct, and the names and address of the researcher and supervisor. An identification number was included on each questionnaire based on the alphabetical order. Principals were asked to hand out the quesitonnaire to any teachers who used computers with learneres with very high needs? Follow-up E-mails were sent to those not

responding after 3 weeks. School principals were contacted by phone if they did not respond to the email.

3.8.2. Phase Two: Interview

The second part of the research was devised to gather information from teachers who believed that computers could be used effectively for learners with very high needs and those who felt otherwise.

Questions

The second part of the research was based on the following questions:

- What are teachers' beliefs about learners with very high needs using computers?
- What experiences do teachers perceive have shaped their belief and practices?
- To what extent are teachers aware of the different assistive technologies available to support learners with special needs?

Selection Procedure

The participants for this part of research were selected based on the response to the criteria in the questionnaire that the teacher must have at least one student with very high needs who uses computer and who indicated willingness to participate in the follow up interview

This resulted in selecting 13 teachers; the total participants selected for an interview. The researcher chose these participants as they had agreed to participate; no participant showed any last minute unwillingness to go ahead with the interview.

Reasons for using this method for selecting interviewees

To examine the effective use of computers by learners with very high needs, it was necessary to know the beliefs, perceptions and the practices of the teacher

involved with learners with very high needs. This would allow the researcher to make some hard and fast findings.

Methodology

Semi structured interviews were used to find the meanings and perceptions of the respondents who used computers for students with very high needs in their class.

Data collection

Interviews can provide extremely interesting and relevant information that may not be revealed by quantitative methods such as surveys and records. Brown and Dowling, (1998, cited in Rose & Grosvenor, 2001) stress that interview allows the researcher to explore complex issues in detail. They help to probe beneath the surface of events, to find out 'how people think' and "how they construct meaning" (p.60). Researcher uses this method when the research question requires in-depth information and that the data collected from a small sample will satisfy the demands of reliability and validity.

Interviews have the potential to yield valuable insights into people's lives experiences, attitudes, opinions and aspirations. It is a short- term; secondary social interaction between two strangers with the explicit purpose of one person obtaining information from other (Neuman, 2006). Interviews in a qualitative study are typically done with an unstructured or minimally structured format (Mertens & McLaughlin, 2004).

Reason for using this method

The most useful and frequently used interview format for conducting qualitative research is often 'semi-structured' (Zorn, 2006; Barrio, 1999). Hence, this method was chosen for this part of research. Semi-structured interviews tend to be made up of a combination of closed and open questions aimed at collecting both factual and attitudinal data. The interview is not highly structured consisting

of all closed-ended questions, nor is it unstructured where the interviewee is allowed to talk freely about whatever comes up. This type of interview offer topics and questions to the interviewee, which are carefully designed to elicit the interviewee's ideas and opinions on the topic of interest, as opposed to leading the interviewee toward preconceived choices, and utilizes question schedule, but gives the interviewer an opportunity to ask for clarification and elaboration.

Pilot interview

It is best to pilot-test interviews prior to implementation. Neuman (2006) talks about cognitive interviewing, in which researchers examine how respondents answer questions during pilot tests. They use this information to refine the interviewing process.

This pilot interview was done with two teachers who did not participate in Phase One of the research but have learners with very high needs and use a computer.

This helped the researcher to assess the interview questions in terms of:

- Length of interview
- Use of probes
- Wording of the question
- Retrieving relevant information
- Relevant themes for eliciting needed information

This interview also gave the researcher a chance to master the technique of using audio tape. With the feedback obtained the necessary changes to the interview questions were made.

Description of interview

The interview schedule consists of themes: a) computer and learners with very high needs; b) Teacher and computer; c) Computer technology integration; d)

Software selection e) concerns about using computer technology for learners with very high needs; and f) Teacher beliefs.

Questions and probes were developed by the researcher to elicit the information on the themes above. The respondents were given a chance to talk freely about the theme they were interested in, in their own time.

Procedure

Two to three weeks before the interviews, all the respondents who had agreed to participate were sent a letter asking if they were still interested in participating in the interview. They were thanked for their cooperation in Phase one of the research and willingness to participate in Phase two of the research.

The respondents were sent an information letter (Appendix D) outlining the aims and objectives and asked to return the consent form (Appendix E) signed to the researcher. They were contacted by phone the next week.

The respondents were contacted by phone and interview dates and avenues were arranged, the interviews were conducted between 10th of August to 9th of September, 2006. The school principal's permission was asked if the school was arranged as a venue for the interview.

The respondents were explained about their rights as outlined in the Massey University Code of Ethical Conduct. The interviews took approximately 40 minutes to one hour. With the permission of the respondents the interview was audio taped.

3.9 METHODOLOGICAL LIMITATIONS

Phase one

This method has some limitations; the respondents may not be able to give detailed answers, which might limit their freedom of expression. As the

researcher operated at a distance from the participants, the opportunities to correct any misunderstanding were not present. There was a chance that every participant may not have interpreted each question in a similar way. The opinions, attitudes and experiences of respondents may be too complex to fit within the categories asked, and therefore the answer the respondent may want to give may not appear as an option on the survey (McNeill & Chapman, 2005). This could create false or distorted data being collected.

Phase Two:

Possible limitation of this method includes not getting a true representation of teachers' beliefs, but rather what they thought was a correct response to that question. Use of tape recorders could put a constraint on some teachers from speaking what they wanted. Being the interviewer's first attempt at collecting data through interview, there was every chance of results being affected due to inexperience. There was also a chance that the interviewer's interpretation may not be what the participant intended. The questions asked may not be understood by the respondents as intended by researcher.

3.10 ETHICAL CONSIDERATIONS

Massey University Code of Ethical Conduct played a major role in designing the study and the procedures that followed. The principles considered were:

- informed consent
- confidentiality
- minimizing harm
- Truthfulness.

Informed consent

Berg (2001) points that informed consent, "means the knowing consent of individuals to participate as an exercise of their choice, free from any element of fraud, deceit, duress or similar unfair inducement or manipulation" (p.56). With

questionnaires, implied consent arises, where completion of the questionnaire implies that the respondent has agreed to participate.

Principals were sent a letter outlining the research and asked if the enclosed questionnaire (Appendix A) could be passed on to the teachers in their school passing the questionnaires on to the teachers implied consent on the part of the principal. This was informed to the Principal of the schools by the researcher. An Information sheet outlining the nature and purpose of the study with the participant's right including the right to decline or withdraw from the study, right to confidentiality and right to know the outcome of the study was attached. The participants were told that they were under no obligation to complete the questionnaire but the completion and return of the questionnaire lead to the assumption that they had given informed consent. The names of the supervisor and researcher with their contact details were made available to the participants.

Participants who had volunteered (there was a note in the questionnaire asking the participant's willingness) to participate in the interview were sent an invitation by post and then contacted verbally by phone. An information sheet (Appendix D) outlining their rights was given which included the clause that they had the right to turn off the audio tape at any time they wish.

Participants were also told about what happened to information collected on completion of the project, destruction or return of the audio tapes to the participants. Participants were asked to sign a consent form if willing to participate in the interview (Appendix E).

Confidentiality

The teachers and their schools were guaranteed that all measures were taken to maintain anonymity. Numerical codes for schools/teachers were used to protect from identification. Teachers were asked not to mention the name of the learner or the school during the interview, the transcriber was asked to replace the name

(if inadvertently mentioned) with the term 'learner'. Transcripts were not included in the appendix to prevent the risk of schools and teachers being identified.

Questionnaires, school names and addresses, tapes and transcripts will be kept under lock and key, accessible to the researcher only.

Minimizing harm

The researcher was aware of the potential risk that could occur in the research, but for research of this type it was minimal. Issues like identification of schools, control over direction of research were considered. On emergence of unforeseen circumstances which could place anyone at risk, the researcher was prepared to change or stop any procedures. Participants were given a copy of the interview transcript prior to data analysis so that any changes that were made did not affect data analysis and researcher's analysis of the research.

Truthfulness

Full and truthful information was given to the participants at all stages of the study both in written form and discussions by the researcher.

3.11 SUMMARY

Outlined in this chapter is the methodological approaches used in the study, their limitations. The research questions of the two parts of research, the method, and procedure were also presented. Ethical issues that need to be looked were discussed.

CHAPTER 4

DATA ANALYSIS- QUESTIONNAIRE

4.1 INTRODUCTION

The results of the first phase of the research are outlined here. It looks at the findings of the questionnaire and gives an overview of the nature and extent of computer use by learners with very high needs and the perceptions and opinions of the teacher regarding its usefulness for the learners with very high needs in their class. To make it very clear, the findings are separated, into four parts. The first looks at the learners' background information, the second at use of computers by learners with very high needs, the third at teachers' background information and the fourth section looks at the teachers' perceptions regarding the effective use of computers by learners with very high needs.

On the whole the findings of the questionnaire were:

4.2 LEARNERS' BACKGROUND INFORMATION

This section provides background information on 53 learners with very high needs who use computer in the classroom. Gender summary of the learners is given in Table 1 and Ethnicity summary of the learners is given in Table 2.

Table 4. 1

Gender of the learners:

Gender	Frequency	Percent
Male	37	69.8
Female	16	30.2
Total	53	100.0

Table 4.2

Ethnicity of the Learners:

Ethnicity	Frequency	Percent
NZ European	32	60.4
Maori	4	7.5
Pacific Island	8	15.1

Asian	5	9.4
Others	3	5.7
NZ European/Maori	1	1.9
Total	53	100.0

The age of the learners ranged from – 6 years to 22 years.

The table below shows the age range of the learners:

Table 4. 3

Age of Learners

Age (years)	Frequency	Percent
6	1	1.9
7	1	1.9
8	2	3.8
9	2	3.8
10	3	5.7
11	3	5.7
12	6	11.3
13	5	9.4
14	7	13.2
15	2	3.8
16	1	1.9
17	5	9.4
18	4	7.5
19	5	9.4
20	5	9.4
22	1	1.9
Total	53	100.0

According to the latest update (2006) of Services and Funding for school learners with high special education needs under Special Education 2000, a very small number (3%) of children are defined as having high needs and meet the criteria for specialist services, usually in the form of individualized programmes and specialist support at school.

The services and funding are available through a number of targeted schemes: some schemes are managed solely by Ministry of Education, Special Education

(GSE) district offices and some are delegated to particular schools approved as Accredited Special Education Service Providers (ASESPs). ASESPs are sometimes called 'fund holders'.

Figure 4.1 shows the duration learners were taught by a teacher. Majority (66.0%) of the learners were taught by the same teacher for more than a year, followed by 26.4% of learners who had new teacher and the rest had teachers who taught them for more than 5 months and less than 12 months (7.6%).

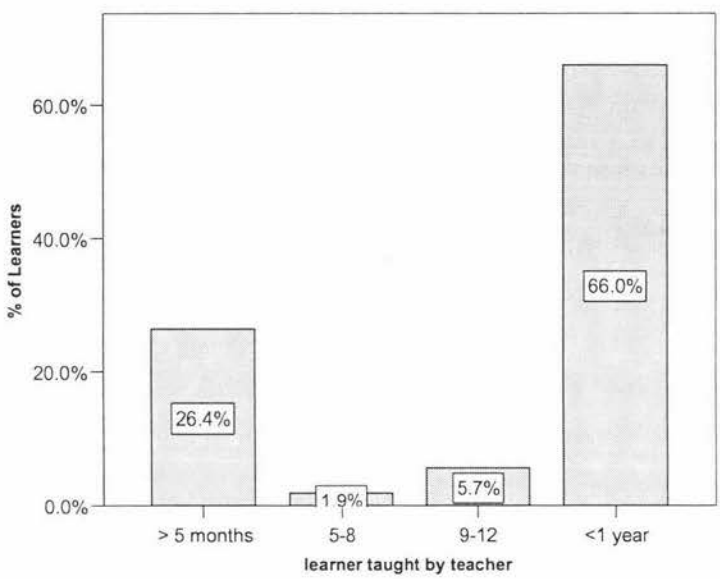

Figure 4.1 duration learners were taught by a teacher

Teachers have indicated the areas of disability experienced by the learner, they were- Physical, Visual, Hearing, Intellectual, Behavioral and others. The learners experienced a combination of different disabilities. 47.2% of the learners had disabilities in three areas, and 30.2% have in two areas, followed by learners having disability in four areas or one area which accounts for 18.8% and 3.8% of them have disability in five areas.

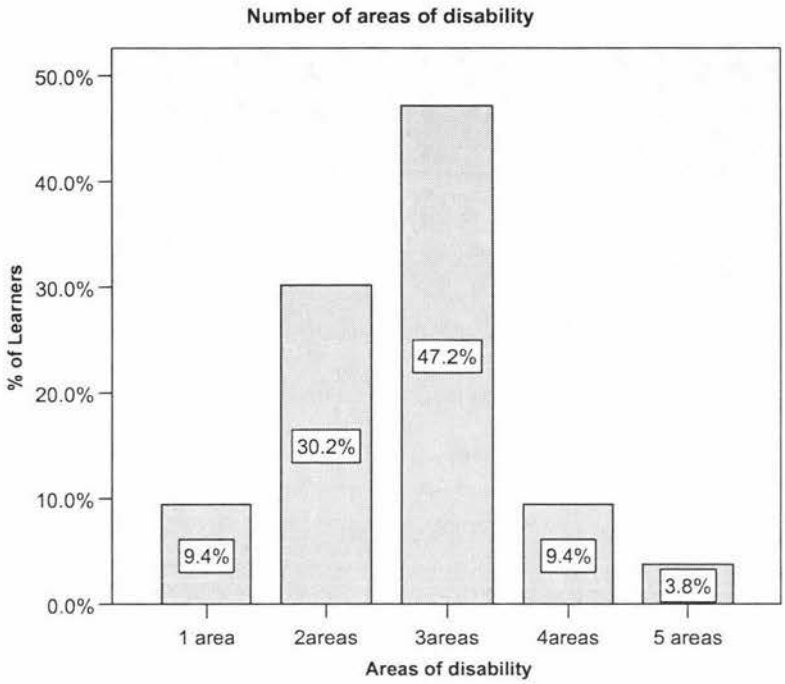

Figure 4.2 The areas of disability of learners.

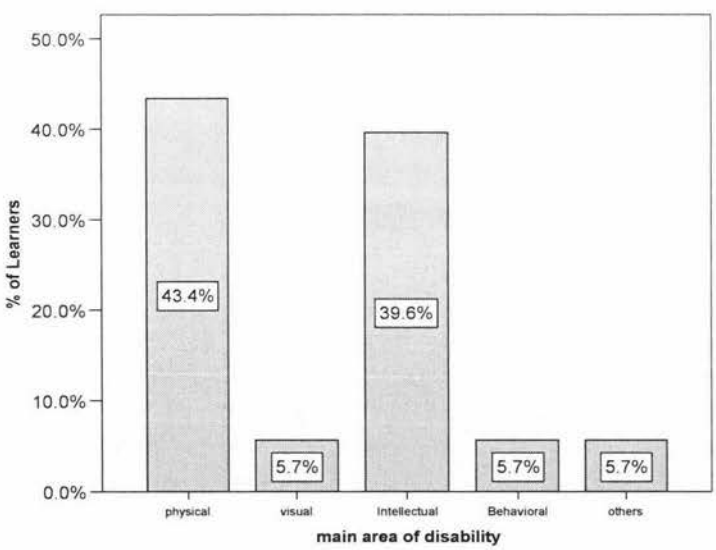

Figure 4.3 The main area of disability experienced by learners.

The most common area of disability experienced by learners with very high needs was physical. Intellectual was the next common area of disability.

4.3 USE OF COMPUTERS BY LEARNERS WITH VERY HIGH NEEDS

Figure 4.4 indicates the percentage of learners with very high needs using computers to that not using computer for accessing the curriculum.

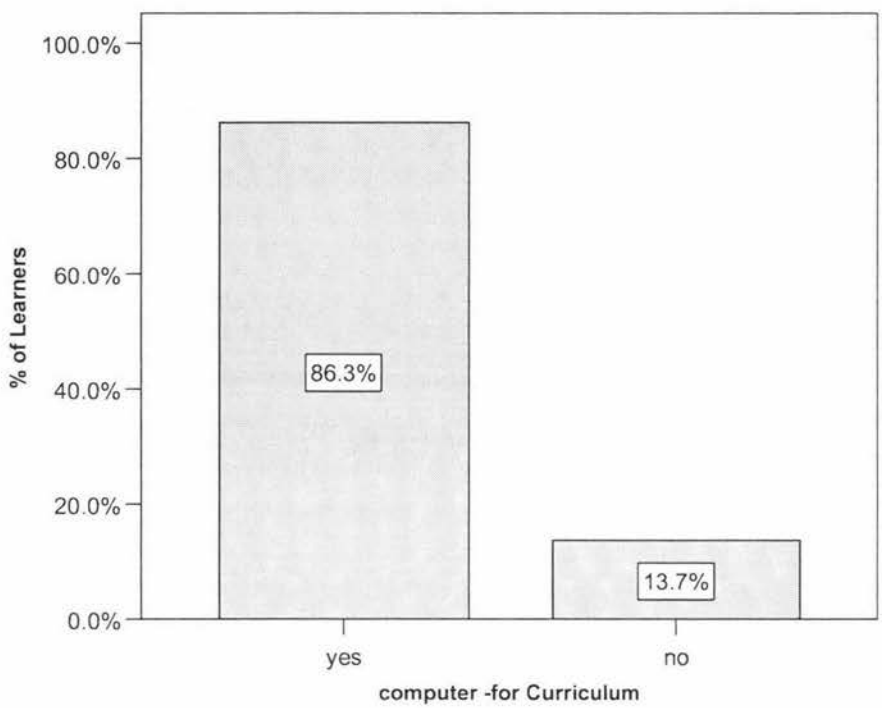

Figure 4.4: Percentage of learners using/ not using computer to access curriculum

86.3% of learners use computers to access curriculum and only 13.7% of learners do not use computers to access curriculum work.

Figure 4.5 and 4.6 shows that majority (75%) of learners work with some else (teachers, teacher-Aides, Therapist) when accessing the computer and 25% work on their own.

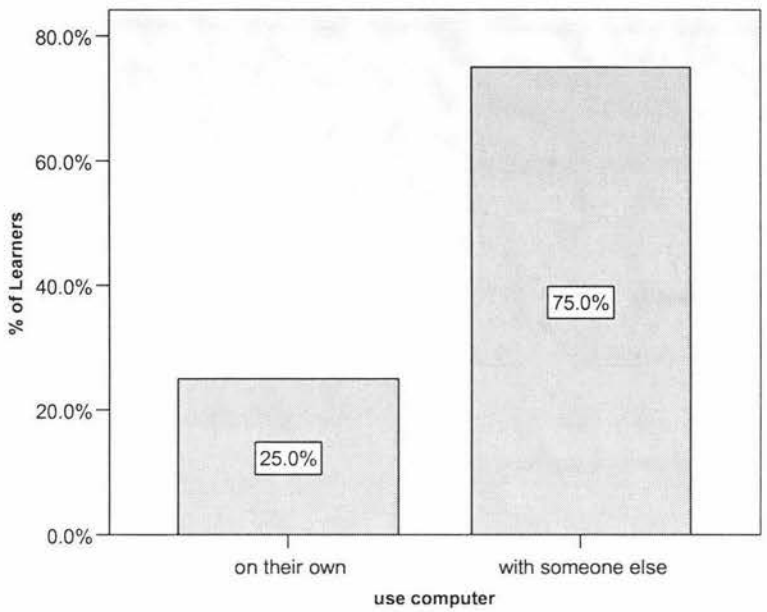

Figure 4.5: Percentage of learners using the computer independently/with someone else.

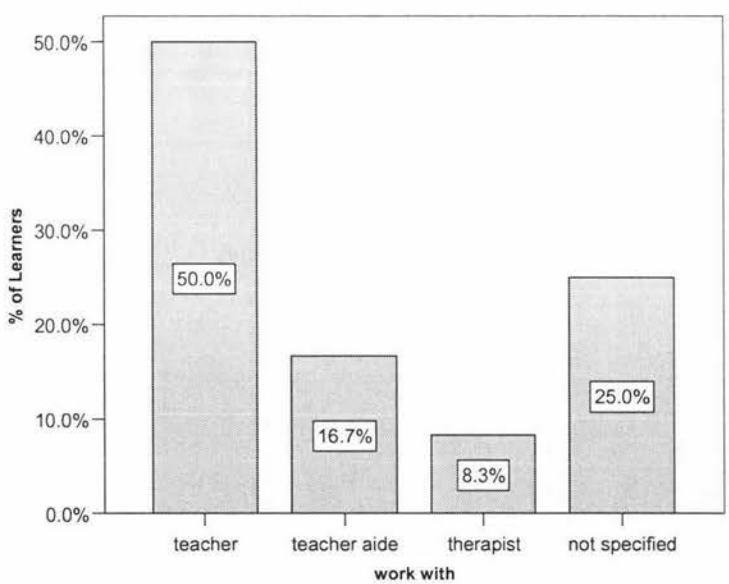

Figure 4.6: Percentage of learners using computers with others

About 50% of the learners work with the teacher, 25% work with either Teacher-aide or Therapist.

Figure 4.7 shows that the curriculum area where it was used mostly was English- 72.23% (language, spelling, reading, written language), Mathematics and Numeracy- 16.67% and communication and Information-11.12%.

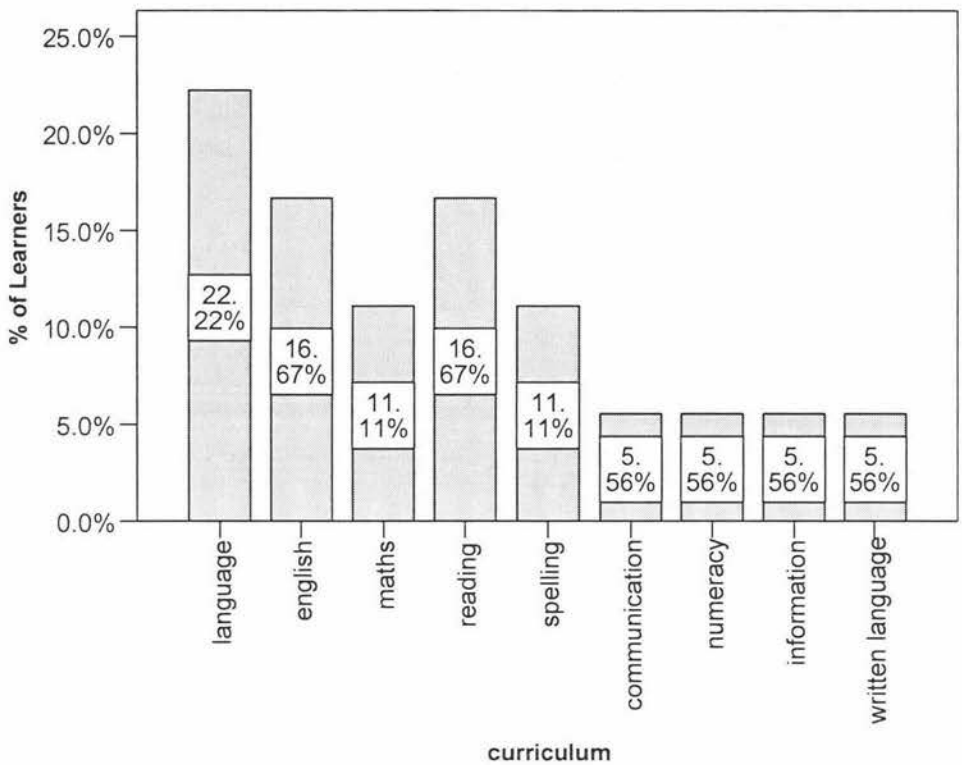

Figure 4.7: Curriculum areas where computer is used.

Figure 4.8 gives an outline of teacher's perception of level of support needed to access the computer by learner with very high needs. Teachers were asked to tick the level of support needed by the learner with very high needs to access the computer in the classroom. Learners (97.8%) required support to access computer, of which teachers felt that 65.2% of learners required very high (47.8%) and high (17.4%) level of support. 32.6% of the learners required moderate (19.65) and low (13.0%) level of support. Only 2.2% of learners did not require any support to access computers.

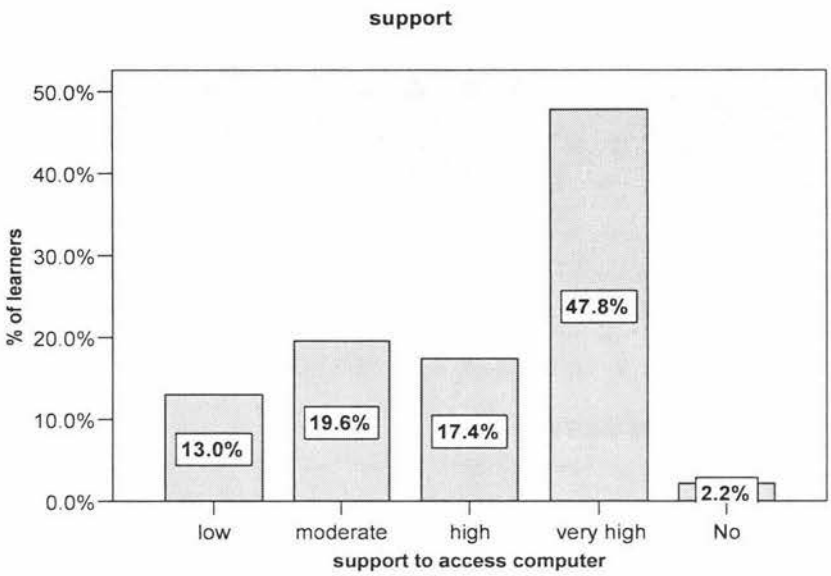

Figure 4. 8: Teachers' perceptions about the level of support required.

Figure 4.9 pointed out the time spent per day by the learner on computer, this ranged from less than 10 minutes to more than one hour. About 39.6% of learners use computers on an average for more than 10 minutes and less than 20 minutes everyday. 3.8% of learners spent more than an hour using computers.

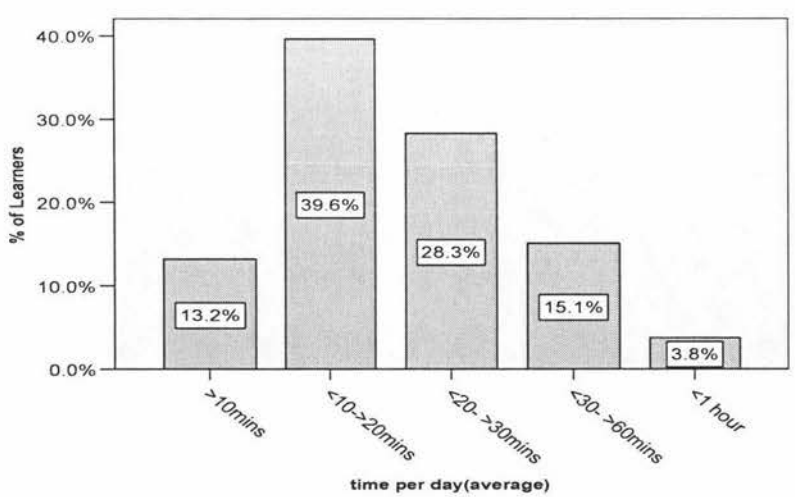

Figure 4.9: Time spent on the computer/per day.

Teachers were asked to point to the different skills that the learner would use the computer for. Figure 4.10 shows this clearly.

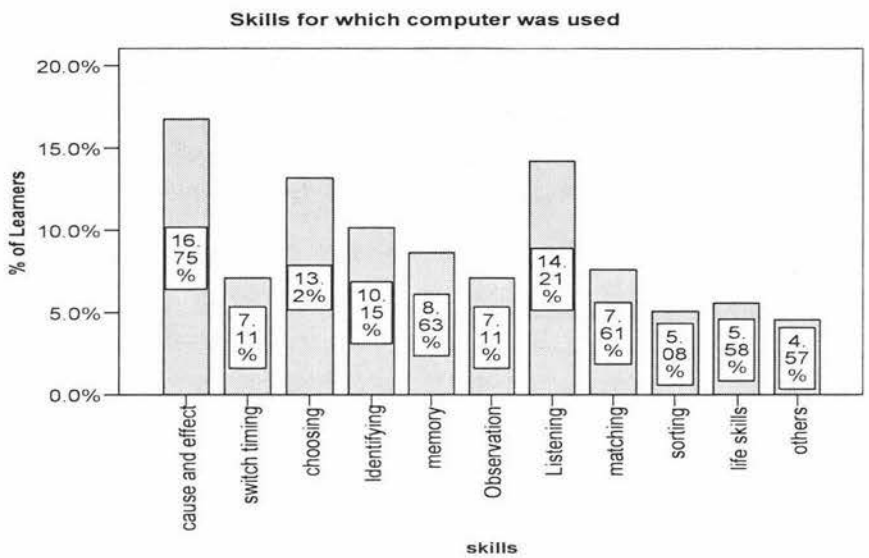

Figure 4.10: Common skills for which computer are used.

The common skills were: cause & effect (16.75%) followed by listening (14.21%) and choosing (13.2%).

Figure 4.11 points that 67.9% of learners use adapted devices and 32.1% of learners do not use any adaptive devices to access the computer.

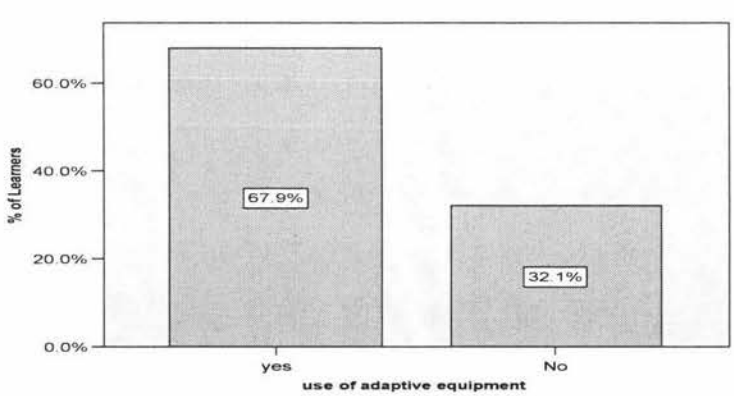

Figure 4.11: Percentage of Learners using adaptive equipment.

Figure 4.12 shows the different adaptive devices used by learners. The common devices used by learners were: 41.82 % switch devices, 10.91% touch screen, 9.09% adapted keyboard, 3.64% head wand, 1.82% braille keyboard, and 9.09% others.

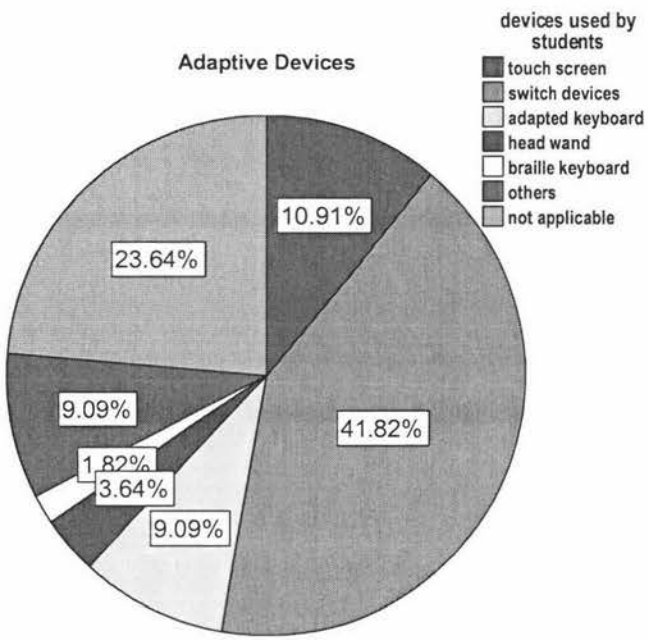

Figure 4.12: Different adaptive equipments used.

More than half (60.4%) of the participants said that computer played a part in the

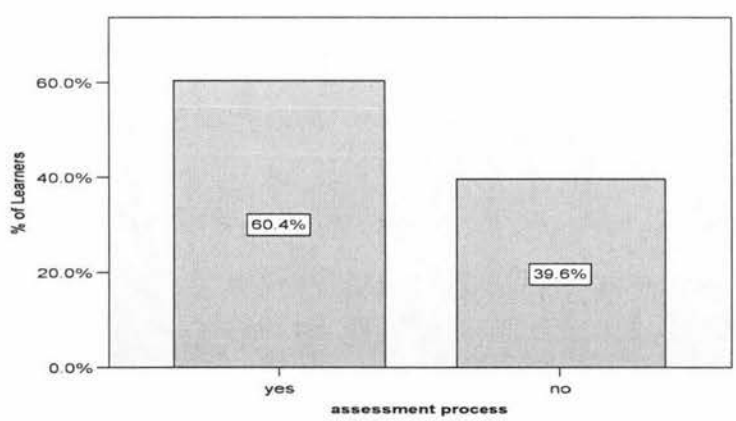

Figure 4.13: Computer for assessment process

assessment process. This is clearly depicted in Figure 4.13. It was mostly used for assessment in IEP Goals followed by switching skills and Independence.

Most of the learners had computer in their IEP. For some, it was a main objective (34%) and for others, it was a part of the strategy to achieve the learning outcomes written in their IEP (76.9%). Figure 4.14 and 4.15 elicits this result.

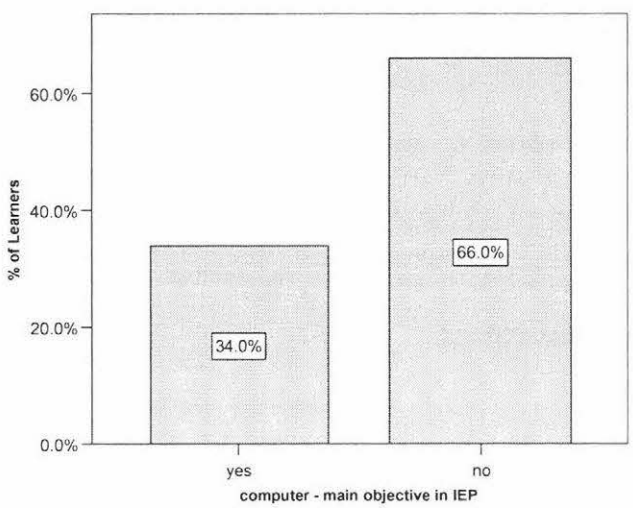

Figure 4.14: Computer as main objective in IEP

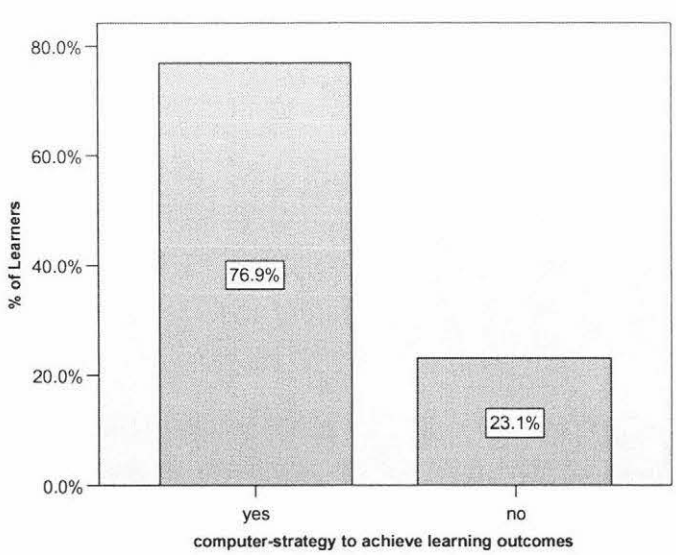

Figure 4.15: Computer as a strategy.

4.4 TEACHERS' BACKGROUND INFORMATION

39 Teachers completed the questionnaire for this study. Table 4.4 gives the age of the participants. Most of the teachers (66.7%) fall in the age group of 41-60 years followed by 25.6% in the age group of 20-40 years

Table 4.4

Age	Frequency	Percent
20-40	10	25.6
41-60	26	66.7
61<	3	7.7
Total	39	100.0

Majority of the teachers (28.21%) fall into the group of 21-30 years of teaching experience followed by 25.64% in the group 11-20 years. There was an equal percentage of representation in the other groups (6-10 years and less than 5 years) too. Only 10.26% of teachers fall into the group having more than 30 years of experience in teaching.

Majority of the teachers have 1-5 years of teaching experience, teaching learners

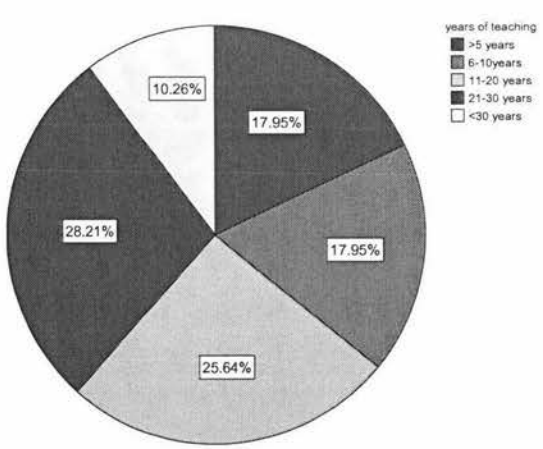

Figure 4.16: Years of teaching experience.

with very high needs. Both these results are shown in Figure 4.16 and 4.17.

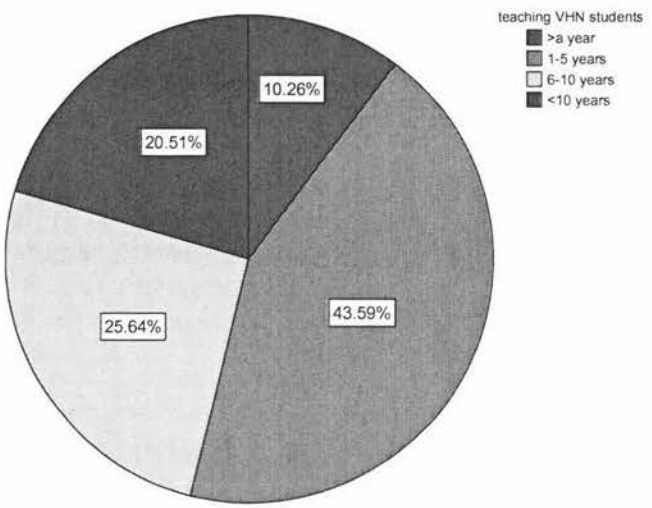

Figure 4.17: Years of teaching learners' with very high needs.

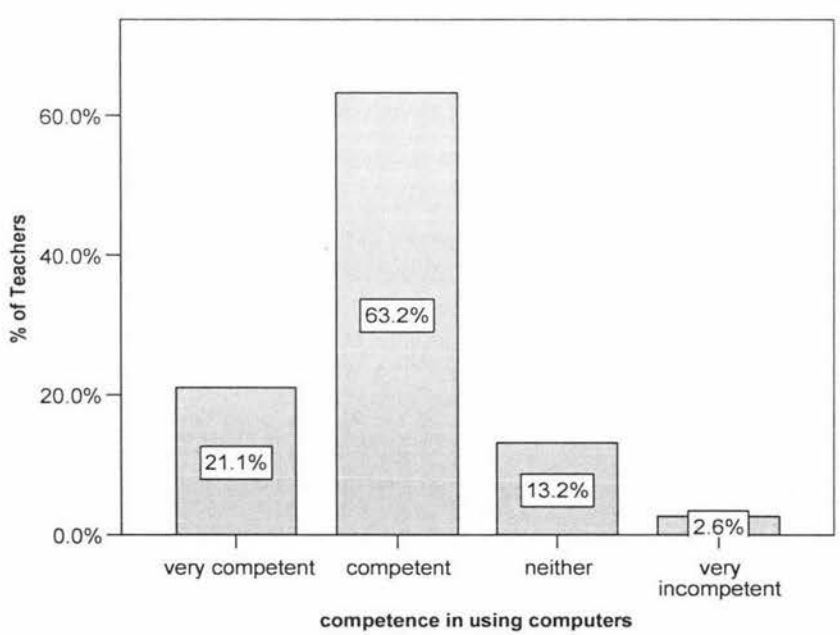

Figure 4.18: Teachers' level of competence.

Figure 4.18 shows the teachers' perceptions on the level of competence in using computers. In total (84.3%) teachers have rated them as very competent (21.1%)

or competent (63.2%) when compared to (15.8%) of teachers who rated as neither (13.2%), incompetent (none) or very incompetent (2.6%).

78.9% of teachers rated themselves as being very confident (26.3%) and confident (52.6%), in contrast to 21.1% teachers who felt neither (13.2%) or Unconfident (5.3%) or very unconfident (2.6%).

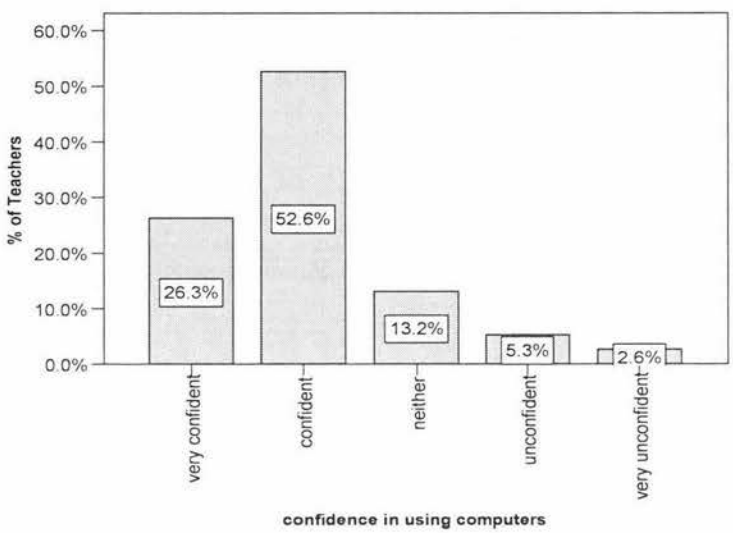

Figure 4.19: Teachers' level of confidence in using computers.

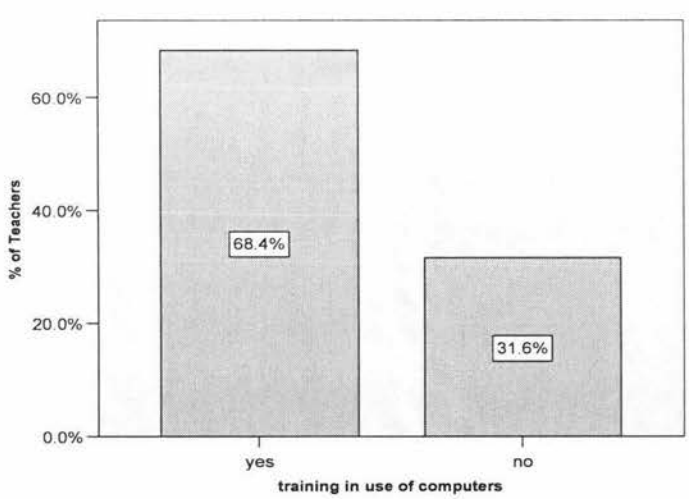

Figure 4.20: Training in the use of computers.

Figure 4.20 shows that 68.4% of teachers received training in general use of computers and 31.6% of teachers did not receive any training. Those who received the training, the training were provided by Education services, in-service and other service providers given in Table 4.5

Table 4.5

Training was provided by:

Training provided by	count
Educational Institution –university, Teacher's college.	7
In-service-School	6
Specialist Education service	5
Self taught-Osmosis	5
Private consultant	3
Not specified	4

Teachers were asked about the training received in the use of adaptive devices

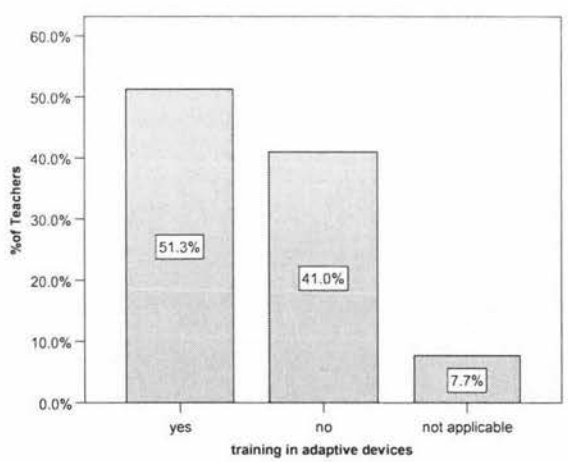

Figure 4.21: Training to use adaptive devices.

used by learners. Figure 4.21 showed that majority (51.3%) teachers said they did receive training from the personnel of Educational Institutions like University

and teacher's college, and Specialist service Providers. Others had from in-service PD and some gained it by self teaching and by osmosis. 41.0% did not receive any and 7.7% of teachers reported that it was not applicable for them.

Regular updates on the various adaptive devices were received only by (26.3%) of teachers as opposed to (65.8%) of teachers who received none or was not applicable (7.9%). Figure 4.22 depicts this.

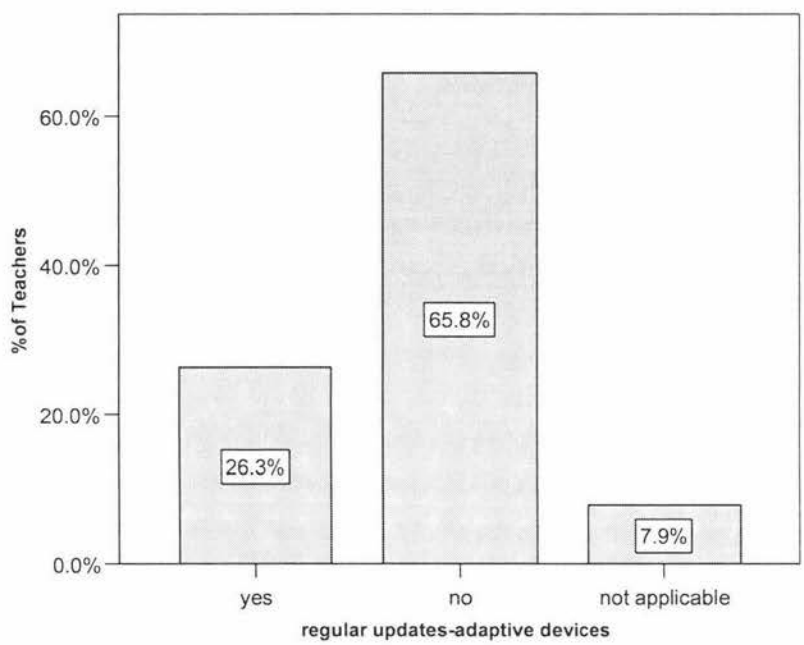

Figure 4.22: Regular updates on adaptive devices.

About 30 titles of soft ware were listed by teachers as the ones used by learners. Table 4.6 lists the titles from the most commonly used to least commonly used software.

***Table 4.6**: Soft ware Titles:*

Software titles	count
Inclusive programmes	15
Clicker 4 and 5	11

Switch It programmes	9
Readers	8
Astech	7
Priory woods	6
Power point	3
Kid pix	2
Sherston	1
Bears	1
ABC	1
Others	15

64.9% of teachers were recommended the soft wares used by learners and 35.1% were not given any recommendations of the soft wares that could be used by learners. Figure 4.23 reports this.

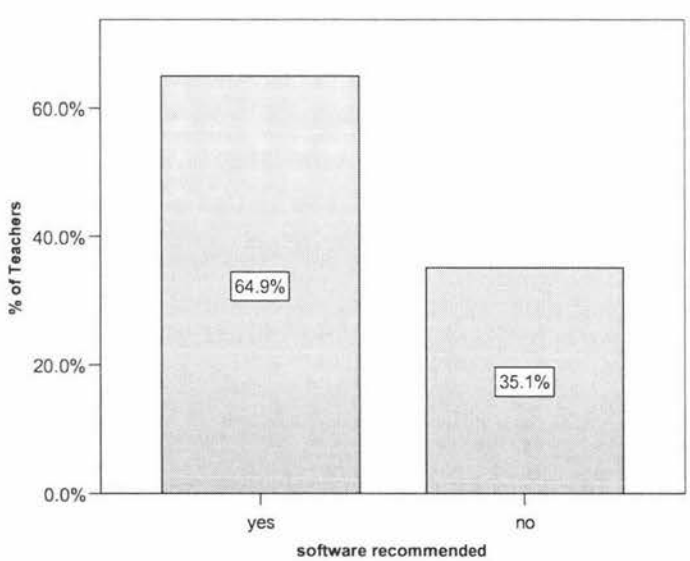

Figure 4.23: Recommendations of softwares.

Teachers were asked the confidence level in assisting the learner to use them. – 92.3% of teachers said that they were confident and 5.1% were not. They were also asked if they were trained to use the recommended software, Majority

(53.8%) said no and (43.6%) said yes. The results are depicted in Table 4.7 and 4.8.

Table 4.7

Confidence	Frequency	Percent
yes	36	92.3
no	2	5.1
Total	38	97.4
Missing System	1	2.6
Total	39	100.0

Table 4. 8

Training	Frequency	Percent
yes	17	43.6
no	21	53.8
Total	38	97.4
Missing System	1	2.6
Total	39	100.0

Figure 4.24 shows that only 26.3% teachers were trained to make their own computers resources that could be used by learners, compared to 73.7% who did not receive any such training.

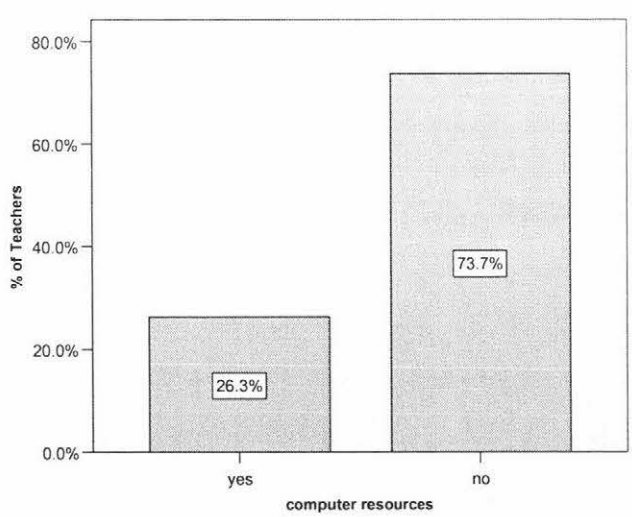

Figure 4.24: Training to create computer resources.

59.46% of the teachers had some recommendations for others about using computers in general for learners with very high needs but some of them did

specify them; those who did it ranged from having a 'sharing time' to know the resources used by others in class to keep trialing and trying, don't expect results too soon. Figure 4.25 and Table 4.9 reports this.

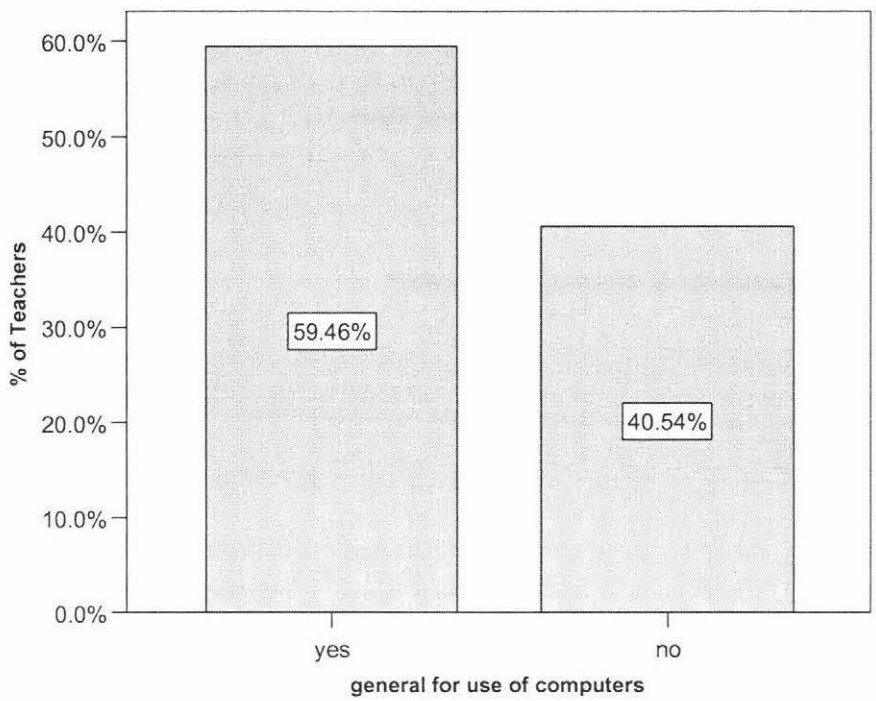

Figure 4.25: Percentages of teacher who recommended use of computers.

Table 4.9

Recommendations given by some of the teachers are:

- To have 'sharing time' about ICT resources used in class.
- Try all software thoroughly.
- Get advice from others in the field rather than do same base work.
- Don't underestimate learner's interest and motivation to use computers no matter what their disabilities are.
- Spend time alone with computer and software after the training.
- Start learners on basic programmes, do not move too quickly.

Keep trialing and trying, don't expect results too soon

4.5 PERCEPTIONS

Teachers were asked to outline the benefits and drawbacks of using computers for learners with very high needs. Table 4.10 and Table 4.11 outline this in most common to least common.

Table 4.10

Benefits of using computers by learners with very high needs

Perceived Benefits	count
Providing independence, social interaction	12
Providing different stimuli, immediate feedback	11
Highly motivating, self motivation	10
Accessing curriculum, Extending learning experience	9
Improves attention skills, concentration	8
Interactive nature	5
Learning cause and effect	5
Gives choices	3
Self paced and consistency	6

Table 4.11

Drawbacks of using computers by learners with very high needs

Drawbacks	count
Finding suitable software programme which is age appropriate	6
Technical support	5
Software • Lack of training to use • Time required to train staff • Time required working with learners. • Trialing software	7
Availability of computers	5
1:1 support	4
Time consuming process for individualizing programme	2
Obsession	3
Social interaction is neglected	2
Others • Turn taking lengthy • Difficult to maintain interest. • Progress very small	15

- Difficult to operate by students, hence prevents independence
- Fragile
- Slow to set up
- Finding suitable adapted hardware
- Over stimulate

4.6 SUMMARY

This chapter reported the results of the first part of the study. The overall findings of the questionnaire, the overview of the nature and extent of computer use by learners with very high needs and perceptions and opinions of the teachers were reported here. The results were divided into four sections: Learners' information, use of computer, Teachers' information and Perceptions. Teachers felt confident and competent in both using the computer and the recommended soft ware for learners with very high needs, though some of them did not receive any formal training in use of computers and soft ware.

Teachers were aware of the various benefits of using computers for learners with very high needs, some of which are improving attention skills, enhancing independence, and providing different stimuli. Some of the drawbacks said by them were the lack of technical support, finding suitable software and time required to train staff and learners.

The mean age of the learners was 14 years and most of them worked with teacher. They spent 10-20 minutes at the computer working at English

curriculum/ cause and effect skills. Most of them had computer as a main objective or as a strategy for achieving learning outcomes written in their IEP.

CHAPTER 5

DATA ANALYSIS – INTERVIEW (II PHASE)

5.1 INTRODUCTION

The result of the second phase of the research is outlined in this chapter. Data from interviews with 13 teachers, who use computers for learners with very high need, are presented.

The demographic data of the respondents who participated in this interview are outlined in table 5.1. The methodology used for this phase is described in detail in chapter 3.

Table 5.1

Interviewee Data.

Respondent Code	Ethnicity	Gender	Age (Range)	Setting they are teaching in	Length of teaching very high need learners(Years)
A	NZ European	Female	20-40	Special School	6-10
B	NZ European	Female	41-60	Special School	1-5
C	NZ European	Female	41-60	Special School	19
D	NZ European	Female	41-60	Special School	11.5
E	Pacific/Asian	Female	41-60	Special School	22

F	Pacific Island	Male	41-60	Special School	> 1
G	NZ European	Female	41-60	Special School	6-10
H	NZ European	Female	41-60	Special School	>1
I	NZ European	Female	41-60	Special School	6-10
J	Indian	Female	41-60	Special School	1-5
K	NZ European	Female	61<	Special School	6-10
L	NZ European	Female	41-60	Special School	16
M	NZ European	Female	20-40	Special School	1-5

All participants were teaching in special schools as teachers. These teachers were teaching in the class catering to learners with different areas of disability and support levels ranging from high to very high needs.

Looking through the data gathered, the following points kept coming up frequently: 1) *Beliefs about the wisdom of using computers* included statements in which computer was described as versatile tool for some learners, and not necessarily for others and its benefits ; 2) *Characteristics of teachers* involved discussion on the role of teacher's attitude on using computer ; 3) *role of computer* involved descriptions of situations in which computers are used by learners with very high needs ; 4) *Social nature* statements reflected how computers influenced interaction ; *5)Experience* are those statements indicating what past encounters shaped teachers views about computers and learners with very high needs. 6) *Type of teacher* mark comments indicating whether use of ICT transforms

teacher's role; and 7) *Role of teacher* mark comments indicating how teachers role changes with programme, and learners' ability; 8) *use of computers* indicated statements which reflected how teachers used computers with learners with very high needs; 9) *confidence and competence* indicates the confidence and competence level of teachers when using computers with learners; 10) *Resource* marked comments about material items –software required or prepared for the participants; 11) *Curriculum* comments indicated what other areas computer could be used, integration and use of adaptive device to access computer; 12*) IEP goals* indicated statements showing how computers were used for achieving outcomes; 13) *software* marked comments about what criteria they looked at and the time required*;* 14) *Training* indicated statements on software, general computer use and suggestions for special training*; and* 15) *Challenges* commented on the barriers they faced , how they overcame them and future possibilities for learners .

Analysed data was then be placed under six major headings, which represented the statements respondents made about computers and learners with very high needs. Figure 5.1 shows the six major headings (1) Very high need learners and Computers; (2) Teacher practices; (3) Teacher competence and confidence; (4) Computer and Curriculum; (5)Support; and (6) Teacher's experience.

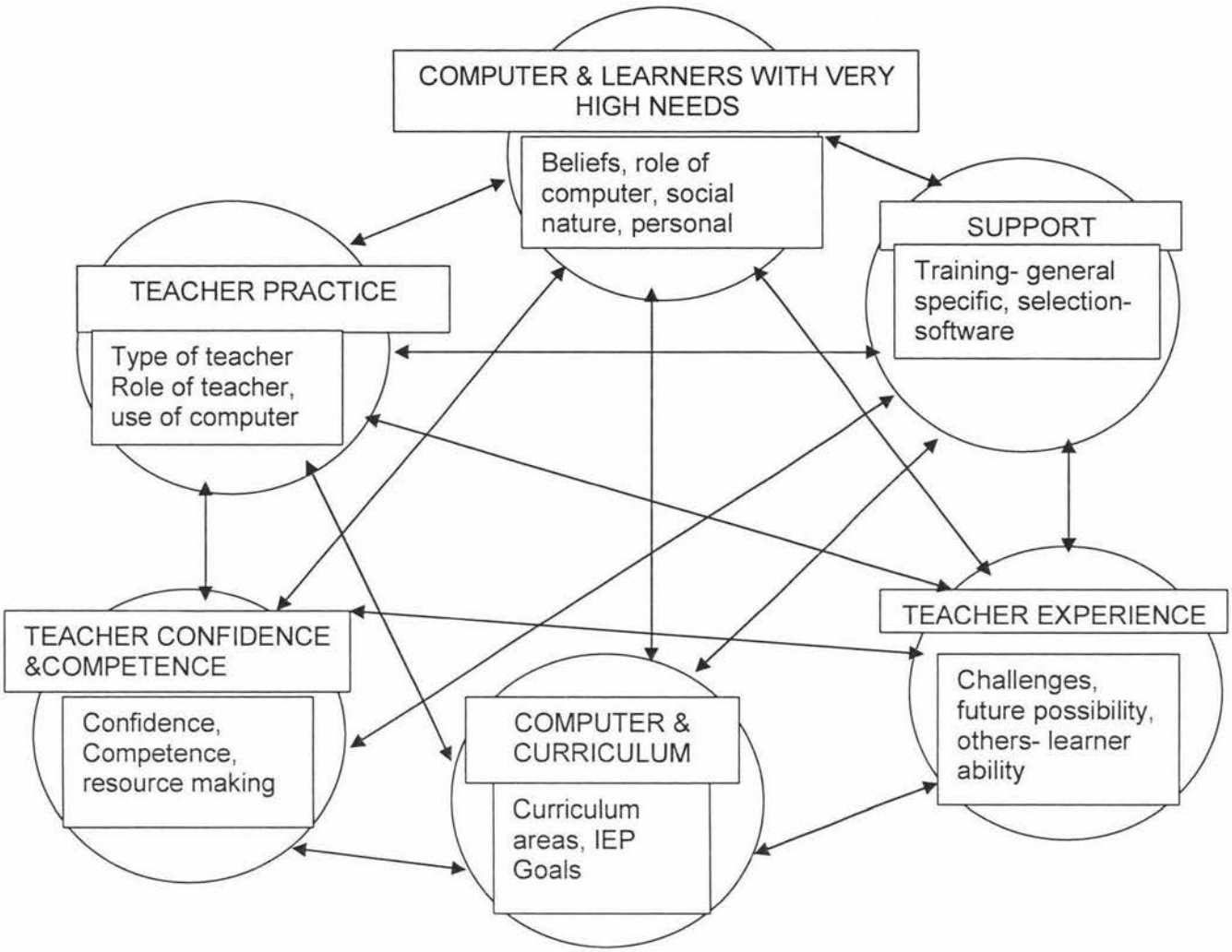

Figure 5.1: six major Headings.

Importantly, there were several areas of overlap which appeared as passages were coded.

5.2 LEARNERS WITH VERY HIGH NEED AND COMPUTERS:

Teachers were asked to talk about their beliefs about the wisdom of using computers for students with very high needs. Three have said that it was a tool:

> *I think they are excellent tools for some students who could access information they normally could not have access to (d).*

It is just another way for them to access the curriculum for presenting information in another way…a tool to use. (e).

Computer is a powerful tool to use; it is visual learning tool, that's why I think it is so essential (h)

Six teachers talked about the beneficial effects students get. These included knowing cause and effect, a good leisure activity, making a difference to their behaviour, helping them to focus, providing good visual and auditory feedback and enhancing their learning a lot faster:

It is a very good thing, because all students benefit from it, even the very high needs especially the cause and effect; even if they don't switch but have a programme to watch that has got contrast and colours then they do benefit from it(a).

I see it as a really good leisure skill for students of my class(i)

It makes a difference in their behaviour, it occupies them. It gives eye and hand coordination (j)

Three teachers felt that it is a good option but not necessarily for students' with very high needs as they have no concept of screen, or that something happens when an action occurs:

I like to think that we do use them and it is useful tool but in lot of cases are children don't recognize that a screen is something that holds their interest. (c)

I think that like with any other student probably take into account the interest and ability of student themselves, it can be a very useful tool but it is not necessarily (g)

Teachers' felt that teachers need to access technology and develop their own skills, find out what computers can do, and also enter into the world of their learner. The teachers' beliefs about their ability to use computers in instruction

may be the key in determining behavior (Ertmer, Conklin, & Lewandowski, 2003). Teachers were asked if characteristics and attitudes of teachers have a role to play in using computers in class. Ten teachers felt that they could make a huge difference. They also pointed out that if they had written it off in the first place, the learners would have never coped with it. Being knowledgeable also helps because if one does not know how to use it they will not use it. One teacher felt that the importance she gives to the computer in class has brought about a difference in the class. Enthusiasm for using computer waives to others. This is indicated by some quotes:

> *Umm, I think the teacher has to be knowledgeable of the different ways of accessing the computer. The teacher's attitude also plays a role in it…I guess so because some of the teacher look at students in wheelchair, who have limited physical function and think that they wouldn't get much out of the computer, yes the teacher must have the attitude of yes it is a tool and what strategies do I need for the student to be able to be successful at their level (e).*

> *I think teacher's attitude plays a major role in it, I could say there is no point in learning causality on computer because they are not going to be given computers or I could say lets try computers and see what makes the difference for them, teachers could make a huge difference(f)*

> *If I had written it off in the first place all these kids would never be interested in it and would never cope with this equipment, so if I had never tried I wouldn't have known how interested they are and how much they have got out of it.(i).*

Two teachers felt that teachers' attitude played no role as computers are just another/alternative tool like any other tool and it is basically the students' ability that has to be taken into account:

> *No, well…I don't think so. I think it comes down to student ability, what you think they can… (g).*

> *In almost every class with children with very high needs you have teacher and teacher aides and you may get one person who hates computers and another who is good, it probably is that person with the kid…you have the teacher as*

the team leader...but I feel teachers' attitude do not play...it is just one of the tools (k)

One teacher replied:

I have no idea, I am sorry I don't know. Every teacher is different. (d)

5.3 Role of Computer

Teachers were asked to express the different roles or applications of the computer for learners with very high needs. Six teachers talked about computers being used more for communication, as a means of expressing their needs, interacting with others and reading. They also used it for motivation as it enhances learning and encourages them to get through the programme. The challenge of teaching learners with very high needs is to keep them motivated as the attention span is less. Here are some quotes:

It has many many applications but it is something that often and frequently there has been challenges of teaching students with very high needs is actually keeping motivation for the child to learn and quite often the limitations that they have to... but the very important thing is to keep the interest so that they are motivated and only if it is a high level interest it is a motivator, but it is an excellent teaching tool. (d)

well, that is where the problem lies, my class because of their particular needs .my 20 year old student doesn't really, I don't use computer with him to access curriculum but for his communication I use it and for others, mainly as communication device for literacy activity. Does not help much as motivational device (g)

Six teachers said that computers are used to access curriculum at different levels ranging from learners who are cognitively able to very low functioning learners; as training tool towards communication for all prerequisites skills; and to develop skills to access leisure activities:

It depends on the student because all of them are uniquely individual and it depends on the situation because some students are more cognitively

developed and less able physically to be able to access to demonstrate and certainly for that thought of students computer are excellent(d)

It is sometimes used as a training, like I have a couple of my students who are working on scanning on the computer and that requires the prerequisite skills like visually attend to the monitor, pressing a switch to make something happen on the screen like cause effect, choice, switch at the appropriate time to choose those things so the computer can be used as training tool towards communication (e)

As I have said, a leisure skill , there might be other ways (other than leisure and communication)that I may not be aware of yet, could be listening to music and things like that(j)

5.4 Social nature

Teachers were asked whether working on a computer leads to any social interaction or isolation for learners with very high needs. Three teachers felt that it definitely lead to social interaction. Here is one indicative quote

No, it doesn't isolate but helps in socializing, because for the little one who is learning how to use the mouse, she sometimes has someone sitting with her doing the work and times when she is on it and when people come and see what she is doing , it is a quite a big thing for her that she can share her work It is socializing for lower functioning kids when they integrate with the mainstream buddies- all sit and play on the computer doing turn taking and it is cool.(a)

Six teachers felt that it led to both social interaction and isolation depending on the ability of the learner and the type of activity they do. Because each learner is different from their classmates, they need individualized programmes to work at which may not be suitable for other learners. Some learners require one to one situations to work effectively or more independent learners may prefer working individually without being disturbed. This sometimes leads to isolation, but at the same time when they are working on an activity, like listening to a story, playing games, it leads to interaction with their peers (both in class and with mainstream peers). Hence teachers felt

working with computers did lead to isolation and interaction. Here are few quotes that explain it:

A bit of both, because the more advanced they can get, they could work, so that's an opportunity there for interaction. It could be isolation because they block off whats going on in the world, Ya, it is both ways actually. I would like to think that it leads to social interaction more than isolation but it is the same even when they are not on computers, they do go off....that is with autism, they would do that in any situation. (h)

Some students in my class who are able to operate it independently become isolated when working on it as they do not want to be disturbed at all, having said that...it also helps in social interaction because when they are stuck they approach for help and gain the attention of everyone when they find something funny e.g. they watch some butterflies on the screen, they call out to others and everyone moves to the computer and they enjoy the programme as a group and laugh out loudly...they also take turns to switch the button to make it happen again (j)

Umm, no, it can be social interaction because they sit as a group and listen or take turns...having said that even when doing group activity the person is isolated because each one does their own activity because I never have two children interact together to do something, they watch what other does and then do it when it is their turn e.g. we have a group of kids who use Priory woods, we sit around a table and have turn making the music happen, they also listen to stories as group but it can also be individual work. So it can be both, isolation and social interaction (k)

Three teachers felt that it definitely lead to isolation which they saw as being due to the learners' individuality and the solitary nature of the task, as the learner always worked in a 1:1 situation even within the classroom environment. :

Definitely isolation, certainly doesn't encourage social interaction, because they sit and do it on their own, it is not something they do with anybody else, it is an isolated activity other than the teacher aide or someone who works with them...ah...(pause)...very limited interaction and very direct with teacher aide which only lasts for 10 seconds (g)

When teachers were asked to describe any events that shaped their views on computer use with very high need learners, they talked about personal experience with learners. Teachers felt that there was a change in behaviour of the learner, the multisensory experience helped learners to use the senses and get information; learners enjoyed and were motivated by it. One teacher expressed that over the years of using computers with learners with disability, she came across only one learner who did not find computer a good tool. These quotes indicate this:

> *I think just becoming aware from when we first had computer in classrooms that children often have the ability to demonstrate and give evidence based learning outcomes and having something simple as the computer games, like in old days you thought a child could perform something but often not a way of proving it or a kind of checking it out to make sure that they could and certainly being able to for a child to access a just a computer game gave us a lot more information and stuff like that and then I began to see the potential for use for students certainly for other functional activities and academic (d).*

> *A child in my class…has behaviour problem especially during breaks…is a bit aggressive…when she is said, "it is your turn on the computer" she sits and works and after 10minutes she is a changed person. Another child who has some physical challenges in accessing computer also tries to move the mouse and looks to the screen expecting something to happen…that gives me immense pleasure to see students enjoying this tool (j)*

5.5 TEACHER PRACTICES

Type of teacher

'Research says that teachers can transform their teaching role through deliberate and considered use of ICT'. Teachers were asked how much of a believer they are of the above statement. Four teachers agreed with this statement because they felt that using ICT did definitely help in transforming their teaching role as they were able to motivate learners using their areas of interest in varied ways:

Oh, definitely, most definitely it enhances for some students to develop the skills that possibly that they might not have had access to so it is a powerful tool for some kids. I have a student was not able to talk, he was able to communicate with social scripts, he had a system to put things on his voice output device so he can carry several conversations, initiate and interact with somebody, e.g. One of my other students is now accessing internet to get information of things that highly interest him which has helped to develop his cognitive abilities when his physical ability has decreased hugely from the time he has first started to use the computer, this definitely transforms a teacher's role.(d)

Four teachers felt that it might, but had not experienced this personally as the learners were not functioning at that level:

I do think that teachers could transform their role because that is the way the world is going too and we learn from them.(h)

Yes it could be changed. Not in my case, it may happen in some classroom where students' access for more information than mine (i)

Three teachers felt that computer was just another tool and making deliberate use of it could not transform the teaching role.:

It can do sometimes...but no, I don't think so it is just an extra tool, it is just like how you books...if I didn't have it I would still do much the same so I don't think it transforms the role.(k)

Role of teacher

Teachers were asked to tell what type of a role they would take when a learner with very high needs uses ICT to access curriculum or work on their skills. The majority of them said that they would act as a facilitator in combination with other roles like tutor. Three teachers looked at themselves as being facilitator as the learner is just guided and left to learn through their mistakes, they felt that it gives learners a level of independence to work on their own:

Facilitator, it like finding something at their interest level and making the opportunity available for the students to become familiar with whatever it might be and comfortable and confidence, lots of feedback when they produce things, allowing them to do themselves once you have accessed the way they can e.g. whether they are going to use a head switch or a hand activated hand switch however that works for that student. reasons ,umm, with students with very high needs people do too much for them sometimes and they actually do not push the kid outside their comfort zone and allow them to a) do it and b)makes mistakes which help them to learn and motivate the kids to try hard(d)

First role is actually making sure that there are programmes set up that actually match what you are doing for it to be relevant for them to be using the computer. it has to be fun ,but has to be educational and has to be purposeful for them doing it, that is the main thing….ummm, first of all you have to show the children what the programmes is and you do have to, like role model what they need to be doing with the programmes especially with scanning, and then from experience, it is actually best to leave them, leave them to do on their own and make the mistakes because they need to know that they need not be always right but if they made a mistake they learn from that and think, ok now, that's right now I have to do this, because if we do it for them we can show them ,and you can do hand over hand and do it for them, but they are not actually learning anything with the teacher or whoever is working with the computer(a).

Only one teacher expressed that she would take the role of a tutor as the learners have to be taught, in a 1:1 situation with hand over hand:

It is always guided I suppose because it is hand over hand really so its got to be 1:1,it could be looked as social exercise in interaction between two people really and try to reach these children in any way we can and this might be another way of reaching them(c)

Five teachers said that a combination of being both as tutor and facilitator helped learners, however more as a tutor because each learner is different. Some require more tutoring than others and then stepping back to be able to facilitate:

Teacher has to be a mixture of tutor and facilitator, initially teaching but you are facilitating the student even in the tutoring role for the student to participate in the process (f)

The role of the teacher is to basically get the students, very high need, get them to use the technology, so basically you begin to be a teacher and then slowly back off and encourage independence, i.e. tutor to facilitator because if it is new to the student you have got to teach them how to use it and then they have got to realize why they are using it and once they enjoy doing it and get rewards from it, then the teacher backs off and the child is actually encouraged to become independent (m)

Two teachers were unsure about the role they would take when working with the learner as each programme needs them to take a different role:

as tutor or facilitator depends on how the programmes is set up, with the touch screen it is brilliant because you can only do whats there but sometimes you have to be careful with computers that they don't go into the wrong programmes and do something they shouldn't and get lost...so you need somebody there because the child can get into a programmes that they can't get out or they don't know where to go now...(k)

Use of computer

Teachers were asked to express in what capacity they used computers with their learners with very high needs. The response was varied from using it as training tool to work on isolated skills or to develop pre-requisite skills for communication, working on cause and effect to give them an idea of how environment can be controlled by them, using it as leisure tool to play games and listen to music to incorporating it as part of regular class programme.

5.6 TEACHER COMPETENCE AND CONFIDENCE

Teachers were asked to rate their confidence and competence in using computers with learners with very high needs. Three teachers rated themselves as being very confident and competent, eight teachers rated themselves as confident and competent, and one teacher rated herself as very unconfident and incompetent. One teacher had very little experience in using learner oriented

programmes, hence did not rate himself. They were asked to tell how they had developed this confidence and competence, and in summary reported that it was through hands on experience, workshops, seminars, regular practice and the experience of working with learners having very high needs. Here are some indicative quotes:

> *That would be from basically having to do, then actually sitting down and doing it yourself and also having help from colleagues.(a)*

> *I think initially I would have been shown by our OT therapist and would have taken it from there, working on that with different pupils over the years and find out what they could do and couldn't do. (i)*

> *By doing it, some training but mainly personal .training has helped, we had people come in and demonstrate to us how the computer could be used with the students and we had people come and show the programmes that could be used, and time to time we had workshop where someone from other parts of the country have been involved. We have been able to look at new programmes and try with them and have been able to ask other people about what would they use (l)*

Teachers were also asked to give their suggestions of how teachers could gain the confidence and competence to use computers with learners who have very high needs. Their suggestions included spending time to learn programmes, training, talking to colleagues, knowing learners' interest and abilities and get over the barrier that learners cannot learn from computers as is evident in the following statements.

> *The only way you your going to develop it is if you actually use it, you actually got to get on there and say , "Ok , I need to spend time to learn these programmes. I need to sit down for an hour on my computer and go through what's on there", because most teachers don't even know that they got programmes on the computer because they are busy doing other things and I think they need to sort of move and turn to make emphasis on making ICT a priority because it is such a good tool to use.(a)*

Gain from talking to other teachers who have a similar type of situation and hands on experiences is probably the best experience to find out about it (e)

The first thing is to get over the barrier that students can't learn from computers and that computers are there only for playing and for fun which is a big part of learning too, once the teachers get over their own fears of using computer then there is really no turning back .For very high needs it basically playing along with the kid and getting used to the programme along with the student(m)

5.7 Computer resources

Computer resources form an important part of effectively using computers with learners with very high needs. Respondents were asked if they had any formal training to make computer resources using different programmes, for example Power point. Three teachers had formal training to prepare their own resources, and the other ten teachers had no formal training to make their own resources. Teachers said that the resources (readily available) also depended on the individual learner but had some disadvantages like the speed of the response or only certain parts of the programme may be appropriate to the learner's level or age whereas making resources helped to individualize to learner's need and helps to teach a particular skill.

Sometimes we make resources. I have been trained to do it but I find the children who are learning with visual media, the video works much more powerfully and video feedback as learning tool. As class we video a lot of things e.g. we were flying kites so we had video footage and children like to see the ones who like computer and stuff would like to see the video, "me doing kite flying", resources made by us is real it is not someone else's and so much more meaningful for them, "me doing with my class". (d)

Probably the advantage of doing a power point presentation is that you can individualize it, sometimes when you buy software programmes for my particular students, the idea is good but it might be too fast or may be one part of the programmes is good whereas another part is not. so power point is advantageous, but having said that some programmes available are good for students with very high needs like using switch access or touch screen access, such software are more appropriate but the tricky part is that some of the softwares is a bit babyish for 16, 17 and 18 years old although their skill

level wouldn't be high but having cute little 5 years old on the screen is not appropriate for my young adults(e)

It depends on the goal of your computer programmes, if it is to teach a child to wash their hair, then obviously a power point presentation or video of themselves or someone doing it would be better. This helps to teach a particular social skill and if it was for games or cause and effect relationship or switch use, like that, you could use bought packages (g)

5.8 COMPUTER AND CURRICULUM

It was found from the first phase of the study that Literacy and Numeracy are the most used areas of curriculum. Teachers were asked to give other areas of curriculum where they thought computers could be useful for learners with very high needs. Science and Social Studies were the next most common areas. Every one agreed that it could really be used in all the seven areas of curriculum. Here are some quotes:

We would look at internet to look at things like science, social studies. For science we have been talking about recycling, we could look at different things that could be recycled e.g. if you have scanning, you might have a plastic bottle or a nappy or something and the student scans for the correct answer...road safety, it would be recognizing different road signs and press the switch to activate the voice telling the sign (e)

It could be helpful in anything, I guess if you had a high tech dance situation it could be used for that, but I would suspect, umm...mainly the language and maths, stimulation through music , cause and effect in science, relationships and community in social studies(f)

Just some social skills like turn taking perhaps, trying to extend his concentration, just to some visual curiosity, it could be to recognize faces of people he knows by looking at the photographs on the screen and match-matching games.(g)

Maths, social studies for your topic, technology because you are using computer. I think across most, all curriculum areas really. Even can help in physical education because you would have programmes with aspects of hygiene and health, well being and fitness type of teaching in them (l)

Technology has become increasingly prevalent in the workings of the educational system, with today's classrooms using more and more technology to enhance their curricula (Heinich, Molenda, Russell, & Smaldino, 2002; Shelly, Cashman, & Gunter, 2002; Tiu, Guglielmi, & Walton, 2002). On the basis of this importance on computer integration, teachers were asked to give their opinions and talk about barriers, if any, they had to face when integrating computer use into the class programme. Ten teachers had tried and succeeded in integrating into regular programmes but did face some barriers like confidence and developing their own ability, getting other teachers on board, getting teacher aides, being dependent on an Occupational Therapist and finding time to update programmes to match the topic. These quotes explain it:

> *It becomes apart of the programmes like everything else. To me the biggest barrier is-I am totally dependent on our OT to access the switching devices and to bring that kind of technology and show me how to set them up and work with it (d)*

> *It is very difficult at the beginning because as I said I believe in using it but a lot of people don't, so I didn't get a lot of support ,e.g. someone came into the classroom and saw the kids on the computer, passed a comment, "oh, gosh that's what they do all day", they do not really see it, they just thought that they were having fun but once you explain to people and make them realize what you are doing and what the children are doing. They are more realistic with it now and it is more acceptable. barrier, I faced was to get a touch screen-to get funding for that and to prove that it is worthwhile with the students and then the appropriate software for ICT, getting other teachers and showing them how to use it and become aware of its uses . With them on my side we went to BOT and presented it to them. (m)*

Four teachers felt that integrating computer use as part of the regular class programmes was not very feasible, because of the daily routine, the behaviour of learners, getting personnel as learners need 1:1 attention or a belief that technology expenses outweigh possible benefits for students with disabilities.

Probably too high flying, if any student have very high need they haven't got…I don't see how it could help. It is not fully integrated. Very difficult with mine ,e.g. if I leave the computer in the room learner keeps switching the screen on and off all the time, so it is not left for him to have free access ,I have to take him out because he likes noises so he turns the volume up all the time so I have to be careful that he is not left unsupervised, its just another tool like I said…it is not an essential device to help him to access the curriculum…there are barriers, as I said he likes playing with buttons and the programmes has to be ready to go as he doesn't wait very well or he gets fidgety(g)

It is difficult…it is a lot to fit in a busy classroom day but gradually training teacher aides so they can use computers with me so we can cover at least two pupils at the same time. barrier, yes mainly personnel getting staff because with my students it is 1:1 activity…it is also difficult to teach teacher aide on the job…it is a bit tricky to fit everything in(i)

Technology holds the potential to significantly alter the traditionally accepted boundaries of severe disabilities (Fields, 1999). Teachers were asked if they required training to use it with learners. Seven teachers felt it would really help, because training helps them to know the intent of the equipment and the intent for the learner to use, it gave an idea how the equipment could be used and to overcome the fear of using it with learners:

Yes, absolutely, I have an OT on site that I work with and a SLT and the PT so- a multidisciplinary team, apart from that we also have a technology expert and technology room where they have the different types of switches and equipment where I would be able to go and learn to use and the bring back to class and trial. Yes they need training before they start using them. (l)

Yes, I think lots of teachers don't use the computer because of fear of not knowing. It is a new thing especially for teachers if they have been teaching for a while, so once they have training and they find that it is easy to use, it is very beneficial and that they would come around with the way of thinking and use it. The more you use it the less you fear about mucking it up or using it wrong or things like that(m)

Three teachers felt it was not really needed because it was more of hands on training and once explained it could be adapted to other learners.

5.9 IEP Goals

Every learner had an individual education plan (IEP) and most teachers indicated that if computer use was written into the plan, it was mainly as a strategy to achieve the learning outcomes; very few said that it was a goal in itself. They gave examples of how they used the computer to work on the learning outcomes. Teachers explained that they tried to match the outcome to a programme on the computer, and work as a team to write down ideas for using the computer to achieve the goal.

> *Basically it is put down with whether they need to be switching independently or whether they need to be switching and give a response to a cause and effect programmes and gets evaluated .Every time they go on, we write down what programmes they did, how long they were on it and what their responses were and they move on from there basically. Some of them probably won't move on because of the level they are at. E.g. Ok, we have got 'choosing' one here, this programmes has got choosing. we have got 'hold head up for 15seconds' lets get them on the computer because that's one way they will achieve the goal, 'be calm for 20minutes while standing' put music video on the computer that the kid can switch.(a)*

> *Strategy, e.g. one student had to use the left hand to choose a programme because she was very stiff on her left hand so it was incorporating the lifting of left hand to operate the jelly switch and another one was to use a touch screen to change the programmes and become independent, that was her IEP goal. Another was to focus for 2 seconds on a programme, we use variety of strategies but we saw computer as a strategy because there are so many different programmes, some very fun programmes that are really good for very high needs student which are colourful and interesting, so we thought lets give it a go and see what happens(m)*

Two teachers said that they did not look at using the computer as a strategy for achieving a learning outcome and hence it was not mentioned in the IEP:

> *No, we use a lot of techniques but we do not have that they must use the computer or they must...we have that the student must have this level of literacy and this level of Numeracy but not...we don't actually write them that way. Using lots of tools, unlimiting and not limiting them, holistic approach (d)*

> *It is a strategy,(long pause) I don't know ,I don't know how to answer that question.(g)*

Eleven teachers indicated that the computer was used for assessing and when asked to elaborate on this, explained that assessment is generally on whether they have an understanding of the concept, stay on task (attention span), respond in a given period of time, attain their IEP goals and whether they are able to transfer the learnt skill to a new situation or to access new programmes. For example:

> *One way we have actually done it is , we have changed the programmes .we have put a different cause and effect programmes on to see if they do have understanding—OK, the screen has stopped or something has stopped moving, now I need to hit the switch for something else to happen. That is how we have done it. (a)*

> *Yes, we do use it as assessment tool because as I have said some of them have computer as a part of their IEP programmes, e.g. looking at the monitor for a longer period of time, they track from left to right or up and down so you are assessing their computer ability level. Sometimes it is actually their IEP goal so there you are assessing their programme on the computer. When you have worked with the student we record their abilities or their attention span or whatever session you are actually doing it with. You might say, "Really enjoyed the power point presentation of All Blacks with independently hitting the switch 5 times without the teacher support". So you are constantly recording what you have done by taking photos and video also because you might miss something when you are writing your comments (e)*

> *It is mainly the skills that are in their IEP, we mark them everyday. we look at the skill e.g. if they have to hit switch to access a computer programmes, we mark them when they do it 5 times in a row and then move on to the next IEP goal, for those who have to use the mouse independently we mark them down- do it so many times and then how long they were on their own like 5 minutes on without any help and mark it they did that 5 times in a row or ten times in a row till they become independent to certain extent(h)*

5.10 SUPPORT

Teachers were asked how they selected software for the learners' use, that is, the criteria they used to select software. Many teachers said that they would look at the ability of the learners, and some said that they looked at what has been loaded on to the computers by the school and use them according to the learner's needs. Regarding the support they received for selecting the software,

teachers relied on colleagues and catalogues. Some did not receive any support but were self motivated to search for appropriate software. For example:

> *Selecting software-me going out to other schools and have seen got it written down and brought it back to school and said can we have this programmes or going to other special needs schools on the internet and see what they have got and either downloading programmes they have or bring it back to see if we could have it as a resource (a)*

> *I guess a lot of it is from other teachers- which is popular and has been successful for them and contacting the company and asking them for trial software, that is probably the best way. We can look at catalogues and find what ability level they are trying to highlight. The software should have some auditory visual and auditory as students are motivated by it, switch accessible and not just by mouse. The school had sent me to courses that I have requested to go to, another colleague has good computer skills and his strength is of higher ability level group so we put our heads together to come up with range of softwares with priorities in mind (e)*

> *Very hard, go everywhere and try it out and if somebody get something really good we share it around...mainly peer support from other teachers...easy to see, nice big clear picture...like Clicker 4 has different levels allows to see and hear, some of the Priory wood too .If the child is intellectually able but physically having very high needs then the programmes must be age appropriate but children in my school are intellectually very high needs, it doesn't matter as long as it is not too complex(k)*

Teachers felt that they must take time to evaluate the software they plan to use. When asked about this, teachers said that it was time consuming but having said that, they also pointed out that it requires good time management. It was also helpful to have the software on trial with learners for few weeks as each learner and each day is different. Hence teachers agreed that taking time to evaluate helps in getting appropriate software:

> *Well it is a bit of time consuming, I try to do bits and pieces at home and I must admit I don't always make worth the time, it is one of the things the teacher has to do. In fact we are very lucky that we do not have books to mark so we should spend more time. (c)*

Usually when we trial softwares, I usually ask for about 3 weeks- a month because of each day is different...you might have a student who might not be interested in it one day but might be interested another day or another time of the day so you kind of need or we need quite a few weeks to catch them at different times and you can make an overall judgment to figure out whether the software is appropriate for your class or not or for a specific individual (e)

When asked about the support they received for planning and using computers for learners with very high needs, four teachers said that therapists provide the necessary support when they find a programme to use. One teacher was provided support by the school, whereas others said that they received no such support but being self motivated they worked out plans to incorporate computers. Some quotes:

I often call on the expertise of the therapists for ideas or ask for suggestions. (e)

I don't know; using computer is not a big part of my student's day. It is just one aspect or one different thing to do. If they didn't have a computer it wouldn't make a huge difference, it is not a huge impact on them (g)

Not in planning computer into class programmes. I have done it myself and had to change my day programmes to fit it in .I was mostly self motivated anything to benefit the children. (h)

I got lot of support .We have a meeting once or twice a week after school and catch up and ask each other what software would be good, new tools or new technology that's out and things like that(m)

5.11 Training

Teachers were asked about receiving any specific training to use the software they were given or recommended. Few teachers gave a positive answer and many replied that they worked on it in their own way as they had no specific training or asked for help from the therapists. Teachers felt that training does help to know different software available and could be used in the future too.

They also felt that the principles they learn at training could be adapted for learners to make resources. Here are some quotes:

Clicker4, training was good and to see what kind of girds and things you can do with it but again it comes back to time, you have the time to sit down with the programmes and the sad thing about it is you do actually so much with it but you do not get the time to sit down and make the girds appropriate (a)

I went to a half day course on Clicker 4 and to a company at Hamilton which met every month to look at softwares and that sort of things, bits and pieces, really. The training does help you sometimes, but it makes you aware of what is out there so even though it might not apply to your situation now, it may apply in the future or the principles of the software may apply and you say," Oh! That could be a good idea to apply". So you might be able to adapt that particular idea/ principle even if you cannot use that programmes or software (e)

Yes, just through school professional development and just self taught too...you know the level of the students, so you go on the internet and have a little play and see if it is interesting or not and go from there(m)

Regarding general training in the use of computers, all teachers had some training either through school or through private agencies. Teachers felt that training did help them to use computers with learners with very high needs directly or indirectly. Confidence in using computers generally has helped them develop the confidence to use it with learners with very high needs, and adapt programmes for learners and making portfolios for learners. One teacher felt that planning using computers has indirectly helped learners as they get more of the teacher's time. Here are some quotes:

Yes, I did that probably on my own; taking night courses-community classes, my computer skill level which I think helped. I think if you use whatever course you going to, to build your computer skills level, I think that eventually it down tracks, it does help you with formulating individual programmes. I think that having that general skill level helps you to adapt programmes for our students (e)

Only in terms of my planning for them, it is a superb tool and it would be foolish to do it on the paper, so students benefit from me indirectly because if

the teacher spends a lot of time planning, then they will not be functioning effectively as teacher.(f)

I have had lots of training in the windows, documents. It did help because if I am not scared of computers, I might say that is a very good idea. I went on a reading conference last year and a computer workshop there, he was talking about virtual books and how things might go, and I was really excited by all that. (h)

When they were asked what type of computer training they believed would be beneficial for teachers using computers for learners with very high needs, this is what they suggested: To be fairly confident and competent in computer skills, being trained in the respective software and hardware required for learners in their class, and an opportunity to see what is available and the access to the computer for their learners. This is indicated by these quotes:

To have the confidence that you are not going to erase things up, and if something goes wrong you can start things again. Computers are very frightening things for ones who aren't computer literate. It is an awareness and confidence that comes to you with use, having said that you forget things told as you turn round...age too...(c)

An opportunity to see what programmes are out there, what goals , what purpose they fill, what you can hope to achieve with them and to know that even the most physically disabled student can always move some part of their body to access a switch, whether it is voluntary or involuntary might be of a debate but they can still access a switch and therefore a programmes(g)

5.12 Teacher's experience

Challenges faced

Teachers were asked about the challenges they faced, if any, in using computers for learners with very high needs. Teachers pointed out that finding suitable programmes that are interesting, accessing appropriate hardware, and finding the funding to get the right equipment were huge challenges that they faced. Apart from these, the frustration of lack of knowledge, placement of the computer

in the class and positioning of learners and necessary equipment also challenged teachers.

> *Probably, mainly the frustration of my lack of knowledge, just trying to work the technology, keep the computer on and know what to do next with the lack of training...most of them was trial and error and asking one or two questions everyday(i)*

> *Positioning, accessing like a good table that goes up and down and choose the adjustment so that you get things at the right height etc, getting the programmes that you wanted to get loaded on to the computer and accessing funding so you can buy the programmes should you need without having to wait for ages...yes that's about it I think (l)*

> *The major challenges was the processing, if there is anything that a special need want for work on, they wipe on extra money and so it was finding the funding to get the stuff...because I like working on computer so time was never a challenge for me...so it was mainly the funding and recognition of the technology(m)*

Teachers overcame some of the barriers by making it a priority and getting help from experts, through experience and practice, perseverance and getting teachers and Board of Trustees on board. Some challenges are such that they are still ongoing, like getting funding. This is indicated in these quotes:

> *Basically by just making it a priority, saying this isn't working what can we do? So it us knowing the children for a start that helps in giving them an access and I don't think you can use- I don't have the time or I don't know how they are going to use the comp because actually you have to make the time and that is how we did. (a)*

> *Getting other teachers on board, the BOT and telling them it was not a waste of time and that children are actually learning from it and how you can incorporate it into curriculum (m)*

Future possibility:

Teachers commented on how working with computers might help learners with very high needs in the future. Teachers said that it would help them access

various devices, can occupy their time, engaging in a leisure activity and learning as it is never ending process.

What comes to my mind is more for enjoyment, they might be able to access something they might be interested and communication (c)

It can be a leisure activity; it would help if they are able to be trained to using their communication device that they could carry around with them, visual skills that can help them to generalize to other areas (e)

If the child has the intellectual ability the child can use computer programmes to open doors ,shut doors...activate various situation like using the phone, things like that and for the ones who are intellectually very high needs- for entertainment and gives them a chance to maybe play game with somebody else and something they are going to learn to listen, stop and respond and wait till the response is finished...it helps in lot of skills and cognition(k)

Teachers were invited to share any other aspects of computer use and learners with very high needs. Teachers felt that learners could surprise them with their ability if given the right surroundings and enough patience:

The people who work with the children with very high needs have to be told use it, use it while you have got it because you will be surprised at the results you actually get (a).

It is a good tool but it is a tool like any other tool. I guess the best thing is to know your students, their strengths and weakness and to be able to work from there (e)

I am really a firm believer so I appraise it very highly for all levels of disability because I have got a very wide range of disability like, very high needs, high needs and just basic learning disability and they all use ICT and they have all come so far with their learning with everything- social skill ,language development in every angle, so I am all for it in school and hopefully lot of teachers will change their view that don't believe in using it because it is such an useful tool and I think that every child should have the ability to and a time frame to learn on it and from it. Lot of support for them and tell them that there is no limit on the computer, you can find anything ,anywhere and anytime and it makes teaching so much easier...once teachers know that it is time saving and fun maybe they will get on to it(m)

Teachers have also pointed out that learner's limitations like behaviour must also be considered when looking at computer use because there is a very fine line between working and damaging equipment.

> *I am limited because I have limited myself and not explored all the possibilities and all the programmes available. It is a very important tool but we must also know our student's limitations. (c)*

> *It is an individual thing and will be beneficial for some people and not for others, like we do have couple of students that would not use a computer at all because they don't have the attention span, they are too rough and violent that do not get it or understand that you have to be careful with it. Computers are...all kid's behaviour is not conducive to work with computers. One student has the ability to access the touch screen but there is very fine line between doing that and pulling the screen and wires...so it is a very individualistic tool (Tg)*

> *It is an individual thing and will be beneficial for some people and not for others. (g)*

Teachers meet a new group of learners every year that may have different abilities to those in previous years. This sometimes poses a hiccup in setting up the class programme. One teacher felt that this could be managed if the teachers looked at it with the class team (therapists and teacher).

> *Combination of new staff and new children every year takes a little while to settle down and then they need to understand what the programmes are, whats available, what they need to have, where the computer should and then the access and position of the kids, once this gets sorted out and then must look at the IEP goals. lets really see what we have got, what do the children actually respond to this and they all respond to things differently, it is integrating together-IEP goals, computer use and curriculum (a).*

Another teacher expressed that learners with very high needs do not require sophisticated computers but just basic operations.

> *You just need a specific computer designed for special needs children to run a particular programme. You need something more than a toy and not so much sophisticated, that level of sophistication you don't need. I think there is still the idea that computers can do all these things plus a child can use it and there is some problem in that area...I really think it is a very good tool but can be made easily accessible to students with very high needs with new set up...(k)*

5.13 SUMMARY

This chapter outlined the results of the second phase of the research. Teachers believed that the computer was a 'wonderful' and good tool for learners with very high needs, but not all teachers had positive experiences using it in their class. Characteristics of the teacher play a big role because it is the teacher who makes a huge difference and the enthusiasm shown waives to others in a positive manner. Teachers expressed their views on integrating computers into the class programme wherever and whenever possible but also felt that it depended on the learner's ability.

Teachers relied on colleagues and catalogues for selecting software. Some did not receive any support but were self motivated to search for appropriate software. All teachers except one were confident and competent users of computers and attributed this to in-service training, courses, or self motivation. Regarding the role teachers took when using computers with learners with very high needs; this fluctuated from tutor to facilitator as the situation demanded. Though teachers felt that looking for computer resources was time consuming, they looked at it positively, and managed it well by finding the time to do it. They felt training would help them to overcome the fear of using technology. Teachers had a good vision of future possibilities of using skills learnt by learners with very high needs. Thus, in general, teachers held the view that though there are certain negative aspects, the positive outcomes overshadow the negatives.

CHAPTER 6

DISCUSSION OF FINDINGS

6.1 INTRODUCTION

Technology is universal. People with disabilities and people without disabilities both use some form of technology. Everyday tasks are now completed in a systemic manner because of technology. Learners with very high needs are confronted daily with multiple mental and physical challenges. Trying to meet and accommodate the challenges of teaching learners with very high needs requires the use of numerous teaching strategies, techniques, special equipment, technology, assistive devices and materials. Teaching learners with very high needs how to use technology requires a collaborative effort of several professionals in the field of special education.

Teacher perceptions revealed that there is a place for effective use of ICT (computers) for learners with very high needs and a place for integration of it across the curriculum. Basic skills have to be taught so that a foundation is formed for students. Continuous learning should be modelled for students especially by teachers, whose role has evolved into that of a facilitator. This chapter discusses the results of both the first and second phases of the research which gives an overview of the nature and extent of computer use by learners with very high needs, the perceptions and opinions of their teachers regarding its usefulness. Beliefs, attitudes and practices of respondents who use computers with very high needs learners are also reported.

6.2 NEEDS OF THE LEARNER

All the learners identified in this study have been verified as very high needs under Ongoing Reviewable Resourcing Scheme (ORRS). The Ministry of Education ORRS Guidelines (2006) shows that this scheme is for students

verified with very high or high needs at the time of application and where it is clear they will continue to require the highest level of specialist support until they leave school. The Ministry of Education Assistive Equipment Guidelines (Ministry of Education, revised 2002) states that school students with special learning needs are eligible to be considered for assistive equipment funding if they are supported through any of the Special Education initiatives.

The findings from this study showed that 67.9% of learners use adapted devices and 32.1% of learners do not use any adaptive devices to access the computer. A large percentage of learners (97.8%) required support to access a computer, of which 65.2% of learners required very high and high level of support. Learners in this study ranged from six years to twenty two years old. The mean age was fourteen. Out of fifty three learners, twenty three were under and twenty three were above the age of fourteen. Learners (47.2%) in this study had disabilities in three areas of which 43.4% of the learners had physical disability as the main area of disability. Intellectual disability was the next most common main area of disability among the learners. This could show a big picture of the visible usefulness of using the computer for learners with very high physical needs to access the curriculum. McGregor and Pachuski (1996) also found that largest population of learners using assistive technology were learners with physical disabilities.

6.3 COMPUTER

Used by

Depending on the particular disability, there are various software and hardware devices which provide alternative input systems. Teachers suggested that once appropriate access has been provided to the computer, these students function as equals and their disability vanishes. This supports the idea of Edyburn, (2000) and Lahm et al, (2001). Services and funding for school students with high special education needs (Ministry of Education, revised 2006) states that in the education context assistive technologies may include 'low-tech' or 'light-tech'

devices such as a communication board and 'high-tech' devices such as complex modified computer-based system and the use of assistive technology supports students with the Essential Learning Areas and Essential Skills of The New Zealand Curriculum Framework.

Duration spent using computers:

The time spent per day by the sample of learners on a computer ranged from less than 10 minutes to more than one hour. Only a very small percent of learners (3.8%) spent more than an hour using computers whereas 96.2% of learners used computers on an average for less than 60 minutes. The majority of learners used it very sparingly, less than an hour and in some cases less than 10 minutes (13.2%). Teachers expressed that the time spent on the computer depended on the learners' ability and motivation.

The computer as a tool:

Computers offer infinite patience, learner control (Schnackenberg & Sullivan, 2000), immediate feedback (Meskill & Mossop, 1999), multi-sensory interaction (Fletcher, 1990), and a non-threatening learning environment (Meskill & Swan, 1997). In an ICT environment teachers and students work as partners with the result that they complement each other and this helps in easy adaptation of teaching and learning processes to meet the student's needs (Ballantyne,2004). This will assist students to develop a positive self-esteem.

Ryba and Selby (1995) state that, "Technology provides a means of communication and information for students that enable them to become capable learners" (p.156). Ryba and Selby outline that a child has to have skills in four areas- motor skills for control of input, sensory skills to recognize feedback, cognitive skills for understanding cause and effect, and social skills to interact with others in the environment. The effectiveness of computers is heightened when combined with communications. Apart from the simple user domains of data input and output, computers provide a source for information and communication

(Meadows, 1998). Teachers in this study used computers mainly for communication and motivation because the challenge of teaching learners with very high needs (intellectual) is to keep them motivated as their attention span is less (Male, 1997). Computers were also used for entertainment, as training tool, to calm down learners who get stressed or agitated and practicing skills- fine and gross motor skills.

Social nature:

Much literature highlights the computer as an effective socializing tool (Curzon, Selby & Ryba, 2005; Huntinger, Johanson, & Stoneburner, 1996; Mason, 1996). It not only promotes interpersonal skills (e.g. working alongside other students and being able to wait for their turn) for social development but also promotes co-operative learning, which in turn helps students to understand interdependence-positive ways of depending on one another (Curzon, Selby & Ryba, 2005). The findings from this study support this. Having said that, 75% of learners worked with someone, either a teacher (50%), a teacher-aide (16.7%), or a Therapist (8.3%), this according to Prochnow, Kearney and Carroll-Lind (1999) is not encouraging social interaction but exclusion from peers. However, the findings from this study suggest that it led to both social interaction and isolation depending on the ability of the learner and the type of activity they do, and the isolation was mainly seen as being due to the learners' individuality and the solitary nature of the task.

Curriculum:

Teachers who took part in the study used the computer mostly for curriculum areas, like English 72.23% (which included mostly language, spelling, reading, written language), Mathematics 16.67% and communication and information 11.12%. Teachers were also utilizing the computer not only in social studies and science but also in other areas of curriculum and are accessing the internet to create resources contrary to the findings of Green (1997, cited in Kearney, 1999). Computers were also used for skills like: cause and effect (16.75%) followed by

listening (14.21%) and choosing (13.2%). Looking at these findings, it appears that teachers who are confident and think that computers do support learners to a very large extent push themselves out of their comfort zone to find resources to help access the curriculum by adapting the information to the learner's ability level.

Teachers in this study expressed that integration of ICT teaching and learning across the curriculum is definitely possible and would have positive effects on student engagement and student learning outcomes which concurs with the statement in MOE, 2006, (pg 14.of Enabling the 21st century Learner). *Quality Teaching for Diverse Students in Schooling- Best Evidence Synthesis* draws upon research from overseas and New Zealand about effective teaching across different curriculum areas with students of different ages. Included in this research is evidence that ICT usages must be integrated into the pedagogical practice across different curriculum areas (Alton-Lee, 2003).

Technology that is well integrated into the curriculum proves to be useful as a tool for learning. The study shows that teachers have tried integrating into regular programmes and have succeeded but did face some barriers like confidence and developing their own ability, getting other teachers on board, getting teacher aides, being dependent on occupational therapists and finding time to update programmes to match the topic. However in some cases integration with regular class programme was not very feasible, either due to the day routine, the behaviour of learners or getting teacher aides as learners need 1:1 attention. Hence using technology was a daily routine for some teachers, but for others it was a major task because, by their own admission, they were not computer savvy or due to the routine in class. Thus there was a mismatch between what they would like to achieve with their learners and what is realistic on any given day. Insertion of ICT into the curriculum in small steps, supported by Savidan (2003) may be a wise step to take prior to attempting full integration throughout other learning areas.

Teachers felt that it is the teacher attitude, the professional development they receive, as well as the access to available resources and support that makes appropriate integration possible as found by Hadley and Sheingold, (1999).

Assistive technologies:

The wise use of assistive and computer technologies can significantly reduce the impact of disability at levels, like, impairment, activity and participation (Curzon, Selby, & Ryba, 2005). Special educators and speech therapists use numerous teaching techniques and teaching strategies to instruct students with disabilities. Technological equipment and special needs equipment, electronic switches, enabling devices, and communication devices are selected based on students' abilities. This study showed that 67.9% of learners use adapted devices and 32.1% of learners do not use any adaptive devices to access the computer. The common devices used by learners were: switch devices (41.82 %), touch screen (10.91%), adapted keyboard (9.09%), head wand (3.64%), braille keyboard (1.82%), and others (9.09%).

Assistive technology support involves a team of people including the student, teacher assistant, classroom teacher, onsite disability support teacher, district support teachers, therapists, parents and carers (Casimir, 2001). Teachers in this study said that they depended on the occupational therapist for switching devices and the physiotherapist for positioning to use the technology effectively. This support works most effectively when a collaborative practice model is endorsed by all members of the team (Lahm & Sizemore, 2002; Male, 2003; Shuster, 2002).

Software:

Computers have been called "freedom-givers" because well designed software programmes are truly interactive and can provide students with individual attention and continuous feedback (Scherer, 2003).

Teachers generally used software that helped learners work on different skills. Teachers used software prepared by an Inclusive Technology Company. A few teachers in this study supported the use of commercial packages as they believed them capable to cater to the learners' ability and level. They would like more software programmes made as the time available for teachers to make resources is not enough, this differs to the findings of (Curzon, Selby & Ryba, 2005) that the demand for commercial specialized packages appears to be declining.

Teachers rely on experts to produce quality instructional materials for classroom use with the assumption that these commercial products have been properly designed, developed, and evaluated (Williams, Boone, & Kingsley, 2004). However, this is not necessarily the case (Shiratuddin & Landoni, 2002; Sugar, 2001). The majority of teachers in this study concur with this because it is difficult to find age appropriate programmes, and there is always a danger of not fitting into the specific requirement of the learner.

With new computing technologies, instructional tools can be developed that are not only effective and flexible, but also motivating to students (Lindsey, 2000). This could be seen in this study where some teachers said that they prepared their own resources using PowerPoint to individualize the programme for the learner to help them achieve their goals in the long run. Specialized software is now bridging the gap between regular software and special requirements. Teachers felt that making resources helps to individualize the programme to the learner's needs, level, ability and goals to achieve and can now create individualized learning resources if they were equipped with a digital camera, regular multimedia software, patience and creativity as pointed out by Curzon, Selby and Ryba (2005)

Teachers identified a number of important characteristics when selecting software for learners with very high needs. Ease of use, or the software being user-friendly, was the characteristic mentioned most frequently. This finding is highly consistent with those found by Haugland (1997). Other important characteristics include colourful graphics and reinforcing sound, fun and entertainment, and developmentally appropriate. It is noteworthy that when teachers evaluate programs, they are primarily searching for software that is developmentally appropriate. In fact, teachers indicated a desire for more developmentally and age appropriate software to be designed for learners with very high needs.

Individual Educational plan:

Every learner had an Individual education Plan (IEP) and a computer was incorporated into it either as a goal or as a strategy for achieving learning outcomes. IEPs outline the student's goals and the time, in which those goals should be achieved, it also describes the teaching strategies, resources, monitoring and support, and the evaluation required to enable the student to meet those goals (Ministry of Education, 2005). Learners (34%) had computer as a goal in their IEP and 76.9% of learners used computer only as a strategy to achieve the learning outcomes, these numbers are not very encouraging. Copenhaven (1998) stressed that computing technology can be easily implemented in the IEPs and evaluated for the effectiveness of technology integration during the evaluation process of the IEP. However, the findings in this study show that only 34% of learners have it as a main objective in their IEP and others use it as a strategy to achieve the outcome so not much evaluation is done regarding the effectiveness of using the tool.

Assessment:

We need to know if these investments are making a positive difference for students with high and very high needs and how can we do better. The study showed that the computer did not play a very formal part in assessment for

learners with very high needs, teachers generally used computers as a tool which could help them observe the learner at work to know their grasp of the skill or level they are working at. Continuous assessment for learners with very high needs, using computer was relatively very low when compared to the use of it in teaching a skill. This is supported by Woodward and Cuban (2001) who pointed out that technology used for assessment has been ignored in special education. If students are to be learning in such environments, creative means of assessment will be needed as suggested by McGregor, Halvorsen, Fisher, Pumpian, Bhaerman and Salisbury (1996). This requires ongoing development and implementation of appropriate monitoring, assessment, and tools that will enable educators to modify and improve their current practice (MOE, 2006, pg.18). However, this study is not focused on assessment and recommendations for research into appropriate assessment are made in the following chapter.

6.4 TEACHER

One of the remaining concerns of educators of students with disabilities is the uncertainty of how much information students are actually receiving and comprehending (Ehrmann, 2000). A vital component of education is acquiring knowledge. How well students use knowledge could indicate how well they understand the material. How ICT teaching and learning takes place is primarily left up to the teachers' choice. Cuban (2001) and Brown (1998) pointed out that the teacher is the gatekeeper to student learning and makes the difference.

Role

Hill and Letham (1999) stated that, "The aspect of any classroom which has the most power to influence the learning process is the teacher" (p.28). The role of the teacher has decentred so that the teacher is now regarded as an expert learner, as outlined by Muffoletto (2001), Savidan (2003), and Schuck (2001). Teachers are experts in learning, but cannot be experts in all aspects of ICT as the field of knowledge is extensive. Although current pedagogy supports collaborative learning, teachers in this study feel that some teacher-directed

learning is needed at times to convey 'best practice' of skills in the most efficient manner. They have also said that their role changes based on the programme, needs and ability of the learner which concur with what Loveless (1995, cited in Loveless, DeVoogd and Bohlin, 2001) highlighted:

> *There is a variety of research evidence that teachers do alter their roles and ways of working with it, from shifting management and control of the activity to the children and computer, to varying the nature of the interventions according to the technical experience and cognitive needs of the children (p.150-1).*

Teachers as facilitators of knowledge rather than providers of knowledge was a common theme in the findings of this study and consistent with findings of Leis (2005). They also strongly supported the role of teacher as tutor, then of facilitator. When they were asked about their use of technology and their role as facilitators, they appeared to think deeply about their teaching practices and to become more aware of the significance those practices brings to their students.

Type

Teachers can transform their teaching role through deliberate and considered use of ICT (MOE, 2006, pg.10). Seeing the responses, teachers in this study could be placed in two groups, one for and the other against this statement. Teachers who supported that the use of ICT could transform their teaching role as learners started accessing the internet to get information, and the teacher steps back to let them take control and develop cognitive abilities. This helps in building on their strength and skills and no matter what programme learners are working on, they always learn from it and with it. On the other hand, teachers who do not support this are of the opinion that ICT is just another tool for learners with very high needs which supports the finding of Lai, Pratt, and Trewern (2001) that "by and large technology was used to support existing teaching styles" (p.50) and in some cases, not necessarily the right tool. Hence, they felt that using ICT

need not transform the teaching role because they would much the same even if they do not use ICT.

Beliefs

Ertmer, Conklin, and Lewandowski (2003) pointed out that even the best ideas about using technology will remain unused unless and until teachers believe that they are capable of implementing them in the classroom. In particular, teachers' beliefs about their ability to use computers in instruction may be the key in determining behaviour (Becker, 2000; Christoph, Schoenfeld Jr., Leis, 2005 & Tansky, 1999).

There needs to be recognition of the role of beliefs about the place and purpose of ICT education for learners with very high needs. 'Technology doesn't change practice; people do'- as their knowledge, understanding, skills, beliefs and goals change (Loveless, DeVoogd & Bohlin, 2001).

The findings in this study showed that teachers looked at it as a versatile tool; when talking about the wisdom of using computers for learners with very high needs, they were all positive except three teachers who had some doubts about it for their learners. They saw it as a very useful, excellent and powerful visual learning tool (Bereiter, 2002; Harasim, Hiltz, Teles, & Turoff, 1995). One teacher noticed a positive difference in learner's behaviour which supports the finding of Wetzel and Thormann (2001) that technology could overcome problematic behaviour patterns in severely disabled students, especially the ones who had difficulty in integrating with other students. Teachers had personal experience of working with learners with very high needs and computers; they had seen learners with different areas of disability enjoying and learning from and with computers. They were surprised at what the learner could achieve when using computers.

Confidence and Competence

Teachers are experts in learning, but cannot be expected to be experts in all areas, especially in the area of ICT since this field of knowledge is huge, and continually expanding. Once teachers acknowledge this, the fear or shame of knowing less will disappear (Wentworth, 1998). However, a significant number of teachers believe that the 'basics' should be taught before students are left to explore on their own. In addition to the teacher's role evolving, schools are referred to by the Ministry as a "community of learners" (MOE, 2002, pg16). Hence we are all a part of this continual learning process. With regard to computer use, self-efficacy is influenced by a synergy of confidence and skill (Joo, Bong, & Choi, 2000); that is, it is difficult to be confident using CT without a given skill level, and it is difficult to acquire a high skill level without some degree of confidence (Snoeyink, 2000, cited in Ertmer, Conkiln,& Lewandowski, 2000).

Effective teaching for all students will depend on teachers becoming confident and capable users of ICT and understanding how to integrate ICT effectively into their teaching practice. In total 84.3% teachers have rated them as very competent or competent when compared to 78.9% of teachers who rated themselves as being very confident and confident. They felt that they had the necessary skills to effectively make use of computers for learners with very high needs. Though teachers felt confident and competent, they still suggested that ICT personnel or lead teachers having a high level of ability in the field of ICT could be utilized to assist other teachers and encourage the use of computers and the integration throughout all curriculum areas. This is supported by the suggestion of Ballard (2000) to use 'lead teachers' or ' master teachers'.

Benefits of the use of computers for learners with very high need learners have been outlined by various researchers and teachers. However very few of them still do feel that using ICT for very high needs learner is not effective and it depends on the ability of the learner. This was disappointing since it is teachers who need to model ICT learning so that learners are encouraged to use them for

the sake of both their current and their future students. Not every child starts out enthralled with the computer. Their interest must be nurtured with the correct choice of computer software.

Atkins and Vasu (2000) found that most experienced teachers trained before computers were used in the classroom which means that they have no models of effective technology integration in their content areas. However, this was not so with teachers in this study. Teachers said that confidence and competence could be developed by spending time learning programmes, training (Becker, Ravitz, & Wong, 1999; Chin, 2000), talking to colleagues, knowing learners' interest and ability (Levande, 2000; Winn and Blanton, 1997) and getting over the barrier that learners cannot learn from computers, working with a peer who could help when stuck (Haugland, 1999; Male, 1997; Meskill, Mossop, Diangelo, & Pasquale, 2002), attending courses to up skill themselves, by surfing the web (Anderson & Speck, 2001).

Computer use in class

The frequency of computer use among teachers in this study was consistent with the research by Jaber and Moore (1999). Most of the teachers reported that they used computer technologies 'occasionally,' and only a small percentage of teachers reporting extensive use of computers (Cuban, Kilpatrick & Peck, 2001). This study found that teachers use computers more often for informative and purposes like the internet. This finding was consistent with Becker, Ravitz and Wong's (1999). In fact, all teachers in this study reported using computers for learning skills like communication, cause and effect, choosing, and identifying for which computer is written as strategy in the learner's IEP. Hence, this does not support Cuban et al.'s (2001) claims that computers may simply maintain existing instructional practices that traditionally focus more on transmitting information, but these skills reported by teachers are pre-requisites for being independent and to control their immediate environment (Lilley, 2001).

Usefulness of the computer

Teachers agreed that the use of computers was a very good motivational tool and helped learners to a great extent as it has been a challenge to keep the learner motivated to learn. The computer as a teaching /learning tool was next in order of usefulness, followed by adapting the curriculum. These roles are well documented by various researchers like Male (1997), Marr (2000), Sivin-Kachala & Bialo (2000). Survey data showed that teachers perceived that computers do encourage social interaction (Epstein, Willis, Conners & Johnson, 2001) but it was not with peers. On the other hand when data was analysed after interview, it was clear that the teachers in this study considered that working on computers led both to interaction and isolation depending on the activity and learner's ability. Literature points to the fact that teachers use computers as an alternative way to develop isolated skills (Raskind, Herman, & Torgesen, 1995) which concurs with the findings in this study. Teachers have pointed out that they use computer as a strategy to develop skills like choosing, cause and effect etc to give the learners some amount of independence and control of their environment. They also looked at the computer as a multisensory tool that provided different stimuli and sensations for the learner to access curriculum, communicate and learn in their learning style.

Drawbacks of computers

Teachers did not see computers as all good. In particular, such attitudes indicated that there were identified downsides to computers which must be understood alongside the positive aspects. These included difficulty finding suitable adapted hardware and age appropriate software (Au, 1996), the teachers not having enough training to select software (Hutinger et al., 1996; Lesar, 1998) and use adapted devices, having enough teacher aides as learners with very high needs require 1:1 support most of the time. Finding the time to keep abreast of the rapid growth of computer technologies and effective strategies to use them was mentioned frequently by teachers (Judge, 2001).

Though the teachers in this study concur with this, they felt that individualizing programmes according to learner's need and ability was more time consuming than experimenting with new techniques. Literature points to the different benefits of using computers like developing skills, motivation, on-task behaviour and so forth. Having said that teachers found that learners can get over stimulated, become obsessive and the progress seen can be very small. Hutton (1997) describes that successful use of computers can be hindered by lack of training of classroom teachers, a lack of funds to buy software and computer peripherals, a lack of maintenance. This is concurred by teachers in this study. Hence the picture has not changed till today, this may be due to fast changing nature of technology.

6.5 SUPPORT

Ryba (2005) points out that when students are given computer and appropriate enabling software, students with disabilities are able to perform at a higher level than expected. Balandin and Sweep (2005) stress that teachers require ongoing training and support to ensure that they can use technology and facilitate the student's participation in the academic and social environment of the school as student's needs may change with experience, maturation or with developments in the fields of technology.

6.5.1. Training:

Ward, Parr and Robinson (2004) stressed that teachers need to feel better prepared to use computers in the classroom and to see clear advantages in doing so. Therefore, a broader pedagogical approach to ICT professional development is needed along with skill based training. 'One-size' fits all workshops can be seen as deficit model. Cuban (2001) argues that unless teachers are able and willing to change their teaching practices and adapt to new technologies, continued expenditure on ICT will have little impact on student learning and classroom practices. Teachers felt that being self motivated encourages them to fully participate in the integration of ICT, including gaining

the requisite skills which is consistent with the findings of Ward, Parr and Robinson (2004) and Leis, (2005).

General use of the computer:

In this study 68.4% of teachers received training in general use of computers and 31.6% of them did not receive any training. For those who received the training, this was provided by Education services, in-service and other service providers. It is generally accepted that as teachers gain experience with computer technology, their use in the classroom evolves into using more computer applications, more often and more flexibly (Ertmer, Addison, Lane, Ross, & Woods, 1999; Marcinkiewicz; 1996). Recent studies, however, have raised questions about whether teachers' computer use tends to support existing teaching styles (Cuban et al., 2001). All teachers in this study had some training either through school or through private agencies. Teachers felt that training did help them to use computers with learners with very high needs directly or indirectly. Confidence in using computers has helped them develop the confidence to use it with learners with very high needs, and adapt programmes for learners and making portfolios for learners.

Specific use of the computer:

Teachers (92.3%) said that they were confident in assisting learners to use them and 5.1% were not. 53.8% of teachers did not receive any training to work with the software the learner was using whereas 43.6% received some training. Teachers had a training session in using Clicker 4 and for other software, the training ranged from 5 minutes to half a day. This training was provided by the Occupational therapist who recommended the software. Teachers suggested that developing confidence and competence in computer skills, getting trained in the respective software and hardware required for learners in their class (Mills, 2001; Sugar, 2001), and having an opportunity to see what is available and adapt it to the learners' needs (Joyce & Weil, 2000) and the access to the computer for their learners would help teachers working with learners with very high needs.

Software and resource making:

In addition to appropriate goals for computer use and sufficient staff training, beneficial use of computers is dependent upon appropriate software selection. Choosing good software from the vast array that is available depends upon the salient features of the software, the goals planned for computer use, and the children who will be using it. The research points out teachers need to develop skills with specific software (Murray & Campbell, 2000; Roder, 2001). Many teachers said that they would look at the ability of the learners, and some said that they looked at what has been loaded on to the computers by school and use them according to learner's needs. Teachers relied on colleagues and catalogues. Some did not receive any support but were self motivated to search for appropriate software, 64.9% of teachers were recommended the software used by learners and 35.1% were not given any recommendations. 26.3% teachers were trained to make their own computers resources that could be used by learners, compared to 73.7% who did not receive any such training.

6.5.2 Planning:

Equally important, training should include not only how to use the technology but how to effectively integrate these tools into the existing curriculum (Judge, 2001). The absence of a systematic policy and proven planning strategy can also hamper teachers' efforts to incorporate computers into the classroom (Cuban, 2000; Morton, 1996). Although teachers felt comfortable using computers, they wanted more training, specifically in the integration of computer technology into meaningful activities of interest and relevance to the learners (Cunningham & Coombs, 1997; Stevens & Lonberger, 1998). It is one thing to have learners use computers and an entirely different matter to integrate computer technology into a variety of curriculum content, including play, art, music, daily activities, and emergent literacy. Teachers in this study revealed that they had no such support and it was left to them. Being self motivated and keeping the learner's benefit in mind, teachers have often called on the expertise of a therapist for ideas and

suggestions. This raises the question for future research- has true integration of ICT into the classroom happened? Because the difference between ICT integration and ICT use is that integration connotes full-time, daily operation within lessons (Hooper & Rieber, 1999).

6.5.3 Assistive technology:

Hutinger, Johanson, and Stoneburner (1996) presented a case study report on a 3-year project examining the use of assistive technology with fourteen young children with severe disabilities. Planning, staff training, lack of smooth transition in placement moves, and a lack of integration of the technology into teaching plans and curriculum were discussed, concluding that "major changes in the technology practices of staff and administrators are needed if the schools are to make use of the potential of technology for children with disabilities" (p. 33).

One group of teachers in this study felt that training would help overcome the fear of using new technology whereas another group felt that it was more of hands on experience, hence training was not necessary. A session with an OT would be enough to know about the equipment, but research says that to successfully use assistive technology, it is recommended that professionals "acknowledge the complexity and interaction of the issues relating to [assistive technology]" (p. 15), and consider the impact of values and perspectives of the all stakeholders who work with the user (Todis & Walker, 1993, cited in Fields, 1999). Regular updates on the various adaptive devices were received only by 26.3% of teachers as opposed to 65.8% of teachers who received none or were not applicable 7.9%.

Teachers expressed that they also learn by watching their colleagues work or try themselves as highlighted by Lipnack and Stamps (2000) that willingly and openly sharing acquired skills, knowledge, expertise, and opinions with constituents can build a stronger relationship among teachers.

6.6 TEACHER'S EXPERIENCE

Interestingly none of the teachers who were interviewed questioned the presence of computers in schools. There appeared to be silent agreement that computers offer something of value to students. The silent concurrence that computers have a reason to be in schools reflects the purposefulness of their role. The teachers did not seem to have difficulty holding contradictory beliefs about computers and were comfortable with the pairing of positive and negative qualities. The most salient finding from the interview data was the connection between teacher attitudes and prior experience. As with the survey data, these teachers revealed a relationship between their prior computer-related experiences and their current attitudes and opinions about their use. It was clear that many of the teachers had developed their attitudes and opinions about computers from their past experiences, consciously or perhaps unconsciously.

Another variable that surfaced in the views expressed by the teachers was funding. This was not originally addressed by the research questions in the study. Literature shows that funding remains the single greatest barrier to the acquisition of assistive technology (Male, 2003).

As learners with very high needs require 1:1 support, a large number of teachers in the survey indicated their belief that if paraprofessionals were also trained along with teachers, they could assist teachers with technology use in the classroom. This would also give more time to teachers to plan their lessons with technology assistance. Apart from these, the frustration of lack of knowledge, placement of computer in class and positioning of learners and necessary equipment also challenged teachers.

For the questions relating to special educators' perceptions on the future of computing technology in special education, the response from the teachers

was promising with most of the teachers believing in its potential. Teachers considered that ICT teaching and learning is required for students' current and future roles as learners, for future use in employment and future for use in society as told by Le Court (2001).

6.7 SUMMARY

This chapter discussed the results of both the phases of the research. It has highlighted the themes that have emerged. It provided a detailed analysis of the nature and extent of computer use by learners with very high needs, the beliefs and practices of teachers. Teachers appear confident and competent in facilitating learning even though they have not had specific training in their use. Teachers do understand the role of the computer as socializing tool, but the needs of certain learners does not make it conducive for them to use it and hence they feel that learner's limitations must be taken into account for computer use.

The time spent on the computer by learners with very high need ranged from 10 minutes to an hour depending on the learner's level, interest, ability and behaviour. Teachers were confident that computer use could be integrated into all curriculum areas and various adaptive devices used, but stressed the need for proper planning. Teachers felt that they had to change their role depending on the learner's needs, and that they used computers for developing isolated skills written in the learner's IEP.

All teachers indicated a high interest level in the future of ICT education for learners with very high needs. While this discussion has highlighted significant factors to the researcher, caution must be exercised in drawing generalizations from results. The results and discussion may highlight for the reader the ways in which computers and teachers might accommodate the needs of learners with very high needs in special schools.

The final chapter will look at the research objectives and evaluate these. The implications of the study will be discussed and some suggestions for future practice and research will looked at.

CHAPTER 7

CONCLUSION: WHERE TO FROM HERE?

7.1 INTRODUCTION

This research began by asking whether ICT, especially computers are effectively used by learners with very high needs. It also investigated teacher attitudes and beliefs in the effective use of computers for learners. Despite continuing debate surrounding the topic, the answer has emerged that computers could be used effectively for learners with very high needs. However, more significantly, the importance of training, time, and appropriate software for the learners has been revealed. Pedagogy has emerged where teaching and learning occur side by side. It is a time where learner's specific needs are kept in focus all the time. There is so much knowledge out in the world, that we as teachers can never be expected to know it all. Instead, teachers are evolving as expert learners, learning, and guiding students as they learn how to learn. Learners are able to work in a co-operative manner, and this freedom and choice creates in them increased motivation and independence to learn more (Ryba, Curzon, &Selby, 2005).

Although many interesting findings, specific recommendations and implications have resulted from this research, it must be kept in mind that this study is only a part of the ongoing journey towards continual improvement in ICT (computers) for learners with very high needs. New and improved ICT technology will help in more effective ways of teaching and learning as teachers self efficacy improves.

The issues to be focused are:

- Did we find what we wanted to find?
- Implications to Practice
- Limitations and strengths of the study.
- Future Direction: Research.

7.2 DID WE FIND WHAT WE WANTED TO FIND?

This study set out to examine how computers are used to cater for the needs of learners with very high needs in special schools, and in particular, the beliefs, experiences and practices of teachers about the effectiveness of using computers as a tool. This study was not designed to judge teachers; as a field practitioner as well as researcher, I acknowledge the challenges and difficulties faced by the teachers.

The aim was to gather information on the use of computers by learners with very high needs and document the beliefs that teachers have about the use of computers for learners with very high needs. It is hoped that the findings from this research would prove useful to teachers and learners by highlighting ways in which the teacher, the computer, and other associated accessories like assistive technology, relevant softwares might accommodate learners with very high needs in accessing the curriculum. This study also aimed to highlight factors like the beliefs, values and practices of teachers who used the computer as an effective tool for learners with very high needs.

The study was successful in identifying a sample of teachers who had learners with very high needs in their class and who used a computer. A wide range of information was gathered regarding each learner's level of need to access curriculum, area of disability, and beliefs of the teachers about the effectiveness of using computers for learners with very high needs through the use of a questionnaire. However, this could not give in-depth information as teachers may not have described beliefs and portrayed practices well within the limits of a written questionnaire. But, it did give information, on perceptions of their practices.

Interviews were used to gather the views of teachers', their beliefs, understandings and their practices, however, these interviews may not have obtained the real beliefs of the teachers. Some teachers could have said what they thought was appropriate. A number of thoughts surfaced that may be useful as stepping stones for future research and practices in computer use for learners with very high needs. It is evident from the quotes provided that teachers generally desire to provide support that is effective and appropriate and know that using technology is the way for 21st century learner.

However, in drawing final conclusions from this study, it must be acknowledged that there remains an issue around use of computers for learners with very high needs. Looking at the question posed by the research, we know there is an issue, as it cannot be said that all learners with very high needs are using computers effectively which could be due to teachers' attitudes to learners' limitations. This does not imply a judgment on the teachers, for the research reinforces how much teachers try to implement ICT in all areas of curriculum, and the frustrations that they may face on many levels. Rather, it is the hope of this study that by bringing such issues to light, solutions may be found, and the teachers and schools be better equipped to deal with the challenges that they face.

The results show optimism; the developing climate of partnership between teachers, computers and learners with very high needs are bringing changes in the pedagogy. It could be said that as this continues, teachers will have more positive experiences, and will develop a greater sense of competency and confidence, with concerns lessening, creating a positive movement onwards, and eventually leading to more usage of computers effectively for all learners with very high needs.

With the Government initiate *Enabling the 21st Century Learner: an e-Learning Action Plan for Schools 2006-2010* (MOE,2006) and further implementation of

the strategies from the *Special Education 2000* policy the next few years in ICT education looks to be exciting and progressive. As these policies are translated into practice, with accompanying finance, the future looks good for all learners in New Zealand.

However, the journey is an ongoing one, and there are some areas that need to be addressed before it is said that all learners with disabilities are using computers to achieve their potential. It appears that teachers have taken on board the importance of computers for learners with very high needs, but still need to develop skills, confidence, and an attitude that learners with very high needs can access curriculum through computers as well as dealing with challenges that may surround it.

7.3 IMPLICATIONS FOR PRACTICE:

A vital point that was highlighted by the research is that computers could be a versatile tool for learners with very high needs. Without exception, all teachers who were interviewed agreed that computer was a useful learning tool for learners even though few teachers did think that although it was a good tool, it was not necessarily the right tool for the learners in their class. If teachers were given more support in terms of planning and teaching, a climate of computer use would be established and encouraged.

In view of the fact that proficiency was associated with regular use across all the computer applications, it is recommended that teachers may be provided with technology training sessions that include actual hands-on training to develop their use of computer applications. Since non-availability of timely technical support also influenced current use of computers by teachers, the training could include an element of technology use that provides simple troubleshooting skills to teachers to make them less dependent on the ICT personnel or OT for minor problems and more skilled in managing the available technology in their classroom.

The Computer as a tool for promoting social interaction among peers is highlighted in the literature. Teachers in this study have perceived the computer's role in this aspect but due to the learner's limitation or need level haven't promoted it enough. This should be given more thought, for example the learner could join a group to play games (use switch device).Consideration must be given to software that encourages social interaction.

Research on providing opportunities for networking between experienced and novice teachers may provide further knowledge in this area, since some of the teachers found the training too basic while others had no training at all and many of them depended on assistance from colleagues.

Accessing appropriate software was an area of problem for teachers. Teachers have looked at catalogues and have tried making individualized programmes but it is time consuming. Software loaded on the computer by the school helps the teachers to a certain extent, but it appears that teachers are forever looking for age and developmental appropriate software. Hence there is a need for ongoing assessment of software needs for the learners and this must be associated with the necessary training to become proficient in using it with learners with very high needs.

Periodic evaluation of existing training programs with a focus to provide all teachers with training that will allow them to step back into the classroom more confident and skilled in using technology will be helpful, or the training could happen in the classroom. As many of the teachers expressed the belief that technology can be implemented into the school curriculum, training in technology use could address curricular needs, giving the teachers actual examples and practical guidelines to transfer to skills learnt at training into the classroom.

An IEP outlines the student's goals and the time, in which those goals should be achieved. It also describes the teaching strategies, resources, monitoring and support, and the evaluation required to enable the student to meet those goals (Ministry of Education, 2005). Copenhaven (1998) stressed that computing technology can be easily implemented in the IEPs and evaluated for the effectiveness of technology integration during the evaluation process of the IEP. It would be highly desirable if all the learners with very high needs have the use of computer incorporated in their IEP as main objective or as strategy. Planning and assessment of computer use through the IEP may lead to positive effects encouraging computer use for learners with very high needs.

7.4 LIMITATIONS AND STRENGTHS OF THE RESEARCH

The purpose of this study was to document the teachers' beliefs about computer use for learners with very high needs. Thirteen teachers provided in-depth information. While this study makes no claim to be a definitive study, there are areas that could have been explored further, additional literature that could have been added, other questions that could have been asked and other interpretations that could have been made. Computer use by learners with very high needs is complex, and undertaking research into teachers' beliefs is even more complex.

It is also acknowledged that the researcher's experience as a special education teacher has probably played a role in influencing and shaping beliefs the interpretations of the data. As data collected in this study was analysed, the researcher could have been influenced by the interviews with each teacher. As the researcher made decisions about what to ask, or not to ask, and took meaning from their responses given, researcher's own underlying beliefs about computer use by learners with very high needs could have intertwined in the decision making process. Researcher's professional background and beliefs could have shaped and influenced the research questions; this could have

affected the responses given. Seale (1999) acknowledges that such a series of responses and processes form part of the qualitative research journey.

A further limitation of this study was the absence of any visual recording of teacher-learner and classroom interactions. As teachers' practices were not observed, the link between teachers' beliefs and practices was not established empirically.

What you believe does not have to be true or form a persistent part of your belief system. However, the aim of this study was to establish what beliefs teachers had about computer use for learners with very high needs and not to judge the validity or truthfulness of those beliefs. Phenomenologist might argue that beliefs held on one particular day cannot be validated or invalidated.

Sample size must always be acknowledged as a limitation when seeking to draw conclusions for a population as large as the New Zealand Special Schools sector. The findings in the study are limited to the responses of teachers who voluntarily chose to respond to the survey and interview. Thus the nature of the findings and the perceptions discussed exclude unavailable information from the teachers who did not respond, that may have influenced the results otherwise.

The strength of the study lies with each teacher and the beliefs they chose to share about-computer use by learners with very high needs. Their beliefs give us an important insight into teaching and learning for learners with very high needs.

The potential for regional differences must be acknowledged. As the study was not bound to one particular area, but to whole of New Zealand, it could have been a full representative of experiences in smaller towns and cities which has brought their perspective to the issues addressed in the study. Teachers have expressed the same views irrespective of where they come from.

The aims of this study have been achieved: the beliefs teachers have about computer use for learners with very high needs have been recorded, together with the professional development, and integration of ICT into class programme. The teachers' beliefs signal directions for future study and highlight the need to take further research.

7.5 FUTURE DIRECTIONS: RESEARCH

This study only touched a small part of a huge mountain. It would appear valuable to determine which specific factors of support achieve the greatest outcomes for teachers which in turn would help and support learners. Research should consider ways in which teachers may be empowered to develop their skills and confidence in supporting learners with very high needs in using computers.

This study focused entirely on teachers' perspectives. It is important that further research acknowledge that this is only one side of the picture, and that parents' perspective on computer use for learners with very high needs would be essential.

More teachers should do research to educate themselves about technology and to learn how using technology will benefit their students and improve classroom instructional practices. Although this study focused on the teachers perspectives of technology, additional studies could focus on student outcomes.

While there is much research surrounding computer usage in special education, there is little research concerning use of computers with students with challenging behaviours. Researchers could narrow the study by focusing on one level of disabilities such as physical disabilities or intellectual disabilities. Using a video camera in addition to interviewing teachers might add greater detail to notes and more direct observations could be helpful to future researchers.

Finally, Technology used for assessment has been ignored in special education. If students are to learn in such environments, creative means of assessment will be needed. Research into implementation of appropriate monitoring, assessment, and tools may be beneficial to teachers to help modify and improve their current practice.

7.6 CONCLUSION

All the views relating to teacher's belief in future potential, promising future, student benefits, and improved level of paraprofessional help from technology are positive, and can be summed up in this comment from the teachers: "Computers are invaluable in working with students with behavioural problems." Or "I think it is going to be the way in future and I have found that children no matter what their need level and ability, are highly motivated to use the computer".

Teachers' overall belief in the future potential of computing technology and its benefits to learners is high. Research is necessary to provide recommendations to address resolution to the barriers expressed by teachers to allow them to use computing technology to its full potential. It should also help to put teachers in special schools on an equal footing with other teachers and allow learners with very high needs to benefit from the full potential of technology. Special education teachers believe in technology, they need it; research findings are necessary to guide them in best practices.

The researcher believes that this research has provided some answers and created more questions that require further research. A research should not just provide answer, but has to ask more questions. Keeping this in mind, this study had a positive outcome.

In the words of Charity Ability:

> The technology available today to empower and enhance lives of disabled people is extensive, varied, exciting stuff- but there are no magic wands here. Nothing removes the disability itself. And the real solution takes flexibility, patience and some effort...even after the right technology is chosen.
>
> (AbilityNet, 1998:4)

REFERENCES

Abbott, C. (2001). *ICT: Changing Education*. New York: Routledge Falmer.

AbilityNet. (1998). *Computing for Life: Realizing the Potential of Disabled People-with a Little Help from (electronic) Friends*. Warwick: AbilityNet.

Alton-Lee, A. (2003). *Quality Teaching for Diverse Students in Schooling- Best Evidence Synthesis.* Policy division: Ministry of Education.

Alton-Lee, A. (2005). *Collaborating across policy, research and practice: Knowledge building for sustainable educational development.* Paper presented at the meeting of the Organisation for Economic Co-operation and Development, The Hague, Netherlands.

Anderson, R.S., & Speck, B.W. (2001). *Using technology in K-8 literacy classrooms.* Upper Saddle River, NJ: Merrill Prentice-Hall.

Au, W. (1996). Using computer technology to assist learning. In P. Foreman (Ed.), *Integration and inclusion in action.* Sydney: Harcourt Brace.

Babbit, B.C., & Miller, S.P. (1996). Using hypermedia to improve the mathematics problem-solving skills of students with learning disabilities. *Journal of Learning Disabilities, 29,* 391-401.

Balandin, S., & Sweep, A. (2005). Functional communication in the classroom. In P. Foreman (Ed.), *Inclusion in Action (3rd ed.)*, 363-393. Melbourne: Thomson Nelson

Ballantyne, L.M. (2004). *In what ways could ICT teaching and learning take place at Orewa College: Osmosis, integration and/or specialist subjects?* Massey University.

Ballard, M. (2000). *Technology Lead Teachers. Multimedia Schools.* Retrieved 14.04.06 from http://www.infotoday.com/MMschools/nov00/ballard.htm.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Barrio, C.D. (1999).*The Use of Semi structured Interviews and Qualitative Methods for the Study of Peer bullying.* Universidad Autónoma de Madrid, Spain. Retrieved March 30, 2006 from www.gold.ac.uk/tmr/reports/aim2_madrid1.html.

Bateson, G. (1972). *Steps to an ecology of mind.* New York: Ballantine.

Barry, J., & Wise B. J. (1996). *Fueling Inclusion through Technology.* Retrieved June 26, 2006, from <http://www.netc.org/cdrom/fueling/pdf/fueling.pdf>

Becker, H. J. (1999). *Internet use by teachers: Conditions of professional use and teacher directed student use. Teaching, Learning and Computing: 1998 National Survey, Report #1.* Retrieved October 20, 2006, from http://www.crito.uci.edu/TLC.findings/Internetuse/ startpage.htm\

Becker, H.J. (2000). *Secondary teachers of mixed academic subjects: "out-of-field" problem or constructivist innovators.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Becker, H. J., Ravitz, J. L., & Wong, Y. (1999). *Teacher and teacher-directed student use of computers and software (Rep. No. 3).* Irvine: Center for Research on Information Technology and Organizations, University of California, Irvine; University of Minnesota, Center for Research on Information Technology and Organizations.

Bereiter, C. (2002). *Education and mind in the knowledge age.* Mahwah, NJ: Lawrence Erlbaum.

Bottge, B.A., & Hasselbring, T.S. (1993). A comparison of two approaches for teaching complex, authentic mathematics problems to adolescents in remedial math classes. *Exceptional Children, 59,* 556-566.

Bracewell, M., & Evans, M. (1998). Where we are and where the Ministry of Education is taking us in information technology. *Computers in New Zealand Schools, Vol.10, No.2* , p.13.Dunedin: University of Otago Press.

Bronfenbrenner, U. (1979). *The ecology of human development.* Cambridge: Harvard University Press.

Brown, A., & Dowling, P. (1998). *Doing Research/Reading Research*. London: Falmer Press.

Brown, M, E. (1998). The Use of Computers in New Zealand Schools: a critical review. *Computers in New Zealand schools, Vol.10, No.3.* Dunedin: University of Otago Press.

Brown, A., & Miller, D. (2001). *Wazzu widgets*. Retrieved May 06, 2006 from http://education.wsu.edu/widgets.

Brown, M., & Murray, F. (2003). Whose line is it anyway? Alternative stories about the digital world. *Computers in New Zealand schools, July 2003.* Dunedin: University of Otago press.

Bryant, D., J., Erin, J. Lock, R., Allen, J., & Resta, P. E. (1998). Infusing a teacher preparation program in learning disabilities with Assistive Technology. *Journal of Learning Disabilities, 31 (1)*, 55-66.

Burbules.N., & Callister, T. (2000). *Watch IT: The risks and promises of information technologies for education, p.1*. Colorado: Westview Press.

Burgstahler, S. (1998). *Focus On technology*. Retrieved on April 29, 2006 from http://staff.washington.edu/sherylb/haring.html

Casimir, G. (2001). Enhancing Learning with Assistive Technology. In P.Foreman (Ed.), *Integration and Inclusion in Action* (3rd ed.). p. 360-388. Marrickville, NSW: Harcourt

Chin, J. (2000). *The role of technology in America's schools*. Washington, DC: U.S. Government Printing Office.

Christoph, R. T., Schoenfeld Jr., G. A., & Tansky, J. W. (1998). Overcoming barriers to training utilizing technology: The influence of self-efficacy factors on multimedia-based training receptiveness. *Human Resource Development Quarterly, 9*(1), 25-38.

Clark, R.E. (1983). Reconsidering research on learning from the media. *Review of educational research, Vol.53* ,p.445-459.

Cole, P., & Chan, L. (1990). *Methods and strategies for special education.* Sydney: Prentice Hall.

Cook, Tessier, & Klein, (2000). *Adapting early childhood curricula for children in inclusive settings (5th ed.).* Columbus, OH: Merrill/Prentice-Hall.

Copenhaven, J. (1998). *The provision of AT for students with disabilities.* Retrieved August 24, 2006, from http://www.usu.edu/~mprrc/Products/Assist.tech.html

Cuban, L. (1993). Computer meets classroom: Classroom wins. *Teachers college Record, 95*, pp.185-209.

Cuban, L. (2001). Why are Most teachers Infrequent and Restrained Users of Computers in their Classrooms? In Woodward, J & Cuban, L. (Ed.), *Technology, Curriculum and Professional development: Adapting Schools to meet the needs of students with disabilities.* California: Corwin Press.

Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: explaining an apparent paradox. *American Educational Research Journal, 38(4),* 813-834.

Cunningham, C, & Coombs, N. (1997). *Information access and adaptive technology.* Phoenix, AZ: American Council on Education, The Oryx Press.

Curzon, J., Selby, L., & Ryba, K. (2005). Realizing the power within: Partnerships with Information and Communication technology. In D.Fraser, R. R.Moltzen, & K.Ryba (Ed.), *Learners with Special Needs in Aotearoa New Zealand.*Palmerston North, Dunmore Press.

Derer, K., Polsgrove, L., & Rieth, H. (1996). A survey of assistive technology applications in schools and recommendations for practice.*Journal of Special Education Technology, 12 (2),* pp.62-79.

Eachus, P., & Cassidy, S. (1999). *Developing the computer self-efficacy (CSE) scale: Investigating the relationship between CSE, gender and experience with computers.* University of Salford, United Kingdom, 1-10. Retrieved May 06, 2006, from http://www.salford.ac.uk/healthSci/selfeff/selfeff.htm

Eadie, G.M. (2001). *The Impact of ICT on Schools: Classroom Design and Curriculum Delivery, p.6.* Wellington: Winston Churchill Memorial Trust.

Edyburn, D.L., & Gardner, J.E. (1999). Integrating technology into special education teacher preparation programs: Creating shared visions. *Journal of Special Education Technology, 14(2),* 3-20.

Edwards, A.D.N., & Mynatt, E.D. (2000). *Enabling Technology for Users with Special Needs.* 2000 Conference on Human Factors in Computing Systems (CHI 2000 Tutorial Notes), The Netherlands.

Ellis, E.S., & Sabornie, E.J. (1986).Effective instruction with microcomputers: Promises, practices and preliminary findings. *Focus on Exceptional Children, Vol.19, No.4,* p.1-16.

Ehrmann, S. C. (2000). *Technology changes quickly but education changes slowly: Technology a counter-intuitive strategy for using IT to improve the outcomes of higher education.* Washington, DC: TLT Group (Technology Learning and Technology.

Ertmer, P.A., Conkiln, D., & Lewandowski, J. (2000). *Using exemplary Models to increase Pre service Teachers' Ideas and Confidence for Technology Integration.* University of Salford, United Kingdom, 1-10. Retrieved May 06, 2006, from http://www.salford.ac.uk/healthSci/selfeff/selfeff.htm

Epstein, J. N., Willis, M.G., Conners, C. K., & Johnson, D. E. (2001). Use of a technological prompting device to aid a student with attention deficit hyperactivity disorder to initiate and complete daily tasks: An exploratory study. *Journal of Special Education and Technology, 16(1),* 10-32.

Fallon, M. A., & Wann, J. A. (1994). Incorporating computer technology into activity-based thematic units for young children with disabilities. *Infants and Young Children, 6(4).*

Fields, L.S. (1999). *The effects Of Technology Use by an Individual with Severe or Multiple Disabilities within the Educational Environment: A case study.* Dissertation, University of Oklahoma.

Feuer, M.J., Towne,L.,& Shavelson, R.J. (2002). Scientific, culture and educational research. *Educational Researcher, 31(8),* p.4-14.

Firek, H. (April 2003). One order of ed tech coming up... You want fries with that? *Phi Delta Kappan, 84,* 596-597.

Fisher, M. (2000). Computer Skills of Initial Teacher Education Students, *Journal of Information Technology for Teacher Education, Vol. 9, No. 1.*

Fitzgerald, G., & Koury, K.(1996).Empirical advances in technology-assisted instruction for students with mild and moderate disabilities. *Journal of Research on Computing in Education, Vol.28,* p.526-553.

Friedrichsen, P., Dana, T., & Zembal-Saul, C. (2001). Learning to teach with technology model: Implementation in the secondary science teacher education, *The Journal of Computers in Mathematics and Science Teaching, 20*, 377-394.

Gall, M.D., Gall, J.P., & Borg, W.R. (2003). *Educational Research: An Introduction,* New York: Allyn & Bacon.

Gerristen, J. (1997). IT invaluable for special needs students, *NZ Education Review,* p.37

Glaser, C.H.M., & Hasselbring, T.S.(2000). Use of Computer Technology to Help Students with Special Needs, The Future of Children ,*Children and Computer technology, Vol. 10 • No. 2 .*

Gleason, M., Carnine, D., & Boriero, D. (1990). Improving CAI effectiveness with attention to instructional design in teaching story problems to mildly handicapped students. *Journal of Special Education Technology, 10(3),* 129-136.

Gomm, R. (2004). *Social Research Methodology: A Critical Introduction.* Basingstoke: Palgrave Macmillan.

Hadley, M., & Sheingold, K. (1993). Commonalities and distinctive patterns in teachers' integration of computers. *American Journal of Education 101(3),* 261-315.

Harasim, L., Hiltz, S. R., Teles, L., & Turoff, M. (1995). *Learning networks: A field guide to teaching and learning on-line.* Cambridge, MA: MIT Press.

Hardy, C. (2000). *Information and Communication Technology for All.* London: David Fulton.

Harris, D., & Boyd, S. (1998). A Link to Learning: The use of computers by children with disabilities. *New Zealand Council for Educational Research*, Wellington.

Haugland, S. W. (1997). How teachers use computers in early childhood classrooms. *Journal of Computing in Childhood Education, 8,* 314.

Haugland, S. W. (1999). What role should technology play in young children's learning?Part1. *YoungChildren,54(6).*

Hawkridge, D., & Vincent, T. (1992). *Learning difficulties and computers-Access to the Curriculum.* London: Jessica Kingsley Publishers.

Heinich, R., Molenda, M., Russell, J., & Smaldino, S. (2002). *Instructional media and technologies for learning (7th* ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Hickson, L., Blackman, L.S., & Reis, E.M. (1995). *Mental retardation: Foundations of educational programming.* Boston: Allyn & Bacon.

Honey, M. & Moeller, B. (1990). *Teachers' beliefs and technology integration: Different understandings. Technical Report Issue No. 6.* Washington, D.C.: Office of Educational Research and Improvement.

Hooper, S., & Rieber, L.P. (1999). Teaching, instruction, and technology. In A.C. Ornstein & L.S. Behar-Horenstein (Ed.), *Contemporary issues in curriculum (pp. 252-264).* Boston: Allyn and Bacon.

Hunter, W.J. (2001). Eagle Ridge: Virtual Schooling in Alberta, Canada. *Computers in New Zealand schools, Vol.15, No.1.* Dunedin: University of Otago Press.

Huntinger, P., Johanson, J., & Stoneburner, R. (1996). Assitive technology applications in educational programs of children with multiple disabilities: A case study report on the state of the practice. *Journal of Special Education Technology, XIII (1),* 16-35.

Hutton, R.S. (1997). Computers and the child with special learning needs: Salvation or sham? *Computers in New Zealand, 9 (2),* 19-23.

Ivers, K.S. (2003). *A Teacher's Guide to Using Technology in the Classroom.* Westport, CT: Libraries Unlimited.

Ivers, K.S., & Barron, A.E. (2002). *Multimedia projects in Education: Designing, producing, and assessing (2nd ed.).* Westport, CT: Libraries Unlimited.

Jaber, W.E., & Moore, D.M. (1999). A survey of factors which influence teachers' use of computer-based technology. *International Journal of Instructional Media, 26(3),* 253-66.

Jonassen, D.H. (2000). *Computers as Mindtools for schools: Engaging Critical thinking (2nd ed.), p.4-6.* Upper saddle River, New Jersey: Merrill.

Joo, Y., Bong, M., & Choi, H. (2000). Self-efficacy for self-regulated learning, academic self-efficacy, and Internet self-efficacy in web-based instruction. *Educational Technology Research and Development, 48(2),* 5-17.

Joyce, B., & Weil, M. (2000). *Models of teaching* (6th ed.). Boston: Allyn & Bacon.

Judge, S. L (2001). Computer Applications in Programs for Young Children with Disabilities: Current Status and Future Directions. *Journal of Special Education, vol.16, no, 1,* p. 29-40.

Kearney, A. (2000). Inclusive Education in the 21st Century: The role of computer technology. *Computers in NZ Schools, 12(3)*, pp.33-36.

Keller, K.A. (1997).*Family Guide to Assistive Technology. Parents, Let's unite for Kids(PLUK)*.Retrieved April 25, 2006, from http://www.pluk.org/AT1.html

Lahm, E. A.,& Sizemore, L. (2002). Factors that Influence Assistive technology decision making, *Journal of Special education technology, Vol.17, No.1.*

Lahm, E. A., Bausch, M. E., Hasselbring, T. S., & Blackhurst, A. E. (2001). *National Assistive Technology Research Institute, 16(3).* University of Kentucky.

Lai, K. W., Pratt, K., & Trewern, A. (2001). *Learning with technology: Evaluation of the Otago Secondary schools Technology Project.* Dunedin: The Community Trust of Otago.

Langone, C., Wissick, C., Langone, J., & Ross, G. (1998). A study of graduates of a technology teacher preparation programe. *Journal of Technology and Teacher Education, 6 (4),*pp.283-302.

Leis, A. L. (2005). *Factors affecting in-service early childhood teachers' use of computers.* Dissertations, Temple University.

Lesar, S. (1998). Use of assistive technology with young children with disabilities: Current status and training needs. *Journal of Early Intervention, 21.*

Levande, J. S. (2000). What is your vision of the future of technology education? *Technology Teacher. 59(4).* 32-35.

Lewis, R. (2001). Musings on technology and learning disabilities on the occasion of the new millennium. *Journal of Special Education Technology, 15,* (2), 5-12.

Lilley, C. (2001). A Whole school approach to ICT for Children with physical disabilities. In L, Avril & E, Viv. *ICT, Pedagogy and the Curriculum- Subject to Change.* London: Routledge Falmer.

Lincoln, Y.S., & Denzin, N.K. (2000). *Handbook of Qualitative Research, (2nd ed.).* Thousand Oaks, London: Sage.

Lindsey, J.D. (2000). *Technology and exceptional individuals.* Austin, TX: Pro-Ed.

Lipnack, J., & Stamps, (2000). *Virtual teams people working across boundaries with technology* (2nd ed.). New York: John Wiley and Son.

Loveless, A., DeVoogd, G. L., & Bohlin, R. M. (2001). Something old, something new...Is pedagogy affected by ICT? In Avril, L & Viv, E. *ICT, Pedagogy and the Curriculum- Subject to Change.* London: Routledge Falmer.

MacArthur, C.A., & Malouf, D.B. (1991). Teacher's beliefs, plans,and decisions about computer-based instruction. *Journal of Special Education, 25 (5),* pp.44-72.

MacArthur, C.A.(2001).Technology Implementation in Special Education: Understanding Teacher's Beliefs, Plans, and Decisions. In J, Woodward & L, Cuban. (Ed.), *Technology, Curriculum and Professional development: Adapting Schools to meet the needs of students with disabilities.* California: Corwin Press.

Male, M. (2003). *Technology for Inclusion. (4th ed.).* Boston: Allyn and Bacon.

Malouf, D.B. (2001). Special Education Technology and the Field of Dreams. In J, Woodward & L, Cuban. (Ed.), *Technology, Curriculum and Professional development: Adapting Schools to meet the needs of students with disabilities*. California: Corwin Press.

Marr, P.M. (2000). Grouping students at the computer to enhance the study of British literature. *English Journal, Vol.90, No.2,* p.120-125.

Mason, J. (1996). Transforming education with new cultural tools. *Computers in New Zealand Schools,* 13-20.

McCarthy, J. (1995). *The effective use of computers by special needs students in the mainstream.* Unpublished dissertation submitted in partial fulfillment of the Diploma in the Education of Students with Special Teaching Needs. Wellington College of Education.

McGregor, G.$_S$ Halvorsen, A., Fisher, D., Pumpian, I., Bhaerman, B., & Salisbury, C. (1996). Professional development for all personnel in inclusive schools. *Consortium on inclusive schooling practices issue brief 3(3) - November 1998:* CISP Publications and Resources.

McNeill, P., & Chapman, S. (2005). *Research Methods (3rd ed.): Social Surveys*. Routledge: New York, p 28-67

Meadows, A.J. (1998). *Communicating Research*. London: Academic Pr

Mertens, D.M., & McLaughlin, J.A. (2004). *Research and Evaluation Methods in Special Education*, Thousand Oaks, CA: Sage.

Meskill, C. & Mossop, J. (2000). Technologies Use with Learners of English as a Second. *Journal of Educational Computing Research, 22,3.*

Meskill, C, Mossop, J., DiAngelo, S., & Pasquale, R. K. (2002). Expert and novice teachers talking technology: Precepts, concepts, and misconcepts. *Language learning & technology, 6(3),* 46-57.

Meskill, C. & Swan, K. (1997). Roles for Multimedia in the Response-based Literature Classroom. *Journal of Educational Computing Research. 15,3.*

Mills, R.J. (2001). Analyzing instructional software using a computer-tracking system. *Information Technology, Learning, and Performance Journal, 19{\),* 21-30.

Ministry of Education. (1995 b). *Technology in New Zealand curriculum.* Wellington: Learning Media.

Ministry of Education,(2002). *Assistive Equipment Guidelines.* Retrieved September 10, 2006, from http://www.minedu.govt.nz/web/downloadable/dl7576_v1/7576-assistive-equipment-word.july 2002.doc.

Ministry of Education. (2002). *Digital Horizons. Learning through ICT. A strategy for schools, 2002-2004.* Wellington: Learning Media.

Ministry of Education. (2006).*ORRS Guidelines.* Retrieved September 10, 2006, from http://www.minedu.govt.nz/web/downloadable/dl5323_v1/5323-orrs-guidelines-2006-revision-web.doc

Ministry of Education.(2006). *Services and funding for school students with high special education needs.* Retrieved September 10, 2006, from **http://www.minedu.govt.nz/web/downloadable/dl7304_v1/7304-services-and-funding-for-school-students---hi.doc**

Ministry of Education. (2006). *Enabling the 21st Century Learner: An e-learning Action Plan for schools 2006-2010.* Learning Media Limited, Wellington: New Zealand.

Morse, J. (2002). Principles of mixed and multi-method research design. In A. Tashakkori & C. Teddlie (Ed.), *Handbook of mixed methods in social and behavioral research* (p.180-208).Thousand Oaks, CA: Sage.

Morton, A. (1996). Factors affecting integration of computers in western Sydney secondary schools. In J.G. Hedberg, J.R. Steele, & S. McNamara (Ed.), *Learning technologies: Prospects and pathways.* Selected papers from the Biennial Conference of the Australian Society for Educational Technology (pp.107-114). Canberra, ACT: AJET Publications.

Muffoletto, R. (2001). *Education and Technology: critical and reflective Practices.p.3.*Cresskill, New Jersey: Hampton Press.

Murray, D., & Campbell, N. (2000). Barriers to implementing ICT in some New Zealand Schools. *Computers in NZ Schools, Vol.12 no.1,* pg.3-6.

Neuman, W.L. (2006). *Social Research Methods: Qualitative and Quantitative approaches (6th ed.),* Pearson Education Inc.

O'Brien, P., & Ryba, K. (2005). Policies and Systems in Special Education. In D.Fraser, R.Moltzen & K. Ryba (Ed.), *Learners with special needs in Aotearoa New Zealand* (p.27). Palmerston North. Dunmore Press.

Okolo, C., Bahr, C., & Reith, H. (1993). A retrospective of computer-based instruction. *Journal of Special education Technology, Vol.12, No.1,*p.1-27.

Olson, J.L., & Platt, J.M. (2000). *Teaching children and adolescents with special needs.* Upper Saddle River, NJ: Merrill/Prentice Hall.

Paveley S. (1999). *I T and Special Educational Needs.* Retrieved June 18, 2006, from http://www.advisory-unit.org.uk/itspnds.html

Praagh, M.V. (2003). *Information Technology, Dyslexia, And The Disabled Learner,* Western Institute of Technology at Taranaki (WITT) New Plymouth,

NZ. Retrieved April 15, 2006, from
www.naccq.ac.nz/conference04/proceedings_03/pdf/439.pdf

Prochnow, J., Kearney, A., & Carroll-Lind, J.(1999). *Successful inclusion: What do teachers say they need?* Paper presented at the *Australian Association for Research in Education/New Zealand Association* for Research in Education Conference, Melbourne, Australia.

Raskind, M. H., Herman, K. L., & Torgesen, J. K. (1995). Technology for persons with Learning disabilities: report on an international symposium. *Learning Disability Quarterly, Vol.18*, p.175-184.

Reid, D., Robinson, S., & Bunsen, T. (1995). Empiricism and Beyond. Expanding the boundaries of special education. *Remedial and Special Education, 16(3),* p.131-141.

Roblyer, M., & Edwards, J. (2000). *Integrating educational technology into teaching (2nd ed.).* United States of America: Prentice Hall, Inc.

Roder, J. (2001). The Challenges of understanding our goals with regard to ICT in education, *Education Today.*

Rose, R., &Grosvenor, I. (2001). *Doing research in Special Education: Ideas into Practice,* London: David Fulton Publishers.

Russell, S.J., Corwin, R., Mokros, J.R., & Kapisovsky, P.M. (1989). *Beyond drill and practice: Expanding the computer mainstream.* Reston, VA: Council for Exceptional Children.

Ryba, K., & Selby, L. (1995). Empowering learners with computers. In D.Fraser, R.Moltzen & K. Ryba (Eds.), *Learners with special needs in Aotearoa New Zealand* (p.156-177). Palmerston North. Dunmore Press.

Savidan, V. (2003). ICT and the New Zealand Secondary school Curriculum. *Monograph Research Report Series, Iss 12.* Auckland: Auckland College of Education Research Services.

Scadden, L. (1998). The internet and the education of students with disabilities. *Technology and Disability 8,* 141 -148.

Scherer, M.J. (2003). *Connecting to Learn: Educational and Assistive Technology for People with Disabilities*, American Psychological Association, Washington: DC.

Schmidt, M., Weinstein, T., Niemic, R., & Walberg, H. (1985).Computer-assisted instruction with exceptional children. *Journal of Special Education, Vol.19,* p.493-501.

Schnackenberg, H., & Sullivan, H. J. (2000). Learner control over full and lean computer-based instruction under differing ability levels. *Educational Technology Research and Development, 48 (2),* 19-35.

Schuck, S. (2001). *Walking the Electronic tightrope: Questions surrounding Infusion of IT into Education Subjects*

Schunk, D. H. (2000). *Learning theories: An educational perspective (3rd. ed.).* Upper Saddle River, NJ: Merrill/Prentice Hall.

Schrum, L. (1999). Technology professional development for teachers. *Educational Technology Research and Development, 47*(4), 83-90.

Schwandt, T. (2000). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructionism. In N.K.Denzin, & Y.S. Lincoln, (Ed.), *Handbook of qualitative research, (2nd ed.),* Thousand Oaks, CA: Sage.

Seale, C. (1999). *The Quality of Quantitative Research.* London: Sage.

Semmel, M.I., & Lieber, J. (1990). Technology applications for infants and preschool children with handicaps: A review.*International Journal of Special Education, 5(2),*160-172.

Shelly, C., Cashman, T., Cunter, R., & Gunter, G. (2002). *Integrating technology in the classroom, (2'''. Ed.).* Boston: Course Technology.

Shiah, R., Mastropieri, M., & Scruggs, T. (1995).Computer-assisted instruction and students with learning disabilities: Does research support the rhetoric? In M.Mastropieri & T.Scruggs (Ed.), *Advances in Learning and behavioral disabilities*, p.162-192, Greenwich, CT: JAI.

Shiratuddin, N., & Landoni, M. (2002). Evaluation of content activities in children's educational software. *Evaluation and Program Planning, 25,* 175—182.

Shuster, N.E. (2002). The Assistive Technology Assessment: An Instrument for Team Use. *Journal of Special education technology, Vol.17, No.1.*

Sivin-Kachala., & Bialo, E.R. (2000). *Report on effectiveness of technology in schools (7th ed.).*Washington, DC: Software and Information Industry Association.

Snoeyink, R. (2000). *Experienced Teachers' Perspectives of Learning and Using Computer Technology.* Unpublished doctoral dissertation. , Purdue University, West Lafayette, IN.

Stevens, K., Blackhurst, A., & Slator, D. (1991). Teaching memorized spelling with a microcomputer: Time delay and computer-assisted instruction. *Journal of Applied Behavior Analysis, 24,* 153-160.

Stevens, C. & Lonberger, R. (1998) *Using Technology in Instruction; Supporting Teacher Education Faculty Development.* Paper presented at SITE 98

Conference, Washington.

Stratford, R. (2000).Professional development and barriers to Successful ICT Integration in Classrooms and schools. *Computers in New Zealand schools, Vol.12, No.1.* Dunedin: University of Otago Press.

Sugar, W. A. (2001). What is so good about user-centered design? Documenting the effect of usability sessions on novice software designers. *Journal of Research on Computing in Education, 33{3),* 235-250.

Teddlie, C., & Tashakkori, A. (2002). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (p.3-500).Thousand Oaks, CA: Sage.

Tiu, E., Guglielmi, J., & Walton, G. (2002). *Assessing a technology initiative: Lessons learned while integrating technology into teaching and learning.* Paper presented at the Annual International Forum of the Association for Institutional Research, Toronto, Canada.

Todis, B. (2001). It Can't Hurt: Implementing AAC Technology in the Classroom for Students with Severe and Multiple Disabilities. In J, Woodward & L, Cuban (Eds.), *Technology, Curriculum and Professional development: Adapting Schools to meet the needs of students with disabilities.* California: Corwin Press.

Tunmer, W.E. (1999). *Science can inform education practice: The case of literacy.* 1999 Herbison Lecture presented as the NZARE/AARE conference. Melbourne: Australia.

Tyler-Wood, T.L., Putney, D., & Cass, M.A. (1997). Accessibility: The main factor influencing special education teacher's perceived level of computer competence. *Journal of Computing in Teacher education, 13 (4),* pp.20-24.

Ulman, J.G. (2005).*Making technology work for Learners with Special Needs: practical skills for teachers*. London: Pearson Education. Inc.

Vannatta, R. A., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education 36(3)*, 253-271.

Vygotsky, L.S. (2006). *Vygotsky and Social Cognition.* Retrieved April 22, 2006, from http://www.funderstanding.com/vygotsky.cfm

Ward, L., Parr, J., & Robinson, V. (2004). Oversold and Underused: Computers in the classroom. *Computers in NZ Schools, Vol.16, no.2.*

Ward, M. (2002). *A template for a CALL programme for Endangered Languages.* Retrieved26June,2006 from www.computing.dcu.ie/mward/mthesis/chapter2

Wentworth, N. M. (1998). *Technology Inservice: a powerful force.* Paper presented at SITE 98 Conference, Washington.

Wetzel, K., & Thormann, J.(2001). Reaching students with emotional disabilities: Partnerships that works. *Learning and Leading with Technology, 29,(2),* 23-27.

White, B.Y., and Fredrickson, J.R. (1998). Inquiry, modeling, and metacognition: Making science accessible to all students. *Cognition and Instruction* 16:3–117.

Williams, D.L., Boone, R., & Kingsley, K.V. (2004). Teacher beliefs about educational software-A Delphi study. *Journal of Research on Technology in Education, vol.36, no.3.*

Winn, J., & Blanton, L. (1997). The call for collaboration in teacher education. In L. P, Blanton., C. C. Griffin., J. A. Winn., & M. C. Pugach (Ed.), *Teacher*

education in transition (pp. 1-17). Denver, CO: Love Publishing Co.

Wishart, J. (2000). Students' and teachers' perceptions of motivation and learning through the use in schools of multimedia encyclopedias on CD-ROMs. *Journal of Multimedia and Hypermedia, Vol.9,No.4,*p.333-347.

Wolfensberger, W. (1983). Social role valorization; A proposed new term for the principle of normalization. *Mental Retardation, 21 (6),* pp.234-239.

Woodward, J., Gallagher, D., & Reith, H. (2001). No easy Answer: The Instructional effectiveness of Technology for Students with Disabilities. In J. Woodward & L, Cuban. (Eds.), *Technology, Curriculum and Professional development: Adapting Schools to meet the needs of students with disabilities.* California: Corwin Press.

Zorn, T. Designing and conducting Semi-structured Interviews for research. Retrieved March 30, 2006, from wms-soros.mngt.waikato.ac.nz/.../ Interviewguidelines.pdf .

APPENDIX A

Letter to the Principal

Date:

The Principal

<name of the school>

<address of school>

<town/city>

Dear <name of the Principal>

I seek your assistance with research I am doing the nature and extent of computer use for learners with very high needs. This is a part of my study for Masters of Education endorsed in Special Education; I wish to undertake a research project with the teachers teaching learners with very high needs at your school.

I have eighteen years of teaching experience in teaching, including four years as a teacher in a Special school in Auckland. During my career here, I saw the use of computers by learners with special needs and became aware of their potential. However, I feel more needs to be understood in this area regarding learners with very high needs. I believe that teachers could be a very important source of information to share with others. The specific area I would be studying is to examine how computers are used to cater the needs of learners with very high needs in special schools, and in particular, the beliefs, experiences and practices of teachers about the effectiveness of using computers as a tool for these learners.

I would very much appreciate if you could pass on the attached questionnaires to teachers at your school who have learner/s with very high needs who also use a computer. I would also be asking teachers to indicate if they would be prepared to participate in an interview as a follow up with me. For those who agree I would

be grateful if you would allow me to negotiate a suitable time to meet them at a later date. The results of my study would be made available to all participants.

Participants will be given all rights under Massey University Code of Ethical Conduct outlined in the information sheet. If you or participants have any questions, I may be contacted directly at the address below. The name and contact details of my supervisor are also provided below.

Thank you for your cooperation
Suchitra Umapathy

Researcher
Suchitra Umapathy
Ph: 09 6243929
Email:umapathy@xtra.co.nz

Supervisor
Alison Kearney
Department of Learning and Teaching
Massey University College of Education
Private Bag 11 222
Palmerston North
Email: a.d.kearney@massey.ac.nz

APPENDIX B

THE EFFECTIVE USE OF COMPUTER FOR LEARNERS WITH VERY HIGH NEEDS

INFORMATION SHEET

Introduction

I am Suchitra Umapathy doing this study as part of my thesis towards Masters of Education endorsed in Special Education. I am working as a teacher in a Special school in Auckland; I can be contacted at Ph: (Res) 6243929/ email: umapathy@xtra.co.nz.

The number of learners with very high needs is growing steadily in special schools every year and they are supported to some extent by computers with adaptive devices. However, very little is known about the extent to which computers are used. This study aims to investigate how computers are used to cater for students who have high needs and teacher's perceptions about the conditions necessary for their successful implementation.

Participant Recruitment

The study is specifically targeted at teachers of learners with very high needs who use a computer. Special schools in New Zealand were selected. The Principal of each school was contacted inviting them to pass on the attached questionnaires to teacher/s on their staff that has a learner or learners with very high needs who also uses a computer. Approximately 30 participants will be involved.

Project Procedures

The data gathered will provide useful information on which to base the effective use of computers for learners with very high needs. Data will be analyzed using SPSS software, and will be stored under lock and key which can be accessed only by the researcher/supervisor. You will be given an opportunity to see the summary before data analysis and publication. The anonymity of participants and participating schools will be protected by masking their identity and assigning numerical codes.

Participant involvement

You have been given this questionnaire as you have student/s with very high needs in your class who also use a computer. I would like to invite you to spare 20-25 minutes of your valuable time to answer this questionnaire which highly appreciated by me. Please return the completed questionnaire in the stamped addressed envelope by _____.

Participant's Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question.
- Withdraw from the study three months after completing the questionnaire.
- Ask any questions about the study at any time during participation.
- Provide information on the understanding that your name will not be used unless you give permission to the researcher.
- Be given access to a summary of the project findings when it is concluded.
- Completion and return of the questionnaire implies consent.

Project Contacts

If you have any questions about the study, I may be contacted directly at the address below. The name and contact details of my supervisor are also provided below.

Researcher
Suchitra Umapathy
Ph: 09 6243929
Email:umapathy@xtra.co.nz

Supervisor
Alison Kearney
Department of Learning and Teaching
Massey University College of Education
Private Bag 11 222
Palmerston North
Email: a.d.kearney@massey.ac.nz

Committee Approval Statement

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

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor Sylvia Rumball, Assistant to the Vice-Chancellor (Ethics & Equity), telephone 06 350 5249, e-mail humanethicsouthb@massey.ac.nz".

APPENDIX C

THE EFFECTIVE USE OF COMPUTER FOR LEARNERS WITH VERY HIGH NEEDS.

Questionnaire

Thank you for taking the time to complete this questionnaire. Please select two students from your class to base your answers on and use a separate questionnaire for each student. The criteria for selection of the two students, is, in this order:

1. **Verified as having very high needs**
2. **Uses a computer to achieve social an/or educational objectives**
3. **Are the two students in your class with the next birthdays**

If you only have one student who fits this criterion, I would still appreciate you completing one questionnaire.

For most questions, put a tick in the box beside the answer you have chosen. For some questions, you may tick more than one answer. Please use a pen, not a pencil.

Student Information:

1. Age and Gender of the Learner:

   Age: _____

   Gender: ☐ Male ☐ Female

2. Ethnicity of the learner:

- ☐ New Zealand European
- ☐ Maori
- ☐ Pacific Island
- ☐ Asian
- ☐ Other ----------

3. How long has the learner been taught by you?

- ☐ Less than 5 months
- ☐ 5-8 months
- ☐ 9-12 months
- ☐ More than 1 year

4. Please tick the area of disability. You can tick more than one:

- ☐ Physical
- ☐ Visual
- ☐ Hearing
- ☐ Intellectual
- ☐ Behavioral
- ☐ Others (please specify) ----------

5. Please tick the main area of disability experienced by the learner. (Tick one box only)

- ☐ Physical
- ☐ Visual
- ☐ Hearing

□ Intellectual

□ Behavioral

□ Others (please specify) ----------

6. Does the learner use computer for accessing curriculum?

□ Yes □ No

If Yes, do they mostly use it

□ on their own

□ with someone else (specify ----------)

and in which curriculum area would it be used most: _____.

7. Does the learner need support to access the computer?

□ Yes (tick the level) □ No

□ low

□ Moderate

□ High

□Very High

8. How much time per day 'on average' would the learner spend time on computer?

□ Less than10minutes

□ more than 10 and less than 20 minutes

□ more than 20 and less than 30 minutes

□ more than 30 and less than 60minutes

□ more than an hour (specify ----------)

9. Which of the following skills would the learner use the computer for? (You can tick more than one.)

- ☐ Cause and effect
- ☐ Switch timing
- ☐ choosing
- ☐Identifying
- ☐ Memory
- ☐ Observation
- ☐ other (please specify)
- ☐ listening
- ☐matching
- ☐sorting
- ☐life skills

10. Does the learner use adaptive equipment to access the computer?

☐ yes (Go to Q.11) ☐ No

11. What adaptive devices does the learner use to access computer?
You can tick more than one:

- ☐ Touch Screen
- ☐ Switch devices
- ☐ adapted keyboard
- ☐ Head wand
- ☐ Other (please specify ----------)
- ☐Braille keyboard

12. Does the computer play a part in the assessment process?

- ☐ Yes (please specify ----------)
- ☐ No

13. Is use of Computer a main objective in the IEP?

☐ Yes ☐ No

14. Is use of computer a part of strategy for achieving the learning outcomes in the IEP?

☐ Yes ☐ No

Teacher Information:

1. Age:

☐ less than 20

☐20-40

☐ 41-60

☐ 61 and above

2. Ethnicity:

☐ New Zealand European

☐ Maori

☐ Pacific Island

☐ Asian

☐ Others ----------

3. How many students are in your class?

☐ less than 5

☐ 5 ☐ 6

☐ 7 ☐ more than 7.

4. How long have you been teaching?

□ less than 5 years

□ 6- 10 years

□ 11-20 years

□ 21-30 years

□ more than 30 years

5. In your teaching career, how long have you been teaching learners with very high needs?

□ less than a year

□ 1-5 years

□6-10 years

□more than 10 years (please specify_____)

6. How do you rate your competence in using computers? Circle the option:

Very competent Competent Neither Incompetent Very incompetent

7. How do you rate your confidence in using computers? Circle the option:

Very confident Confident Neither Unconfident Very unconfident

8. Have you had training in use of Computers?

□ Yes □ No

If yes, please specify, from whom and how long

_____

9. Did you receive any training in the use of adaptive devices?

□ Yes □ No □ not applicable

10. Do you receive regular updates on the various adaptive devices available and its use?

☐ Yes ☐ No ☐ not applicable

11. List the softwares used by the learner.

!2. Were these software recommended to you?

☐ Yes ☐ No

13. Do feel confident in assisting the learner to use them?

☐ Yes ☐ No

14. Did you get any training to use the software?

☐ Yes ☐ No

15. Are you trained for making your own computer resources?

☐ yes ☐ No

16. Do you have any recommendations for teachers using computers in general for learners with very high needs? (Please specify)

☐ Yes ☐ No

---

17. What do you consider are the benefits of using computer for learners with very high needs?

---

18. What do you consider are the drawbacks in using computers for learners with very high needs? ----------

---

Thank you for taking the time to complete this questionnaire.

Please tick the appropriate box.

□ I would like a copy of the findings.

□ I would be prepared to be interviewed. If 'Yes', could you please give me your contact details:

Phone (Day)

(Evening)

Email:

Address:

My contact details are:

Name:

Address:

Phone (Day)

(Evening)

Email:

APPENDIX D

THE EFFECTIVE USE OF COMPUTER FOR LEARNERS WITH VERY HIGH NEEDS.

INFORMATION SHEET

Introduction

Thank you for your participation in the first part of this study which is as part of my thesis towards Masters of Education endorsed in Special Education. I can be contacted at Ph: (Res) 6243929/ email:umapathy@xtra.co.nz This project aims to investigate how computers are used to cater for students who have very high needs in Auckland Special schools. The questionnaire in the first part yielded a lot of useful information and has formed the-basis for the second part of the study which involves interviews.

Participant Recruitment

The sample for this part of the study was done of the basis of the responses to the questionnaire. The participants were selected based on the following criteria: Those who agreed to participate in the interview and who have students with very high needs using computer.
Approximately about 13 participants will be involved; this will give me in-depth information. In a study of this kind, the potential for discomfort or risk is minimal and procedures will be modified or terminated if anyone was placed at risk.

Project Procedures

The data gathered will provide useful information on which to base the effective use of computers for learners with very high needs. Data will be transcribed using word processing software, and will be stored under lock and key which can be accessed only by the researcher/supervisor. You will be given an opportunity to see the summary before data analysis and publication. The anonymity of

participants and participating schools will be protected by masking their identity and assigning alphabetical codes.

Participant involvement

The interview will be conducted in a semi-structured manner. The interview will be driven by the responses given by interviewee to the themes pursued by the interviewer. This would take a maximum of one hour. Attached to this sheet is an interview consent form. Could you please sign the form if you agree to participate and return in the prepaid envelope to me as soon as possible? As soon as I receive your consent, I will get in touch with you to negotiate the place and time for the interview. If you are in agreement, I would be using an audio tape to record the interview.

Participant's Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- Withdraw from the study (one week before the interview date).
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- Be given access to a summary of the project findings when it is concluded.
- Ask for the audio/video tape to be turned off at any time during the interview.

Project Contacts

If you have any questions about the study, I may be contacted directly at the address below. The name and contact details of my supervisor are also provided below.

Researcher
Suchitra Umapathy
Ph: 09 6243929
Email:umapathy@xtra.co.nz

Supervisor
Alison Kearney
Department of Learning and Teaching
Massey University College of Education
Private Bag 11 222
Palmerston North
Email: a.d.kearney@massey.ac.nz

Committee Approval Statement

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

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor Sylvia Rumball, Assistant to the Vice-Chancellor (Ethics & Equity), telephone 06 350 5249, e-mail humanethicsouthb@massey.ac.nz".

APPENDIX E

THE EFFECTIVE USE OF COMPUTER FOR LEARNERS WITH VERY HIGH NEEDS

PARTICIPANT CONSENT FORM

This consent form will be held for a period of five (5) years

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being audio taped.

I wish/do not wish to have my tapes returned to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name - printed .....