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Assistive technology: effects of training on education assistants' perceptions of themselves as users and facilitators of assistive technology and consequent transfer of skills to the classroom environment

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ASSISTIVE TECHNOLOGY: EFFECTS OF TRAINING ON EDUCATION ASSISTANTS' PERCEPTIONS OF THEMSELVES AS USERS AND FACILITATORS OF ASSISTIVE TECHNOLOGY AND CONSEQUENT TRANSFER OF SKILLS TO THE CLASSROOM ENVIRONMENT.

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ABSTRACT

With the increasing use of Education Assistant Special Needs (EASN) to support students with special needs in regular settings, it is important to consider the tools and knowledge that they bring to the role. The use of assistive technology (AT) as a support for students with special needs in Australia and globally is becoming more prevalent as the technology becomes increasingly affordable and more widely available. Consequently, it is important that the staff who are most likely to be working closely with these students are competent and confident in the use of AT. The purpose of this research was to investigate EASNs' perceptions of themselves as users and facilitators of AT in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. Perceptions of EASN in regards to AT have not previously been examined, even though these perceptions may potentially impact upon if, when and how, AT is utilised in the classroom.

Eighteen EASN were recruited to participate in the study. These participants were drawn from five primary school settings in the Perth, Western Australia, metropolitan area. The EASN were all employed to work with students with special needs, and indicated that they previously had little training in the area of AT. As part of the study, an eight-week training program was designed for the EASN to incorporate a wide range of assistive technologies, from low-tech to high-tech, across a number of functional areas (i.e. learning disability, vision and hearing impairments, physical disability). The training was targeted towards the EASN and their role as described by the level 3 Job Description Form (Department of Education and Training, 2002c) and the Competency Framework for Education Assistants – Special Needs (Department of Education and Training, 2008).

A mixed method study incorporating a combination of quantitative and qualitative methodologies underpinned the research. Participants were asked to complete a skills test, questionnaire and focus group interview at three phases of the study – pre-training, post-training, and after a ten week maintenance period. The data collected were then analysed using non-parametric statistics and qualitative coding. Together the data allowed the researcher to explore the perceptions of the EASN to using and facilitating the use of AT and to determine the level of skill development as a result of the training. The use of a ten week maintenance period also assisted the researcher to determine how the training had transferred into the classroom setting.

The research revealed significant impacts for the EASN in the areas of confidence for using and facilitating AT with students with special needs and highlighted areas where barriers to the use of AT were evident. Recommendations to address these barriers are presented. Future avenues of research are also highlighted. These areas of research would provide further insight into the use of AT and how EASN are utilised in school settings to support students with special educational needs who are using AT.

STATEMENT OF SOURCES

This thesis contains no material published elsewhere or extracted in whole or part from a thesis by which I have qualified for or been awarded another degree or diploma. No other person's work has been used without due acknowledgment in the main text of the thesis. This thesis has not been submitted for the award of any degree or diploma in any other tertiary institution. All research procedures reported in the thesis received the approval of the relevant Ethics/Safety Committees.

Signed: _____ Date: _____

Dianne Chambers

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

The purpose of this research was to investigate Education Assistants Special Needs' (EASN's) perceptions of themselves as users and facilitators of assistive technology (AT) in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. An overview of the study and reasons for the selection of the topic will be detailed in this section, including reference to the purpose, value and significance of the study for the field. The structure of the thesis will be introduced, along with limitations of the study.

1.2 Overview

With the continuing inclusion of students with special educational needs into regular school settings, there is an increased need to cater effectively for these students (Takala, 2007). This may be achieved in a multitude of ways, such as further training for the classroom teacher, the use of assistive devices, or the allocation of support staff such as Education Assistants Special Needs (EASN), to provide additional targeted support for the student. Schools are often choosing to employ EASN as a primary way of assisting students with special needs to access the curriculum (Gerber, Finn, Achilles, & Boyd-Zaharis, 2001), and as a result EASN are taking increasing responsibility for the delivery of the educational program for students with special needs (Achilles, Finn & Gerber, 2000; Carter, O'Rourke, Sisco, & Pelsue, 2009). Along with the proliferation of support staff to assist students with special needs, the variety, functionality and availability of assistive technology (AT) to support students with special needs has improved

greatly over recent years (Netherton & Deal, 2006). As many students with special needs may be able to access AT to support academic, social and independent learning, the EASN need to know not only how to effectively use this technology, but also have the desire and confidence to do so.

1.3 Purpose

The purpose of this research was twofold: firstly to investigate Education Assistants Special Needs' (EASN's) perceptions of themselves as users and facilitators of AT in the classroom; and secondly, to examine the transfer of skills learnt in a training situation into a classroom setting. EASN are important contributors to the process of including students with special needs in regular class settings (Gessler Werts, Harris, Young Tillery & Roark, 2004). They often assume responsibility for facilitating the learning of students with special needs by providing the structure and resources that these students require to be successful learners. As part of their role, the EASN are increasingly required to access AT devices and materials and facilitate the use of the devices with students. How the EASN perceive themselves as both users and facilitators of AT will be examined to determine if there is an impact on the AT that is utilised with the students, not only in quantity, but also in quality. While perceptions of efficacy in relation to AT use have been reported for teachers and other professionals working with students with special needs (Ashton & Wahl, 2004; Lee, Vega, & Ashton, 2005), perception of efficacy has not been clearly identified from the perspective of the EASN, a person who is most likely to spend a large part of their work day working closely with these students. It is this perspective that is being sought in this study.

The need for training in AT has been identified as an important factor in the appropriate and continuing use of this technology in the classroom (Carter, O'Rourke, Sisco & Pelsue, 2009; Netherton & Deal, 2006). Equally important is that the training relates to increased and effective use within the classroom setting. Planning for the transfer of skills and knowledge from a training situation to the classroom is an essential consideration, as without appropriate transfer, the training has little benefit for the trainees and ultimately, the employer and the intended recipients of the training (Goldman & Schmalz, 2005).

1.4 Justification

With the increased use of EASN in classrooms to support students with special needs, the Department of Education (formerly the Department of Education and Training) in Western Australia developed a *Competency Framework for Education Assistants - Special Needs* (Department of Education and Training, 2008) to articulate the professional roles and responsibilities of this group. The framework provides guidelines for the practice and professional learning of the EASN and includes reference to training requirements in a number of key areas, including AT. All EASN "require specific knowledge and a high level of competence in the areas of: communication and language acquisition; social skill development and training; behaviour management; and applications of technology to support learning" (Department of Education and Training, 2008, p. 12). Explicit reference is made to AT requirements in the competency framework, with EASN expected to be accomplished at using and facilitating the use of devices such as voice output communication devices, audiological aides, Braille keyboards and word prediction software. This research will examine training in AT for EASN, perceptions of EASN

in regards to their use and facilitation of AT and how training in AT translates to the classroom.

1.5 Value of the Research

This research will provide an original contribution to the special education discipline by providing information on EASN's perceptions of themselves as users and facilitators of AT and whether or not training in the area of AT is able to be successfully transferred to the classroom setting. While there is limited literature available on EASN's perceptions of training in general, and on teachers' perceptions of AT use, a search of national and international literature, utilising databases such as EBSCO, PsychInfo and MasterFile Premier, has not located any study of EASN's perceptions in the area of AT. This study attempts to remedy such a situation. The information gleaned will be valuable to schools, school districts and education systems, in that it is likely to provide a baseline upon which to develop training in the area of AT for EASN. Further, it will highlight appropriate classroom practices to ensure that all staff involved with AT have positive attitudes towards such technology and the skills to use the AT in an educationally appropriate manner.

An understanding of potential barriers to the use of AT by EASN, such as poor self-efficacy and confidence to use the AT, will possibly impact upon the use of the technology or the way in which technology is introduced into schools. Consequently, if positive training experiences can have an effect on the EASN's perceptions of themselves as users and facilitators of the technology, then appropriate training and use of AT in the classroom is more likely to be instigated.

An examination of whether there was training transfer to the classroom and the form this might take ought to provide insight into the dynamics of the classrooms as well as determine whether further follow-up training is required. The form of the transfer is of interest as this indicates strengths and weaknesses of the training and areas of possible concern in regards to classroom environments. The information gathered on transfer of the skills and knowledge to the classroom environment will add to the existing knowledge base in this area and will potentially allow future researchers to develop ever more effective means of transferring knowledge and skills of this type, particularly in relation to AT.

1.6 Context of the Research

In regards to personal involvement, the researcher has had a long-standing interest in the use of technology to support the learning of children with special needs in regular classrooms. This interest includes the use of assistive technologies, particularly as they are becoming more readily available in Australia, for students with a wide range of functional difficulties. In addition, the researcher is increasingly aware of the need for large numbers of support staff, in particular, Education Assistants Special Needs (EASN), who are employed to assist students with special needs to access regular and special settings. Of particular concern is the potential for people without significant training to be employed in reasonably challenging roles with children with special needs. Personal observation of such staff in a number of classroom environments indicated that the staff were very caring and eager to assist the students, but were occasionally unaware of the tools and strategies available to assist them. While the eagerness of the staff to support the student is admirable, without the tools necessary to do so, their efforts may be ineffective.

Further insight into the use of AT in the classroom was gained when an approach was made to the researcher from a local school district (Fremantle/Peel Education District) to provide training for EASN in the area of AT. Such an approach indicated that further training may be an area of concern not just for individual schools but for whole school districts. In an attempt to ensure that the training was not undertaken in vain, a longitudinal approach consisting of training over a sustained period of time was determined to be most appropriate, and an examination of how well the training was transferred to the workplace deemed necessary.

Training in AT for EASN was undertaken in five regular primary schools in the Perth south metropolitan area. The venue for the training varied according to a schedule devised jointly with the participants, and consisted of a rotation between schools. Two separate groups were involved in the study, consisting of eighteen participants in total. The training was identical for each group. The first training group of participants (9 in total) were drawn from three different schools in relatively close proximity to each other, and the second training group (9 in total) were drawn from two different schools, also in relative proximity. The participants in the study came from schools ranging in size from very small (approximately 86 students) to very large (approximately 730 students). The cohort was also from a variety of educational and experiential backgrounds and ranged in age from 18 years of age to over 55 years. The schools allowed the EASN to be absent from the classroom to attend the AT training, which required that the schools provide alternative personnel to replace these staff. On some occasions, the EASN very

generously gave up some of their own (unpaid) time to participate in the training, sharing this load with the schools.

The training was provided by the researcher along with other experts in the area of AT. A session on AT for communication, for example, was delivered by a speech pathologist from the Independent Living Centre WA (a not-for-profit organisation to assist people with disabilities to live independently), who has had extensive experience with this AT. The AT Team Leader from the Centre for Inclusive Schooling (a section of the Department of Education) also had input into the training, providing information on the AT which is available to schools through the Department of Education and what formats were most likely to be used in the regular education setting. This collaboration ensured that the training provided was consistent with what the EASN could reasonably be expected to access in their classroom settings, and with policies and procedures developed by the Department of Education.

1.7 Research Questions

The general research question aims to explore the use of technology in the classroom after Education Assistants have been provided with training. The main research question is:

- How does assistive technology (AT) training for Education Assistants Special Needs (EASN) affect the subsequent use of the technology in the classroom?

Sub-Questions

- How do Education Assistants Special Needs (EASN) view their effectiveness as users and facilitators of assistive technology (AT)?
- Does training in assistive technology (AT) make any difference regarding the EASN's perception of personal competence and confidence?
- How well do the skills associated with assistive technology (AT) and learnt in a training environment, transfer to a classroom setting?

1.8 Significance

This research is significant as it addresses AT training requirements for EASN in Western Australia and evaluates the use of AT in the regular classroom, as a result of this training. The research is timely in that the Department of Education in Western Australia recognises that EASN require access to further training in areas such as AT and student learning. The Department of Education stresses that there is a "… need for EASN [Education Assistants Special Needs] to be life-long learners who engage in ongoing professional learning during the course of their careers" (Department of Education and Training, 2008, p. 3).

Dimension 2 (Learning) of the *Competency Framework for Education Assistants Special Needs* explicitly states that at all three levels of employment (described later), EASN are required to work with AT (Department of Education and Training, 2008). In discussion with key personnel in the Fremantle/Peel Education District it has been recognised that there is a need for EASN to have access to information about AT and to become skilled in the use and facilitation of this technology for students with special needs (C. Hackett, personal communication, 20

February, 2008). Assessing the implementation of AT in the classroom following training for EASN, will allow further examination of effective pedagogies for training purposes to take place.

1.9 Ethical considerations

Consideration needs to be made for the ethical treatment of participants within the research. The participants were volunteers and all identifying biographical information has been kept strictly confidential. Written permissions were obtained in all cases, and participants were able to withdraw from the research at any time. All information has been kept in a locked facility at The University of Notre Dame Australia, Fremantle Campus, which is only accessible by the researcher. This data will be destroyed (via secure shredding) after a minimum period of five years post completion of the thesis.

1.10 Limitations

As with any research this study has some limitations that must be addressed. These include:

- A relatively small number of participants drawn from only one education district
- Public education system only
- Lack of long term follow-up

These limitations will be addressed in more detail in the concluding chapter of the thesis.

1.11 Definitions of Terms

Assistive technology (AT)

AT can be described as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (United States Congress, 2004, sec 602.1). AT can be described as low-tech or high-tech (and occasionally as mid-tech). Low-tech AT includes tools which are generally easily constructed or are of a low level of technological complexity. High-tech tools include sophisticated electronic devices and software. Examples of AT include pencil grips, modified eating utensils, voice output devices, adapted switch software and computer screen magnifiers. Assistive technologies are specifically designed to assist students to bypass difficulties or augment strengths and would generally be used by a small number of students within the regular classroom setting.

Education Assistants Special Needs (EASN)

This term describes a person employed to provide assistance to students with special educational needs within a school setting. The EASN may be employed at level 1, 2 or 3 (Department of Education and Training, 2008), with their work roles and responsibilities varying in accordance with their level of employment. Level 1 EASN are expected to work under teacher direction, level 2 EASN work under general guidance and level 3 EASN may work under limited guidance from the teacher. EASN provide support in the areas of communication, learning, student self-management, managing students at risk, managing student behaviour and administrative tasks/resource management.

Inclusion

Inclusion, according to the Curriculum Council (1998), refers to "…providing all groups of students, irrespective of educational setting, [with] access to a wide and empowering range of knowledge, skills and values" (p. 17). Inclusion can be viewed as a broad concept which reflects shifts in international, national and local provision of services and supports for students with disabilities. "Inclusive practice is defined as a mindset or a worldview that permits inclusivity to be realised" (Berlach & Chambers, 2010, p. 3). Inclusion in the context of this study refers to students with special educational needs being included in a regular classroom setting.

Instructional technology

Instructional technology may be used by all students in the class to enhance learning experiences (Loeding, 2002). Examples of instructional technology include a computer, an electronic whiteboard or a projector and appropriate software. The teacher would use instructional technology to introduce new concepts or content to the whole class, and to consolidate learning experiences. Instructional technology is seen to be enhancing the learning taking place in the classroom, but differs from AT in that it is not specifically designed to bypass or functional difficulties that students may be facing or augment poor abilities.

Perceptions

Schunk (2009) described perception as a process of pattern recognition that is a "…process of assigning meaning to a stimulus input" (p. 133). A person's perception of their experiences consists of the meaning that they make from those

experiences and is tempered by their prior experiences and expectations of the experience. The perceptions of the EASN in regards to the AT training that they have experienced are of interest in this study. These perceptions include thoughts and feelings in relation to the training and the resulting application of the training, as the EASN engage in the process of meaning-making.

Regular school

This term describes a school which provides services to students within the local area, which does not cater specifically to one category of student (i.e. students with autism, students with learning disabilities). Other terms used include mainstream school or local-intake school. The regular school setting is considered the least restrictive setting for the majority of students in the education system (Westwood, 2010).

Special Educational Needs

Children who have special educational needs may be described as "...children who have learning difficulties or disabilities that make it harder for them to learn or access education than most children of the same age" (Her Majesty's Government, 2011, para. 2). Students with special educational needs in the Western Australian context may have difficulty with behavioural requirements, learning difficulties, an intellectual disability, an Autism Spectrum Disorder, sensory impairment, physical disability or have a severe mental or health condition (Department of Education, 2010c).

Transfer of Learning

Transfer of learning may be defined as "the effective and continuing application, by trainees to their jobs, of the knowledge and skills gained in training" (Goldman & Schmalz, 2005, p. 5). It is important that the participants of any training situation are fully aware of what they are expected to change as a result of the training and where this fits into their workplace duties. Clear planning by the trainer is required to address transfer into the workplace settings throughout the training (Thomas, 2007). Therefore, with regard to the EASN, the transfer of the AT training to the classroom setting is of interest.

1.12 Structure of the Thesis

The thesis is organised into six chapters. Table 1.1 provides an overview of the structure.

Table 1.1

Overview of the Thesis Structure

Chapter 1	Introduction
Chapter 2	Review of Literature
Chapter 3	Methodology
Chapter 4	Results
Chapter 5	Discussion and Implications
Chapter 6	Conclusions and Recommendations

Chapter 1 provides an introduction to the work contained in the thesis, including the purpose behind the research. A justification for the research is provided, as is the significance of the research for the Education Assistants Special Needs, the schools, and the wider research community. Research questions that are to be addressed throughout the thesis are provided which act to guide the research and assist in defining the areas under examination. The context in which the research is situated is examined in order to place the research within an appropriate framework for exploration of the issues involved. Limitations to the research and definition of key terms are also provided. Finally a brief summary of each of the chapters is provided to demonstrate how the chapters are related and complement the questions under consideration.

Chapter 2 describes literature in the areas of inclusion, Education Assistants Special Needs, AT and learning and attitude theory. Specifically, the topics of defining inclusion, impacts of inclusion, the current context of inclusion, the role and responsibilities of Education Assistants Special Needs (EASN), training for EASN, EASN's perceptions of personal efficacy, defining AT, examining the use of AT in the classroom, social cognitive theory, transfer of learning theory and attitudinal theory are explored. The literature described the increasing inclusion of students with special needs in regular education settings and the use of Education Assistants Special Needs as one form of support for these students. One way of assisting students to access the curricular and social aspects of a classroom is through the use of AT. Training in the use of AT is required in order for the AT to be effective in the classroom. The areas of literature are related to the purpose of the study.

Chapter 3 details the methodology that was employed to gather data to address the research questions. A framework is presented which describes the theoretical basis for the study, and the lens that was employed to view the data. The research methodology consists of examination of the philosophical approach of mixed method research (components of both qualitative and quantitative research methodology), incorporating a pragmatist paradigm. The theoretical perspective is that of parallel mixed methods, with the qualitative approach of phenomenology and the quantitative approach of quasi-experimental design playing leading roles. True to a mixed method design, the methods used to collect data incorporated a range of tools including skills tests, observational notes, questionnaires, rating scales and focus groups. A description of the method of sampling and the instrument protocols is given, along with details of the training program developed for the EASN.

Chapter 4 presents the findings of the study. The findings are arranged according to the three research sub-questions and include the demographic information which describes the participants. Firstly, to determine the participants' views on their effectiveness as users and facilitators of AT, responses to the initial questionnaire, the training and the understanding of AT are presented. The relevance of the training from the perspective of the EASN is also explored. Secondly, the impact of the training on EASN'S perceptions of personal competence and confidence is reported as a change in skill level and self-reported confidence. This change is examined at three points: pre-training to post-training; pre-training to maintenance; and post-training to maintenance. Results for analysis tools in the form of the Wilcoxon signed-rank test analysis and focus group interview analysis are provided. An examination is also made to determine any between group differences.

Finally, the use of the AT in the classroom after the training is examined using information from questionnaire responses, rating scales and a final focus group interview. Observational field notes are used to support findings throughout this chapter.

Chapter 5 comprises a discussion of the findings of the research in relation to the literature in the area. This section addresses the three sub-questions of the study: How do Education Assistants Special Needs view their effectiveness as users and facilitators of assistive technology (AT)?; Does training in assistive technology (AT) make any difference regarding the EASN's perception of personal competence and confidence?; How well do the skills associated with assistive technology (AT), learnt in a training environment, transfer to a classroom setting? The discussion is organised into five main sections, which are:

- Prior Experiences of the Participants
- Education Assistants Special Needs' Initial Perceptions of their Effectiveness as Users and Facilitators of Assistive Technology
- The Impact of Training on Perceptions of Personal Competence and Confidence
- The Use of Assistive Technology in the Classroom by Education Assistants Special Needs After Training
- Chapter Summary

Chapter 6 provides the conclusion to the thesis, including overarching findings, recommendations based on these findings, limitations of the research and future directions as suggested by the research. This chapter aims to address the main

research question for the study: How does assistive technology (AT) training for Education Assistants Special Needs (EASN) affect the subsequent use of the technology in the classroom? A final concluding section acts to bring together the findings from the research in a succinct statement.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Introduction

The purpose of this research was to investigate Education Assistants Special Needs' (EASN's) perceptions of themselves as users and facilitators of AT in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. In order to situate the study within the context of existing research a literature review has been undertaken. The following literature review will identify what is already known about AT use and EASN and will identify areas where further research is required, including the area under consideration in this study.

2.2. Conceptual Framework

The literature review provides information on the critical areas related to the research, including the theory which underpins the research. The core areas relevant to the study are inclusion, Education Assistants Special Needs (EASN), assistive technology, learning theory and attitude theory. Within these core areas, sub-themes have been identified including defining inclusion, impacts of inclusion, the current context of inclusion, the role and responsibilities of EASN, training for EASN, EASN's perceptions of personal efficacy, defining assistive technology, examining the use of AT in the classroom, social cognitive theory, self-efficacy theory, transfer of learning theory and attitudinal theory. These areas of literature inform the research and assist in exploring views on EASN, AT and training. The areas of literature examined are displayed via a Conceptual Framework (Figure 2.1).

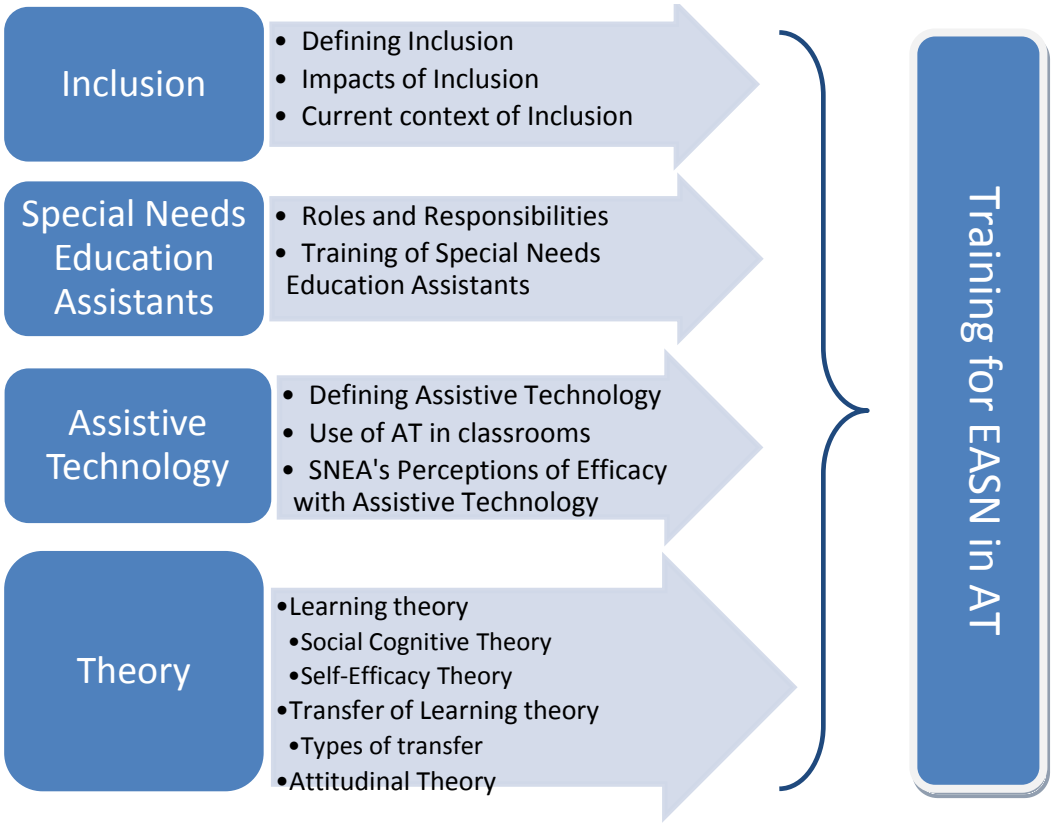
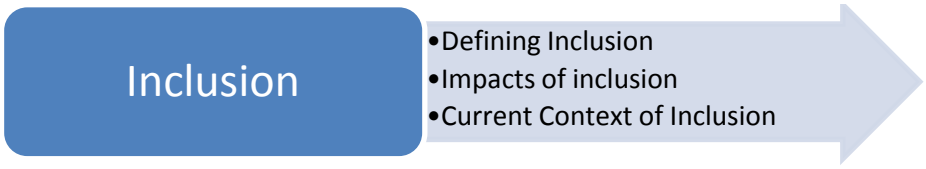


Figure 2.1. Conceptual Framework

2.3 Inclusion



2.3.1 Defining Inclusion.

Over the last 50 years, the conceptualisation of appropriate educational situations for children with special educational needs has moved from Wolfensberger's (1972) principle of normalisation, where the prevention or reversal of deviancy was seen to be a key goal, through concepts of integration to inclusion (Anderson, Klassen & Georgiou, 2007; Westwood, 2010). Bank-Mikkelsen (1969, cited in Wolfensberger, 1972) described normalisation as a process of ensuring that

people with disabilities (particularly those with an intellectual disability) live a life as close to 'normal' as possible. Integration (sometimes known as mainstreaming) was closely aligned with a more accepting view of people with disabilities and often involved the placement of students with disabilities into regular classes. These students, however, were often not fully included in the life of the classroom, accessing a different, often very basic curriculum, and being excluded from participating in all the activities of the classroom (Foreman, 2008; Graham & Slee, 2008). Giangreco, Yuan, McKenzie, Cameron and Fialca (2005) refer to students who have been placed in the regular class, but who are not fully included as being 'islands in the mainstream', referring to the academic and social isolation that exists for some of these students.

Inclusion is a more encompassing term than integration and refers to "…providing all groups of students, irrespective of educational setting, [with] access to a wide and empowering range of knowledge, skills and values" (Curriculum Council, 1998, p. 17). It is a broad concept and "reflects a major shift in the beliefs and practices of educational communities regarding the provision of services for all students" (Department of Education and Training, 2004, p. 29). The inclusion of children with disabilities into regular education settings has been an ongoing initiative in the Department of Education in Western Australia (Department of Education and Training, 2007). The concept of inclusive practice is embedded in the Curriculum Framework (Curriculum Council, 1998) utilised by all schools in Western Australia as "inclusive practice is … a mindset or a worldview that permits inclusivity to be realised" (Berlach & Chambers, 2010, p. 3). Foreman (2008), states

that inclusion is a concept that goes beyond students with a disability and that all schools should be including all students regardless of background or ability.

A review of services for students with disabilities, titled "*Pathways to the Future: A Report on the Review of Educational Services for Students with Disabilities in Government Schools*" (Department of Education and Training, 2004a), found that 3 – 4 % of the students in schools in Western Australia had identified disabilities. The term 'disabilities', according to the government school sector's resource allocation arm, SchoolsPlus, refers to students who have been identified as having Global Developmental Delay, an Intellectual Disability, an Autism Spectrum Disorder, a Vision Impairment, who are Deaf or Hard of Hearing, a Severe Mental Disorder, a Physical Disability or a Severe Medical/Health condition (Department of Education and Training, 2006). Many students with a disability in these areas attend regular local schools with appropriate support provided. Regular schools are those in which students with and without disabilities are enrolled, with the majority of students not having identified disabilities. These are generally schools within the student's local intake area, being close to their current residence.

The impetus for inclusion has been underpinned by policy and legislation, both locally and internationally. This legislation has been driven by an increased emphasis on aspects of social justice and understanding of diversity in the educational sector. The *Salamanca Statement and Framework for Action on Special Education Needs* (UNESCO, 1994) focused on the inclusion of students with special needs in school settings alongside their peers. The statement was highly influential

world-wide (Rose & Forlin, 2010) and included reference to the design of educational programs and pedagogy that was capable of meeting the needs of all students. These programs, it was felt, would act to combat discriminatory attitudes towards those who may be perceived as being different, and to create welcoming communities that will lead to an inclusive and well educated society (Berlach & Chambers, 2011). UNESCO (2005) subsequently produced a document which provided support for the principles of inclusion which was titled *Guidelines for Inclusion: Ensuring Access to Education for All* and broadened the inclusive education movement to encompass all students, not just those with a disability. These guidelines (UNESCO, 2005, pp. 15-16) describe four main elements of inclusion: a) that inclusion is a process; b) that inclusion is concerned with the identification and removal of barriers; c) the presence, participation and achievement of all students is important; and d) access should be given to those who are highly marginalised or excluded for any reason.

The *Education for All Handicapped Children Act* (Library of Congress, 1975) was early legislation introduced in the United States of America to ensure that all students with special needs received access to education. The Act did not specify where or how this education was delivered, only that it should be available. More current legislation, *Individuals with Disabilities Education Act* [IDEA] in 1990 (Library of Congress, 2004) and the re-authorisation of this legislation in 2004, has refined the previous requirements and now includes reference to the type of education and the quality of education that should be available. The current legislation is also more prescriptive in terms of the responsibilities of educators to ensure that they have catered effectively for all students with disabilities. For

example, there is a mandated requirement for individualised planning and consideration of a least restrictive environment (i.e. the environment that has the widest range of choice for the individual) embedded within the legislation. As a result of the legislation, students with disabilities are increasingly being included in regular settings.

Legislation relating to inclusion in Australia consists of both state and federal legislation. Nationally, the *Disability Discrimination Act* [DDA] (Commonwealth of Australia, 1992) states that students with disabilities should have access to an appropriate education. In order to clarify the responsibilities of education service providers under the DDA, a set of standards have been developed. The *Disability Standards for Education 2005* (Commonwealth of Australia, 2005) provide education service providers at all levels of education (Early Childhood, Primary, Secondary and Tertiary) with specific information on their responsibilities in regards to providing appropriate educational experiences for students with disabilities. The standards "provide a framework to ensure that students with disability are able to access and participate in education on the same basis as other students" (Commonwealth of Australia, 2005, p. iii). Included are standards for enrolment, participation, curriculum development and delivery, student support services and harassment and victimisation. The *Disability Standards for Education 2005* also define a number of key terms that educators need to be familiar with including, 'on the same basis', 'reasonable adjustments', and 'unjustifiable hardship'. The standards are still being absorbed into the culture of schools, and it may be some years yet before the full impact of the standards are felt (Berlach & Chambers, 2010).

Each state education provider within Australia has specific policies and state-based legislation that relate to the principles of inclusion and catering for students with special educational needs (Forbes, 2007). Sometimes the policy and legislation is couched in terms of diversity and covers a wide range of minority groups such as those from other cultures and language backgrounds or who may be living in poverty (Berlach & Chambers, 2010). In Western Australia, policy and legislation that relates to including students with disabilities includes the *Equal Opportunity Act 1984*, which states that a person with a disability cannot be discriminated against in work, accommodation or employment in regards to their impairment (Government of Western Australia, 1984), the *School Education Act* (Government of Western Australia, 1999) which provides guidelines for school administrators on the enrolment processes for students with a disability and the *Pathways to the Future: Report of the Review of Educational Services for Students with Disabilities in Government Schools* (Department of Education and Training, 2004a), which clarified the term inclusivity and referred to the principles, resources and supports required to ensure inclusion in schools was successful. The *Pathways to the Future* document included provision for professional development and training for all government school staff on building inclusive schools and inclusive classrooms.

The policies and legislation that have been implemented in Western Australia have impacted on the number of students with a disability being included in regular classrooms. The number of students identified as having a disability has also increased in recent years, with 4326 students enrolled in 2005 (Department of Education and Training, 2006) compared with 7561 students with disabilities enrolled in 2011 (Department of Education, 2011) . Some of the reasons for this

include “greater community awareness of disabilities and better access to diagnosis and treatment; higher survival rates among children born prematurely and among children with profound disabilities; and an increase in the number of recognised disabilities” (Department of Education and Training, 2006, p. 136). With the increase in the number and identification of students with disabilities, and often more complex disabilities, included in regular settings, there is a need for appropriately trained staff to assist these students to reach their full potential (Students with Disabilities Working Group, 2010).

2.3.2 Impacts of Inclusion.

Inclusion can provide benefits not only for students (with and without disabilities), but also for teachers and the wider community (Raschke & Bronson, 1999). Students with special needs who are included in regular settings may be involved in a more stimulating environment than that of a segregated setting. These students are provided with the opportunity to work alongside same-age peers who can act as appropriate behavioural, social and academic role models (Anderson, Klassen & Georgiou, 2007). Through this interaction, students with special needs are more likely to develop friendships within their local area and a stronger sense of belonging to the community. Such interaction and sense of belonging aids in enhancing self-esteem (Raschke & Bronson, 1999). For other students within the classroom, the inclusion of students with disabilities can allow them to experience the diversity that society has to offer and in turn assist them to develop respect and empathy for others, through an appreciation of individual uniqueness (Anderson, Klassen & Georgiou, 2007). Students without disabilities may be empowered to

make a difference to others around them as a result of experience in an inclusive environment.

Teachers in inclusive classrooms may benefit from being immersed in inclusive practice in many ways. These benefits include being able to determine students' strengths as well as weaknesses, an increased appreciation of the diversity of student needs, enhanced collaborative and creative problem solving skills, improved instructional ability and a more balanced school environment (Raschke & Bronson, 1999). As a community, the growth of an inclusive attitude will impact positively and act to promote the rights of all individuals to live as full a life as possible. An inclusive attitude supports equality within the community. The classroom can be seen to be a microcosm of society as a whole, and the closer this is to the 'real-world' the more likely students will be accepting of difference as adults.

In regards to academic achievement, Farrell, Dyson, Polat, Hutcheson and Gallannaugh (2007) conducted a study to determine whether the inclusion of students with special needs had an impact on the language development of all students within the school, not only the students with special needs. They found that there were no significant overall differences between schools which had a well developed inclusive culture and those who were substantially less inclusive in nature. From this finding they concluded that some of the extreme concerns raised about the impact of including students with special needs in regular schools on the achievement level of peers were unfounded. Students who are having difficulty in school (but who not been identified as having special educational needs) who have been educated alongside peers with identified special educational needs have been

found to perform better academically than students who were not educated with peers with disabilities (Huber, Rosenfeld, & Fiorello, 2001). Huber, Rosenfeld and Fiorello (2001) completed a three-year longitudinal study focusing on academic achievement of general education students in inclusive settings and found that the reading scores of students without disabilities were not impacted by inclusive education. These findings support that the inclusion of students with special needs is not detrimental to the educational progress of other students within the classroom.

While there are many benefits to inclusion, several cautions need to be considered. Forbes (2007) stresses that inclusion as a process, rather than a place, needs to be carefully considered and that some of the difficulties in implementing inclusive practice should be addressed. She feels that moving students from a specialised setting to a regular setting will result in the staff from the specialised settings being lost to the school system. The knowledge of the professionals associated with these specialised settings will therefore diminish and be lost over time. Concomitantly, the concern is that regular classroom teachers do not have sufficient skills, knowledge and time to be able to assume responsibility for students with disabilities within regular classrooms, without extra support. The willingness of the teacher to utilise inclusive practice is an also important factor in the success of inclusion (Anderson, Klassen & Georgiou, 2007). Lieberman, James and Ludwa (2004) suggested that "quality inclusion produces benefits for all students, but inclusion can also produce negative effects if mishandled. The difference depends to a great extent on the environment the teacher creates" (p. 37).

Inclusion has been most widely accepted for students with physical and sensory impairments, such as vision and hearing impairments (Elkins, 2009). Reasons for this may include a greater knowledge of these disabilities by the staff, and the application of appropriate resources to support these students. Some students with disabilities who require more of a specialist approach, such as those relating to emotional and behavioural disorders and severe health or intellectual disabilities, may not be as readily accepted in regular settings (Clough & Nutbrown, 2004). Clough and Nutbrown (2004) found that there was a sound "capacity of mainstream schools to meet the needs of children with various difficulties though this was often dependent on the 'type' and 'severity' of those difficulties" (p. 197).

Elkins (2009) suggested that in order for inclusion to move forward in Australian schools, education authorities need to ensure that curriculum is modified appropriately, teachers take responsibility for students with special needs, effective school policies are developed and positive attitudes towards disability are encouraged. For these factors to be adequately addressed, all of the adults who work with the students with disabilities, including EASN, should have sufficient knowledge and skills to cater for a diverse range of student needs and abilities. Anderson, Klassen and Georgiou (2007) found that teachers cited the use of EASN as a key form of support that was necessary in a regular classroom to ensure that inclusion of students with disabilities was optimised for all parties.

2.3.3 Current Context of Inclusion.

Several researchers (Anderson, Klassen & Georgiou, 2007; Gessler Werts, Harris, Young Tillery & Roark, 2004) cite evidence to show that assistance in the

regular classroom is essential to the success of inclusion for students with special needs. When examining inclusion in the Western Australian context, this assistance is generally provided in the form of visiting support services (i.e. Centre for Inclusive Schooling, Vision Impairment Services, Western Australian Institute for the Deaf), School Psychologists, extra training for the teacher and, when deemed necessary, the provision of an Education Assistants Special Needs (EASN) to support the work of the teacher. In some countries the use of an EASN (or equivalent) is legally mandated to ensure that inclusion is more likely to be successful (Takala, 2007). This is not yet the case in Western Australia, although the implementation of the *Disability Standards for Education* (2005) gives much impetus to the need to use other adults to appropriately support students with special needs.

In 2002 the Department of Education and Training in Western Australia instigated a system-wide policy initiative in regards to inclusion. The first and second phases of this initiative were titled 'Building Inclusive Schools' (Department of Education, 2002d) and focused on implementing the policy at a system and district level (Anderson, Klassen & Georgiou, 2007). The third phase was titled 'Building Inclusive Classrooms' (Department of Education and Training, 2003) and focused on professional learning for teachers in regards to the theory behind the policy initiative and how to develop more inclusive classrooms.

The professional learning component of the policy, Building Inclusive Classrooms, was achieved through the development and dissemination of five learning modules, each focusing on a particular inclusive aspect (Department of

Education and Training, 2003). Module 1 examined inclusive education, what that meant for teachers and the theory underpinning inclusive education. Module 2 examined policy and legislation that was currently in place to support inclusive practice. Module 3 focused on building strong collaborative communities and examined the teacher's role as a change leader. Module 4 required teachers to examine their own beliefs and practices in regards to inclusion and consider what was required for the future. Module 5 was concerned with working in harmony and focused on the diversity of school staff and what is required to ensure that everyone is respected and included. Taken together, these modules form the basis of an in-depth examination of inclusion, particularly in reference to the individual environments of the teachers.

As well as the system-wide initiative promoting inclusion, a review of services for children with disabilities was completed in 2004. From the review a *10 Point Action Plan* (Department of Education and Training, 2004b) was developed which made "…recommendations that address culture, decision making, provision of resources and effective teaching and learning" (p. 3). The recommendations made include providing additional support for students with disabilities and difficulties, introducing a Learning Support Coordinator role in schools, designing appropriate new facilities, improved information and support materials for teachers and parents, more effective state-wide specialist support services, appropriate allocation of resources, clearly defined standards of practice (including clear policies and procedures), and appropriate processes to monitor the implementation of these recommendations.

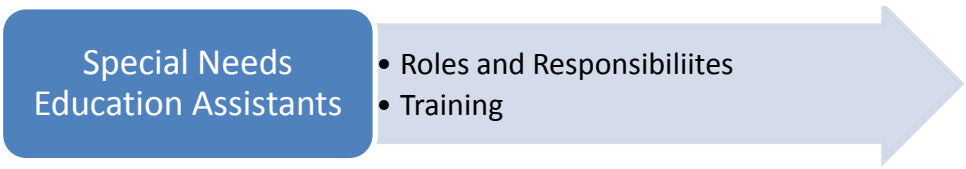
In addition to these recommendations, and of particular relevance to this study, the Action Plan also incorporated reference to the use of technology and training. Point 4 of the plan states the specific goal of "improved technology support for students with disabilities and diverse learning needs" (Department of Education and Training, 2004b, p. 1). Improving technology support for students requires an increased budget in the area of technology and increased support to schools provided by technology teams. Point 5 requires that there should be enhanced skills and values education for both teachers and education assistants. Improving skills and knowledge requires the provision of professional learning and a framework in which this learning will take place.

The Department of Education has subsequently developed a *Competency Framework for Education Assistants (Special Needs)* which details practice and professional criteria that are considered to be necessary to perform the tasks required of the EASN, in the current context of inclusion (Department of Education and Training, 2008). The competency framework was developed jointly with EASN and policy makers, and allows EASN to consider their effectiveness in a professional capacity, to identify areas for professional growth and professional development and to reflect on career development. The framework provides guidelines for line managers and administrators regarding performance management and identifying training opportunities, and also allows common understanding and discussion to develop between all stakeholders.

The framework explicitly details the requirements of the EASN to work with AT as part of dimension 6 – Administrative tasks and managing resources

(Department of Education and Training, 2008). As a result of the competency framework, EASN now have a clearer indication of their roles and responsibilities within the classroom and the extent of knowledge and skills that are required to be attained in order to be considered effective. The development of the competency framework also has implications for the professional development opportunities that must be made available to EASN to ensure that they have the best possible chance to gain needed skills and knowledge.

2.4 Education Assistants Special Needs (EASN)



2.4.1 Roles and Responsibilities of the Education Assistants Special Needs.

'Education Assistants Special Needs' (EASN) is a term used in Western Australia to describe an adult in the classroom who assists the teacher in implementing the educational program of that classroom. EASN are often employed to assist children with special learning needs to access the curriculum and the social environment in the classroom (Broadbent & Burgess, 2003; Takala, 2007). Education Assistants are known by a variety of synonymous terms such as teacher assistant, teacher aide, learning support assistant, classroom assistant, para-educator, paraprofessional or special needs assistant (Carter, O'Rourke, Sisco & Pelsue, 2009; Giangreco, Suter, & Doyle, 2010). For the purpose of this study the term Education Assistants Special Needs (EASN) will be used in the text, as it the term favoured by the Department of Education in Western Australia, with whom the cohort under

investigation were employed. A wide range of search terms were used to locate relevant literature in this area and incorporated all terms (previously mentioned) that may be used to describe Educational Assistants Special Needs.

The number of EASN employed in regular classroom settings has been increasing over the last two decades (Department for Education and Skills, 2003; Ghere & York-Barr, 2007; McKenzie & Lewis, 2008; Rose & Forlin, 2010). Indeed, "in some schools they already outnumber teachers" (Kerry, 2005, p. 374). Giangreco, Smith and Pinckney (2006) have noted an increase in the ratio of EASN to students with disabilities in the state of Vermont (US) from 1:10 in 1990 to 1:4 in 2005. This correlates with a 300% increase in the numbers of EASN in the Vermont district (Suter & Giangreco, 2009). Swann et al. (cited by Hancock & Eyres, 2004) discuss the increase in staff numbers in schools in England from 1992 to 2000 as being 3.3% for teachers and 111% for support staff (mainly education assistants). Hancock and Eyres (2004) suggested that the EASN employed to assist students who may be at risk of academic failure have responsibility for the remedial education of up to 25% of students in British schools. This increase in the number of EASN is partly due to the growing inclusion of students with disabilities into these settings, but may have also been compounded by a shortage of qualified special education teachers and an increasing requirement of teachers to complete large quantities of administrative tasks, including paperwork (Lee, 2003; McGarvey, Marriott, Morgan & Abbott, 1996). Many other countries have also experienced a substantial increase in the number of education assistants employed in both regular and segregated settings, including Finland, the US and Australia (Broadbent & Burgess, 2003; Takala, 2007).

Legal requirements in the USA, UK and Australia have influenced the increased use of classroom support to assist teachers to cater effectively for students with disabilities. In the USA, the main legislation in regards to the provision for students with disabilities is the *Individuals with Disabilities Education Improvement Act* (United States Congress, 2004), while in the UK the *Every Child Matters: Change for Children* policy (Department for Education and Skills, 2004) is of key importance. Legislation has impacted on the use of EASN in Western Australian schools, as they are often seen as the best way to accommodate children who are having difficulty in the regular setting (Giangreco, Smith & Pinckney, 2006). In particular the *Disability Standards for Education 2005* (Commonwealth of Australia, 2005) require that a student with special learning needs be provided for in the areas of participation, curriculum and student support. This provision may entail the use of the EASN in order to meet these requirements.

Some researchers feel that the increased use of EASN to support the students with special needs in a regular classroom can potentially have unintended or even negative effects (Causton-Theoharis & Malmgren, 2005; Giangreco, 2003; Giangreco & Broer, 2005; Giangreco, Smith & Pinckney, 2006). These effects may include a loss of social interaction for the individual student, an over-dependence on adults, and lack of access for the student to appropriately trained teachers. This may be due to teachers leaving the education of the student with special needs in the hands of the EASN. Giangreco, Smith and Pinckney (2006) stated that this situation should not occur, that the teacher must take responsibility for the educational program of the student, rather than the EASN, and that the inappropriate use of the EASN may be an indicator that the school itself is not functioning well. As EASN

receive further training, there is also the danger that the teacher will relinquish even more of the responsibility for the student, as they feel that the EASN is now able to take on this role (Ghere & York-Barr, 2007; Giangreco, 2003). In some cases, it has been reported that EASN communicate more with parents than the classroom teacher, and often this is without adequate supervision, a role that may not be considered appropriate for an EASN (Giangreco & Broer, 2005). Breton (2010) described a study undertaken with EASN which required them to identify how often they received feedback from the teachers who were supervising them. A large number (39.5%) stated that they never received feedback from the teacher, which is very concerning, particularly if they are involved in delivering complex programs. Appropriate supervision, as well as training, is an important aspect in the utilisation of the EASN in the classroom, and is an element that Giangreco, Smith and Pinckney (2006) feel has not been adequately addressed.

Retention of EASN in a school is an issue that has been raised in regards to the ability of schools to ensure program continuity and to be cost effective (Ghere & York-Barr, 2007; Giangreco & Broer, 2005; Giangreco, Suter & Doyle, 2010). With EASN now being seen as a vital part of the inclusion of students with special needs, it is also necessary to consider how they are best managed within the school. Ghere and York-Barr (2007) stated that the turnover of EASN in a school has a large impact in many areas. Where the EASN play a substantial role in supporting inclusive programs, loss of effective and experienced staff can impact on the costs and time involved in managing these programs. Giangreco, Suter and Doyle (2010, p. 44) suggested that "…turnover can adversely affect students' educational programs and have a disruptive effect on relationships among team members as

well". In turn, a loss of experienced staff may impact on the district and state level implications for the continuing input into the programs being run. One of the reasons posited for the turnover of EASN is the poor clarification of roles and responsibilities at the initial employment phase. Inadequate understanding of the role may lead some EASN to become discouraged about training and career prospects, and cause them to seek alternative employment.

Often there is confusion over the role of the EASN in the classroom and this can lead to a lack of understanding of responsibilities and approaches that are required (Broadbent & Burgess, 2003; Collins & Simco, 2006; Dew-Hughes, Brayton & Blandford, 1998; Moran & Abbott, 2002). The roles of EASN have evolved over time from that of the general assistant to the teacher to one of greater responsibility and management in the classroom (Fox, 1998; Groom, 2006; Moran & Abbott, 2002; Takala, 2007). Whereas EASN may have previously taken a peripheral role in the classroom, they are now more likely to be substantially involved in the educational program of an individual child, small group of children, or on occasion, a whole class. Rather than one EASN working with one student, it is now seen as being more beneficial (both academically and socially) for the EASN to facilitate learning and work with a variety of students within the classroom (Giangreco, Smith & Pinckney, 2006; Groom, 2006; Lee, 2003; Moran & Abbott, 2002).

EASN in the regular classroom are experiencing a rapid change in role from that of being an 'extra pair of hands' (Potter & Richardson, 1999) to being an essential part of the instructional team. Where previously the EASN may have been

responsible for such tasks as photocopying, cutting out resources, laminating, and washing paint pots, they now take on roles such as providing instruction, managing behaviour, and even designing curriculum, although there is some dispute about the ability and/or suitability of the EASN to perform these functions (Giangreco, Smith & Pinckney, 2006; Giangreco & Broer, 2005; Hancock & Eyres, 2004; Kerry, 2005; Lee, 2003; Potter & Richardson, 1999). Giangreco and Broer (2005) suggested that many students with special educational needs are getting their instruction primarily from the EASN. There is therefore a need to ensure that the EASN has appropriate knowledge and skills to adequately cater for the students, and to address the requirements of these changing roles with appropriate training (Butt & Lance, 2005).

Hancock and Eyres (2004) stated that the EASN is almost an invisible member of the school staff. They suggested that EASN have taken on many duties normally associated with a teachers' role, but are more poorly paid, have limited career paths, little job security and training that may be variable, if offered at all. In order to plainly define roles and responsibilities EASN require a clear job description, induction on school policy and procedure, a designated line-manger, and involvement in planning and evaluation meetings (Giangreco & Broer, 2005; Groom, 2006). Mistry, Burton and Brundrett (2004) suggested that appropriate and effective communication and logical line-management structures would improve the situation in many schools. Effective team building practices within the school will enhance the capacity of the school to effectively deploy EASN in an appropriate manner. The more involved in the classroom planning, the greater the ability of the EASN to determine the support that is required by the student or students with whom they are working. For example, if a teacher discusses the day's lessons and the

outcomes that are expected for the lessons prior to the beginning of school each morning, the EASN will have a clear understanding of the expectations of the student/s and their role in ensuring the success of the lesson.

In an attempt to define the role of the EASN, Kerry (2005) created a typology of roles in which the EASN may be involved. These include:

- Dogsbody (menial tasks and little respect from managers)
- Teacher's PA (deals with routine classroom paperwork and runs errands)
- Factotum (versatile role dealing with paperwork and individual instruction)
- Carer/Mentor (concerned with physical or psychological welfare)
- Behaviour Manager (responsible for behavioural support for an individual or group)
- Curriculum Supporter (prepare and revise curriculum materials and plan aspects of curriculum)

Other roles that he identified included a 'ring-fenced operative' (i.e. role requiring specialist training), a specialist (such as a translator who is used for translating, not teaching), a delineated paraprofessional (where teacher and EASN duties are highly compartmentalised), teacher support and substitute (teaching individual and small groups under teacher guidance), and a mobile paraprofessional (a trained person who may teach whole classes under supervision) (Kerry, 2005). Each of these descriptors indicates a different level of task requirement and responsibility for the EASN within the classroom environment.

Of these roles, the ones that, anecdotally, are most commonly identifiable in schools in Western Australia include those of factotum (somebody who does many

jobs), behaviour manager (particularly during recess and lunch time) and a delineated paraprofessional. Some EASN may also relate to the role of the dogsbody, particularly if they have had poor working relationships with teachers. The tasks within a classroom that could possibly be completed by either the EASN or the teacher are those that cause the most role confusion (Calder & Greive, 2004).

Takala (2007) has examined the work undertaken by EASN in mainstream and special education settings. She states that the division of work between teacher and EASN varies considerably and that the content of the work undertaken by the EASN also varied according to the setting in which they were working and the age of the students. EASN working in mainstream settings, for example, were more likely to work directly with the student in a one-on-one capacity, whereas EASN in a special education setting tended to work more closely with the teacher and in a less direct way with the student (Takala, 2007). Similarly, younger students required more direct assistance than older students, and EASN working with older students noted that they spent more time observing and listening to the teacher, than those working with younger students. Some of the skills that teachers have identified as being important for EASN to possess are listening skills, an ability to work unassisted when necessary, an understanding of student needs, adaptability and a willingness to learn and be part of a team (Groom, 2006).

There is often great variation in experience and skills of EASN and this may impact on the role that they undertake in the classroom (Griffin-Shirley & Matlock, 2004; McGarvey, Marriott, Morgan & Abbott, 1996). EASN may also be underused, having talents and skills which are not fully recognised or utilised in the

classroom (Griffin-Shirley & Matlock, 2004; Mistry, Burton & Brundrett, 2004). Occasionally, the teacher can feel overwhelmed by the responsibilities of teaching and will unwittingly leave the EASN to make decisions about the educational program of children with special needs without the EASN having adequate knowledge or skills in the area and without appropriate supervision (Giangreco, 2003). Groom (2006) described some key factors that determine effective collaboration between teachers and EASN. These factors include the schools valuing the work of the EASN, involving EASN in planning and reviewing, opportunities for regular meetings, collaborative opportunities and providing quality professional development. It is important that the EASN is a valued member of the school and classroom as children do not necessarily differentiate between the teacher and the EASN, seeing them both as 'helping adults' (Bowers, 1997; Eyres, Cable, Hancock & Turner, 2004). The EASN can act as a constant in the classroom, particularly if there is a great deal of change of classroom teacher or structure.

Several researchers (Cremin, Thomas & Vincett, 2005; Moran & Abbott, 2002) have referred to models of deployment for EASN in regular classroom settings and the importance of disseminating these models to teachers who may have not previously had to work closely with another adult. Cremin, Thomas and Vincett (2005), for example, discuss the use of three different models to improve and even establish teamwork between teachers and EASN within the classroom and suggest that a structured approach to EASN'S work within a classroom will have beneficial effects for the students. The three models they describe are the room management, zoning and reflective teamwork models. The room management model involves the people in the classroom taking on the role of individual helper, activity manager or

mover. Either the teacher or the EASN can take on any of these roles, depending on the requirements of the classroom. In a zoning model, the room is divided or 'zoned' so that each person has responsibility for a section of the room or for particular groups. The composition of these groups is determined jointly beforehand in regards to the students and their needs. The last model described is that of reflective teamwork. This requires that the teacher and EASN devote at least one 15 minute session per week to reflect on the week and plan ahead for the following week (Cremin, Thomas & Vincett, 2003). Moran and Abbott (2002) stated that when teachers receive training on how to effectively deploy EASN in a classroom environment, that the learning of all students within the classroom will potentially be improved.

While the in-class deployment of EASN is a key consideration in an inclusive classroom, EASN may also be utilised in other ways that do not necessarily involve work in the classroom. Logan and Fieler (2006) described the role of the EASN in linking school and family, and how this can substantially improve the communication between the school and the parents, as well as promoting positive learning practices within the home setting. Giangreco (2003) discusses the use of the EASN in such a way as to increase the instructional time that the teacher spends with the students, as the teacher is generally the more highly trained of the two. One suggestion includes having the EASN take the whole class, and have the teacher work one-on-one with students who require assistance. Once again, much thought needs to be given to the best way to employ the abilities of both teachers and EASN in a specific classroom environment.

In Western Australia, the Department of Education provides for three levels of EASN, with a number of sub-levels within these. A level 1 assistant has the lowest level of qualification and works as a general education assistant, rather than with a specific cohort of students. "Employees at this level work under direct supervision [of the teacher] performing routine tasks which require a basic competency" (Department of Education and Training, 2002a, p. 2). EASN at level 1 are required to assist the teacher in preparing the resources and education programs, caring for the students (including during excursions), preparing food and feeding, administrative support and toileting where necessary. There is little autonomy at this level, although some EASN are given responsibility for teaching small groups or individuals, with supervision.

Level Two EASN are those with greater experience or higher qualifications, or who work with a specific group of students, such as those with language difficulties. "Employees at this level work under general supervision and guidance, performing tasks that require limited discretion and judgement in achieving clearly defined outcomes determined by the teacher" (Department of Education and Training, 2002b, p. 2). At this level, EASN are required to perform the same duties as a level 1 EASN, but may do so under general, rather than direct, teacher guidance. They may also be asked to implement specialised programs, assist in delivery of planned programs, provide feedback on programs, be involved in evaluation processes, assist with communication, collect resources, and (with teacher supervision) give feedback to parents and caregivers.

The level 3 EASN has generally received a qualification in the form of a Certificate 4 Teacher Assistant from a Technical and Further Education institution (TAFE), or a university-run Teacher Assistant course. The Level 3 EASN often works with more challenging students, such as those with significant support needs, or challenging behaviours. "Employees at this level work under limited supervision and may be expected to participate within a team situation, offering advice and expertise relating to their relevant area" (Department of Education and Training, 2002c, p. 2). The level 3 EASN is expected to be able to perform the tasks required of a level 1 and 2 EASN, and may also be required to provide support and advice to teachers on students at risk, design and implement behaviour management programs, maintain records, assist with life-skill training, consult with parents and provide physical restraint (where appropriate).

All EASN working with students with special needs (at level 1, 2 or 3), are required to have knowledge and competence in the area of technology to support learning (Department of Education, 2008). Some of these requirements include the ability to implement programs using computer technologies, using technology to create or modify resources, assisting students with health care or mobility devices, and using and facilitating the use of communication devices. All level 3 EASN require a high level of competency in the "…application of technology to support learning" (Department of Education and Training, 2008, p. 12). This generally includes some type of formalised training in the area of technology and/or assistive technology, to ensure that the appropriate skills and knowledge are developed and maintained by the EASN.

2.4.2 Training of Education Assistants Special Needs.

Education Assistants Special Needs come to the regular classroom with a wide variety of skills, knowledge and training. Some of the EASN have attended formalised training courses for education assistants, either in the area of special education or early childhood education. These are often undertaken at a local university or college and may equate to a Certificate course or even a Diploma course and some EASN may eventually access further training to become qualified teachers (Christie, 2005). These courses range in duration, with some being part time over a six month period, and others over a twelve month period. These initial courses are designed to ensure the EASN have the basic skills and knowledge required to begin working in the role. It is generally assumed that they will access ongoing professional development throughout their careers.

Many EASN currently working within the education system in Western Australia have no recognised qualification, but have accessed formal training courses through the schools at which they are employed. This training, often known as 'on-the-job' training, is generally quite specific in relation to areas in which the EASN is required to provide support (i.e. behaviour management, visual cues, communication) and may have allowed the EASN to have developed a large knowledge base over time (French 2002). A large number of EASN have previously taken on the role as EASN when their own children began formal schooling, particularly as they had little formal training, and were sometimes referred to as 'Mum's Army' (Ainscow, 2000). With the change in roles and responsibilities for EASN, however, this is no longer an apt descriptor.

Although it is recognised that training is a vital element in the efficient use of EASN in the regular classroom, this has often been overlooked by school systems (Cobb, 2007; Giangreco, Smith & Pinckney, 2006; Kerry, 2005; Moran & Abbott, 2002). Giangreco, Suter and Doyle (2010), in a review of research into paraprofessionals in American schools, state that there is still very much a need for training to be both available to EASN, and of adequate quality and that this need is persistent over time. This view is supported by Breton (2010) after research into the training received by EASN over a twelve month period. Approximately 27.5% of the EASN surveyed had received two hours (or less) of training over the 12 months. Even though the schools involved had professional development days set aside, the EASN were generally not paid to attend these days if they were not scheduled to work and therefore often did not access the professional development. Even when they were available to attend, the professional development was often not relevant to the needs of the EASN.

Butt and Lance (2005) surveyed teachers in regards to their perceptions of the training needs of the assistants with whom they worked and 78% reported that the assistants would benefit from more training, while Takala (2007), discusses the practice of placing the least trained person (the EA) with the students with the most demanding needs as being unethical, but widespread. Dew-Hughes, Brayton and Blandford (1998) surveyed 274 EASN in England in regards to the structure of their employment and roles and responsibilities. In-service professional development was cited as an issue that needed to be addressed by education authorities to ensure that the EASN were trained to a high level and so that their professionalism was recognised. In particular, 52% of the EASN surveyed requested that training be

undertaken in the area of information technology (Dew-Hughes, Brayton & Blandford, 1998, p. 181). Griffin-Shirley and Matlock (2004) also surveyed EASN working with students with vision impairments in regards to their descriptions of their jobs, their responsibilities, the training they had received and any further training desired. The training that the EASN thought was most needed, but that was also the most desired by them, was training in assistive technology. It was also suggested that teachers and EASN be trained together so that each was clear about the other's responsibilities.

As EASN can spend a great deal of instructional time assisting students with special needs (up to 50% without a teacher present in some cases), training to ensure that they are able to be as effective as possible is required (Broadbent & Burgess, 2003; Keller, Bucholz & Brady, 2007). Increasing the knowledge of EASN can assist them to increase the instructional time for the student, which has been shown to be an indicator of student success (Groom, 2006; Kennedy, 1999 cited in Giangreco, Smith & Pinckney, 2006). Ghere and York-Barr (2007) found that customised in-service training for Education Assistants, that assisted them to support students with special needs, was vital in order to retain quality staff. It has been shown that when EASN have appropriate training that their confidence and competence are enhanced (Rose & Forlin, 2010; Weintraub Moore & Wilcox, 2006; Woolfson & Truswell, 2005). Such training must be relevant to the role of the EASN and be part of their paid time, rather than as an additional cost or time burden for the EASN (Lee, 2003). It is important that the EASN feel able to complete the tasks required of them.

Causton-Theoharis, Giangreco, Doyle and Vadasy (2007) described the role of an EASN during literacy instruction as supporting the teacher or special educator, but not making the key decisions about what is to be taught and how. The use of research-based instructional approaches is suggested as being a necessary element when employing EASN, so that pedogological decisions are in place prior to the beginning of teaching. Training in the use of the chosen approach and in management of the students is deemed to be critical to the success of any program. Causton-Theoharis, et al. (2007) cite Erlbaum et al. (2000) as indicating that student success in a one-on-one situation could be influenced by the training of the instructor. When provided with appropriate training, it was found that people who were not qualified teachers had an effect on the increase in reading skills for students (Miller, 2003; Vadasy et al., 2006, cited in Causton-Theoharis, et al., 2007).

EASN, even when they have training, have much less training than qualified teachers and special educators (Causton-Theoharis et al., 2007). Giangreco, Suter and Doyle (2010) stated that a study undertaken by Giangreco, Backus, Cichoski Kelly, Sherman, and Mavropoulos (2003) provided evidence of a gain in knowledge, perspectives and skills across content areas for EASN as a result of the training undertaken. The literature tends to indicate that there is a need to provide opportunity and continuity in professional development opportunities for EASN (Collins & Simco, 2006; Cremin, Thomas & Vincett, 2005).

EASN may be assigned to work in a classroom in a variety of ways. These include working with the individual student, within a specific classroom, within a grade level, or within a cluster grouping, for example early childhood (Cobb, 2007;

Fox, 1998). The role of the EASN will impact upon the training that is required. Cobb (2007) outlines a training format that can be used to assist in training EASN to work effectively with students who have literacy difficulties. She suggested that the training consists of three steps: needs assessment, planning of training sessions and follow up and consultation. Feedback is obtained from the EASN in regards to the use of the strategies in the classroom setting and this can then be used to aid further planning in the area. French (2002) also described needs assessment, teaching new skills and giving feedback as important aspects of maximising the use of EASN in the classroom.

Good initial training and in-service training that adequately matches the role that the EASN is undertaking in the classroom is required to ensure that they have the capacity to work well with the students and as a team member within the classroom (Giangreco, 2003). Breton (2010), however, described a recent survey of EASN in which 29.1% were not satisfied with or uncertain about their initial training in relation to the roles they performed. Giangreco (2003) also provided a warning that "although paraprofessional training certainly is a step in the right direction, it is typically insufficient to prepare paraprofessionals to perform the instructional duties that teachers increasingly ask of them" (p. 50).

The use of EASN to provide direction to small groups of students who may be struggling with specific content areas has been suggested as an effective use of their time in the classroom (Muijs & Reynolds, 2003). This may allow more individualised attention for students who require a more directed approach to their learning, without the negative aspects that may be associated with one-to-one

assistance. Muijs and Reynolds (2003) suggested that there is mixed evidence for the efficacy of this approach and that further research is required to determine the effects of EASN working with small groups or individual students. Training must be given of a sufficient length and depth to ensure that the EASN has the required skills and knowledge to effect change in a student's understanding of content. It is not enough to simply increase the number of adults in the classroom (Broadbent & Burgess, 2003; Cremin, Thomas & Vincett, 2003).

A survey of parents found that there is a need for more training, and better communication with the EASN (Gessler-Werts, Harris, Young Tillery, & Roark, 2004). The parents felt that the EASN was an important member of staff in the class and, as they were working closely with their child, that they had a good understanding of the needs of the child. The perceived importance of the role has implications for the training requirements of the EASN, as they must be able to understand the difficulties faced by the student and have a bank of strategies to use in varied situations and for a number of different tasks. Teachers also feel that EASN require further training with a recent study finding that 78% (of 181) teachers surveyed indicating such training was necessary (Butt & Lance, 2005).

The types of training that are required by EASN will vary depending on the previous qualifications and experience of the EASN, but should be based on best practice and be offered in an ongoing nature (Bugaj, 2002; Christie, 2005). Suggestions from district staff, teachers and EASN can assist in developing training programs at all levels that will support the work of the EASN in the classroom, and be effectively targeted towards the required skills and knowledge. The training that

has been identified by EASN as being most sought after includes behaviour management and record keeping, classroom management, instructional skills, communication methods and AT (Breton 2010; Bugaj, 2002; Rose & Forlin, 2010; Schepis, Ownbey, Parsons & Reid, 2000). Other features of training generally include examination of roles and responsibilities, ethics and confidentiality, and working with teachers and parents. Regardless of the types of training offered, the Department for Education and Skills (2005) in the UK stated that there is a need to "…provide for a more consistent approach to the provision of excellent and stimulating continuous professional development" (p. 88).

One way of identifying the training needs of EASN is to conduct a needs assessment prior to the development of the training (Cobb, 2007; Schepis, et al., 2000). Some ways in which the needs assessment can be undertaken include circulating a list of potential training areas to staff so that they can prioritise the order in which they would like to see the training delivered (Cobb, 2007), or so that teachers can indicate which instructional strategies they most use within the classroom so that these can be used as a basis for developing training. Alternatively, a survey, memo or open-ended questionnaire can be used to gather appropriate information from EASN. Interviews with participants may also be effective in suggesting areas of need (Breton, 2010). As part of the development of the training, Cobb (2007) suggested that providing "…background information, an explanation, practical applications, and opportunities for participants to practice" (p. 688) are important elements to incorporate. A follow-up discussion at the completion of the training session will assist EASN to consolidate the information learnt and consider how to apply it in their contexts.

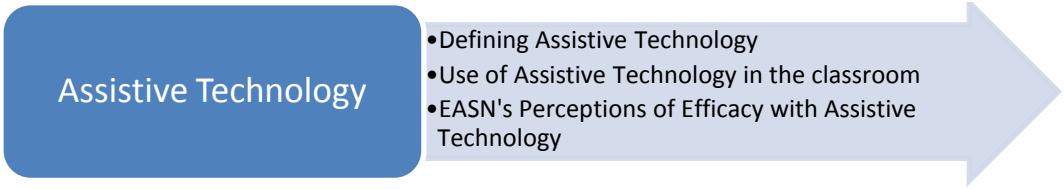
In some situations, the training needs to be targeted to specific groups of EASN, in particular those who work with students with severe and profound disabilities, visual impairments and reading disabilities, as they may require access to very specific types of training (Aird, 2000; Cobb, 2007; Russotti & Shaw, 2004). Burgess and Mayes (2009), when evaluating EASN's perceptions of a training program for high level EA status, found that the EASN involved reported individual differences in requirements for training, which, if addressed, would have made the training more relevant for them. McKenzie and Lewis (2008) surveyed 107 EASN in regards to the training they had received and that which they still desired. Many (49.5%) stated that, although they had received some training in assistive technology, it was the area in which they felt more was needed. It was, in fact, the most requested area for further training.

Bugaj (2002) stated that distance, cost and time are all factors which influence the availability of training for EASN, particularly in rural areas. He recommends the use of technology in the form of online learning as a way to overcome some of these difficulties, citing the University of Nebraska Para-educator Training Program (University of Nebraska-Lincoln, n.d.) as an example. This program provides web-based training for EASN and teachers who are supervising them. Another training format advocated by Potter and Richardson (1999), is that of video feedback to promote reflective practice. Short video clips of the EASN working within the classroom are used to promote discussion among the teaching team on current practice within the classroom and can be used as a tool for determining gaps in knowledge and skills. If possible these gaps can be addressed

immediately in the context of a group problem-solving session, where all parties share experiences and suggestions for future practice.

Hancock and Eyres (2004) stated that EASN have "variable access to training" (p. 231). In Western Australia, EASN are able to access training in the area of assistive technology, among other areas, through the Centre for Inclusive Schooling (CIS). It is a requirement that a staff member has completed a course on the AT through the CIS if the school is going to borrow equipment through the Centre (H. Epton, personal communication, 26 March 2008). There is limited training in general knowledge of AT and in specific applications that are not those used by the Department. The training may not be offered over a long duration (i.e. one off sessions), not be targeted sufficiently, or be inaccessible (i.e. long distance to travel). It is also required that the school principal makes staff aware of the training opportunities that are available and that the school has the necessary relief staff to cover absences. For various reasons this does not always occur. It is not enough to provide training on an intermittent basis. Ongoing professional development is needed so that EASN have the capacity to discuss experiences, and share information with other EASN and teachers (Keller, Bucholz & Brady, 2007).

2.5 Assistive Technology



2.5.1 Defining Assistive Technology.

The ability to use computers and technology is a growing requirement for children and adults in today's society (Besio & Salminen; 2004; Netherton & Deal, 2006; Parsons, Daniels, Porter & Robertson, 2008). Scherer (2005) suggested that much of the increase in use of technology (including assistive technology) has been driven by mainstream users who are struggling to 'keep up' in a complicated and busy world. Due to the increasing use and reliance on technology in all aspects of life, including communication and information attainment, students must be taught effective ways to use and access the available technology. Just having the technology in the room, or using it because it is there, is insufficient (Besio & Salminen, 2004; Nelson, 2006; Rapp, 2005). Educators must ensure that appropriate pedagogies are employed when working with students and technology (Besio & Salminen, 2004; Duhaney & Duhaney, 2000; King-Sears & Evmenova, 2007) and that the use of the technology has been applied to appropriate activities.

When assisting students with special needs to access the curriculum, AT and/or instructional technology may be used (Blackhurst, 2005; Jost & Mosley, 2011; Rose & Meyer, 2000; Stoner, Beck, Dennis & Parette, 2011). Blackhurst (2005) also distinguishes between different technologies such as those that improve productivity (e.g. computers allowing more efficient work) and information attainment (e.g. the World Wide Web). Instructional technology is that which is used by all students in the class to enhance learning experiences (Loeding, 2002; Parsons & Cobb, 2011; Stoner, Beck, Dennis & Parette, 2011). Examples of instructional technology include computers, a virtual reality system, and an electronic whiteboard or a projector, coupled with appropriate learning software. The technology by itself

is, however, not sufficient; rather the instruction that is delivered with the support of the technology is the key element: poor instruction will result in poor learning outcomes (Blackhurst, 2005).

AT is defined in the US *Individuals with Disabilities Education Act* as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (United States Congress, 2004, sec 602.1). The Australian Government does not provide a consistent definition of assistive technology, although some of the states and territories may do so. For example, in Queensland, AT is defined as "…practical solutions to everyday activities for people with disability, people with long or short term injury, and seniors. Assistive, adaptive and rehabilitative devices allow you to perform tasks that you may be otherwise unable to do, improve quality of life and allow you to remain independent. They range from devices which assist with the use of computers to heavy lifting aids and making general household tasks like turning taps or reaching light bulbs easier" (Queensland Government, 2012, Glossary, para. 1). AT may allow a student to access regular classroom activities that may not otherwise be available to them (Borg, Larsson & Östergren, 2011; Rose & Meyer, 2000) and therefore enhance opportunities to increase or improve upon learning outcomes. Examples of AT include voice output devices, adapted switch software, talking calculators and computer screen magnifiers.

The key differences between instructional and assistive technologies are the intent and audience for the technology, and the function for which it is used. What

may be an instructional technology for one student may be considered an AT for another (Jost & Mosely, 2011). An electronic whiteboard, for example, may be a useful piece of instructional technology for the teacher when taking whole class lessons, but may be considered an AT when used with specific targeted computer software for a small group of struggling students, or for a student who has organisational or visual difficulties. Subject content and academic skills are often targeted through instructional technology, but this does not necessarily accommodate for difficulties that students may be experiencing (Stanberry & Raskind, 2009). There are also occasions when the technology may be both instructional and assistive. Parsons and Cobb (2011), for example, described a virtual reality system for students on the autism spectrum that may act as both an instructional tool (teaching vocabulary) and as an assistive tool (supporting social interaction).

Rose and Meyer (2000) suggested that further developments in technology will act as catalysts for changing the nature of how technology (both instructional and assistive) is used in the classroom, and that differentiation between the two will become outmoded, leading to true Universal Design for Learning (Center for Applied Special Technology [CAST], 2010). Universal Design for Learning (UDL) "…provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone-not a single, one-size-fits-all solution but rather flexible approaches that can be customized and adjusted for individual needs" (CAST, 2010, para. 2). UDL provides students with multiple means of representation of information (i.e. textually, graphically, verbally), multiple means of expression (i.e. video, text, voice, picture), and multiple means of engagement with the

materials (i.e. novelty, similarity), depending on their individual needs and learning strengths.

Through use of currently available assistive technology, people with physical, intellectual or sensory impairments can access the curriculum and social/recreational environment of the school or community, where this may have previously been extremely difficult or even impossible for the person (Borg, Larsson & Östergren, 2011; Netherton & Deal, 2006). These benefits are often evident throughout the lifespan of a person with a disability and have advanced to a point beyond what could have been imagined 20 years ago (Bryant, Bryant, Shih & Seok, 2010). AT allows students with disabilities to be included in settings which are the least restrictive for them (allows them the greatest choice), "level[s] the playing field" (Loeding, 2002), leads to more confidence and higher self-esteem (Duhaney & Duhaney, 2000; Scherer, 2005) and assists teachers to meet goals for these students (Campbell, Milbourne, Dugan & Wilcox, 2006; Netherton & Deal, 2006). Stanberry and Raskind (2009) stated that students with learning disabilities, in particular, benefit from the use of assistive technologies by being able to use their strengths to bypass areas of difficulty. A good example of this is the use of audio books and good listening skills to bypass a reading difficulty. The provision of AT can mean the difference between the student remaining in an inclusive setting or having to access a segregated special education setting.

The Individuals with Disabilities Act coming into effect in the United States (originally in 1992), drove further inclusion and the use of the AT for students with disabilities. The *Assistive Technology Act* was passed into law in 1998 (Library of

Congress, 1998). This act directly relates to the provision of funding for each of the States to develop state-wide programs to assist individuals to gain access to AT and associated services. These funds are intended to increase the availability of assistive technology, the involvement of all stakeholders including those who are in rural and underrepresented populations, to ensure coordination between agencies (including private agencies), and to expand the skills and awareness of both service providers and people who access the assistive technology. While Australia does not have equivalent legislation related directly to AT use, the *Disability Standards in Education 2005* (Commonwealth of Australia, 2005) may support the attainment and use of AT through the standards of participation and curriculum. Stronger legislation in this area would have a greater impact on the availability and consideration of AT (and understanding of benefits and uses) in Australian schools.

Lack of access to assistive technology, which may be required to increase an individual's functionality, may be described as an environmental barrier for the student (Borg, Larsson & Östergren, 2011; Scherer, 2005). In the USA, it is necessary to at least consider the use of AT as part of the IEP (Individual Education Plan/Program) process for a student who is eligible for special education provision. Subsequent funding from the government to support the purchase of the AT is available is some cases (Bausch, Mittler, Hasselbring, & Cross, 2005). In the US education system, AT must be provided to the student if it is required for them to access the least restrictive environment, to implement the goals of the IEP, or to benefit from the placement in the classroom (Library of Congress, 1998; Netherton & Deal, 2006). In Western Australia there is opportunity for schools in the Government sector to access AT through the Assistive Technology Team based at

the Centre of Inclusive Schooling (Department of Education, 2010b). The Assistive Technology Team provides schools with access to a wide range of support from visiting teachers as well as software and hardware consultancy. The team also offers a range of professional learning and a loan system for software and hardware. These resources are only available to Government schools, however, the Independent and Catholic school sectors also have consultants who may provide assistance in this area (including assisting with funding applications).

Access to the curriculum/social environment and skills that are acquired through the use of AT should be those that will benefit the student in their current or next probable environment (i.e. primary school, secondary school, tertiary setting, workplace, or community). Bryant, Bryant, Shih and Seok (2010) suggested that assistive technologies are generally grouped into seven main categories: "…positioning and seating, mobility, augmentative and alternative communication, computer access, adaptive toys and games, adaptive environments, and instructional aids" (p. 204). Students who may have previously struggled to write may be assisted by tools such as voice recognition software, alternative keyboards and word prediction software. Mobility aids such as walking frames, wheelchairs and prosthetics assist those with physical difficulties to access areas of the school and community and participate in sports and recreational activities (Netherton & Deal, 2006).

There is a wide variety of assistive devices available, and the range is increasing rapidly (Evans, Williams & Metcalf, 2010; Loeding, 2002). Simpson, McBride, Spencer, Lowdermilk and Lynch (2009) stated that there are now over

29 000 AT devices available, compared to less than 100 in the 1970s. AT may be considered for use with very young children (possibly younger than 24 months of age) as well as with older children and adults (Dugan, Campbell & Wilcox, 2006). As the products become more widely available and are in more common use in school systems, it is hoped that the price will also reduce to a more affordable level for all potential users.

Assistive devices are often referred to as existing along a continuum and may be classed as low-tech, medium-tech or high-tech depending on the level of sophistication (Blackhurst, 2001; Hopkins, 2006a; King-Sears & Evmenova, 2007; Netherton & Deal, 2006). Often devices that are not electronic, or that are simple to make or acquire, are referred to as low-tech devices (Evans, Williams & Metcalf, 2010; Rose Plaxen, 2005; Scherer, 2005). These may include items such as a built up spoon handle, bowls with lips, communication boards, sticky notes and pen grips. Low-tech devices may be useful in the classroom as they are generally not complicated to use and require minimal maintenance. In addition, they may be disposable or easily replaced (e.g. plastic cup with slot cut out for student who cannot tip their head to drink). Easy replacement is vital if the student is known for exhibiting destructive behaviour (and regularly damages equipment) or if the device is expended quickly (e.g. large print materials that need to be developed rapidly in accordance with individual class programs). A small sample of low-tech assistive technologies is illustrated in Table 2.1.

Table 2.1

Examples of Low-Tech Assistive Technology That May Be Used to Support Students

Low-Tech Assistive Technology	**Functional Area**
Modified drinking cup	Independent skills
Large grip spoon handle	Independent skills
Colour coding	Organisational skills
Desk-side holder	Organisational skills
Large print materials	Visual access
Magnifying glass/tool	Visual access
Modified board games	Physical access
Pencil grips	Physical access
Book holders	Physical access
Visual cues	Communication skills
Communication board	Communication skills

Medium-tech devices are reasonably complicated devices such as tape recorders, talking calculators, visual timers and wheelchairs (Evans, Williams & Metcalf; 2010; King-Sears & Evmenova, 2007). The distinction between medium and high-tech AT may be very fine. The distinction is often made by examining the cost and relative complexity of the device; the more costly and complicated to use, the more likely it is that the device is of a high-tech nature. Medium-tech devices generally only require basic instruction or minimal ability to use, and are not overly complicated to operate. They may be useful in an educational setting due to this ease of use, and also to the relatively low cost when compared to high-tech assistive

devices. Simple computer software that requires minimal training or knowledge to use may also be included as a medium-tech assistive technology. Further examples of medium-tech devices and the functional areas they assist with are illustrated in Table 2.2.

Table 2.2

Examples of Medium-Tech Assistive Technology That May Be Used to Support Students

Medium-Tech Assistive Technology	**Functional Area**
Digital tape recorders	Writing/memory support
Audio books	Reading/visual access
Visual timers	Organisation support
Wheelchair	Physical support
Electronic spinner	Cognitive/learning
Single-use voice output device	Communication/commenting
Talking calculator	Vision/learning access

High-tech devices are quite complex and are often specialised to accommodate for a specific impaired function (Bryant, Bryant, Shih & Seok, 2010; Evans, Willams & Metcalf, 2010). These include devices such as voice output devices, prosthetic limbs, electronic page turners, virtual reality systems, and computer hardware and software. High-tech AT generally requires that training be provided, for both the user of the assistive technology, the student, and the facilitator, who is often the classroom teacher and/or the EASN. In addition to

requiring training in the use of the technology, high-tech devices may also be susceptible to failure or misuse and are not usually able to be repaired on-site. The need to send the device away for repair, or call in a repair technician, may mean that the student is without the device for an extended period of time. For a student who uses a voice output device, for example, this may mean a loss of voice and communication ability until the device is repaired, effectively gagging the student, which is less than an ideal situation.

It is important that contingencies, possibly in the form of a low-tech communication board, for example, be accessible in case of difficulties that may arise with high-tech devices. It is useful for the classroom teacher and EASNs (if employed) to discuss alternative tools to augment function if high-tech AT currently in use is unavailable for any period of time. There are many occasions when a simple, or low-tech, device can be used to perform the function that is required, without having to purchase a costly and sometimes complicated high-tech device (Loeding, 2002). Examples of high-tech AT and functional areas it may assist in are illustrated in Table 2.3.

Table 2.3

Examples of High-Tech Assistive Technology That May Be Used to Support Students

High-Tech Assistive Technology	**Functional Area**
Text-to-speech software	Communication skills
Voice output device	Communication skills
Communication software	Communication skills
Concept-mapping software	Cognitive skills/organisation
Subject specific software (i.e. maths)	Cognitive/learning skills
Computer switches	Physical access
Puff switches	Physical access
Prosthetic limbs	Physical access
Voice operated software	Independent living
Voice-to-text software	Writing skills
Virtual reality systems	Social and cognitive skills

When selecting AT for students there are a number of factors which must be considered. These include the cost of the device (Borg, Larsson & Östergren, 2011), the availability of the technology (Scherer, 2005), the ability to upgrade the device (Duhaney & Duhaney, 2000), the maintenance that is required (Duhaney & Duhaney, 2000), the amount of training that is required by the student and those assisting the student (King-Sears & Evmenova, 2007), the attitudes of staff to the use of technology (Loeding, 2002; Scherer, 2005), and the physical structure of the classroom (Loeding, 2002). "Maximising the effectiveness of available technology

requires thoughtful planning and decision making" (King-Sears & Evmenova, 2007, p. 11). Often there is no single factor that affects the use of AT for students with disabilities; rather it is an interaction between many of these factors (Copley & Ziviani, 2004).

The selection of appropriate AT to support students should be made as part of a team approach to the student's educational provision (Marino, Marino & Shaw, 2006; Parette & Stoner, 2008). An absence of appropriately trained personnel to assist in matching and purchasing AT for the person with special needs is seen as a societal barrier, in that society tends to place a low priority on this aspect (Scherer, 2005). It is important that there are people involved who have adequate training in this area and who are up-to-date with current technologies that may be available, as well as with the pedagogies that are associated with the technologies.

Marino, Marino and Shaw (2006) stated that there is a "…lack of adequate training for pre-service teachers entering the field" (p. 18) and that this impacts upon the use of AT in classrooms. Pre-service teachers "…need to be prepared to recommend and utilise innovative technologies which bridge many of the learning gaps for students with special needs" (Nelson, 2006, p. 486). In addition, the degree of comfort experienced by pre-service teachers who are required to use AT has been reported as being very low (Sze, 2009). These authors further express a concern that even experienced teachers who strive to stay current in the AT area have difficulty doing so, due to the large volume of information available and the rapid nature of the changing technology. Sze (2009) stated that the use of the technology alone is not

enough to ensure an inclusive educational environment, and that a consistent support network and team approach for staff is a requirement for any program.

King-Sears and Evmenova (2007) described an acronym to use to assist with selecting and implementing assistive technologies: T.E.C.H. The acronym stands for:

- T – Target students needs and the outcomes required
- E – Examine choices and make a decision
- C – Create opportunities for integration with activities in the classroom
- H – Handle implementation and monitor the learning impacts

The use of the acronym to assist in selecting appropriate AT can help with what is sometimes an overwhelming choice (King-Sears & Evmenova, 2007). The process will also ensure that the AT is appropriately considered in relation to the educational program of the classroom and not as a separate entity. The AT must be sufficiently flexible to be used in a number of contexts where possible. Being able to use the technology in a variety of settings will have a number of impacts on the use of the technology (Borg, Larsson & Östergren, 2011). Use in a variety of settings will allow the person to generalise the use of the device and will assist in ensuring the use (and not abandonment) of the technology. It will also aid in developing competency in the use of the device, as practice is an important consideration. If the person is able to effectively use the device in a number of ways or settings, the utility for them is greatly increased and the chance that the device will continue to be used and further competency developed will be greatly enhanced (Copley & Ziviani, 2004).

The cost of the AT may be seen as a significant barrier for some students and schools (Borg, Larsson & Östergren, 2011; Copley & Ziviani, 2004; King-Sears & Evmenova, 2007). The assistive technologies (particularly high-tech devices) are often expensive as a result of substantial costs incurred by the companies that develop and manufacture the technology, and a relatively small market for some complex devices (such as eye-gaze systems and complicated voice-output devices). The cost of the device for the student has to be balanced by availability of funding and school resources. In Western Australia there are a number of funding sources that can be utilised to assist with funding of devices, including the Independent Living Centre WA, Lotterywest grants, and Commonwealth education funding submissions. For Government schools, there is also access to loan equipment through the Centre of Inclusive Schooling (H. Epton, personal communication, 8th Dec, 2010). AT is increasingly available through internet providers who are able to ship internationally. Internet providers have enabled users to purchase equipment which may not be available in their own country or area, often at more competitive prices than those offered by specific suppliers, although access to support and servicing of equipment can be difficult. The ability to purchase easily from overseas vendors is particularly relevant in Australia which has a relatively small market compared to countries such as the United States or the United Kingdom.

Many suppliers of equipment are able to provide a loan service to the school so that the user may trial the equipment (generally for a small fee), to ascertain its functionality for their purposes, and return it if it is not appropriate (Novitatech, 2004). Some providers (e.g., Spectronics) and not-for-profit agencies (e.g., Independent Living Centre WA) also provide support in the form of online or

personal contact to assist users in identifying appropriate AT for their purposes. Generally, staff employed by AT providers to assist in determining the needs of students with special needs are highly experienced and qualified in the area, and include occupational therapists, speech therapists and special education teachers. Many staff in schools are not aware of the availability of these specialists or the support that they can access in determining appropriate assistive technology. The equipment providers and their staff are generally the most up-to-date source of information on available technologies and will also advise purchasers on the ability of the AT to be upgraded or refurbished if required. When considering the needs of young children, upgradability is an important consideration as the AT needs to be able to grow with the child and their needs.

Training for both the user and the facilitator of AT is essential if AT is to be used to its full potential (Hopkins, 2006a; Kelly & Smith, 2008; Simpson, McBride, Spencer, Lowdermilk & Lynch, 2009). It is useful to select AT that is close in functioning to devices that are already well known to the student. For example, a computer program that uses similar commands to one that the student is familiar with will be easier to master than one that is vastly dissimilar (Hopkins, 2006a). Those who have already mastered the AT may be able to train those who are new to the technology. In some cases, the lack of trained staff to support access to the AT can be detrimental to the social and cognitive development of students (Kelly & Smith 2008). Kelly and Smith (2008) examined computer and phone social interaction of students with a visual impairment and found that further teacher training was required to provide teachers with the skills they needed to teach their students how to access the appropriate AT and thereby initiate greater social

interaction. Training should be structured to cover not only technical aspects that may be required by the staff, but also how the device will be used as part of the classroom program (Copley & Ziviani, 2004).

The need for training has implications for schools, where only a small number of staff may receive training in the area of AT or on specific devices used by specific students. Staff often feel that the training is inadequate, is not supported by follow-up services and that they do not have a complete understanding of the AT and are unable to troubleshoot problems (Copley & Ziviani, 2004). It is important that there are sufficient trained users in case of absence amongst trained users or when staff that have been trained leave the school and take their expertise with them. Training may also add to the cost of the device and should be part of the overall consideration given prior to the purchase of any assistive technology. The training may be a 'one-off' requirement or be part of ongoing costs to the school/parent.

A positive attitude towards the use of AT and a belief that it is an effective way to assist students are seen as being vital to the consideration, implementation and continued use of AT (Copley & Ziviani, 2004; Dugan, Campbell & Wilcox, 2006; Loeding, 2002; Scherer, 2005). Copley and Ziviani (2004) suggested that the (sometimes poor) attitudes of teachers towards the use of AT in the classroom are due to the way in which it was introduced to the classroom in the first place and that a lack of consultation and support diminish the teacher's role in the process. Beliefs about the pre-requisite skills that students should have before accessing assistive technology, such as an ability to determine cause and effect, may impact on whether or not AT is used with the person with a disability. Other beliefs that may be held

include the premise that AT will require a lot of effort, that AT is inappropriate for the child's age group, that the student will not have an opportunity to learn specific skills, or that the AT is prohibitively expensive and that obtaining funding is difficult (Dugan, Campbell & Wilcox, 2006). It is necessary to address these beliefs with teachers, EASNs and parents, if AT is to be given adequate consideration in the classroom program. Goode (2006) and Scherer (2005) suggested that a person's attitudes are formed in relation to their values, ideologies and cultural and religious beliefs and are a factor in whether or not AT is utilised in the home, school or community.

There are many positive outcomes associated with the use of AT for people with disabilities. Some of the benefits include the development of functional skills which are able to be generalised to natural settings, improved physical fitness, enhanced social communication, better time management, greater task completion, communication with others (where this may have previously not been possible), heightened self-worth, and improved academic outcomes (Brodin, 2010; Brodwin, Cardoso & Star, 2004; Bryant, Bryant, Shih & Seok, 2010). AT can be used from a very young age, across the life span, to assist the person with a disability to gain the most possible out of their lived experiences. Improved productivity and increased contributions to society as a whole are potential outcomes. Indeed, Brodwin et al. (2004) stated that "…assistive technology is more than computers…, it is the integral process of assisting individuals with disabilities, especially those with severe disabilities, to maximise their human potential" (p. 29). AT will continue to increase in range and diversity in ways in which Bryant, Bryant, Shih and Seok (2010) suggested "….appear limitless" (p. 211). For educators and other key stakeholders it

will be important to keep abreast of these rapid changes so that appropriate supports are provided for students with disabilities.

2.5.2 Use of Assistive Technology in the Classroom.

AT in the classroom may be used by any number of students. Quinn, Behrmann, Mastropieri and Chung (2009) examined students using AT in schools and found that students with multiple disabilities were the most common users, followed by students with learning disabilities, orthopaedic impairments, autism and intellectual disabilities. Many of these students were situated in regular classrooms, although the majority were in self-contained settings.

The Department of Education (2010c) in Western Australia recognises a number of disability groups who are eligible for targeted support services, including students with global developmental delay, intellectual disability, autism spectrum disorder, vision impairment, hearing impairment, severe mental disorder, physical disability and severe medical conditions. Many of these students may benefit from the use of assistive technologies. In addition to students with identified disabilities, support is provided to struggling students via a number of in-school initiatives including *Getting It Right Numeracy (GIRN), Getting It Right Literacy (GIRL)* strategies and the provision of staff in the form of Learning Support Coordinators. The Learning Support Coordinators are responsible for facilitating the work of Learning Support Teams in the school and collaborating with teachers to meet the needs of students with disabilities (Department of Education, 2010d). They also coordinate other support for teachers and assist with providing any professional development that is required.

There are a number of factors that will affect the use of assistive technologies within any classroom setting. These include "diverse learning environments, educator experience, product awareness, individual student needs, legacy [existing] computer systems and budget limitations…" (Hopkins, 2006b, p. 26). Consideration of whether or not the AT must travel from school to home with the student is also needed (Marino, Marino & Shaw, 2006). All of these factors create a complex array of issues that need to be addressed by schools. Hopkins (2006b) suggested that more time and money is generally required when schools and teachers adopt assistive technology, and that many teachers will initially feel overwhelmed or out of their depth. School leaders and IEP team members play a critical role in insuring that AT is appropriately considered (Dyal, Bowden Carpenter & Wright, 2009). They may also be responsible for ensuring that funding and training are provided where necessary. Incorrect selection, implementation and monitoring of AT use may result in poor or unexpected outcomes for students and potential abandonment of the assistive technology.

Abandonment of AT is often evident immediately or within the first year of use in 30% to 90% of cases where AT has been prescribed by relevant professionals (Scherer, 2005; Verza, Carvalho, Battaglia & Ucelli, 2006) and results in a "…lost opportunity for students who need support" (Hopkins, 2006a, p. 14). This is often attributed to the poor match between person, technology and the environment and can result in the person's needs not being met and subsequent increased costs to the individual or health system (Verza, et al., 2006). The perceived advantages of using the technology and how involved the person is in the choice of technology have also been shown to impact on the abandonment of the technology among users (Riemer-

Reiss & Wacker, 2000). There is a need to clearly match the technology with the student's instructional requirements in the areas of acquisition, fluency, maintenance and generalisation (King-Sears & Evmenova, 2007; Raskind, 2006; Scherer, 2005; Simpson, et al., 2009).

A number of tools have been designed to assist students, parents and educators with the decision making process when selecting AT for particular students and for incorporating the use of the AT effectively in class programs. These have mainly been developed in the United States (as a result of the US Federal government requirement that AT be considered for all students with a disability) and include, among others, the Matching Person and Technology Model (Scherer, 2004), the AT Consideration Checklist and Intervention Plan (Georgia Department of Education, 2008a) and the SETT Framework (Zabala, 2002). Marino, Marino and Shaw (2006) stated that "successful programs utilize pre-assessment, collaboration, problem-solving, effective implementation and systematic evaluation" (p.18).

When matching the AT with the user, there are a number of considerations that must be taken into account. These include the individual's disability and what this constitutes in regards to function for the person, the person's expectation of the AT and what they want it to do, and the person's reaction to the use of AT (Scherer, 2005). Scherer (2005) further described these considerations in terms of characteristics and requirements of the person, of the environment and of the technology in the *Matching Persons and Technology* (MPT) model (Figure 2.2). The characteristics of relevance to the person include: their lifestyle; needs, capabilities and preferences; prior support use; motivation and readiness; and expectations.

Characteristics and requirements of the environment in which the person is situated include: physical; cultural; legislative/political; cultural; economic; and attitudinal components. When considering the technology that is to be used the characteristics include: comfort; performance; cost; appearance; and availability. In relation to this model, Scherer, Sax, Vanbiervliet, Cushman, and Scherer (2005) have developed an instrument, the *Assistive Technology Device Predisposition Assessment* (ATD PA), to enable educators to measure both the pre-disposition of users to AT and the match of selected AT to the user, which they suggested will enhance the outcomes associated with AT use.

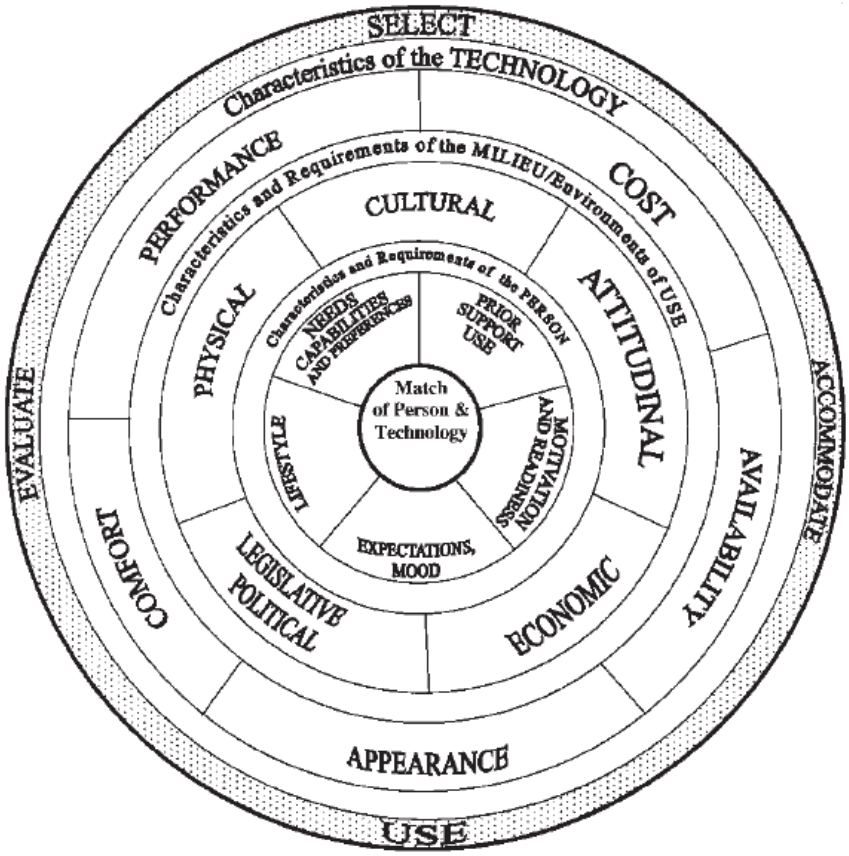


Figure 2.2. Matching persons and technology model (Source: Scherer, 2005, p. 734)

The AT Consideration Checklist and Intervention Plan (Georgia Department of Education, 2008a) were developed as components of an overarching strategy for the Georgia Department of Education to "…improve student achievement, productivity, independence and inclusion by enhancing educator knowledge of AT and increasing student access to appropriate AT devices and services" (para. 2) and include some of the components as suggested by Scherer (2005). The AT Consideration Checklist (Georgia Department of Education, 2008b) is useful in identifying the instructional areas in which the student is having difficulty and the tasks that are required of them throughout the day. The standard classroom tools that are being used, as well as any modifications and assistive technologies currently in place are noted, as is the level of participation of the student (i.e. independent or with assistance). If the student requires further assistance to complete some of the tasks required this information is also included. The AT Consideration Checklist allows the teacher, educational assistant, parent and any other member of the IEP team to contribute information in regards to the functioning of the student and to ensure a substantial and comprehensive picture of the student's abilities and needs is represented. The checklist can be used throughout the year to continually check on the student's requirements for revision if necessary.

The Intervention Plan (Georgia Department of Education, 2008c) requires staff to identify areas of difficulty, tasks required, the current level of functioning of the student, and the expected outcome/s of the use of the AT. Within this document, there is also provision for description of the classroom environment, the activity and how the AT will be used within the activity, as well as any additional supports that are required by the student. The staff responsible and a review date for the student's

progress are critical aspects of the Intervention Plan, as they ensure that there is someone who is accountable for the student's learning needs and that these will be assessed regularly. Both of these forms, along with further information about assistive technologies that may be of benefit, are available to schools free of charge via the internet.

The planning format currently used by the Centre for Inclusive Schooling, Assistive Technology Team in Western Australia (among others) is the SETT (Student, Environment, Tasks and Tools) framework which was developed by Joy Zabala (2002). It is a relatively direct planning format that can be used by schools to gather information about the needs of the student in order to effectively plan for the use of AT in the classroom. This format allows the IEP teams to gain an overview of the student, the environment in which the student works, the tasks the student is required to perform and the tools that may be appropriate to assist them in accessing the environment and curriculum of the classroom and to achieve the tasks required. One aim of the format is to ensure that the student becomes an active participant in the classroom (Zabala, 2002) and that they experience educational success. The SETT framework is a simple format and can be used by all members of the student's educational team, including teachers, psychologists and educational assistants. Figure 2.3 is a pictorial representation of the SETT framework, as it may be used by school staff. The questions in each section aim to guide the process and assist in identifying relevant components to be included.

S **Student**	• What does the individual need to be able to do? • What are the individual's special needs as related to the task? • What are the individual's current abilities? • What are the functional areas of concern?
E **Environment**	• What are the structural and physical arrangements of the environment? • What supports are available to both student and staff? • What materials and equipment are currently available? • What are the physical, instructional, and technological access issues? • What are the attitudes and expectations of the staff and family?
T **Tasks**	• What specific tasks occur in the individual's environment that enables progress toward mastery of IEP goals? • What specific tasks are required for active involvement in the identified environments – such as communication and participation?
T **Tools**	• Is it expected that the student will not be able to make reasonable progress toward educational goals without assistive technology devices and services? • If yes, describe what a useful system of supports, devices, and services for the student would be like if there were such a system of TOOLS. • Brainstorm specific Tools that could be included in a system that addresses student needs • Select the most promising Tools for trials in natural environments • Plan the specifics of the trial (expected changes, when/how tools will be used, cues, etc.)

Figure 2.3. The SETT framework (Source: Zabala, 2002).

Using the previously described planning tools to effectively embed the technology into the curriculum and social and recreational activities will assist in ensuring that it is not the technology that is the focus of the activity being conducted, but the activity itself that is the key aspect (Blackhurst, 2005). Some authors feel

that there is a danger that the use of technology may inhibit the student from reaching independent goals or that it may stifle creativity (Loeding, 2002; Rapp, 2005; Scherer, 2005). Another concern is that the technology may be too complex for the student to use as intended (Scherer, 2005). It is important that the AT does not prevent the student developing skills that they would otherwise have acquired, had the AT not been available. The AT may, in some cases, become a 'crutch' for the student (Rapp, 2005), if not used as an additional or augmentative tool for learning.

Educators should be cautious about claims made by manufacturers and providers of AT in regards to the function of the software or hardware (Blackhurst, 2005), and should look for independent or reliable information from appropriate sources if they are unsure as to the suitability of the technology. Rapp (2005) strongly advocates against the use of technology for technology's sake. The educator will need to be cognisant of these concerns and be watchful that opportunities are given to the student to perform tasks independently when possible and that the AT is being used as intended and required.

Educators in the field of special education have successfully used a variety of assistive technologies for many years and are fully aware of the benefits that these tools provide for students with disabilities, particularly in increasing independence in the classroom (Lankutis & Kennedy, 2002; Sze, 2009). The benefits of AT are potentially available to all students in the classroom, particularly those who may be struggling in certain academic domains such as reading, writing, and math, but who have not been labelled as having a disability and for students who may be gifted and

talented but who also have learning disabilities. Students who have different learning styles to those traditionally catered for in a regular classroom may also benefit from the use of assistive technologies such as concept mapping software and educational websites (Sze, 2009). Students who have difficulty with communication may benefit from technology that allows them to ask questions, comment and re-tell information. These skills have been shown to impact on the student's ability to successfully use written language at a later date (Sze, 2009) and may influence their inclusion in the general education curriculum.

Students using AT may be able to meet academic goals in an appropriate time frame and manner, limiting the need for 'remedial' instruction (Rapp, 2005). An example may be a student who has social, language and spelling goals to achieve. The use of email correspondence with students at another school may provide the student with opportunities to achieve success in each of these areas (Rapp, 2005). Many different classroom designs have been recommended to ensure students with diverse needs have access to appropriate instruction and learning experiences, including multi-age classrooms and inclusive settings (Lankutis & Kennedy, 2002; Simpson, McBride, Spencer, Lowdermilk & Lynch, 2009).

A multi-age classroom, containing students with a range of difficulties including physical disabilities and learning problems is suggested as an appropriate environment for the use of assistive technologies which can be individualised to cater for each student's needs (Lankutis & Kennedy, 2002). The multi-age classroom has benefits, such as peer mentoring, collaborative learning and access to a wider range of assistive technologies due to the large variety of users. When

establishing a multi-age classroom, it is important to plan carefully and fully before beginning teaching to ensure that the needs of all students are taken into account, and the AT is used to supplement or assist, not be the focus of the lesson/s (Lankutis & Kennedy, 2002). Simpson, McBride, Spencer, Lowdermilk and Lynch (2009) also discuss the use of AT in the classroom, but do so in the context of an inclusive environment, or one which is proposed to be universally designed (UDL). The authors feel that many teachers in inclusive settings have yet to be made aware of the extent of AT that is available and the pedagogies that can be incorporated to ensure the assistive technologies are used to full effect. Brodin (2010), when discussing whether ICT (Information and Communication Technology) can assist students with disabilities to access regular settings, adds to these concerns by stating that while the intent is good, the implementation may be lacking. She suggested that both social support and technical support needs to be given to ensure the technology is able to help students to be accepted in inclusive environments.

It is important that the performance of the student is effectively assessed when using the technology (King-Sears & Evmenova, 2007). Performance includes the ability of the student to use the technology for the intended purpose, and the effect of the technology for allowing the student access to the curriculum or to communication functions (Moore, Cheng, McGrath & Powell, 2005). It may be necessary to pair the use of the technology with prompts for the student (i.e. verbal or gestural prompts) to ensure that it is being utilised correctly (King-Sears & Evmenova, 2007). If the technology is not having the desired impact or effect for the student, then changes to the way it is accessed or utilised may need to be incorporated. A change in speed of text being read by the computer or level of

maths problems, for example, may be required. Monitoring the performance of the student who is using the AT also allows the teacher to be responsive to the needs of the student and to modify the use of the AT accordingly.

Assessment of the use of the AT in the classroom should be undertaken at a number of points in the process, from initial referral, through implementation and periodic review (Marino, Marino & Shaw, 2006). Some of the information that may be gathered includes progress in the use of the assistive technology, outcomes for the student, reliability of the AT and any concerns that are evident. This information can be gathered in a number of ways, including checklists, rating scales, observations and end-products (e.g. video, photo, work sample). The University of Kentucky Assistive Technology (UKAT) toolkit includes a resource to assist educators in long-term assessment of students using assistive technology. The *Assessment Planning and Data Collection* tool (University of Kentucky, 2002) provides guidelines for teachers to plan appropriate assessment strategies. This is an easy to use format that can assist in ensuring the technology is being used as it should be and that the outcomes for the student are enhanced.

King-Sears and Evmenova (2007) described a number of considerations for integrating AT into instruction in the classroom. These include that assistive technology, when used appropriately and well, will prepare students for future careers that require them to use technology. They also suggested that the technology should be used in a natural way in the classroom, rather than as a lesson in its own right. This ensures that the students view the AT as an integral part of the functioning of the classroom and have a seamless transition to future settings. The

third consideration is that the teacher be aware of any changes in AT as this is a technology that is changing rapidly. It is important to be aware of these changes so that the student has access to AT that is most appropriate for them, and that new technology that may be more functional for them is identified.

As well as considerations for the use of assistive technology, King-Sears and Evmenova (2007, p. 8) stated that there are four principles that should guide the use of AT in the area of instruction. These are that the AT:

- Aligns with curriculum outcomes
- Matches students instructional needs
- Helps students blend in with peers
- Considers efficient and cost-effective choices (parsimony)

These principles will assist with the decision-making process when selecting AT and may also help to justify the choices made. A justification for the choice of AT may be required in order to access funding or to obtain the device from the educational system body that oversees AT allocation. It may also be necessary to justify the use (and potential expense) of AT to school boards, other teachers, and the parent community in the school. Being able to clearly state the purposes and benefits of the AT to the entire school body may encourage them to embrace the use of the AT in all areas of the educational process.

A study conducted on training educators in how to integrate AT with specific curriculum standards found that with appropriate training and support, there was an improvement in the educators' knowledge of AT and where the AT may fit well with the curriculum of the classroom (Puckett, 2002). Teachers with a sound theoretical

basis for teaching and learning are more able to effectively enhance their use of AT in the classroom, with a solid understanding of learning theory underpinning its use (Duhaney & Duhaney, 2000). The use of the technology should correspond to the teaching theory that is being used in the instructional context (e.g. behaviourism, constructivism). Behaviourist strategies may be most relevant in situations where there is a large amount of content to be learnt and little time for the teacher to spend one-on-one time with the student (i.e. self-instruction materials, drill and skill software). In a more cooperative context, the use of constructivist instructional processes such as web-based learning and group research may be more appropriate (Duhaney & Duhaney, 2000).

Netherton and Deal (2006) suggested that there is a need for educators to access information about AT and appropriate ways to use this technology. Findings from research conducted by Bausch, Ault, Evmenova and Behrmann (2008) which focused on determining the use of AT support services used, stated that there is a strong need for "…training and increased awareness of AT services among teachers and other professionals working with students with disabilities" (2008, p. 1). Educators are able to access information in a number of ways. There are many websites that allow educators to view new and existing assistive technologies and theories of support as they become available. Table 2.4 provides a small sample of useful websites. Conferences in the area of assistive technology, subscription to online newsletters and listservers, online tutorials and professional development sessions with experts in the area are all useful and accessible ways for educators to keep up to date with some of the advances and uses of technologies for people with disabilities and difficulties (Loeding, 2002).

Table 2.4

A Sample of Websites Dealing with Assistive Technology

Site	Brief Description	Address
Georgia Project for Assistive Technology	Resources to assist educational teams in the implementation and integration of assistive technology into instructional activities.	http://www.gpat.org/
National Assistive Technology Research Institute	Conducts assistive technology (AT) research, translates theory and research into AT practice, and provides resources for improving the delivery of AT services.	http://natri.uky.edu/index.html
Resources for Assistive Technology in Education	Resources for learning more about assistive technology devices and services in educational settings.	http://sweb.uky.edu/~jszaba0/JoyZabala.html
Council for Exceptional Children-Technology and Media Division	Support educational participation and improved results for individuals with disabilities and diverse learning needs through the selection, acquisition, and use of technology.	http://www.tamcec.org/
NovitaTech	Supply a wide range of speech generating devices, environmental controls, computer access equipment and other assistive technology products.	http://www.novitatech.org.au/at_home.asp?p=245
Spectronics	Supplier of special needs software and assistive technologies.	http://www.spectronicsinoz.com
Independent Living Centre of WA	Provide an information service on assistive technology and equipment.	http://www.ilc.com.au/

As well as accessing information individually, development of a school or district-wide user group may allow teachers and other personnel who support students with disabilities in the classroom to increase their knowledge of assistive technology, collaborate effectively with one another and make better use of their

time (Parette & Stoner, 2008). Collaboration of all stakeholders, including parents, is important to ensure that consistent messages are delivered to the student, and so that skills can be practiced in a variety of environments (Skau & Cascella, 2006). The formation of a user group may be initiated by individual teachers or the school district and has been found to be effective in developing teacher and EASN skills in the area of AT (Parette & Stoner, 2008).

An AT user group involves a number of teachers or other education professionals who have a shared interest in AT and who seek to share their knowledge with others and gain new skills and knowledge as a result of their interactions (Parette & Stoner, 2008). Often a person who has the highest level of knowledge of AT (and the greatest experience in using it) will lead the group in hands-on examination and training and subsequent application of the assistive technology. Some of the benefits for staff involved in AT user groups that have been reported include: allocated time to develop skills; enhanced skills in using assistive technology; opportunity to develop fluency and speed when using assistive technology; generalisation of the AT to different settings and situations; and modification and adaptation of their skills to accommodate different tasks within the classroom. For the student, the benefits include the ability to be included within the regular setting, a reduction of behaviour problems and enhanced communication abilities (Parette & Stoner, 2008).

In Western Australia all of the education sectors at primary and secondary level provide diverse forms of AT training to staff. The content and amount of this training varies considerably, as do staff who may access it. Hands-on training or

training in the environment in which the technology will be used is seen to be the most beneficial for educators (Loeding, 2002), however, this does not always occur as there may be licensing or logistical requirements (e.g. only one or two people to be trained from each school) that prohibit onsite training. In addition to appropriate selection of AT devices for students with disabilities and training of relevant staff members, support from AT services is also a vital element in ensuring that it is effectively implemented in the classroom (Bausch, Ault, Evmenova & Behrmann, 2008).

In the Government sector in Western Australia, training is primarily provided by the Assistive Technology Team from the Centre for Inclusive Schooling, although schools may also access support services that may be provided through not-for-profit agencies or through retailer support services. The support provided varies substantially and may be related to the selection of a device, the use of the device, adapting the device or software, coordinating the use of the device with other agencies/ professionals, technical assistance for the child or technical assistance for the school. Without such support the effectiveness of the AT may be somewhat limited (Bausch, Ault, Evmenova & Behrmann, 2008).

An instrument known as the Quality Indicators of Assistive Technology Services [QIAT] (QIAT, 2010) has been developed by a collaborative group of researchers to help guide the use of AT services in schools. QIAT aims to assist in improving the educational outcomes for students with disabilities and focuses on developing indicators of effective practices, developing tools to evaluate services, creating resources to guide planning and implementation, sharing information and

resources and providing opportunities for communication and collaboration. The QIAT group has developed quality indicators to assist schools to assess their provision in the areas of consideration, assessment, inclusion in an IEP, implementation, effectiveness, transition, administrative support, and training. These indicators can be accessed via the website of the group. Indicators for successful implementation of AT in the school/classroom, for example, include development of a collaborative plan, integration of the AT across the curriculum, personnel available to support the student using the technology, students given opportunities to use a variety of strategies to support their learning, training of all parties is provided, implementation is based on initial data and is assessed in an ongoing manner, and maintenance and management of devices is determined and followed. It has been suggested that by ensuring these quality indicators are evident in the school, that the implementation of the AT is more likely to be successful (QIAT, 2010).

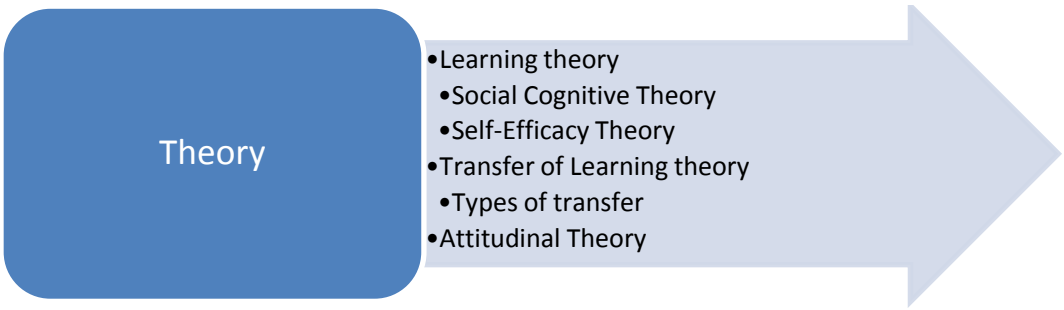
2.5.3 EASN's Perceptions of Efficacy with Assistive Technology.

While there is some research available on the perceptions of EASN in regards to training in general (Breton, 2010; Rose & Forlin, 2010), there is limited research available on the perceptions of EASN as to their efficacy in using and facilitating learning with AT and the effects of training in this area (Loeding, 2002; Sharp, et al., 2005). Search terms such as self-efficacy, efficacy, perception and feelings were coupled with paraprofessional, education assistant and teacher assistant (among others) without result. Much of the available research in this area focuses on teachers as the person primarily responsible for the use of AT in the classroom. As the role of the EASN becomes broader and more in-depth, the likelihood of working closely with students who use assistive technology devices becomes greater, as does the

potential of taking on more responsibility for this area, rather than the teacher being the only facilitator. A number of researchers have examined the effects on students and teachers when EASN are utilised in the classroom, but often do not take into account the thoughts and feelings of the EASN or the use of assistive technology.

Specific skills are required in order to ensure that the AT is being used as it was intended, that it has a positive impact on the functioning of the student and that the use of the technology is appropriately integrated into the curriculum (King-Sears & Evmenova, 2007). Such skill development can be achieved through appropriate training and follow-up to determine the efficacy of the training and to identify further areas of need. If there is little research detailing the responses of EASN to AT, it is very difficult to effectively target the training that is required. Weintraub Moore and Wilcox (2006) stated that "a person's sense of confidence can be increased with training and experience" (p. 16). The ability to understand AT and use it with confidence will have an impact on the use of technology in the classroom. As the EASN is often the person using the technology with the student, and in some cases teaching the student to use it, there should be an emphasis on ensuring that they have the necessary skills and self-efficacy to be successful. In order to ensure that students with disabilities have access to devices which will allow them to reach their full potential, and the support from staff to utilise these, training of all staff is vital.

2.6 Relevant Theory



2.6.1 Learning Theory.

There are many theories of learning which impact upon the way in which research and training are undertaken but each "involves acquiring and modifying knowledge, skills, strategies, beliefs, attitudes and behaviours" (Schunk, 2009, p. 1). Learning experiences should be designed to assist the participants involved in the experiences to acquire knowledge and skills and apply these effectively in new or existing situations. The social cognitive model asserts that learning is a mental process which involves the person acquiring, organising, rehearsing, storing and retrieving information, in the context of a social situation. A further examination of social cognitive theory, self-efficacy theory and transfer of learning theory follows as it is considered that these theories underpin the learning that occurs during training in small groups and are relevant to the subsequent use of the training in the desired context; in this case, a classroom.

2.6.1.1 Social Cognitive Theory.

Social cognitive theory is a framework for understanding human behaviour based around the interactions between the individual, the environment and the behaviour and was developed by Albert Bandura, building on the work of Robert Sears, among others (Grusec, 1992). Social cognitive theory originated in the behaviourist field of operant conditioning, but goes beyond pure observation of

actions of an individual to explain behaviour, to also examining cognitive processes that may be at work. At the heart of social cognitive theory is the understanding that "learning occurs within social spheres and contexts, which inform, develop, deepen and influence individual identity, thinking, learning and meaning-making processes" (Jordan, Carlile & Stack, 2008, p. 69). This theory has some parallels with Vygotsky's perspective on the importance of the social environment in facilitating learning (Schunk, 2012). Bandura (2001) stated that the "human mind is generative, creative, proactive, and reflective, not just reactive" (p. 4), characteristics which need to be considered within a social context. Cognitive processes are an important component in learning new information (knowledge and skills for acting on the knowledge), but the role of social interaction in any training environment cannot be underestimated, as teaching and learning are very much social enterprises (Kim & Baylor, 2006).

Observation of how another participant in the training reacts to an idea will affect (but not necessarily determine) whether the idea is accepted or rejected by the participant. Observational learning is a key element of social cognitive theory, where the participant learns through watching others' reactions and responses to novel ideas and practices. The observational learning impacts on the way the individual makes choices and acts upon these choices to change their own behaviour (Grusec, 1992). Peer interactions constitute a very powerful element in learning and having motivation to learn (Kim & Baylor, 2006). Indeed, Bandura and Walters (1963) stated that observational learning was a more efficient way to change behaviour than either direct learning or successive approximation.

Observational learning as described by Bandura has four main components. These are attention (to events or objects), retaining of information, action (copying a model) and motivation (Bandura, 1977). The more compelling or valued an event is, the more likely a participant is to pay close attention to it. Once this attention is given, it is then necessary to provide a system, such as a verbal description or pictorial representation, for the information to be effectively retained. An example is a mnemonic for remembering the colours of the rainbow (i.e. R O Y G B I V- red, orange, yellow, green, blue, indigo, violet). Once participants have retained the information, practice is given in the form of opportunity to perform a task/action. This may include demonstration of a task or completion of an activity designed to allow practice in the area of knowledge or skill. Lastly, the participants have to be sufficiently motivated through incentives to perform the skill or use the knowledge in their local environment.

Self-regulation of behaviour is another construct important to social cognitive theory. Self-regulation refers to a person's ability to modify the way they react to a specific situation (Bandura, 1982; 2001). Self-regulation may be referred to as a "…metacognitive process that requires students to explore their own thought processes so as to evaluate the results of their actions and plan alternative pathways to success" (Usher & Pajares, 2008, p. 443). The key elements of self-regulation include: setting standards and goals; self-observation; self-judgement; and self-reaction (Ormrod, 2004). Behavioural standards and goals are often determined by an individual when observing the standards of others who are similar in competence to themselves. In order to be aware of how well they are progressing towards a goal, a person needs to be able to observe their own actions and then make a judgement as

to whether or not they are meeting the standards they have set for themselves. If the person is meeting or has met these standards, they are likely to choose to reinforce themselves (Ormrod, 2004). Alternatively, if they feel that they have not achieved their goals, they may feel guilty or depressed about lack of progress and punish themselves by denying reinforcement. To enhance self-regulatory behaviour, techniques such as self-instruction, self-monitoring and self-reinforcement may be employed (Ormrod, 2004).

A well known experimental representation of social learning theory is that of Bandura's 'Bobo Doll' experiment (Bandura, Ross & Ross, 1961). The aim of the study was to determine if children would imitate aggressive actions if they were passive viewers of adult aggression. A group of 72 young children (mean age 4.4 years old) was shown one of three conditions. The first was a person behaving aggressively towards an inflatable clown toy (Bobo doll). The second group were shown a person behaving passively towards the Bobo doll, and the third group were not exposed to either situation, acting as a control group. The groups were further broken down into gender and whether or not they viewed same sex or different sex models (i.e. male model or female model). The study found that the children who viewed the more aggressive model demonstrated more aggressive behaviour, that boys were more aggressive than girls, and that both boys and girls were more aggressive if the model was male (Bandura, Ross & Ross, 1961). The findings supported Bandura's social cognitive theory and observational learning and demonstrated that people could learn new skills and cognitive constructs as a result of observation and imitation. This learning applies to negative as well as positive actions. Modelling of behaviour does not have to be explicitly targeted towards the

person: it is possible to learn incidentally in any situation, or vicariously from a secondary source.

When instigating small group training, it is important to be cognisant of social cognitive theory, as the components of verbal discussion and modelling of concepts and behaviours by all group members are inherent in this type of training (Ormrod, 2004). These components allow participants to represent and assimilate information through social as well as cognitive processes (Grusec, 1992). This assimilation of information takes place in a variety of cognitive domains, including expectation of outcomes, self-efficacy and self-evaluations and reaction, and will impact upon how the participants respond to future situations centred on the training constructs and whether or not they actively seek out situations in which to apply training principles. As small group training is a feature of the current study, it is important to consider the social components and interactions between participants.

2.6.1.2 Self-Efficacy Theory.

Self-efficacy theory describes people's beliefs about their own abilities and how their behaviour is directed by those beliefs (Grusec, 1992). Self-efficacy theory differs from theories of locus-of-control, where people attribute success or failure to either internal or external forces, as it deals with a person's belief about whether or not they are able to perform a particular task or how well they can perform that task. If an individual believes that they are unable to complete a task, they will become pre-occupied with thoughts about their perceived inability, which then impacts negatively on achievement of outcomes. Perceived self-efficacy can be enhanced in a number of ways, including: successful personal experiences, where the person

attempts a task and is successful; vicariously, through the successful experiences of others in a similar position; verbal persuasion, through being told that they are capable of an action; and physiological state, where a person's level of agitation is low and they feel physically strong and assured (Bandura, 1982). Poor self-efficacy will act as a barrier to an individual in performing a task to the best of their ability, or possibly even attempting the task in the first instance (Grusec, 1992).

Self-efficacy affects behaviour in the areas of choice of activities, goals, effort and persistence and learning and achievement (Bandura, 1989; Ormrod, 2004). Having knowledge and skills and being able to perform an action are necessary to be successful in an undertaking, however, some people who have identical skills and knowledge are more successful than others. Perceived self-efficacy can have an impact on both the behaviour and the motivation of a person and is a strong influence on thought patterns, actions and emotions (Bandura, 1982). Bandura (1982; 1989), stated that there is a causal relationship between high levels of self-efficacy and high levels of performance, meaning that the more a person believes that they are capable of performing a task, the more likely they are to be successful (assuming they also have the pre-requisite skills and knowledge to do so). "People avoid activities that they believe exceed their coping capabilities, but they undertake and perform assuredly those that they judge themselves capable of managing" (Bandura, 1977, cited in Bandura, 1982, p. 123).

Self-efficacy can be measured in a variety of ways. As researchers are attempting to determine a person's personal response to a situation, self report is a logical tool to use. Researchers may ask participants to indicate whether they feel

they are able to perform a task at a specific level with a simple 'yes' or 'no' response. When the total number of positive responses is added together, this type of measurement is known as self-efficacy magnitude (Bandura, 1989; Lee & Bobko, 1994). Participants may also be asked to rate the strength of their self-efficacy along a continuum (i.e. very well, well, satisfactory, poor) in response to specific statements (Bandura, 1989; Lee & Bobko, 1994). This type of measurement allows the researcher to determine the strength of the self-efficacy belief, by summing the ratings across all levels. Lee and Bobko (1994) stated that self-efficacy strength is the most commonly used form of self-efficacy measurement. Other means of measuring self-efficacy include the use of scales, including Likert-type scales. Self-efficacy measures target-specific situations and tasks, rather than an all encompassing feeling of ability which may be known as self-concept (Ormrod, 2004). There has been a move towards the development of a General Self-Efficacy scale in recent years, which aims to measure the individual's ability "…to perform well in a variety of situations" (Scherbaum, Cohen-Charash & Kern, 2006, p. 1047), although this is not yet widely accepted and work is continuing on determining the reliability and validity of the instrument.

Self-efficacy affects not only whether or not a person attempts a task in the first place, but also how long they persist with the task, and how much effort they will put into the task (Bandura, 1982; Ormrod, 2004). People with low self-efficacy in relation to the particular task are more likely to give up on the task if obstacles are raised. Those with a high self-efficacy will work to overcome the obstacles in their path. Bandura (1982; 1989) contends that a high self-efficacy, tempered with some cautiousness/doubt, is optimal in learning situations. He believes that a learner who

has a very high sense of self-efficacy may not be fully able to prepare for learning new information and concepts as they already think they are capable. This may hinder new learning, and not result in successful performance of a task. If a learner feels that a task is difficult, but achievable, they are more likely to devote greater resources and effort to it than if they believe it is an easy task which does not require much effort (Ormrod, 2004).

There are a number of factors that can lead to development of a poor self-efficacy (Bandura, 1982). A very confident person can leave another person feeling that they are not as capable as the confident person, leading to a poorer self-efficacy, even when the tasks that are performed are routine and everyday tasks. Similarly, if a person is labelled as being inferior or told that they are not able to perform to an appropriate level, they will not complete tasks as well as they are able, even if they have the appropriate skills and knowledge. Examining a task for differences, rather than similarities to prior experiences, is likely to result in poorer performance of the task, which may be attributed to a lower self-efficacy (Bandura, 1982).

In a study conducted with a group of people who held a number of different phobias, Bandura (1982) described how various levels of self-efficacy related to participants varying abilities to deal effectively with their particular phobia. What was also of interest was that "…perceived self-efficacy was a better predictor of subsequent behaviour than was performance attainment in treatment" (Bandura, 1982, p. 125). Even if an individual was successful in completing a task, their perceived self-efficacy was the main determinant of whether or not they felt capable of completing a similar task, rather than their previous success. An increase in self-

efficacy may result through success in a task, and as a result of challenging poor beliefs about a person's capabilities. Modelling predictability and controllability are also key elements in enhancing a person's self-efficacy (Bandura, 1982). Predictability involves exposing participants to a variety of situations in which the task would need to be performed, allowing them to gain an understanding of the ways in which the task may need to be undertaken, thereby reducing stress for the participant. Controllability involves demonstrating ways in which individual tasks and situations may be approached and handled, providing participants with models for approaching or completing tasks or activities.

The majority of people spend their lives in social group situations and therefore the efficacy of the group, as well as the individual, should be considered (Bandura, 1982). Bandura (2001) stated that if a group holds a strong sense of efficacy in relation to an undertaking, their motivation and aspirations to perform well will be stronger and their persistence and resilience when faced with difficulties will be greater. This leads to a better overall performance of the group. Bandura uses the term 'perceived collective efficacy' to describe this form of social cognitive interaction. The stronger sense of collective efficacy, the more the group feels that they can solve problems and improve their situation. Personal self-efficacy (or self-efficacy of the individual) operates within the context of the broader collective efficacy of the group and is enhanced when the group achieves success. Self-efficacy can be modified through vicarious experiences, by one member of the group viewing the success or failure of another, similar member of the group (Bandura, 1982).

Self-efficacy can be examined in relation to any task a person performs within the sphere of daily living, including work, education, home life and personal interaction. Technological advances, for example, impact upon the lives of many people and there is often low self-efficacy related to the use or control of these technologies, particularly amongst older people (Bandura, 2001). This may cause difficulties for individuals as many people are increasingly required to use technology in their daily lives. It is not enough to have skills such as using a mouse or keyboard; the person must also have a perception of themselves as a competent user of the technology (Wang & Wang, 2008). Kim and Baylor (2006) have suggested that the application of an interactive 'peer' in the form of an animated digital character is one way of using social cognitive principles to assist people in accessing and developing positive self-efficacy in relation to the use of computer technology. Bandura (1982) stated that perceived self-efficacy acts as a cognitive mediator of action and further development of a positive self-efficacy will ultimately lead to a greater use of appropriate technologies. A positive self-efficacy in relation to the use of AT will, potentially, lead to greater use of AT in the classroom (Ajzen, 2001; Ajzen & Gilbert Cote, 2008).

2.6.2 Transfer of Learning Theory.

Transfer of learning from one context to another is a part of everyday life (Ormrod, 2004), without which people would have to learn how to react in every single situation in which they found themselves. The transfer of information and skills learnt in one setting to new contexts has been studied in a scientific manner since the beginning of the last century (De Corte, 2003). Thorndike initially described the use of an identical elements approach (old and new environments share

identical elements) in learning transfer (1906, cited in Lobato, 2006) and this was then expanded upon by cognitive theorists, who determined that an individual constructs a mental representation of both the training and transfer environment, and that if there is enough similarity between the two, transfer takes place. The examination of transfer stemmed from an interest in the behaviour change as a result of training or application of learning and whether or not this produced results for the individual or group.

The transfer of skills learnt in a training situation to that of a workplace, which includes a classroom, refers to the "application of knowledge, skills, and attitudes learned." (Sofo, 2007, p. 104) and can be seen as "…fundamental to the overall learning process and…a cornerstone for the success of the total learning experience" (Thomas, 2007, p. 5). The maintenance of these skills over time is also an important consideration. While much of the literature in the area of training transfer has been conducted in the Human Resource area, it is also extremely relevant in an educational context and transfer is indeed a key goal for education (De Corte, 2003; Lobato, 2006). There are a number of reasons why it is necessary to determine the extent of the transfer of skills and knowledge developed in training situations, including to assess the value of the training for the workplace and to determine the effectiveness of the training materials and delivery (Garavaglia, 1993).

The transfer of learning can be conceptualised through a variety of perspectives (De Corte, 2003). The behavioural perspective suggests that the training environment must mirror that of the work environment in order for transfer of learning to take place. The environment may consist of tools, processes and

supports that the participant is likely to find in their workplace. The cognitive view proposes that the transfer of appropriate general skills (not necessarily those which are an exact match to the work environment) is able to occur, and that as long as these skills are taught, the person is able to transfer learning to a work context. A combination of these perspectives can also be applied, with aspects that mirror the work environment (classroom) and the training of skills that are applicable to a variety of contexts (i.e. problem solving skills) both given emphasis (De Corte, 2003). Other cognitive processes may include identifying needs of students in the classroom and appropriate matching of pedagogy to classroom requirements.

Some researchers (e.g. Hager & Hodkinson, 2009; Lobato, 2006) suggested that the use of the term 'transfer' should be abandoned, as it carries connotations of a passive transfer of knowledge, rather than an interaction of the knowledge with the learner and environment. While transfer of learning was previously limited to the immediate application of knowledge in similar or new settings; this view has now expanded to encompass a broader perspective of 'preparation for future learning' (De Corte, 2003; Hager & Hodkinson, 2009) which emphasises the ongoing nature of learning. This perspective emphasises the concept of learning as a constructive element and that the learner has an impact on how they use the knowledge and skills and the other resources that they may have available to them. Transfer will be impacted by the interactions of people and resources within systems. It is for this reason that planning for the transfer of learning should take place before, during and after the training (Thomas, 2007).

Transfer is a complex process that can involve many variables (De Corte, 2003). A number of variables have been identified which impact upon the success of transfer of training to work situations (Figure 2.4). These include characteristics of the learners, design of the training, the tasks that are required to be transferred, the learning environment and the transfer environment (De Corte, 2003; Wehrmann, Shin & Poertner, 2002). Individual trainee characteristics include the participant's expectations, how involved they are in deciding to undertake the training, how involved they are in deciding on training outcomes, and effort given to the training (Sofo, 2007; Wehrmann, Shin & Poertner, 2002).

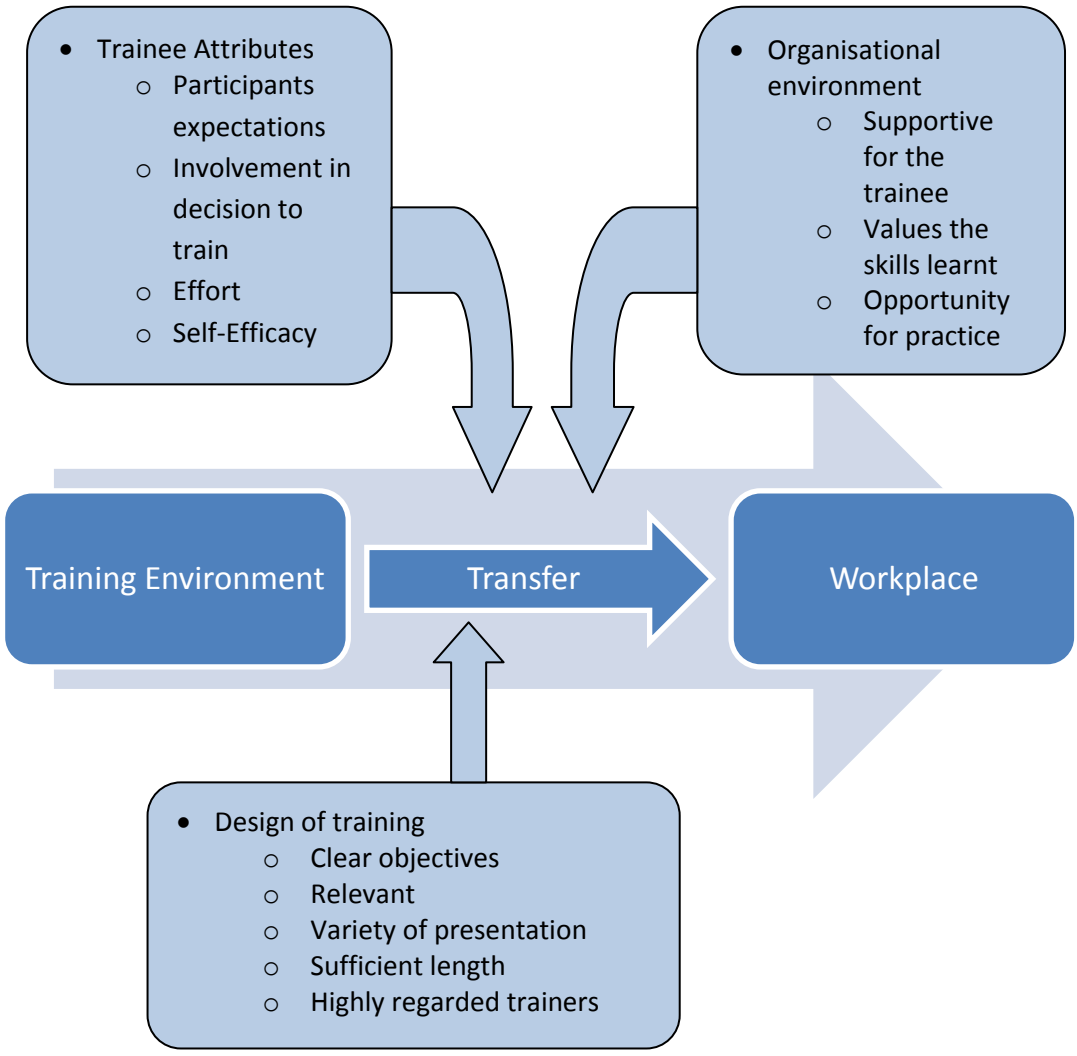


Figure 2.4. Factors affecting transfer of skills from a training environment to the workplace (adapted from Foxon, 1993).

The decision to undertake specific training and ability to have an input into the content will affect transfer. Participants who choose to undertake training are more likely to have better outcomes than those who are required (mandated) to access training. Having participants provide input into the content of the training will ensure that the training is as relevant as possible to the individuals involved (Wehrmann, Shin & Poertner, 2002). Familiarity with the content prior to training will also impact upon the trainee's use of new skills and knowledge. Participants who already interact with the skills/knowledge in some form are likely to be more willing to integrate new information. A strong personal self-efficacy will result in more effort being applied to the new information and subsequently higher performance levels as a result. Transfer of training is also more likely to occur if the participants have a thorough understanding of the goals and outcomes of the training and what is expected of them as a result of the training (Wehrmann, Shin & Poertner, 2002). The aforementioned considerations for ensuring transfer of training have informed the development of training in the current study.

The design of the instruction should include clear objectives, be relevant to the workplace, be presented in a variety of ways, be of sufficient length to maximise learning, and use trainers who are highly regarded (Sofo, 2007; Wehrmann, Shin & Poertner, 2002). The objectives that are set for the training should be congruent with those of the organisation, ensuring that there is consistency in approach. A variety of instructional approaches will cater for the wide variety of learning styles that employees may bring to the training environment. Instructional approaches such as modelling, demonstrating, role play, drill, and guided discovery may be used individually or in concert to assist learners with attaining new knowledge and skills

(Barry & King, 1998). The participant's perceptions of the trainer will determine the status of the trainer. This status is generally determined by how experienced the trainer is seen to be and whether or not they are trusted by the trainees (Wehrmann, Shin & Poertner, 2002).

The organisational environment (e.g. the school) ought to be supportive for the trainee, and opportunity to use the skills learnt provided as part of this support. Without an opportunity to apply the skills that have been taught, the participant may not maintain the trained skill level and also may not perceive the relevance of the skill for their workplace. The opportunity to practice learned skills or use knowledge ought to be supported by the organisation (including managers and peers), and in some cases may even be determined by management. If a participant does not feel that appropriate support is available for them after training, the transfer of learned skills will be affected (Wehrmann, Shin & Poertner, 2002). As well as time and space for learnt skills and knowledge to be applied, the management has to be seen to value the training. A formal evaluation of the transfer of learnt skills to the workplace may be one way for an organisation to demonstrate that they are conscious of the need to accommodate training practice and that the outcomes of the training are valued.

Kirkpatrick (1994, cited in Goldman & Schmalz, 2005) described four levels of evaluation that may be applied to training: a) reaction – did the participants enjoy the training? b) knowledge – did the participants demonstrate that they had learnt the skills and knowledge? c) behaviour – are the participants applying their new knowledge in the workplace? And d) results – is the organisation closer to their goals

as a result of the application of the learning? Wehrmann, Shin and Poertner, (2002) evaluated the transfer of training for child welfare workers by asking the participants to indicate their "…perceptions of how well they attained specific learning outcomes at the end of the training as well as six months later" (p. 33) and suggested that pre-training assessment and supervisor report would also have been useful to strengthen the measurement of the transfer. They found that the attributes of opportunity for practice and peer support for using the new skills were very important in the transfer of learning. Additionally, Lobato (2006) stated that when researchers are evaluating learning in new situations they should examine the influence of the learner's prior activities as these will provide insight into the way in which learning is generalised.

Goldman and Schmalz (2005) stated that very few workplaces directly assess whether or not behaviour has changed as a result of training, and that there is little support to manage the process of transfer. In addition, "no more than 20% of training investment actually results in transfer to the job" (Goldman & Schmalz, 2005, p. 5). This is disconcerting when examining the huge outlay that many workplaces make in relation to training for their staff. Some of the reasons for this disconnect include the poor alignment of training programs and strategic directions for organisations, little post-training follow-up, and the lack of support between managers and trainers of staff.

There are many barriers that may be encountered when participants are attempting to transfer knowledge and skills from a training situation to their working environment. Barriers to transfer can include little or no reinforcement for a change in behaviour in the workplace, pressures within the workplace environment (e.g.

time, colleagues, authority, equipment), and a lack of support within the organisation as a whole (Goldman & Schmalz, 2005; Thomas, 2007). The participants' perceptions of the content and practicality of the training programs and increased levels of discomfort or effort will also impact on the transfer to the work situation. Goldman and Schmalz (2005) suggested that a thorough understanding of the barriers that may be at work in disrupting transfer is vital for an educator so that they are able to prepare appropriately to minimise these. A trainer can prepare for transfer by working collaboratively with all individuals who may have a bearing on whether or not new knowledge and skills are implemented, and through the development of a plan of action for transfer. Through a plan of action, participants can articulate the objectives they wish to meet and detail their progress (Thomas, 2007). An action plan may include specific outcomes and objectives to be achieved, strategies to assist in achieving the objectives, potential barriers, supports required and criteria for success. Including participants in the design of the training and balancing content and process can also aid in facilitating transfer, as can application of a test situation which requires transfer to be applied (Rohrer, Taylor & Sholar, 2010) or the use of post-course reflection to enhance transfer of learning (Leberman & Martin, 2004).

Ellis and Kershaw (2005) investigated the transfer of skills and strategies for teaching students with speech and language impairments from a training environment to the classroom. They found that at the completion of the training the teaching assistants, rather than teachers, had the greatest impact on the implementation and continuing use of strategies provided during in-service training. Teaching assistants were most likely to access resources available and were very

receptive to developing their skills and knowledge base. The teaching assistants were provided with ample opportunities to practice these strategies within the context of small group or individual support; a factor which has been shown to enhance transfer of learning (Wehrmann, Shin & Poertner, 2002). Ellis and Kershaw (2005) stated "…that all too often teaching assistants were the unsung heroes of inclusion" (p. 79). Follow-up sessions after training were advised so that the teaching assistants could clarify and consolidate their understanding and reflect upon what has and has not worked in their environment and reasons for this (Nelson, 2006; Potter & Richardson, 1999).

2.6.2.1 Types of Transfer.

Theorists have described many different types of transfer that may occur after a training period (Ormrod, 2004). These are often described in terms of dualisms and include positive versus negative transfer, vertical versus lateral transfer, near versus far transfer and specific versus general transfer (Figure 2.5). Positive transfer relates to learning being demonstrated well in a new setting. Negative transfer refers to interference from previously learnt information when a person is attempting to learn or perform in a new situation, resulting in difficulty acquiring new knowledge or skills (Perkins & Salomon, 1992). Vertical transfer relates to the transfer of learning by building on necessary previous knowledge. If the knowledge from one area is not necessary, but is useful for acquiring new knowledge or skills, the transfer is said to be lateral (Ormrod, 2004).

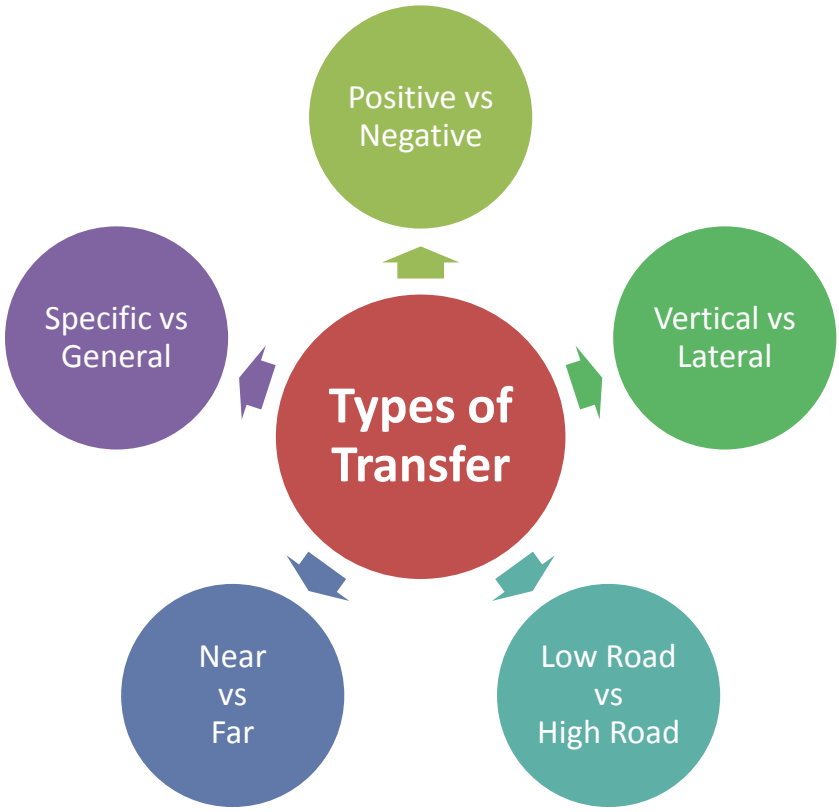


Figure 2.5. Types of transfer (Adapted from Ormrod, 2004; Perkins & Salomon, 1992).

Learning situations that are very similar in both surface characteristics and underlying structure to the work situation result in near transfer. When the underlying structure is the same, but the surface characteristics are different, far transfer may occur (Perkins & Salomon, 1992). Both far and near transfer are examples of specific transfer, where the tasks in both the training environment and the performance setting overlap in some way (Ormrod, 2004). General transfer occurs when the learning that has taken place in one situation is transferred to an unrelated situation. "Research clearly shows that near transfer is more common than far transfer and that specific transfer is more common than general transfer" (Ormrod, 2004, p. 363). Perkins and Salomon (1992) also described a type of

transfer known as low road/high road transfer. Low road transfer refers to learning being transferred easily to a new situation in a reflexive manner, while high road transfer requires a more concerted effort on the part of the participant to make meaningful connections.

Knowledge of the types of transfer of learning may assist educators in designing instructional programs that will allow participants to successfully transfer new knowledge and skills to their work situations. In addition to the design of the training, the educator should aim to develop, within the participants, a positive attitude towards the use of the skills and knowledge in the workplace so that consequent behaviours displayed by the trainees are favourable towards the training principles and the application of these principles in novel settings. Taking transfer of training into consideration when designing AT training for specific groups will ensure that the training has the greatest chance of affecting change in the classroom.

2.6.3 Attitudinal Theory.

"People act in accordance with their attitudes" (Ajzen & Fishbein, 2005, p. 173). Attitudes are internal beliefs about psychological objects which influence the behaviour exhibited by individuals and can be used to predict behaviour in many cases (Ajzen, 2001; Ajzen & Gilbert Cote, 2008; Schunk, 2009). A psychological object may be a physical item, an organisation, a person, a group of people, a policy or an abstract concept (Ajzen & Fishbein, 2005). Attitudes towards psychological objects are acquired, not innate and can be learned, but are generally developed in an indirect manner through processes such as observation and accepting the beliefs of others (Ajzen & Gilbert Cote, 2008). Ajzen (2001, p. 32) stated that there is

"evidence indicating that evaluative reactions tend to be immediate and fast, and can occur outside of awareness". Therefore, rather than the person being fully aware of the formation of their attitudes towards an object, these may be forming as they interact with the object or at any other time in the future.

While it is not possible to explicitly 'teach' attitudes, conditions may be arranged to facilitate opportunities for participants to examine their existing attitudes and determine where these stand within their specific context and societal structure (Ajzen, 2001). Only through this examination can attitudes be modified or changed. According to Kaplan and Fishbein (1969), an individual holds beliefs about objects, where the object may be an intangible concept, such as a value or feeling. They suggested that there is an attitude associated with each object [although Ajzen (2001) raises the possibility of more than one attitude being associated with each object] and that these attitudes may be context-dependent or related to the relevance of the object for the person.

Attitudes become strongly attached to the object through the processes of conditioning and mediation, which ensures that the attitude is present whenever the object is at hand (Kaplan & Fishbein, 1969). Also surmised is that if an object is highly emotive for the person, then a strong attitude towards it will be evident and if it does not elicit strong emotion then the attitude toward it will be weaker. For this reason it may be useful for researchers and others involved in examining and attempting to influence attitudes to have an understanding or evaluation of initial attitudes towards an object through pre-testing or discussion with the people involved. Ajzen (2001) stated that the evaluation of an object is often represented in

"…attribute dimensions such as good-bad, harmful-beneficial, pleasant-unpleasant, and likable-dislikeable" (p. 28), although such extreme dichotomy is rarely the case.

The model of attitudinal theory developed by Kaplan and Fishbein (1969) that is of most relevance to the objects of inclusion and AT is that of the expectancy-value model. This model suggests that attitude towards an object is a function of the beliefs of the person about the object and how they have evaluated the characteristics and qualities of those beliefs (Ajzen, 2001; Ajzen & Gilbert Cote, 2008; Fishbein & Ajzen, 1972). By applying the model to behaviour change, it can be seen that an evaluation of a person's beliefs about an object will allow a change in beliefs and the evaluative aspects of those beliefs, and a potential change in behaviour as a result (Ajzen, 2001; Liska, Felson, Chamlin & Baccaglini, 1984). Kaplan and Fishbein (1969) have placed this relationship into an equation which is represented as:

$$A_o = \sum_{i=1}^{N} B_i a_i$$

In this equation A_o represents the attitude toward the object (o), B_i is the strength of the belief (i) about the object (o), a_i is the evaluative aspect of the strength of the belief (B_i) and N is the number of beliefs held about the object (o) by the individual. The validity of the expectancy-value model and the relationships as expressed by the equation has been supported by many researchers (Ajzen, 2001; Fishbein & Middlestadt, 1995; Hackman & Anderson, 1968).

Measurement of attitudes can be undertaken in a number of ways. Liska, Felson, Chamlin and Baccaglini (1984) described the use of specific items about which information is sought and the use of response categories for participants to indicate their level of agreement with each item. Ajzen (2001) discusses the potential use of response latencies, which can measure reaction to stimuli, to measure attitudes towards objects. He stated that the use of these types of indicators may be "free of reactive effects" (p. 33) and can be useful when examining socially sensitive areas (such as racial attitude). Likert-type scales such as those designed by Loreman, Earle, Sharma and Forlin (2007) have also been used to measure the self-perceptions of participants in regards to their level of skill before and after training. Rose and Forlin (2010) noted the influence of training on attitudes and beliefs, and also confidence to implement new knowledge and skills in the classroom.

In the area of inclusive education, attitudes towards students with disabilities and their inclusion in regular settings is of critical interest. As attitudes affect the actions of a person, then development of positive attitudes towards inclusion may be seen as a necessary element to ensure that students with disabilities are appropriately considered within the regular classroom setting, and that the person who is assisting the students with accessing the curricular or social aspects of the classroom has a positive attitude towards this role (Anderson, Klassen & Georgiou, 2007). Ways to develop or modify attitudes towards inclusion have often consisted of structured and unstructured opportunities to interact with people with disabilities (Golder, Norwich & Bayliss, 2005; Richards & Clough, 2004). It is posited that the more positive an attitude a person has towards inclusion and assistive technology, the more likely they

are to embrace the use of AT to support students in regular settings and be willing to assist others in its use.

Ajzen (2001) suggested that attitudes are not fixed in place, but that they can be modified. However, once established it may be difficult to modify negative attitudes (Ajzen, 2001; Brownlee & Carrington, 2000). Attitudes that determine specific behaviours are a function of the beliefs that the person holds about the behaviour and can be influenced by consequences to the performance of the behaviour. Positive consequences to the behaviour strengthen beliefs about the behaviour which in turn promotes a positive attitude towards the behaviour (Ajzen & Gilbert Cote, 2008). Implications of a negative attitude toward inclusion of students with disabilities and their use of AT in the classroom can lead to the abandonment of AT and potentially poor curriculum and social outcomes for the students (Dugan, Campbell & Wilcox, 2006; Scherer, 2005). In order to promote appropriate conditions for the favourable development of positive attitudes towards both inclusion and the use of assistive technology, knowledge and skill development, as well as reflection and discussion of critical issues to address any negative attitudes can be useful (Ajzen, 2001). These methods have been shown to have a positive effect on the development of attitudes.

Alongside attitudinal theory there should also be a consideration of resistance of the individuals to change, both within the classroom setting and internally. Starr (2011) describes resistance as referring to "… 'negative' actions and non-action, ill will and resentment, and defensive or confrontational dispositions" (p.647). Starr suggests that it is natural for people to resist changes that impact upon them if they

do not have any control over the changes. As with attitudes, people may have to confront pre-conceived notions and beliefs and have experiences which are outside of their comfort zone when experiencing change. If the participants view the change as not valuable, or even negative, it may be perceived as a threat to identity (Collarbone, 2009) resulting in direct defiance and lack of change. Collarbone (2009) states that when making changes to beliefs, attitudes, understandings and position within an organisation or culture, a period of resistance is possible, but that with effective management this period should be short. Similarly, involving the participants in the changes to their own thinking and to classroom practice serves to reduce the anxiety towards change and possible resistance of new ideas.

2.7 Implications of Theory for Assistive Technology Training

Learning theory, specifically social cognitive theory (Bandura, 1977) and self-efficacy theory (Bandura, 1982) underpin the training developed for the EASN in AT. By conducting training in small groups, with a wide variety of skill and ability levels, the participants are able to learn through interaction and through modelling of skills, even when the instructor is not present. As there is more than one participant from each school setting, the opportunity to discuss and collaborate on AT initiatives is enhanced. By increasing the EASN's self-efficacy, they are more likely to attempt to use the technology when not explicitly supported by perceived 'experts', and may even explore the option of using AT in novel ways to support the individual needs of the students whom they support. By increasing the EASN's knowledge of AT and enhancing their perception of themselves as skilled users, their self-efficacy is also increased.

In order to ensure that content and skills learnt in the training are able to be transferred to the classroom, the explicit strategies described by authors such as Perkins and Salomon (1992) were utilised in the training. Some of these included planning for the transfer of skills and utilising resources that were readily available to the participants. A thorough understanding of transfer strategies may enhance training success for professional development providers.

Lastly, an examination of attitudinal theory exhorts the critical need to build opportunities for participants in the training to develop a positive attitude towards AT and the use of AT in the classroom. A positive attitude towards the use of AT is more likely to result in the EASN persevering with AT use and in asking for assistance if they require it (Parsons, Daniels, Porter & Robertson, 2008). By having a positive attitude towards the training the EASN will gain the most from the sessions. The attitudes towards AT may be shaped in a number of ways including examination of the benefits of the AT, successful experiences using the AT, positive responses from others who work with the EASN and increased knowledge of where to access AT.

2.8 Summary

The areas of literature identified as being relevant to the research highlight the changing features of schools in relation to the inclusion of students with disabilities and the use of AT to meet their needs. Central to the idea of inclusion is the provision of EASN to support the inclusive process. The EASN's role is rapidly changing to encompass tasks in which they may not currently have sufficient knowledge or understanding. Training in AT therefore must be provided to ensure

that the skills required are attained. Once the training has been undertaken, the use of the AT in the classroom must be seen to be applied appropriately as a result of the training and the transfer of skills and knowledge in this area, and participants' self-efficacy and attitude towards the use of AT will be important considerations.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The purpose of this research was to investigate Education Assistants Special Needs' (EASN's) perceptions of themselves as users and facilitators of AT in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. In order to explore the methodology used for this study, an understanding of the existing arena of quantitative and qualitative research approaches is firstly considered. The position of researchers in each of these philosophical areas is examined and the lens through which research is examined, both post-positivist and interpretivist, is detailed. Following consideration of the philosophical approaches driving the research, a discussion of the pragmatist paradigm favoured by the researcher, and the mixed method approach that emerges from this paradigm is undertaken. Quasi-experimental and phenomenological designs that allow appropriate data to be collected and analysed are then articulated, along with the methods used. Finally, the researcher will examine the process of interpretation and how these methods are combined or 'mixed' to address the research questions. Figure 3.1 illustrates the theoretical framework for the research.

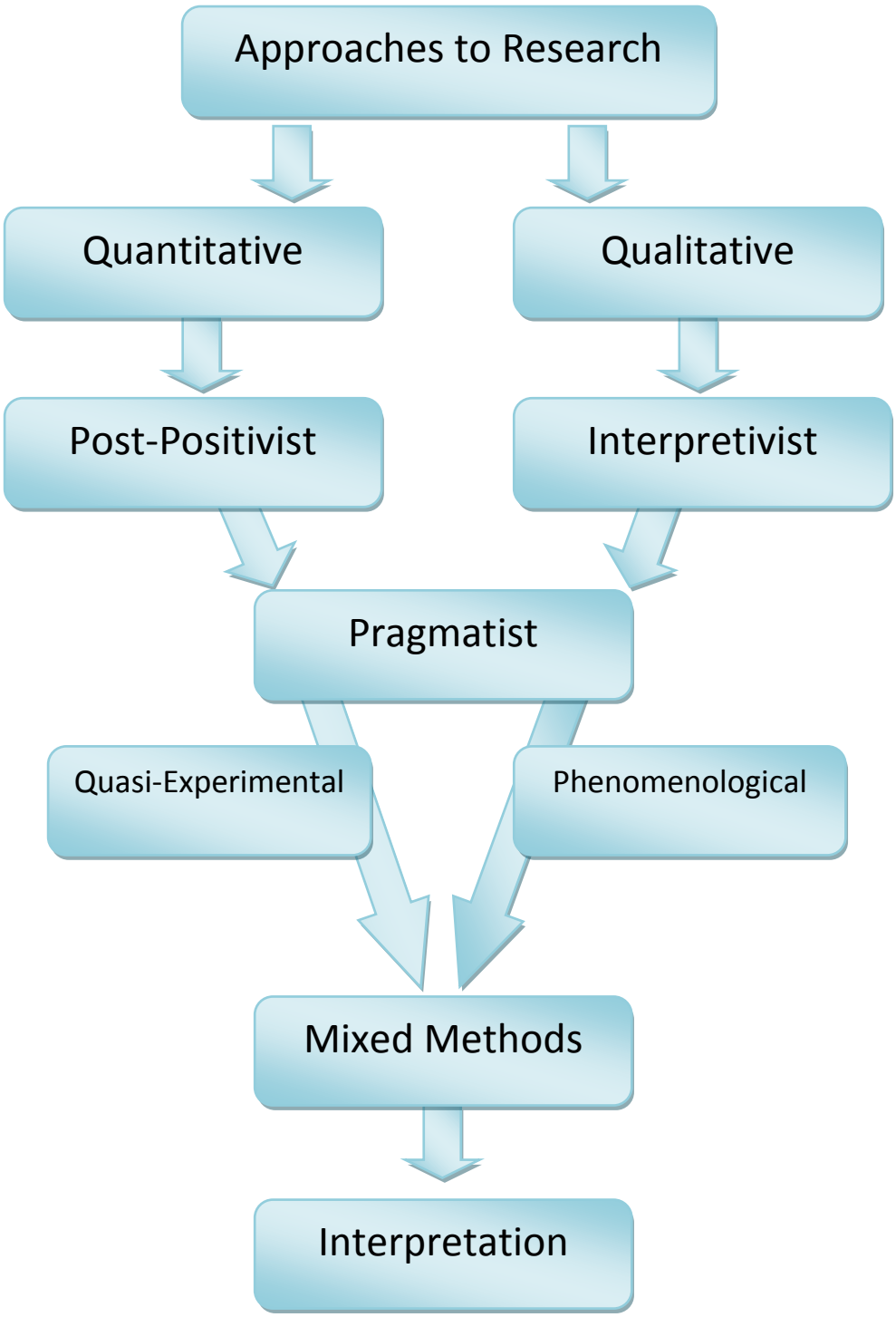


Figure 3.1. Theoretical framework for addressing research questions.

3.2 Quantitative Approach

A quantitative approach to conducting research has been the dominant approach used throughout most of the 20th century (Smeyers & Leuven, 2008; Teddlie & Tashakkori, 2009). Quantitative research "involves the collection and analysis of numerical data" (Kervin, Vaille, Herrington & Okely, 2006, p. 202). The data is obtained through methods such as questionnaires, tests, and checklists. In addition to the type of data collected, quantitative designs may also incorporate hypotheses to be tested and control over independent variables which may affect the dependent variable under investigation (Gay & Airasian, 2003). Large sample sizes are generally required in order to be able to generalise the findings to the population at large (Denzin & Lincoln, 2005; Gay & Airasian, 2003), and these findings are often not related to any one particular social context (Johnson & Onwuegbuzie, 2004). Smeyers and Leuven (2008) suggested that sound contextualisation is necessary when interpreting results of quantitative studies in the field of social sciences, to ensure that the results are not generalised to areas outside of the realm of the study itself. Statistical procedures are also needed in order to manipulate the numerical data to make it meaningful. Often the use of statistical procedures entails describing the area under investigation, or investigating differences between two groups or variables (Teddlie & Tashakkori, 2009).

Due to the large quantity of statistical data collected and the method of analysis, quantitative research is not often overly interactive (Shulman, 1981; Gay & Airasian, 2003), with the role of the researcher being external to the area under examination, and not a part of it. The role of the researcher in most quantitative studies is one of detached observer, rather than active participant, and every care is

taken to remove the influence (potential or perceived) of the researcher from the research (Jackson, Drummond & Camara, 2007). By ensuring that the researcher is not influencing the outcome of the research, objectivity in research can be said to be maintained. This objectivity is achieved through the use of control groups, examination of all variables within the situation and controlling for the influence of those variables.

Quantitative research is based on positivist or post-positivist paradigms (Poggenpoel, Myburgh, & Van der Linde, 2001; Teddlie & Tashakkori, 2009). The positivist paradigm states that objectivity in research is able to be held, and that through this objectivity a real account of the world can be given via direct observation (Denzin & Lincoln, 2005). In a quantitative research approach the aspects under study are quantified and conclusions can then be drawn as to the cause and effect of variables, and relationships between variables, even when examining social phenomena. In the positivist approach, the researcher is not involved with the participants of the research and is said to maintain objectivity through this approach (Johnson & Onwuegbuzie, 2004).

A post-positivist paradigm emphasises quantitative methodology, while recognising that the values of the researcher impact on how the research is conducted and how it is interpreted. "Although post-positivist researchers believe that there is an independent reality that can be studied, they assert that all observation is inherently theory-laden and fallible and that all theory can be modified" (Onwuegbuzie, Burke Johnson, & Collins, 2009, p. 121). Researchers in this area suggest that they can approximate the truth of reality, but that it can never be

completely described. The use of statistics is suited to this area of research as the assigning of a probability value (*p* value) indicates that there is room for error in the measurements and that there may be variation in the data (Onwuegbuzie, Burke Johnson, & Collins, 2009).

3.3 Qualitative Approach

Qualitative research "is a situated activity that locates the observer in the world" (Denzin & Lincoln, 2005, p. 3). It is an approach to research that has developed over the last 20 – 30 years in an attempt to explore aspects of the community that cannot be easily quantified (Denzin & Lincoln, 2005) or to describe lived experiences from the point of view of the participants. The qualitative approach involves using methods such as participant observation, interview and interpretive analysis to gather information about the experiences of the participants. The observer's interpretations of this world are recorded through the use of such devices as field notes, memos, recordings and transcripts, and interviews. This involves a naturalistic approach to the world and those in it (Denzin & Lincoln, 2005). The moments that are recorded describe meaning for the participant in relation to a routine or problem. These moments are situated within the context of the situation in which the individual resides. The context can include social status, race, language, gender and ethnicity and these factors temper the understandings of the individual. Qualitative approaches have derived from the fields of sociology and anthropology, or the study of the human condition (Broussard, 2006).

The researcher is not a passive collector of data in the qualitative approach to research, but rather plays a more active or involved role (Denzin & Lincoln, 2005).

It is important that this role is clearly defined in the research so that the researcher is able to determine and, if necessary, minimise any effect that they may have on the participants' own observations and perceptions. In this study, the researcher's role was one of trainer as well as data gatherer. Such an approach has both positive and negative effects for the research. On one hand, the participants felt comfortable with the researcher (as evidenced by the type of personal and confidential information shared), and on the other hand, the researcher had to use careful bracketing techniques (Ahern, 1999; Wall, Glenn, Mitchinson & Poole, 2004) so as not to sway the data collection in any particular direction (achieved through the use of journaling and self-reflection).

A qualitative approach generally presupposes that the researcher is situated in an interpretivist paradigm (Jackson, Drummond & Camara, 2007; Teddlie & Tashakkori, 2009). An interpretivist paradigm suggests that the observer and the participant are linked and that the reality that is represented is co-constructed as a result of the interaction between the two (Teddlie & Tashakkori, 2009). The researcher draws on the participants' rich descriptions of events that they have constructed to describe the experiences. A large amount of information about lived experiences is gathered in a qualitative study and this must then be interpreted by the researcher (Jackson, Drummond & Camara, 2007). Meaning about the experiences of the person(s) can only be uncovered and described through "…detailed examination and study" (Neuman, 2011, p. 101). This requires that the researcher observe people in a natural context and look beyond the behaviour and actions that are visible to the underlying purpose of the behaviour.

Due to the nature of qualitative research, it may be difficult to generalise the findings to a wider sample, as the richness of the data collected often means that fewer participants are involved in the research (Jackson, Drummond & Camara, 2007). The strength of the qualitative approach is in providing an interpretation of phenomena from those who have actually experienced this phenomenon. Through examination of others' experiences, lessons can be learnt in regards to potential pitfalls and benefits of the experiences.

With a qualitative study, the researcher may often have a personal (as opposed to impersonal or detached) role in the research. This then must be addressed within the interpretation of results. In order to ensure that the researcher has clearly represented the experience as viewed by the participants, they may utilise common techniques such as member checking (Jackson, Drummond & Camara, 2007), pilot studies (Chenail, 2011), investigator interviews (Chenail, 2011) and bracketing (Bednall, 2006; Neuman, 2011).

Member checking involves providing participants with a record of their responses and checking that these are a true reflection of what the participant experienced. A pilot study may be undertaken prior to extensive data collection, in order to ensure that the use of collection techniques is feasible and appropriate (Chenail, 2011). Chenail (2011) advocates the use of investigator interview as a way of ensuring that the investigator can clearly identify their perspectives and biases. He suggested that the investigator have a colleague ask them the same questions or complete the same task as the participants. Through this process they are then able to clearly identify their own perceptions and are more able to be aware of these

during data analysis. Bracketing involves the researcher identifying and putting aside pre-suppositions that they may hold in regards to the experience of the participants. Bracketing is necessary as "...total objectivity is neither achievable nor necessarily desirable in qualitative research, researchers often are required to put aside assumptions so that the true experiences of respondents are reflected in the analysis and reporting of research" (Ahern, 1999, p. 407). Neuman (2011) described the process of bracketing as identifying and then mentally putting to one side the "taken-for-granted assumptions of the social scene" (p. 106). In this way it is possible for the researcher to examine the understandings which underpin the actions of participants. In this study, bracketing was conducted by the researcher through a process of journaling and reflection, participant feedback and supervisor consultation (see page 164 for further discussion of the process used). Table 3.1 displays a basic comparison of the qualitative and quantitative research approaches.

Table 3.1.

Comparison of Qualitative and Quantitative Research Approaches (Adapted from Fossey, Harvey, McDermott & Davidson, 2002, p. 719).

Characteristic	**Quantitative (Empirical)**	**Qualitative (Interpretivist)**
Philosophical Origins	Positivism, post-positivism, natural sciences	Hermeneutics, phenomenology, symbolic interactionism
Why research is conducted	To discover natural laws that enable prediction or control of events	To understand social life and describe how people construct social meaning
Nature of social reality	Social reality contains stable pre-existing patterns or order that can be discovered	Fluid definitions of situations created by people through their social interactions with others

Explanation/theory of social reality	A logical, deductive system of interconnected definitions, axioms and causal laws stated in probabilistic form	A description of how a group's meaning system is generated and sustained; contains detailed contextual information and limited abstraction
An explanation that is true…	Is logically connected to causal laws and based on observed facts about social life	Resonates with or feels right to those who participated in the study
Whose voices are privileged?	Researcher(s)	Participant(s)
Good evidence is…	Based on precise observations that others can repeat	Embedded in the context of fluid social interactions, in which meanings are assigned

3.4 Pragmatist Paradigm

A paradigm can be described as a way of making sense of the world. It is a researcher's beliefs about the knowledge that they are gaining as a result of the research and how this should be viewed (Crotty, 1998). Researchers will view how the data is gathered and analysed through a particular paradigm. Often the paradigm dictates the ways in which research is undertaken. A pragmatist paradigm in mixed methods research, to be introduced later, is akin to the post-positivist (or positivist) paradigm noted in quantitative research and the interpretivist paradigm favoured by qualitative researchers (Creswell & Plano Clark, 2007; Denzin & Lincoln, 2005; Teddlie & Tashakkori, 2009). Teddlie and Tashakkori (2009) described the pragmatist paradigm as:

> A deconstructive paradigm that debunks concepts such as 'truth' or 'reality' and focuses instead on 'what works' as the truth regarding the research questions under investigation. Pragmatism rejects the either/or choices associated with the paradigm wars, advocates for the use of mixed methods in research, and acknowledges that the values of the researcher play a large role in interpretation of results (pp. 7-8).

Early investigation into the pragmatist approach was undertaken by authors such as Charles Pierce, William James and John Dewey (Denzin & Lincoln, 2005;

Melles, 2008; Pihlstrom, 2008) as long ago as 1870. This was a much discussed perspective until after World War II when an empirical flavour regained status as being the eminent focus of research (Melles, 2008). There has been a resurgence of discussion since the 1970's around the pragmatic paradigm, particularly as researchers are seeking to imbed their research within a real-world context, with consideration being given to the temporal nature of truth, concrete situations of participants and the political reality of the situation (Melles, 2008). Dewey (1960, cited in Pihlstrom, 2008) stated that empirical science, when describing the world, indicated that there was only one reality. He felt that human thought should not be used to reproduce what is already known, but should be used to also determine what could become known in different circumstances.

Pragmatism seeks to end the dichotomy between post-positivist and interpretivist paradigms, which were thought to be incompatible. The incompatibility thesis (Howe, 1988) suggested that qualitative and quantitative approaches were not compatible and that only one or the other could be applied at any one time. Onwuegbuzie and Leech (2005) stated that "...relying on only one research paradigm can be extremely limiting" (p. 268). Pragmatism allows researchers to adopt a third option that considers perspectives of both quantitative and qualitative domains in real-world situations and to address research questions accordingly. Both inductive and deductive logic can be utilised by pragmatist researchers to address research questions (Teddlie & Tashakkori, 2009).

Teddlie and Tashakkori (2009) suggested that there are a number of general characteristics of pragmatism. These include:

- The attempt to find a middle ground between philosophies,
- A rejection of the either-or choices in research,
- An examination of how the subject interacts with the environment (not a division of the two),
- A view that knowledge is constructed by an individual as well as being based on their own experiences within the world,
- Theories are viewed in regards to how well they apply to particular situations,
- Many different theories (pluralism) may be used,
- Inquiry is a similar process to that which happens in everyday life - a series of identifying and solving problems,
- It may be that provisional findings are given,
- Practical applications are valued,
- Cultural and shared values are key,
- A range of data is used to support findings (p. 74).

An ontological consideration for pragmatist researchers is ideally one of determining interesting findings rather than claiming a standard reality or Truth (Fossey, Harvey, McDermott & Davidson, 2002). In regards to generalising these findings, pragmatist researchers tend to be "...concerned with issues of both the external validity and the transferability of results" (Teddlie & Tashakkori, 2009, p. 93), where external validity tends to relate to quantitative components and transferability to qualitative components. Researchers wish to produce findings that are able to be generalised or transferred to other populations and settings (generally those which are similar to the participants).

The current research applies most of the characteristics described by Teddlie and Tashakkori to addressing the research questions under consideration. The respondents are active participants in their environments and are the best placed to answer questions about their perceptions and understandings of the environment. This active participation allows for a real-world view to be considered when analysing data. The researcher and participants are also required to interact with each other at many (but not all) points during the research, challenging the positivist view of the researcher as detached and uninvolved observer and the interpretivist view of the researcher as a key player in the research (Teddlie & Tashakkori, 2009). The practical application of information in order to determine appropriate training situations, content and application is highly valued in this study and a range of different data is used to examine responses from participants. Consistent with Putnam and Kuhn's (1960, cited in Pihlstrom, 2008) thoughts on reality, a plurality of acceptable ways to experience reality will vary according to the environments or situations in which the researcher is located. The pragmatist view is that values play a large role in conducting the research and drawing conclusions from the findings (Teddlie & Tashakkori, 2009). Throughout the research, the researcher addressed questions that fell within what she felt was important within her own value system and examined these using methods that she felt were most likely to achieve results which could be practically applied.

3.5 Phenomenological Research

In the present study, phenomenological research, embedded in a pragmatist paradigm, is used to illustrate the experience from the participants' perspective (Creswell & Plano Clark, 2007; Giorgi, 1999; Kervin, Vaille, Herrington & Okely,

2006). Phenomenology is a focus on how people interpret experiences so that they can make sense of the world (Patton, 1990). This study will focus on the descriptions of what EASN have experienced during and after training, and how they have experienced reality. In order to capture the EASN's worldview, their experiences will be "bracketed, analysed and compared to identify the essence of the phenomenon" (Patton, 1990, p. 70). The phenomenon under consideration is assistive technology training and how this is applied to the classroom and the EASN's perceptions of themselves as users and facilitators of AT.

Phenomenological research, which has phenomenology as a philosophical basis, is the largest component of the present research, with quasi-experimental aspects playing a complementary role. Phenomenology has its roots in philosophy and originated a century ago (Craig, 2005). There have been many philosophers interested in the field of phenomenology, however, they often do not agree on the details of the approach. Husserl was the initial philosopher interested in this epistemological approach, followed by many others including Heidegger, Satre, Merleau-Ponty and Ricouer (Craig, 2005). Husserl was interested in what it meant to know something, in what consciousness was (Zahavi, 2003). He used the term 'intentionality' to describe experiences and objects of which a person was conscious. An example of this intentionality is that a person is fearful *of* something, that they can see an object. In the case of the current study, the training that the EASN are involved in can be seen as the intentional object (Zahavi, 2003).

Craig (2005) suggested that there are four main tendencies among phenomenologists: realistic, constitutive, existential and hermeneutical. Of most

interest to the current study is the hermeneutical tendency which "studies interpretive structures of experience, how we understand and engage things around us in our human world, including ourselves and others" (Stanford Encyclopedia of Philosophy, 2008, para. 36). He also stated that there are four main components to phenomenology. These components, which provide a basis for the phenomenological section of the current study, are: a) opposition to the positivist view or naturalistic view; b) a commitment to knowledge based on intuition of its essence; c) reflection on the processes of human existence; and d) that analysis as well as observation of the reflections is required to produce interpretations (Craig, 2005; Gorner, 2001).

Phenomenology, as it is described and used in this study, stems from the early work of Husserl. There are a number of concepts described by Husserl which are central to his description of phenomenology. These components include intentionality, essentialism and bracketing (epoche). Intentionality, or object-directedness (Zahavi, 2003), entails a person being conscious of an act or object. The object can be a loved one, a situation, or even an actual object, and the intentions towards them may be a loving feeling, a perception of competency or a desire to own an object. Husserl suggested that it is necessary to examine the object as well as the intention towards the object in order to develop an understanding of the consciousness of the individual. It is not necessary for the object to be present (or even real) for the person to have intention towards it; otherwise known as existence-interdependency (Zahavi, 2003). For this study, the object in most cases for the participants is their self-efficacy in relation to AT use. This self-efficacy is not represented in a concrete way, yet the participants are able to intend towards it.

Participants express aspects of consciousness through their descriptions and actions towards objects.

Essentialism “in its most stripped down meaning, refers to the belief that people and/or phenomenon have an underlying *and* unchanging 'essence'” (Twine, 2001, para. 1). It is this essence that the phenomenological researcher seeks to expose and describe. The distilling of the essence of an experience is achieved through rich and substantial collection of data provided by participants, which describes their lived experiences in detail. In order to ensure that the essences described by the researcher in the present study are those of the participants and not the researcher alone, a process of bracketing or epoching, as termed by Husserl, (Zahavi, 2003) is carried out. Bracketing in the current study is achieved through the compilation of researcher journaling and field notes.

3.6 Quasi-Experimental Research

Quasi-experimental research is similar to experimental research, but unlike experimental research the participants involved do not usually meet the criteria for a random sample (Teddlie & Tashakkori, 2009) or the research violates assumptions upon which experimental research is based. Quasi-experimental designs can be used when pre-existing groups are already available, or when it is not feasible to have one group receive an intervention, while the other does not (Keppel, Saufley & Tokunaga, 1992). A significant factor of both experimental and quasi-experimental research as being the dependent variable which allows for comparison (Colorado State University, 2012).

Colorado State University (2012) suggests that quasi-experimental designs may violate a number of conditions of experimental research, including: the existence of both a control and treatment group, elimination of confounding variables, and randomised selection of participants. In the current study there is no control group and the participants are purposively selected, meaning that experimental designs are not able to be applied. The use of quasi-experimental design has been thought to better reflect what happens in the real world, and is therefore an appropriate design to use for this study, as the EASN are being examined in their real capacity as facilitators and users of assistive technology. Within the context of quasi-experimental research, pre and post testing to determine changes in perceptions of their own selves and abilities and changes in skill levels have been assessed for the EASN.

3.7 Mixed Methods

Until recently, approaches to research were generally described as being either quantitative (dealing with numbers and statistics) or qualitative (dealing with words and interpretations). Some researchers found this very limiting and over the last 20 or so years, mixed methods has emerged from a pragmatist paradigm to become an increasingly favoured method of investigation in the social sciences (Creswell, 2009; Creswell & Plano Clark, 2007; Leech & Onwuegbuzie, 2009; Tashakkori & Teddlie, 2003). Teddlie and Tashakkori (2009) suggested that mixed method research is ideally a third community of research, as both quantitative and qualitative methods are seen as being useful and valid forms of research. These authors use the term “community” to describe the three major methodologies that are

currently evident in the fields of social and behavioural science: qualitative research, quantitative research and mixed methods research.

Mixed methods research is an appropriate research perspective to use in order to explore participant reaction and response to research questions and how the participants make sense of these responses. Bergman (2010) suggested that mixed methods research aids in enriching overall findings of the research and that it can assist in "designing better questions [and] may also guide analysis and interpretation" (p. 172). Mixed methods research has been described by Creswell and Plano Clark (2007) as emerging from the "philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches" (p. 5).

Mixed methods research was chosen for this study as it best articulates responses required to address the research questions (Gearing, 2004; Guba & Lincoln, 1982; Sale & Brazil, 2004). Mixed methodology allows the strengths of each area to be utilised to best effect by addressing different types of questions using different methodologies (Creswell & Plano Clark, 2007; Johnson & Onwuegbuzie, 2004). Research questions may be exploratory, requiring a qualitative approach to data collection, or confirmatory, requiring a quantitative approach, or both. Mixed methods research comes into its own when both of these types of questions are required to be addressed in the one study, as in the current study, as it allows the researcher to have greater depth and breadth of responses to investigate. Teddlie and Tashakkori (2009) stated that by asking different types of questions within the one study, the researcher can both generate and verify theory.

There is an assumption that by combining methods, the research is strengthened (Johnson & Onwuegbuzie, 2004; Miller & Gatta, 2006). Teddlie and Tashakkori (2009) suggested that this strength is a result of being able to provide stronger inferences in regards to specific situations or events through utilising the strengths of each method. Neuman (2011) described the use of multiple points of view as a form of *triangulation of measures*, in which the researcher can see a problem or event from a variety of perspectives, using many forms of data. He then explained *triangulation of method* as being a combination of styles of research and data which in turn allows for a "...richer and more comprehensive" study (Neuman, 2011, p. 165). The current study seeks to combine methodologies in order to determine the effectiveness of training (i.e. verifying theory) and also to generate understanding of the reasons behind the effectiveness (or lack thereof) of the training and the perceived experiences of the participants in regards to their use and facilitation of assistive technology (i.e. generating theory).

It has been suggested that mixed methods research is a logical progression from scientifically derived quantitative research, and the qualitative reaction to this, through to a more balanced approach to conducting and analysing research (Johnson & Onwuegbuzie, 2004). Mixed methods research is seen as the bridge between these two philosophical approaches, and is presented as a more realistic representation of the work being undertaken by researchers in the 'real world' (Johnson & Onwuegbuzie, 2004). Such bridging of approaches is only possible because of the similarities between research approaches and procedures. Some of the similarities between quantitative and qualitative approaches include a description of the data collected, defining objectives of the research, accounting for bias within the research,

and discussing the outcomes of the research and consequences for future research and development. While the methods used to acquire and interrogate the data may be different, studies in the social and behavioural sciences are generally concerned with human phenomena and how to interpret and address this appropriately. Johnson and Onwuegbuzie (2004) suggested an 8-step model for undertaking mixed method research (Table 3.2). These steps assisted the researcher in developing a sound basis for the application and interpretation of mixed method research in the current study. In particular, the process of determining the purpose of the mixed methods research and applying appropriate methodology worked to familiarise the researcher with the complexity of mixed method research and to ensure that this was, indeed, an appropriate way forward. Subsequent to determination of the purpose of the research is the consideration of methodology that would then be appropriate for this type of research. While the model looks similar to many research structures, a consideration at each level of how the research is defined and data treated is essential.

Table 3.2

Eight-Step Model for Undertaking Mixed Method Research (Johnson & Onwuegbuzie, 2004).

Step	Process
1	Research Questions
2	Purpose of Mixed Methods Research
3	Select Research Methodology
4	Data Collection
5	Data Analysis • Data Reduction • Data Display • Data Transformation • Data Integration

6	Data Interpretation
7	Legitimation
8	Conclusion Drawing/Final Report

Mixed method research may be positioned centrally when describing a continuum of quantitative and qualitative approaches (Figure 3.2), drawing from aspects of each approach, either in a minimal way (i.e. represented by lowercase qual, quan) or in a substantial way (i.e. represented by uppercase letters - QUAN, QUAL). The continuum is useful for examining the interrelationships between the three communities of research. The emphasis placed on the different types of research will vary according to the type of data collected and the way in which the data is analysed. The researcher may, for example, use predominantly quantitative methods, with a smaller emphasis on qualitative methods (e.g. represented as QUAN-qual). Alternatively, the methods may be used with equal emphasis in the research (e.g. represented as QUAL-QUAN). The current study utilised a mixed method design that emphasised qualitative methodology (QUAL - phenomenological research) and also employed quantitative methodology (quan - quasi-experimental research) to address the research questions under consideration. Therefore, the current study may be represented as a mixed methodology approach (QUAL-quan), as qualitative methodology played a larger role in the research.

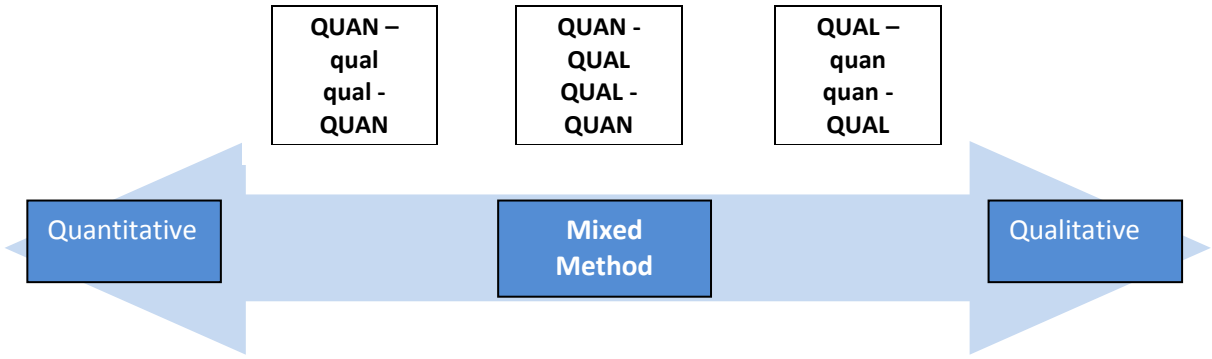


Figure 3.2. A continuum of methodology (Adapted from Johnson & Onwuegbuzie, 2004 and Teddlie & Tashakkori, 2009).

Tashakkori and Creswell (2007) stated that there are many ways that research questions within mixed method studies have been framed. In particular, they articulate three different forms of research questions in mixed methods research; a) separate quantitative and qualitative questions, followed by a mixed methods question which makes clear how the two will be mixed; b) a mixed method question which is then followed by quantitative and qualitative sub-questions to address particular aspects of the question; c) research questions are written as the study evolves, incorporating both quantitative and qualitative questions. For this study the second of the three forms of framing the research questions has been utilised, as there is an overarching mixed method research question and three sub-questions utilising qualitative or quantitative approaches which, when combined using both quantitative and qualitative approaches, allow the main question to be addressed. As the study is a parallel mixed method study (undertaking both quantitative and qualitative research at the same time), this is an appropriate way to approach the research questions (Tashakkori & Creswell, 2007).

Creswell (2009) stated that researchers working in the field of mixed methods should ensure that their research contributes to the field in some way. Primarily, this may be by adding something to the existing body of literature in the area.

Alternatively, Creswell suggested that it may also include replicating existing studies, testing theories, allowing voices of those not usually heard to be at the forefront of the research, explaining what experiences meant for others, or describing personal changes that have occurred throughout the research process. The present study seeks to contribute to the literature in this area by allowing the voices of an under-represented cohort to be heard, namely EASN, and by explaining how this cohort perceived the experiences undertaken during the training. Such an agenda will be demonstrated through the use of both qualitative and quantitative means.

Along with the positive aspects of mixed methods research, Johnson and Onwuegbuzie (2004) suggested that there are also some weaknesses that should be considered by researchers. The researcher needs to be able to carry out both qualitative and quantitative study (often concurrently) when using a mixed method approach, ensuring that appropriate mixing of methods is undertaken. It may be more expensive and time consuming to conduct mixed methods research, and the researcher may be required to argue the use of mixed methods research to purists in the fields of qualitative and quantitative research. In order to be able to undertake mixed methods research, the researcher must have a thorough understanding of both quantitative and qualitative approaches to research (Teddlie & Tashakkori, 2009). Only by being conversant in both approaches can the researcher seek to combine them. The researcher involved in the present study had previously demonstrated the ability to apply both quantitative and qualitative approaches to research questions.

3.7.1 Parallel Mixed Methods.

There are a number of ways in which research can be undertaken within the mixed methods approach. Mixed method designs can be sequential or parallel (Teddlie & Tashakkori, 2009). A sequential mixed method design is where one phase of the study (may be qualitative or quantitative) occurs and is followed by the next phase, which may also be qualitative or quantitative in nature. In a sequential design, the phases usually feed into each other. For example, results from a quantitative scale may be used to determine questions for a focus group interview.

In a parallel mixed method design, the phases occur simultaneously and may consist of both quantitative and qualitative data collection (Teddlie & Tashakkori, 2009). A parallel mixed method design is one in which researchers can use results from both qualitative and quantitative data to confirm the findings of the study (Creswell & Plano Clark, 2007; Teddlie & Tashakkori, 2009). In the present study, a parallel design was chosen as it was the more appropriate design to allow effective data collection to address the research questions. Parallel designs are sometimes referred to as concurrent or simultaneous designs. Teddlie and Tashakkori, however, make the distinction between these terms and parallel designs by stating that the terms ‘concurrent’ or ‘simultaneous’ indicate the data being collected at exactly the same time, whereas parallel gives more flexibility as to the timing of the data collection.

The quantitative and qualitative aspects of a parallel mixed method design are collected separately and are then combined or integrated to answer different but related aspects of the research questions (Teddlie & Tashakkori, 2009). The

researcher may use a different theoretical basis for each of the different aspects of the study. For example, phenomenology may be used for the qualitative component to describe participants' perspectives on the training and then inferential research may be used to quantify the magnitude of the change in knowledge and understanding of the participants. Information from both aspects can then be used to address the research question or questions. Teddlie and Tashakkori (2009) stated that in order for a design to be parallel, it must have at least two independent strands "…one with QUAL questions, data collection and analysis techniques and the other with QUAN questions, data collection and analysis techniques" (p. 152). The current study comprises these two separate strands.

The parallel mixed method design described by Teddlie and Tashakkori (2009) is similar to one of the triangulation designs described by Creswell and Plano Clark (2007). In the Creswell and Plano Clark design, the convergence model is the one which bears the most similarity to the parallel mixed method design. In this model (Figure 3.3), the quantitative data is collected, analysed and results are determined, and at the same time, the qualitative data is collected, analysed and results determined in a parallel fashion. These results are then compared and contrasted and interpreted through both quantitative and qualitative lenses simultaneously.

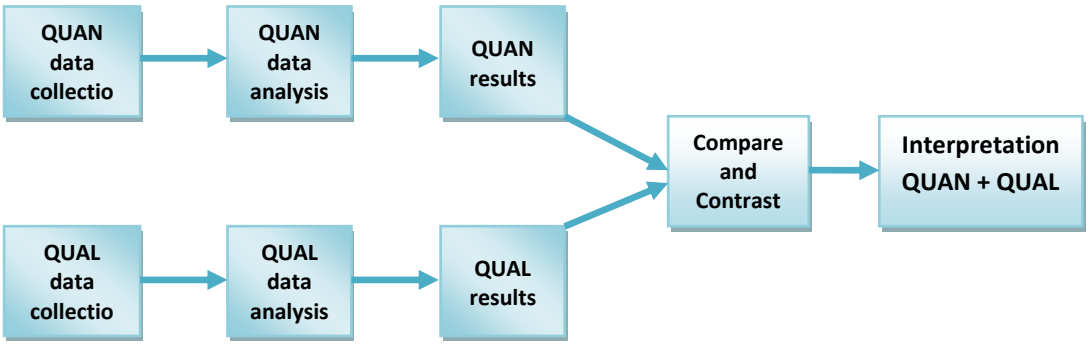


Figure 3.3. Triangulation design: Convergence model (Creswell & Plano Clark, 2007, p. 63).

Leech and Onwuegbuzie (2009) described a number of designs for mixed methods research. They stated that there are three dimensions that point to the design that is used within the study. These dimensions are the level of mixing, whether it is concurrent or sequential and the emphasis of the approaches. The fully mixed concurrent dominant status design, as described by Leech and Onwuegbuzie (2009) is similar to the parallel mixed method design and the triangulation (convergence) designs. Within this design, the researcher mixes the qualitative and quantitative components across one or all of the dimensions at the same or similar time. In this design, however, one of the approaches is given a greater emphasis. In the present study, the qualitative approach is given a stronger emphasis than the quantitative approach, as the participants voices are considered to be of importance when addressing the research questions.

3.8 Data Collection

3.8.1 Ethical Clearance

As the research was undertaken with human participants it was necessary to apply for ethical clearance. Prior to any form of data collection, ethical clearance was sought through the Human Research Ethics Committee at the University of Notre Dame Australia, and permission to approach schools was sought through the Department of Education. An application to conduct research with human participants was granted approval through the university committee (see Appendix 8 for approval letter). In this application consideration was given to any risks and benefits that may be encountered by participants. Participants were provided with an information letter detailing what was expected of them and their right to withdraw from the study as well as a written consent form (Appendix 10). Only participants who gave consent were included in the study. The Department of Education is required to give permission for any researcher who wishes to conduct research in a Government school to approach a site manager (i.e. Principal, Deputy Principal). This permission was sought and received (see Appendix 9 for approval letter). As this is permission to seek involvement from the site manager, an information letter and consent form for the site was also provided to the site manager to ensure all permissions were held (Appendix 10).

3.8.2 Target Population and Sampling Procedure.

EASN were chosen for the study as they work closely with students with disabilities who are often required to use assistive technology in order to access the curriculum and improve academic and physical skills. It is necessary to effectively train EASN so that they are able to facilitate learning for students with disabilities

(Cormack, Couch & McColl, 2000). As EASN will be increasingly called upon to facilitate the learning opportunities for students with disabilities in mainstream settings (Groom, 2006), this study provided the opportunity to gain insight into their knowledge and skill base.

The target population for the research consisted of Education Assistants Special Needs (EASN) in Department of Education (DOE) schools situated within the Fremantle Education District in Perth Western Australia. Participants were recruited from a select number of schools as identified by Inclusive Education Consultants within the Fremantle District Education Office. Those professionals identified schools where they felt there was an existing need for the EASN to have access to training in the area of assistive technology. These schools included those which had a large number of students with special needs and consequently a large cohort of EASN, as well as smaller schools with a relatively small number of students who had mild-moderate support needs. A sample of eighteen (18) EASN, currently working in DET schools, were recruited for the study. The EASN were invited to participate as part of a professional development opportunity, and agreed to commit to the training for a period of approximately eight weeks.

Permissions were sought from the District Directors and permission to approach site managers was obtained through the Department of Education's Research and Planning Unit (Appendix 8). Once the schools had been identified, the researcher contacted the Principal or Deputy Principal directly to provide information, and discuss the potential outcomes of the study, and explain the time commitment involved.

In total eight schools were approached with five choosing to participate in the research. The three schools who chose not to participate gave varying reasons for their decision. These reasons included a lack of funding (to pay for relief staff to cover EASN absences), too long a time commitment and lack of enthusiasm from the EASN themselves (reported by the Principal or Deputy Principal). For one of the schools, an overwhelming number of requests had been made of the school from outside agencies such as universities (for practicum placements) and the Principal felt that the school could not accommodate another change in routine and structure. Those schools that choose to participate in the research did so with enthusiasm and were generally supportive of the EASN in regards to the time allocation required.

The participants were drawn from a variety of schools with student populations ranging from 84 students to 730 students (Department of Education, 2010a). The EASN assisted students with very wide-ranging types of disabilities, from mild to severe. Some of these disabilities included Autism Spectrum Disorders, physical disabilities, intellectual disabilities and learning disabilities. All of the EASN worked with more than one child, often in multiple classrooms throughout the school day. The participants also represented a wide range of age groups, with the youngest being 18 years old and the eldest older than 56 years old. The majority of participants were aged between 36 and 55 years of age.

Sampling of the population for this study was undertaken purposefully. Purposive sampling is a "non-random sample in which the researcher uses a wide range of methods to locate all possible cases of a highly specific and difficult-to-reach population" (Neuman, 2011, p. 267). As a specific cohort was being

investigated (Gay & Airasian, 2003, p. 115; Kervin, Vaille, Herrington & Okely, 2006, p. 106), purposive sampling was seen as an appropriate method of sampling this population, with the sample providing their perspectives of the event (in this case, assistive technology training). This sample is appropriate to the topic under investigation as the EASN are working with students with special needs and are the people best placed to explain their own interactions with assistive technology.

The cohort for this study was partly chosen due to the physical proximity to the researcher. The researcher had also previously been requested to work with EASN in the area of AT in the local district. The EASN were seen as a group who had previously had limited access to quality professional development that was specifically targeted to their needs, particularly in the area of assistive technology. Some of the schools took quite a long time to respond to the researcher, even after repeated contact attempts. As a result of this, one training group of participants (9 in total), completed the training in term two of the school year, and the second training group of participants (9 in total), completed the training in term three of the school year. The training was identical in both cases, with the same personnel covering the same content in an identical order.

3.8.3 Instruments and Training Protocols.

Three research phases were developed in order to address the research questions. Figure 3.4 is a pictorial representation of the training and evaluation phases utilised for the study. The first phase of data collection comprised of collecting demographic and attitudinal information via a questionnaire and Likert-type scale (Appendix 1), and giving a skills test (Appendix 2) prior to any training

taking place. Following this initial data collection, three forms of data collection were undertaken on two subsequent occasions, using both quantitative and qualitative approaches. Phase 2 took place after the EASN had training in the use of assistive technology and consisted of a questionnaire and Likert-type scale (Appendix 3), a skills test (Appendix 2) and a focus group interview (see Appendix 4 for semi-structured questions). Phase 3 was conducted after the EASN had experience in facilitating learning using the technology. During this phase the EASN completed a questionnaire and Likert-type scale (Appendix 5) and a skills test (Appendix 2). There was also another focus group interview conducted (see Appendix 6 for questions).

As part of an initial questionnaire (Appendix 1), EASN were asked to identify their previous experiences with assistive technology and what they perceived to be their individual training needs. This information was used to assist in the development of an appropriate training package for the EASN, as well as provide a baseline indication of prior experience. The participants did not specifically identify that they worked with students with visual impairments or physical disabilities; however, it was decided to include these areas in the training as the likelihood that they would work with students with these disabilities in the future is high.

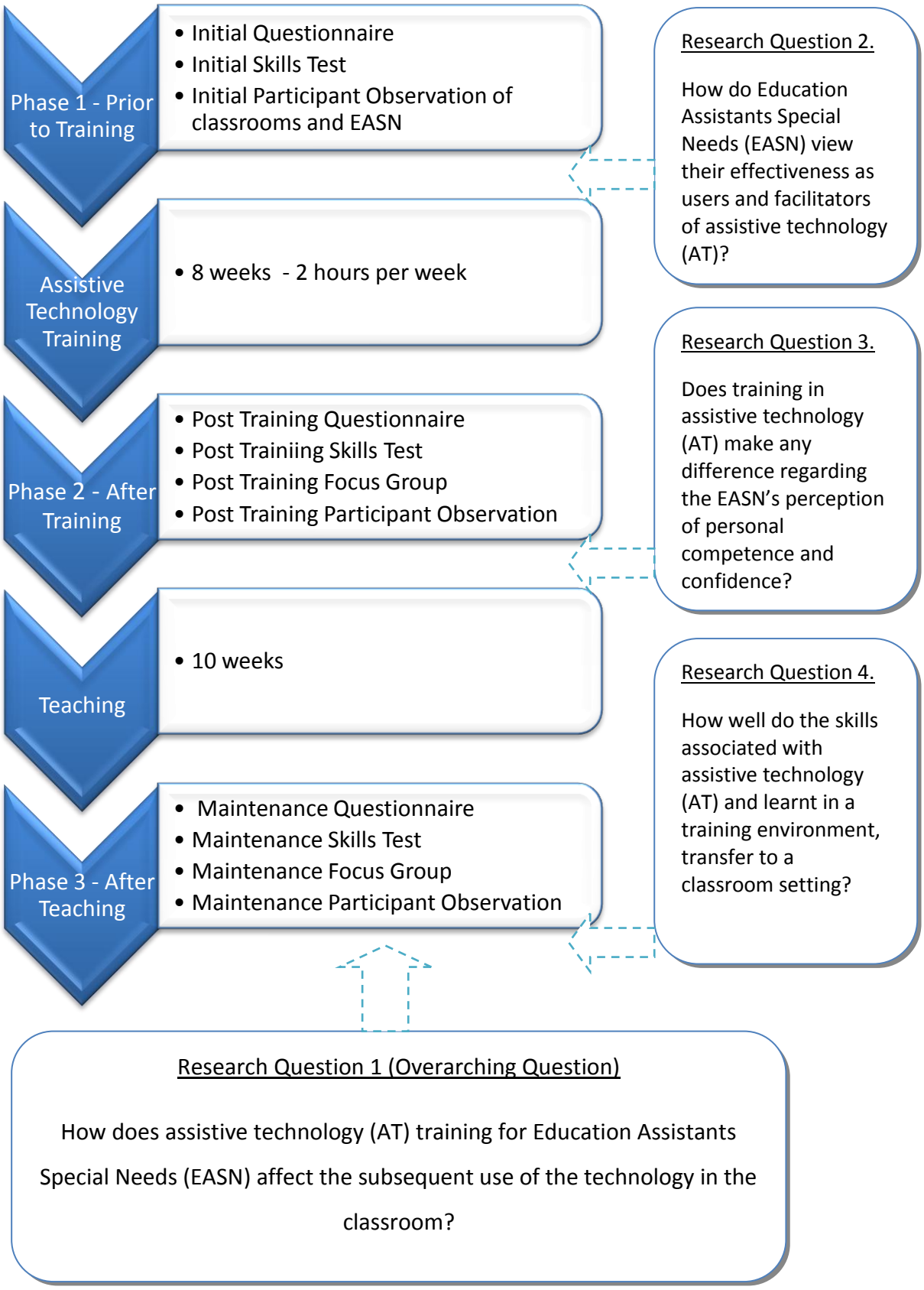


Figure 3.4. Phases of data collection.

The training took place for 2 hours per week, over a period of eight sequential weeks during a nominated school term. Participating schools were accessed for training space on a rotational basis, so as not to disadvantage any one school or the EASN. Table 3.3 lists the sessions in order of presentation. The training format consisted of an initial examination of the term 'assistive technology' and what this might mean for the EASN along with provision of both low and high-tech examples. The participants then examined a range of different planning tools that could be used to determine the needs of the student and used this to match appropriate assistive technology to specific classroom situations/circumstances. See Appendix 11 for a CD-Rom containing all PowerPoint presentations and additional material used during the training.

Following these initial sessions, an examination was undertaken of various types of assistive technologies and when and how these would be used. These technologies consisted of assistive technology for communication, physical difficulties, vision impairment and learning disabilities. A conscious choice was made to examine the assistive technology by looking at function, rather than disability because the EASN are then able to apply their learning more effectively according to the varying needs of students with disabilities. The functional approach required the EASN to closely examine the individual needs of the students with whom they worked and determine appropriate tools to allow them to better access the classroom. Discussion of how the particular tools and technologies could be adapted or modified for specific use was also undertaken.

Table 3.3.

Schedule of Sessions for Assistive Technology Training with EASN.

Session	Topic
1	Gizmos and Gadgets
	What is AT? Low-Tech and High-Tech.
2	When do I do it?
	Planning for the use of AT in the regular classroom
3	Talk to me
	AT for Communication
4	Moving and Grooving
	AT for Physical Difficulties
5	A sight for sore eyes
	AT for Vision Impairments
6	Sharing Information
	AT for Learning Disabilities
7	Promising Progress
	Keeping Records for AT
8	Doing it Daily
	Planning for Transfer of Skills to the Classroom

In order to ensure that appropriate records were kept to support the use or modification of assistive technology, the EASN were introduced to a number of record keeping methods that lent themselves to assessing assistive technology use and efficacy. A final session was developed to plan how the skills and knowledge that the EASN had accumulated over the previous seven weeks could be transferred into the classroom. The EASN completed a transfer sheet (Appendix 7) detailing when they would have opportunity and need to use assistive technology within their specific settings and how this would be achieved considering constraints such as budgets, time and availability. The aim of this session was also to review the

previous sessions and draw attention to appropriate uses of the assistive technology for individual situations.

The training was developed and delivered by the researcher in consultation with other experts such as the assistive technology team leader from the Department of Education's Centre for Inclusive Schooling (CIS) and staff from the Independent Living Centre (WA). CIS supports schools and teachers to address the needs of students with disabilities to access the curriculum. CIS also develops and delivers professional learning for teachers and for other service providers involved with the education of students with special needs (Department of Education, 2010b). This service is available to Government (public) schools.

The Independent Living Centre (WA) is a not-for-profit organisation that "provide[s] customers who have disabilities, mobility and accessibility problems with personalised assistance to find the best solution for their needs that will maximise their quality of life" (Independent Living Centre WA, 2010, para. 1). The Independent Living Centre (WA) provides services such as assisting people to determine whether assistive technology would be of benefit for them and helps them to explore the type of assistive technology that is appropriate and available. The Centre also works with schools and teachers. Staff at the Centre include speech pathologists, teachers and Occupational Therapists. One of the speech pathologists from the Independent Living Centre presented a session for the EASN on assistive technology for communication.

Underpinning the training approach was a philosophy of collaborative inquiry, where participants and the trainer work together to develop understanding and apply strategies within classroom settings. A similar philosophy has been described by Miyasato (2003) to address teachers learning and use of ICT in the classroom. Petress (2003) states that "…a teaching philosophy can and does affect the teaching-learning process; that is contextualizes, frames, and focuses pedagogical activity" (p.1). In this study the collaborative inquiry sought to engage the participants in actively conceptualising the content and assimilating the content and strategies with existing knowledge and practice. The collaborative approach is in keeping with the social basis of the training and a desire to ensure that the EASN are able to establish and maintain networks amongst themselves.

A variety of pedagological methods were used during the training sessions, including demonstration and modelling, individual work, small group work, and whole group activities. On occasion, the EASN were given 'homework' in the form of completing a description of a student with whom they worked, using a specific piece of technology or accessing information via the internet. The 'homework' was designed to consolidate their learning and allow them to apply it to their individual situations. The types of assistive technology that were examined included low-tech options such as pen grips, enlarged paintbrush handles, and magnifying glasses and high-tech options such as text-to-speech software, voice output devices and prosthetics. EASN may encounter a wide variety of students who use an increasingly available variety of assistive technology in the classroom, so a broad examination of the area was warranted.

3.8.4 Method of Data Collection.

3.8.4.1 Observation.

Observation involved viewing the participants of the study, recording the information in the form of field notes, and drawing conclusions about their actions from these observations (Patton, 1990). Hannan (2006) suggested that observation allows the researcher to be positioned within the research, rather than removed from it through the collection of data that is not immediately relevant (i.e. questionnaires, tests). The researcher was also the trainer for the EASN and was therefore positioned as a *participant observer* during observational periods. This role had the potential to impact upon the observations by distorting how the researcher viewed the participants (Hannan, 2006). Impact was minimised through the researcher's experience in classroom and behavioural observation of children and through triangulation of the observations with other sources of data, namely, questionnaire responses, skills tests and focus group interviews to ensure that the observations were consistent with other information or to identify reasons why it was not. Bracketing also worked to ensure that the researcher was minimising any assumptions or pre-conceptions about the EASN and the context during observation and analysis (Bednall, 2006).

Neuman (2011) described observational data collected in the field as "…what you experience, remember and record in field notes..." (p. 441). He suggested that this involves paying attention to the interactions of the participants and using all sources of information to address research questions. The observation of participants, particularly in their 'natural environment' allowed the researcher in this study to reveal what was actually happening in a situation. On occasion, this observation may

differ from what is reported by participants, or may be a confirmation of reported results or perceptions. It is also possible that field notes can reveal something of significance that is not obvious in other forms of data collection. Participant observation was undertaken both informally (when opportunity presented itself) and at the completion of each research phase (see Figure 3.4). Observations took place in classrooms supported by participants, although not all classrooms were accessible for all phases. The researcher observed the participants as they went about their duties, and was given 'tours' of the classrooms, including the AT that the EASN had implemented, during these observation periods. The observations are reported in the results section as Field Notes.

3.8.4.2 Focus Group Interview.

A focus group interview involves a small group of people, usually 6- 8 in number, who are brought together to explore issues and understandings in a social context (Patton, 1990). Focus groups can be the main tool used for the research or "can be used at the end of a program...to gather perceptions about outcomes and impacts" (Patton, 1990, p. 336). Participants in this study were invited to attend focus group interviews and respond to questions from the researcher. They also had the opportunity to comment on the responses of others. These responses took many forms including adding information, contradicting another's perspective or agreeing with another participant. Patton (1990) suggested that it is not necessary for the participants to come to an agreement, but for them to consider their perspectives in light of the views of their contemporaries. This provides high-quality data which can be added to the existing data for examination.

Patton (1990), states that the focus group interview may be anywhere from half an hour to two hours in length. The length of focus group interviews for the current research ranged from 32 minutes to 59 minutes (excluding pre-amble) which is consistent with cited appropriate lengths. Focus group interviews were an advantage for the researcher as a large amount of data was collected from many people in a relatively short period of time. Some control over the data was also experienced, as the participants monitored each other's responses and indicated when people had views which were not consistent with the majority, or that may have evolved from false conceptions (Patton, 1990). This control assists the researcher in determining consensus among group members on particular issues or questions and determining the essence of the experience for the cohort.

During focus group interviews it may be difficult to ask large numbers of questions, as a number of the participants may wish to respond. Patton (1990) suggested that with a focus group interview with eight participants, no more than ten major questions would be able to be addressed within an hour long session. For the current research, seven main focus questions were asked at both the post training and maintenance phases, which directly related to the research questions under consideration. Three to four additional questions drawn from a brief analysis of the groups' questionnaire responses (see Appendices 4 and 6). The additional questions assisted in clarifying responses given on the questionnaires and determining if others within the group had similar thoughts or feelings in regards to issues raised.

The focus group interview needs to be well managed so that all participants have the opportunity to be heard (Patton, 1990). Those who did not respond to

questions during the focus group interviews were asked explicitly if they had anything to add to the responses of their colleagues, to ensure that they had ample opportunity to concur or disagree with statements and opinions of others. In order to determine the order in which people spoke, the researcher in this study took brief notes while conducting the focus group interview. This allowed a higher level of accuracy during transcription of the focus group interview and also an indication of whether all group members' views were equally heard. For an indication of when the focus groups took place please see *Figure 3.4 – Phases of Data Collection* (page 143).

3.8.4.3 Questionnaire.

The questionnaire design consisted of two different types of questions – Likert-type responses and open-ended questions. The questionnaires were designed within organisation and design considerations such as those suggested by Bradburn, Sudman and Wansink (2004) which included numbered questions, each question asked individually, and participants provided with space to make an immediate written response.

A Likert-type scale may be used to evaluate a respondents' incrementally discerned opinion about a particular statement (Burns, 2000). Likert scales were developed in 1930 by Rensis Likert and can be used to measure a person's attitude (Neuman, 2011). Neuman suggested that a scale should contain between four and eight choices for respondents in order to give a more precise indication of their perceptions. The choices in a Likert-type scale are organised along a continuum, rather

than being randomly assigned. This is an ordinal, rather than interval, type of measurement as responses are ranked (Neuman, 2011).

The respondents in the current study indicated their level of agreement with the statements in this study using a five-point scale. The participants rated their perceptions of themselves in regards to a number of statements and the scale ranged from excellent to very poor. A number (1-5) was then allocated to each of the scale responses and a composite of all responses used statistically to determine change from one setting to the next or from one situation to another (Burns, 2000). Burns (2000) and Neuman (2011) suggested that there are a number of benefits and difficulties apparent when using Likert-type scales. The benefits include that they are simple and easy to construct and administer, that the information comes directly from the participants, and that the scale is likely to be accurate in obtaining responses from participants. Difficulties consist of an inability to determine how much more one aspect is preferred over another, and that different combinations of responses can result in the same overall score for the participant. There is also a danger that participants will not read through the questions carefully and just automatically agree (or disagree) with each statement. This could lead to false data. In an attempt to minimise negative aspects the participants were urged to read each statement carefully and take time to consider their responses before selecting an item.

Both the questionnaire and focus group interviews relied on self-report to obtain data for the study. Self-report has been widely used as a research method and can be both a valid and reliable form of data collection (Campbell, Bonaccci, Shelton, Exline & Bushman, 2004; Chan, cited in Lance & Vanderberg, 2009;

Sanford, 2010). Indeed, Sanford (2009) discusses a study with couples in which self-report, partner-report and observer ratings were compared, and found that there was good correlation between the observer ratings of behaviour, partner-ratings of behaviour and self-report of behaviour. Self-report is also considered to be useful when the participants views are sought, and these views are not able to be directly observed (Chan, cited in Lance & Vanderberg, 2009; Sanford, 2010). The types of questions that the participants were asked to address, utilising a Likert-style questionnaire, also lent themselves well to a self-report method, as they are intended to assess the attitudes of the participants (Algozzine, 2009).

3.8.4.4 Measurement – Skills Test.

The skills test used to measure the participants' abilities to use AT in this research was adapted from the University of Kentucky Assistive Technology (UKAT) project materials (University of Kentucky, 2002). The knowledge and skills survey was adapted to allow the researcher to quantify the participants' demonstrated abilities to use and understand terminology and assistive technology (Appendix 2), rather than being purely a checklist (as it was in its original form). Tasks were divided into five areas which corresponded with those described by the UKAT materials, namely: foundation skills, planning skills, assessment skills, practice and collaboration and the use of specific assistive technologies.

The first area of the skills test consisted of foundational skills which described the basic skills required by the EASN in order to be able to operate a computer system as well as to use appropriate terminology when discussing assistive technology. The second area of planning skills, involved the EASN determining the

features of assistive technologies and matching appropriate assistive technologies to the needs of students. During the planning phase of the test, the EASN were required to articulate what they would do in the event that the assistive technology was not working for its intended purpose. The third area of assessment skills required the EASN to indicate how they would monitor the use of assistive technology with students and from this information make a judgement about whether or not the assistive technology was actually supporting the student, or hindering progress.

The fourth area of the skills test was in practice and collaboration. The EASN were asked to identify the people who would be involved in the planning, implementation and instruction of assistive technology in the classroom. The final aspect of the test required the EASN to demonstrate the use of specifically chosen assistive technologies. The assistive technologies in this section were representative of the types of technologies that would reasonably be accessed by the EASN on a regular basis, and that were readily available to them. These were determined with the assistance of the Team Leader for Assistive Technology from the Centre of Inclusive Schooling and staff at the schools from which the participants were drawn. In each area there were a variable number of tasks to complete (between one and eighteen). For each of these tasks a correct response was coded as a 1 and an incorrect response as a 0.

3.8.5 After Training.

Immediately following initial training the EASN were given an evaluative questionnaire (Appendix 3). The questionnaire required the respondents to indicate responses to a Likert-type scale and provide, in writing, reactions to the training,

comments on whether or not it was useful and ideas for future direction. The questions were open in nature in order to elicit a wide range of information. The respondents also had the opportunity to add any information that they felt was pertinent. Another skills test (Appendix 2) was also given. During this test, the participants were required to perform certain tasks, using the assistive technology, in order to demonstrate competence in the use of the technology. The skills test was administered by the researcher. The test also included examination of use of the technology by the EASN when working with a novice user (i.e. student) (Gay & Airasian, 2003, p. 131; Kervin, Vaille, Herrington & Okely, 2006, p. 113).

Three focus group interviews were used in phase 2 to assist with triangulation (Gay & Airasian, 2003; Heaven, 1992; Kervin, Vaille, Herrington & Okely, 2006; Leech & Onweugbuzie, 2009) of the data obtained through other forms of evaluation, and to explore areas which had hitherto not been fully examined. The focus group interviews consisted of between three and four interview participants. Semi-structured focus questions were used during these focus group interviews (Appendices 4) to provide the participants with a starting basis for discussion, and to follow up on issues raised in the written questionnaires.

3.8.6 Maintenance Phase.

During phase three, re-evaluation in the form of a repeat questionnaire (Appendix 5), skills test (Appendix 2) and three focus group interviews (see Appendix 6 for questions) were initiated 10 weeks after the completion of the training. This was considered an appropriate amount of time for the EASN to have had experience in using the assistive technology with their students. This third

round of data collection was designed to provide insight into the EASN's abilities to transfer knowledge from a training situation to an in vivo condition, the viability of the training, usefulness for particular students and schools, and whether or not skills acquired during the training had increased or decreased post training.

3.8.7 Addressing Effects of Researcher Conducting Training.

As the researcher is an integral component of the research in the current study, there is a need to consider a possible 'Hawthorne Effect' in action. Some authors feel that the term 'Hawthorne Effect' can be used in a wide variety of often incorrect or misleading ways (Chiesa & Hobbs, 2008; Merrett, 2006). In this study, the term is used in relation to the phenomenon that "when people realize that their behaviour is being examined, they change how they act" (Brannigan & Zwerman, 2001, p. 56). It is possible that by knowing they were being examined in relation to their AT use, that the EASN increased the use of the AT in the classroom. In this case, however, that is not the only outcome that was sought, but also under consideration was a change in attitude and perception as exhibited by the EASN. Merrett (2006), when discussing the 'Hawthorne Effect', suggests that it is not enough to only examine outcomes. "It is not only what is done to alter conditions of work but how it is done, by whom, and with what accompanying information, as well as the perceptions of such changes by those directly affected by them, that are important" (Merrett, 2006, p. 146). This study examined many aspects of the phenomenon of conducting training in AT with EASN, allowing a richer body of information to be gathered against which the potential effects of being studied could be counterbalanced.

Related to the discussion of 'Hawthorne Effect' is that the researcher was also the person who delivered training to the participants. It is possible that the participants, knowing the researcher more intimately through the close interaction during training, would attempt to 'please' the researcher by providing positive feedback in focus groups and questionnaires. This effect was minimised by the application of a skills test for all participants. The participants were only able to complete the skills test by effectively demonstrating the skills that they had acquired. The skills test was not able to be manipulated by the participants. Further, the participants appeared to be quite willing to give negative feedback if they felt that a component of the training was not useful to them, or that there were barriers to implementation, indicating that they were not concerned that there were any negative implications as a result of being honest in their feedback.

3.9 Analysis

3.9.1 Descriptive and Inferential Statistics and Statistical Analysis.

Descriptive statistics were used to describe the participants and their prior experiences and qualifications. Inferential statistics (Gay & Airasian, 2003; Kervin, Vaille, Herrington & Okely, 2006) were used to assess skill level of participants as it was the most appropriate method to determine whether a change in skill level occurred as a result of the training. The research involved "collecting data to answer questions about the current status of issues or topics" (Gay & Airasian, 2003, p. 10). Information about the practices of the participants was obtained from pre and post and maintenance tests and questionnaires (Gay & Airasian, 2003), so that a change in knowledge, skills and practices could be measured. This methodology also assisted in determining the ability of the EASN to facilitate learning through the use of the

technology. The skills test was designed using a numerical scale which equated to the ability of the EASN to perform the skill. These were then grouped according to area of use (i.e. foundational skills, collaborative skills).

The data collected during the skills test were placed into the statistical package SPSS (version 17) in order to analyse the data descriptively in the form of mean, mode and median to display the data post training and at maintenance. The mean allows the researcher to determine average of the scores achieved, the mode is the score that occurs most frequently and the median is the score that falls in the middle of all the scores. The use of mode and median scores will assist to determine if there is any skewed data, or any outlying data. By comparing the data at the three points of data collection, the researcher was able to determine whether a significant change had resulted from the training, and whether or not this had been maintained.

In order to determine whether there had been a significant change in scores between the pre-training, post-training and maintenance periods, a Wilcoxon signed rank test was applied to the data (Siegal & Castellan, 1988). Non-parametric tests were used here as the sample size was small, the population was not normally distributed, they were appropriate tests to use to test the hypothesis, and they were able to treat data which was categorical, such as that of a numerical or Likert-type scale (Siegal, & Castellan, 1988). As there were two distinct groups who participated in the training, it was also considered necessary to determine if there were any between group differences. One of the two groups had greater access to assistive technology and it was necessary to determine if this had an effect on their knowledge and use of the assistive technology as a result of this access. For these

reasons a Kruskal-Wallis test was used to determine if there were any differences between the two groups (Siegal, & Castellan, 1988).

The use of the inferential component assisted in identifying how well the skills had been learnt and retained or improved upon. Inferential statistics also allowed the researcher to determine how well these transferred to a classroom setting, by comparing pre-post and maintenance responses from participants. This determination was supported with qualitative data drawn from discussions with the participants.

3.9.2 Data Reduction and Verification.

The method of analysis for the qualitative data employed in this study followed a format similar to that described by Miles and Huberman (1984). The analysis included the activities of data collection, data reduction, data display and conclusion- drawing/verification (Figure 3.5.) The data was collected using two main instruments. These were questionnaires and focus group interviews. In order to access the data in an appropriate form it was transcribed and typed into readable formats.

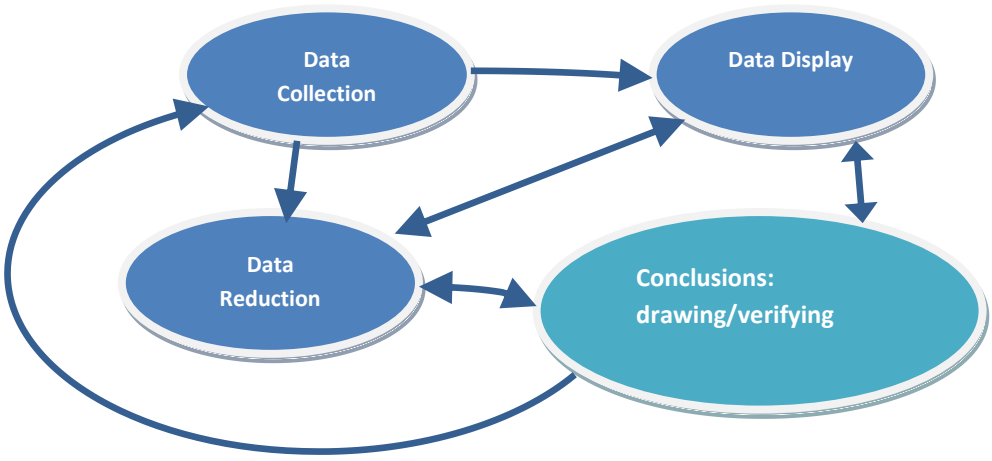


Figure 3.5: *Components of data analysis: Flow model* (Miles & Huberman, 1984, p. 23).

Prior to the collection of the data, a form of data reduction was undertaken by tightening the focus of the collection of data. This focusing was achieved through the development of a conceptual framework (see Figure 2.1), by the explicit use of research questions to guide the focus and through the use of purposive sampling (Miles & Huberman, 1984). The form of data collection used, namely questionnaires and focus group interviews, also act to reduce the data in an anticipatory way, through the use of specific questions to be addressed by participants which relate to the research questions.

Data reduction was undertaken throughout the data collection period and at the conclusion of this period. Interim data reduction methods included a contact summary sheet and data coding. Data collected was organised into categories. These categories were then coded so that they were accessible for later use. This allowed the researcher to examine main themes and categories before final analysis. It is important that these were seen as "temporary" themes and categories, as themes that may have been valid initially come to be seen to be not useful in the final analysis (Guba & Lincoln, 1982; Neuman, 2011). Post data collection reduction included making explicit connections to particular parts of data that reflected the themes or categories identified. This is referred to as "category construction" (Butcher & Prosser, 1993, p. 4; Kervin, Vaille, Herrington & Okely, 2006, p. 146). Throughout this process research questions emerged or changed, depending on what the data described. This design has been described by Guba (1978, p. 14) as being "emergent [and] variable".

Data were displayed according to findings, but some anticipated forms of display included explanatory figures in the form of causal networks and descriptive matrices (using words) (Miles & Huberman, 1984, p. 26). These forms of display allowed the researcher to present the most important variables in the research and assisted in supporting analyses made.

In the conclusion-drawing aspect of the study, the identification of patterns among the data was undertaken (Gay & Airasian, 2003). This followed on from the techniques used to display data and aimed to reduce the quantity of data into a coherent description of experience. This was achieved through close interaction with and coding of data throughout the research as well as building a chain of evidence to support coherent determinations (Miles & Huberman, 1984). Notes were kept throughout the research process to record the researcher's methods of data reduction and conclusion-forming processes.

A journal played an integral part in assisting with bracketing of assumptions and pre-suppositions (Wall, Glenn, Mitchinson & Poole, 2004) by allowing the researcher to record and reflect on assumptions held and put these to one side while analysing data. Bracketing is a term used by Husserl (1931) to describe the process of "hightlight[ing] and put[ting] on hold our everyday assumptions" (cited in Wall, Glenn, Mitchinson & Poole, 2004, p. 21). This is a necessary procedure to undertake so that the researcher can effectively describe the phenomena in terms of the participants' experiences (Bednall, 2006), without the researchers' experiences biasing or skewing those of the participants. Bracketing requires the researcher to identify their interests in undertaking the research (Ahern, 1999), articulate and clarify the

values system that they are operating from (Ahern, 1999; Ashworth, 1999), examine areas of role conflict, consider the interest of the participants in the research (Ahern, 1999; Gearing, 2004), and recognise feelings that may affect perception of data (Ahern, 1999).

The steps used to bracket assumptions for this study were similar to those described by Wall, Glenn, Mitchinson and Poole (2004) and Hamill and Sinclair (2010). Steps that were taken included: a written reflection of what was known about the topic prior to meeting with the participants, a reflective journal was kept throughout the training period and was used to describe thoughts and feelings in relation to the research, an audit trail of research data was kept, and supervisor review and participant feedback were sought. Examination of the researcher's position on issues raised and themes that became evident throughout the research was able to be undertaken as a result of the bracketing process (Hamill & Sinclair, 2010). When there were issues or findings that appeared to have importance for the research, the researcher was able to examine these critically and determine whether the findings were relevant for the participants. Assumptions and pre-conceived notions that were identified during the bracketing process are identified in the discussion of the results of the current study (see Chapter Five).

In order to determine the trustworthiness of the qualitative component of the research the credibility, transferability, dependability and confirmability was examined (Guba & Lincoln, 1982, p. 246). These are analogues for the quantitative terms of internal validity, external validity, reliability and objectivity. Credibility was enhanced through the use of focus interview groups and through sustained

interaction with participants (Gay & Airasian, 2006, p. 246). Participants were asked if their realities were represented as they intended them to be. This data checking determined that the analysis was considered to be credible. As an additional means of demonstrating credibility of the research, prior to data collection and throughout the analysis, the process of bracketing was observed (Ahern, 1999, p. 407; Ashworth, 1999, p. 709).

The transferability of the research lay in the selection of the participants. As this is a purposive sample the results are only able to be transferable to populations who have the same characteristics as the sample group. What the results may suggest, however, are reactions to training from a diverse (albeit small) sample. These reactions and experiences may be considered when designing training for EASN in the future (Chambers, 2011) and the broad essence of the experiences may be applied to settings which are strongly similar to that of the training setting. Dependability is determined by taking into account changes within the data. An audit trail was established to articulate the steps taken in methodology, and decisions regarding data. An audit trail also helps to establish confirmability as the findings can be traced back to the original data sources and can be examined for reasonableness and meaning (Guba & Lincoln, 1982).

The methods of analysis enabled the researcher to explore how EASN viewed their own use of assistive technology and their ability to facilitate its use with students. It also provided some insight into the barriers that are perceived by the EASN in regards to the use of assistive technology in the classroom and further training that may be required.

3.10 Interpretation

Once the quantitative and qualitative data of the research were collected, analysed, and the results made clear, they were compared and contrasted (Creswell & Plano Clark, 2007). This process involved an examination of similarities and inconsistencies throughout the data. When this initial process had been completed, a process of interpretation of the results was undertaken. Reference was made to any comparable findings within the existing literature and any novel findings that emerged. Implications for future research and limitations of the current study are also identified.

3.11 Chapter Summary

Quantitative and qualitative approaches are united within a pragmatist paradigm to develop a mixed method design for the current study. Quasi-experimental methodology from a post-positivist paradigm and phenomenological methodology from the interpretivist paradigm form the basis of the lens through which the research is viewed. A purposive sample of eighteen EASN was recruited from five schools in the Fremantle Education District to participate in the study. Data collection methods used included questionnaires, Likert-type scales, skills tests and focus group interviews. Data was analysed using inferential statistics, non-parametric statistics and qualitative thematic coding.

CHAPTER FOUR

RESULTS

4.1 Introduction

The purpose of this research was to investigate Education Assistants Special Needs' (EASN's) perceptions of themselves as users and facilitators of AT in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. The following information details the results of the study including general information about the participants and their perceptions of themselves as users of AT and an examination of their skill level and knowledge over three assessment periods: pre-training, post-training (after the 8 week training period) and at a maintenance period ten weeks after the completion of training (see Figure 3.4).

4.2 Demographic Information

Eighteen Education Assistants Special Needs (EASN) personnel took part in the study, all of whom were female. Ages of participants ranged between 18 years to over 56 years of age. Fourteen (77.8%) participants were over 35 years of age; three (16.7%) were in the 26 to 35 year age range, while only one (5.6%) participant was in the 18-25 year old age range. The work experience of the participants varied greatly, with two participants having less than one year of experience in their role as an EASN. In contrast to this, two participants had more than 16 years experience in this role. The majority of participants (61.1%) had between 2 and 10 years of experience. Table 4.1 and 4.2 illustrate the ages of participants and the number of years of employment in the role of an EASN.

Table 4.1

Age Ranges of Participants

Age range	Number of Participants	Percentage (%)
18-25 yrs	1	5.6
26-35 yrs	3	16.7
36-45 yrs	7	38.9
46-55 yrs	6	33.3
56+ yrs	1	5.6
Total	18	100.0

Table 4.2

Years of Employment in Education Assistants Special Needs Role

Years	Number of Participants	Percentage (%)
0-1	2	11.1
2-5	5	27.8
6-10	6	33.3
11-15	3	16.7
16+	2	11.1
Total	18	100.0

The primary disabilities of students catered for by the EASN varied, with the highest number being those students with an Autism Spectrum Disorder. Table 4.3 illustrates the types of primary disabilities of the students, as identified by the EASN. The identification of the types of disabilities by the EASN was achieved through information received from the teacher, parents and observation of the students, in

addition to access to formal identification reports from experts (such as psychologists). Students may have had other disabilities in addition to the primary disabilities.

Table 4.3

Types of Disabilities of Students

Disability	Types of Students in each Category	Percentage (%)
Learning Disability/ Difficulty	6	33.3
Physical	0	0
Intellectual	2	11.1
Autism	9	50
Communication	0	0
Vision/Hearing	0	0
Other	1(Bi-Polar Disorder)	5.6
Total	18	100.0

Flyers were circulated to all of the EASN at the target schools prior to the commencement of the training, detailing the professional development on offer in the area of Assistive technology. Professional development is designed to increase skills and knowledge of staff in their area of expertise, and in this study is in the form of AT training. Thirteen of the eighteen EASN were requested to attend the professional development on AT by a principal or classroom teacher for the purpose of increasing their knowledge and skills in the area of AT use. Five participants independently requested to attend the professional development as they were

desirous to increase their own learning in the field of AT and were excited to be offered professional development which was targeted to their needs.

Only one of the participants had any prior training in the area of assistive technology, undertaken as part of the requirement of a previous role she held, that of supporting students with very high support needs. The remaining seventeen participants indicated that they had been given no formal instruction in this area. This was unexpected considering that the majority of participants (55.6%) had formal Education Assistant qualifications. The remaining participants had completed either Year 10 at high school (22.2%) or Year 11 and 12 at high school (22.2%). Table 4.4 illustrates the reported educational experience of the participants.

Table 4.4.

Reported Educational Experience of the Education Assistants Special Needs

Level of Education Completed	Number of Participants	Percentage (%)
Year 10	4	22.2
Year 11+12	4	22.2
Education Assistant Course	10	55.6
Other	0	0
Total	18	100.0

In addition to the educational experiences reported by the EASN, a range of other previously attended professional development was also cited, with nine of the participants reporting having attended workshops or seminars on Autism, or Autism related areas, and ten reporting attendance at behaviour management sessions. Other

types of professional development completed included first aid training, reading support and manual handling training.

4.3 EASN's Views of their Effectiveness as Users and Facilitators of Assistive Technology

4.3.1 Introduction.

The EASN were asked to identify their perceptions of themselves as both users and facilitators of AT through indicating whether they felt that their skills and abilities regarding AT were excellent, good, fair, poor or very poor. They were also asked about prior training undertaken and what aspects of AT they would like to learn more about during the training, to assist both themselves and the students with whom they worked. This allowed the researcher to gain a better picture of the EASN's abilities and skills so that training could be tailored appropriately. The initial data collection also allowed for a baseline to be established to determine if the training had an impact upon both skill levels and perceptions of the EASN.

4.3.2 Responses to Initial Questionnaire.

Prior to the commencement of the training the EASN completed a questionnaire which included qualitative questions about training they considered relevant to their needs and the needs of the students with whom they worked, as well as their prior experience and training in the area of assistive technology. A five point Likert-type scale was employed to quantify responses to questions on their perceptions of themselves as users and facilitators of assistive technology. The scale (Appendix 1) required participants to respond to questions asking how they would rate their abilities and perceptions in specified areas. The participants were asked to

rate their level of confidence in regards to using AT in the classroom (Figure 4.1). Of the eighteen participants, none felt that their confidence was very poor or excellent, thus eliminating the extremes. Most indicated that they were fairly confident (44.4%), or had a good level of confidence (38.9%). Three (16.7%) of the participants felt that their confidence in using AT in the classroom was poor.

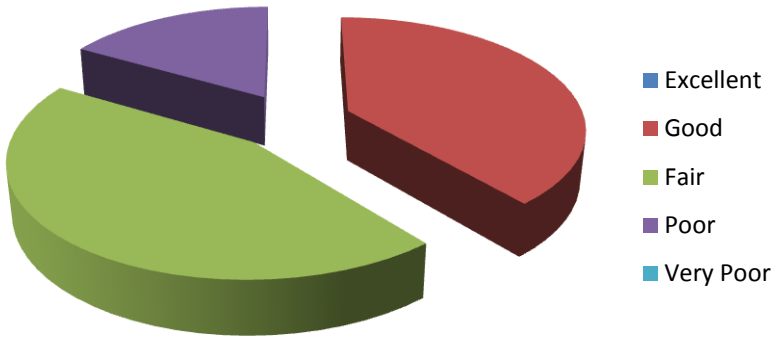


Figure 4.1. Indicated level of confidence in using assistive technology.

The next question asked the participants to rate their current skill level in using AT (Figure 4.2). Once again there were no results for the excellent or very poor categories, indicating that there were no extreme responses. Eight (44.4%) of the participants indicated that their current skill level was good. The remaining participants were equally divided between fair (27.8) and poor (27.8) indications of skill level, which represents over half of the participants. While the majority of the participants therefore had reasonable confidence in their ability to use assistive technology, they did not necessarily feel that they possessed the required skill level to use AT effectively.

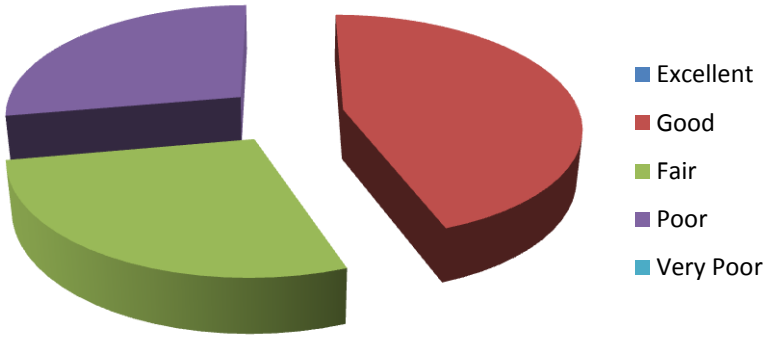


Figure 4.2. Reported level of skills for using assistive technology

Figure 4.3 indicates that participants were less confident about teaching students to use assistive technology, with only six (33.3%) indicating that they had a good level of confidence. Seven (38.9%) participants had a fair level of confidence in teaching others, while five (27.8%) felt that they had a poor level of confidence when teaching others in this area. No-one indicated a very poor or excellent feeling of confidence in this area.

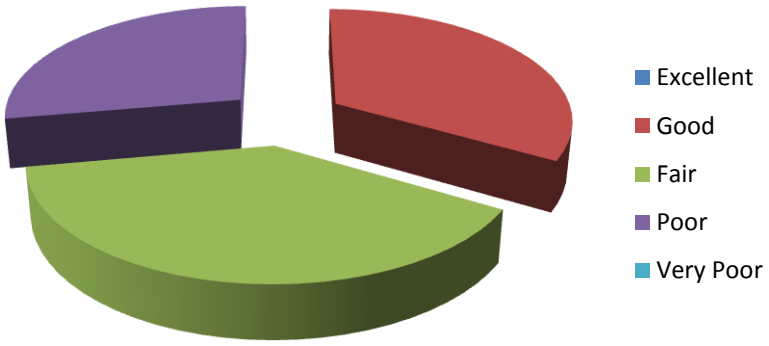


Figure 4.3. Reported confidence in teaching students to use assistive technology

Confidence in their ability to learn more about AT was reported favourably by the EASN (Figure 4.4). Thirteen (72.3%) of the participants stated that their

confidence about their ability to learn more was excellent or good. Three (16.7%) stated that they had a fair level of confidence and two (11.1%) stated that they had a low (poor) level of confidence in learning more about assistive technology. Encouragingly, none of the participants felt that they had a very low level of confidence in learning more about assistive technology.

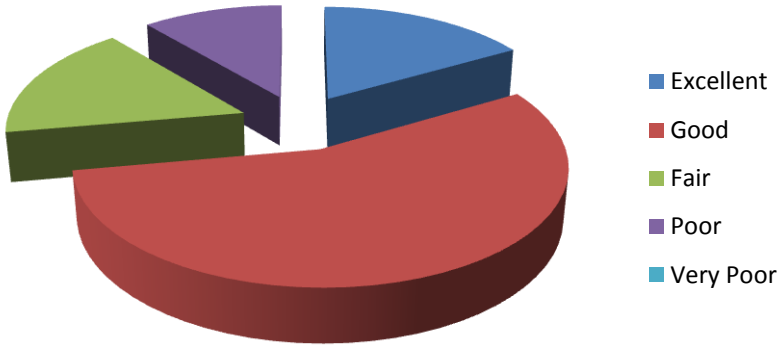


Figure 4.4. Reported confidence to learn more about assistive technology.

Most participants indicated that they had a good (55.6%) or excellent (22.2%) level of confidence in their ability to transfer what they would learn to the classroom environment (Figure 4.5). Two (11.1%) participants felt that they had a fair level of confidence, and two (11.1%) a poor level of confidence in transferring the knowledge and skills learnt. None of the participants indicated that they had a very poor level of confidence in this area.

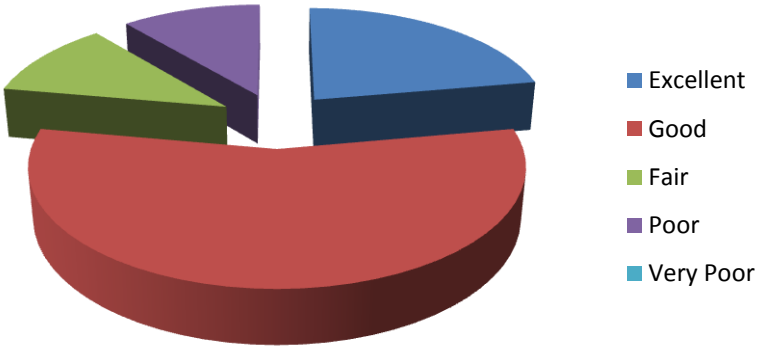


Figure 4.5. Ability to transfer what is learnt in training to the classroom environment.

4.3.3 Training.

In the area of previous training undertaken by the EASN, only one of the participants stated that they had formal training in the area of assistive technology. The remaining participants had received an extensive range of professional development in other areas related to their work. These included behaviour management, courses on specific disability areas (particularly Autism) and first aid training. That the EASN had not received training in AT indicates that it is probably not a priority area for the school or classroom, or even for the EASN themselves, or conversely that the training had not been made available to this cohort. Training in the area of AT is offered by the Department of Education, through the AT team, through companies which sell the assistive technology, or through private training providers. The potential lack of training in this area may contribute to the poor use of AT in a classroom setting.

4.3.4 Relevance of Training.

When asked to detail the training that was relevant to their needs, prior to any testing or training, the EASN were initially hesitant and unsure as to what to suggest. Field notes indicated that the EASN did not fully understand what AT was and that they tended to use the term "computer" to encompass devices, software and computer hardware systems. This observation is supported by their description of what training they would like as it was limited by their understanding of assistive technology. Nine of the participants used generic terms such as 'programs' or 'computer training' as being relevant to their needs, even though they were asked to clearly specify what type of program or explicit training was required.

When asked to identify the training that they thought may be relevant to the needs of the students with whom they worked, the EASN identified assistance with reading and communication to be important aspects. Once again it is possible they did not specify what type of assistance would be required, or the nature of the technology needed due to a lack of understanding of what constitutes assistive technology.

The EASN were not readily able to identify the needs of a student with a specified disability, as indicated by responses received during skills testing (see Figure 4.6) and during the first training session. Such a deficit was evident across both groups of participants. The skills test question required the participants to read a small vignette and identify the needs of a student and two assistive technologies that would be useful in his case. The results were examined for differences between two groups of participants. Group 1 consisted of EASN who were primarily from

regular school settings and group 2 consisted of EASN who had experience working in Education Support settings, such as Education Support Centres and Schools. Group 2 was found to be more likely to identify the AT that may be used with a student, possibly as there was a student with similar disabilities at their school. The failure to clearly identify students' needs, coupled with a poor understanding of what constitutes AT for some of the participants, may reflect the EASN inability to accurately identify the technology and training that was needed to support the students.

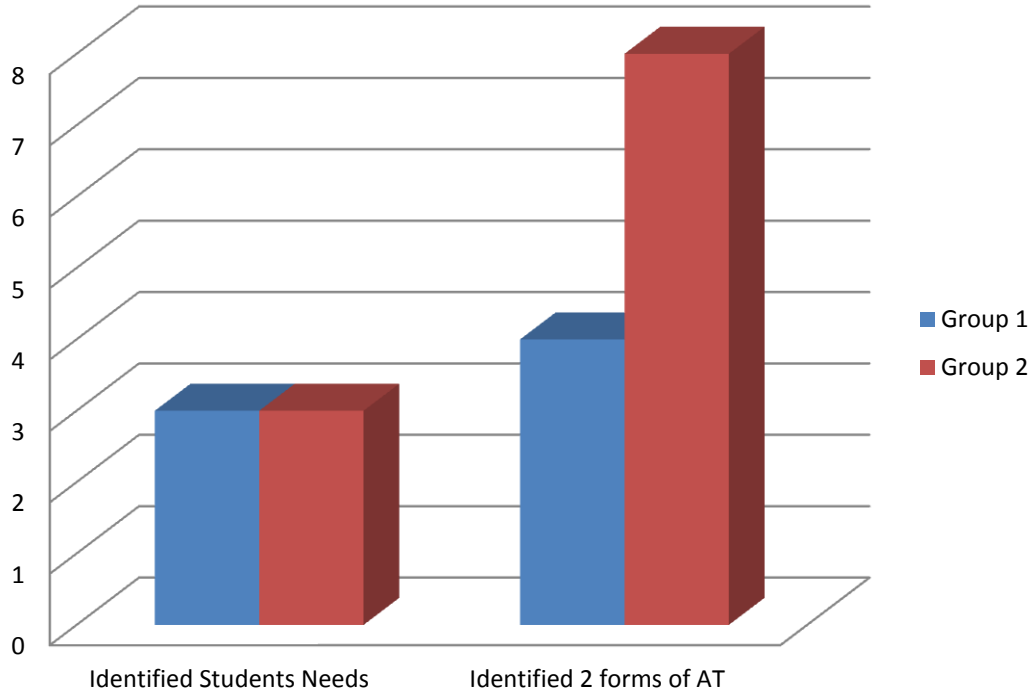


Figure 4.6. EASN's identification of the needs of a student with a special need and the AT to support the student with special needs

4.3.5 Understanding of Assistive Technology.

Often, when responding to questions which asked the participants what their own training needs and the training needs of the students were, there was a general

reference to something that would ‘assist’ or ‘help’ the student, without identifying exactly what this might be. Some of the EASN stated that they were unsure of their own needs in the area of AT. When asked if they had heard of or used various common forms of AT software (e.g. Boardmaker, Clicker 5, PowerPoint), the EASN did not often know what the software was, let alone have any experience with it. Many of the EASN stated that they did not have any previous knowledge of AT specified in the present training program (Figure 4.7). This lack of knowledge indicated that the EASN did not have a thorough understanding of the technologies introduced within the study. This result was interesting as participants within group 2 (who had mainly been associated with special schools and centres) who may be assumed to have experienced a wider variety of AT to support students with more severe needs, had a lower level of knowledge of the technologies than did participants from group 1, who were primarily from regular education settings.

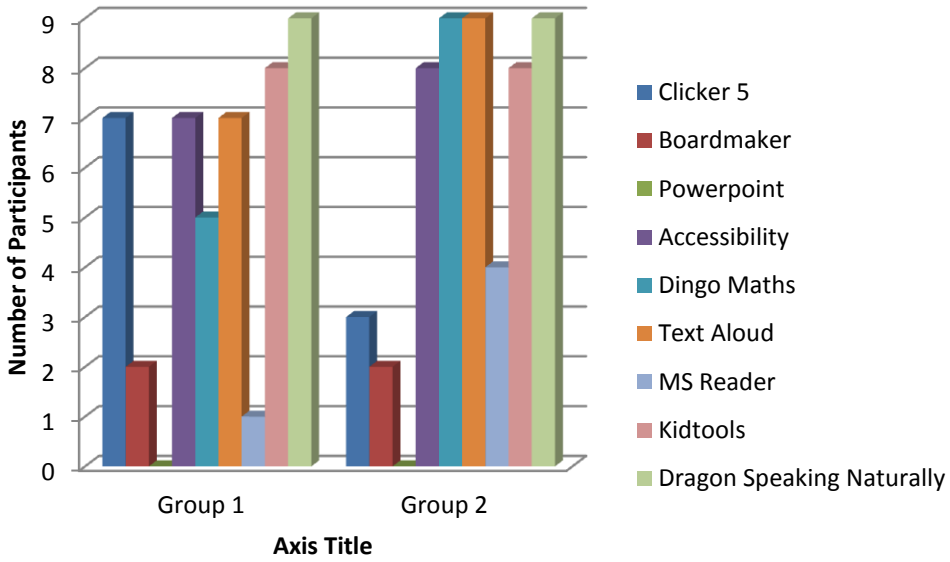


Figure 4.7. Number of participants who had not encountered specific technologies

Figure 4.8 displays the participants from each group who reported having previously used the technologies, either occasionally or extensively, for any purpose. In group 1 there were 11 reports (out of a possible 90) of use of various assistive technologies, while in group 2, there were 13 reports (out of a possible 90). This indicates a low level of use of AT prior to the training across both groups.

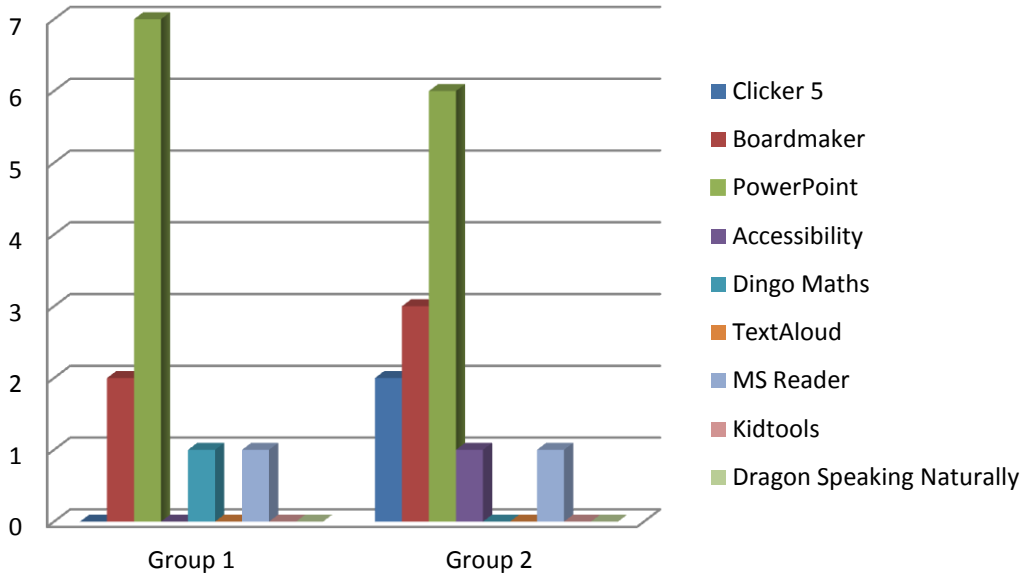


Figure 4.8. Reported use of technology prior to training.

4.3.6 Notes from the Field.

Field notes taken during the initial testing phase of the research support the statistical analysis by indicating that the EASN were unfamiliar with the terminology of 'assistive technology'. They often used the term 'computer' when discussing assistive technology. The EASN were unaware that there was a difference between low-tech and high-tech assistive technology, and that items they may have been using for an extended period of time were considered to be AT (e.g. pencil grips, slant-boards). This lack of awareness became evident during the testing phase and

the first day of training. Once the EASN had established an understanding of what constitutes AT they were more easily able to identify it.

The EASN were originally very unsure of themselves during the initial phase of the testing and claimed to feel 'stupid' and that they 'didn't know anything'. This was especially obvious among those participants who indicated a poor or fair level of confidence on the initial Likert-type scale questionnaire. At the same time, most of the participants expressed a keenness to learn more about AT and the application of such technology in the classroom.

During the initial testing, a number of the EASN confided in the researcher. They shared feelings and thoughts regarding many issues that they felt strongly about in their classrooms. In particular, concerns were raised about the inability of the EASN to discuss issues or make suggestions to the classroom teacher, powerlessness in regards to implementing what they would be learning, and the differences in resourcing associated with different schools. This was surprising as the EASN had only recently met the researcher and were not yet certain of the researcher's affiliations.

When observing the participants prior to the training, the structure of the classrooms was also seen to be quite varied. One of the participants, for example, worked in a small community school setting, and was given a lot of freedom to implement ideas. This was evidenced when she was able to change the schedule of activities for the student with autism, with whom she was working, without teacher approval. While observing another class (this one larger and more formal), the

researcher noted that the EASN was required to abide by a strict sequence and structure set by the teacher.

4.3.7 Summary.

The EASN indicated, during initial testing and questionnaire responses, that they felt reasonably confident about learning more about AT and transferring this into the classroom setting. They felt less confident, however, about their own skill level, their ability to use AT and of themselves as facilitators of assistive technology. The EASN had little previous exposure to the understanding of assistive technologies and were unsure of what this entailed. None of the participants indicated that they had excellent levels of confidence or skills in the area of AT use.

4.4 The Impact of Training on Perceptions of Personal Competence and Confidence

4.4.1 Introduction.

In order to determine the impact of the training on the EASN's perceptions of personal competence and confidence and skill level, it was necessary to assess these impacts in a variety of ways, so that cross-checking amongst the data could occur and a coherent picture built of the EASN's perceptions. The EASN were required to complete a questionnaire on three separate occasions (prior to training, after completion of training and after a 10 week maintenance period), complete skills testing on three occasions (prior to training, after completion of training and after a 10 week maintenance period), and were asked to voluntarily participate in a small focus group on two occasions (after completion of training and after a 10 week maintenance period). The Wilcoxon signed-rank test was chosen to determine

differences in skill level prior to the training and at the completion of the training and to examine participants' Likert-type responses regarding their own feelings of competency and skill level. Quantitative data is used to support and embellish qualitative responses gathered from participants during focus groups, and through questionnaire responses.

4.4.2 Wilcoxon Signed-Rank Test Analysis.

A Wilcoxon signed-rank test of the quantitative data was chosen to undertake a repeated measures test. The Wilcoxon signed-rank test assists in determining if there has been a change in participants' skills and responses to indicators (i.e. questionnaire Likert-type scale) over three identical testing phases: pre-test to post-test; pre-test to maintenance test; and post test to maintenance test, that is not due to chance alone. The Wilcoxon signed-rank test is a non-parametric measure utilised when the population cannot be assumed to have a normal distribution, as was the case for the data under investigation.

4.4.2.1 Pre-Training to Post-Training.

4.4.2.1.1 Pre-post questionnaire responses.

Prior to undertaking any training, the EASN were asked to complete a questionnaire which contained a combination of Likert-type responses regarding their skill and confidence levels and written responses regarding their needs in relation to assistive technology. This was followed by eight weeks of training in the area of assistive technology. At the completion of the training, the EASN were again asked to complete another questionnaire which comprised of a combination of Likert-type responses, identical to the initial questionnaire, and written responses in

regards to the training undertaken. Table 4.5 describes the results of the Likert-type responses.

Table 4.5

Questionnaire Responses of Participants Prior to Training and After Training

	N	Pre-training Median	Post-training Median	Z (Wilcoxon)	p
Confidence for using assistive technology	16	3.00	4.00	-3.035	.002*
Skills in using assistive technology	16	3.00	4.00	-2.658	.008*
Confidence teaching students to use assistive technology	16	3.00	4.00	-2.972	.003*
Confidence for learning more about assistive technology	16	4.00	4.00	-1.933	.053
Ability to transfer to classroom	16	4.00	4.00	-.577	.564

*indicates significance at the $p < .05$ level

The participants indicated a significant ($Z = -3.035$, $p = .002$) increase in their confidence with using AT from the initial testing to the completion of the training. Median response at initial questionnaire was 3.00 and at post questionnaire was 4.00, indicating an increasing number of participants reported a higher level of confidence. This result was determined based on 16, rather than 18 matched pairs, due to missing data in two cases.

The reported skill level of the participants also increased significantly (Z = -2.658, p = .008) after the training. Median response prior to the training was 3.00, and after the training was 4.00, suggesting that there was an increase in participants' perceptions of their skill levels. Once again 16 matched pairs were used to calculate the difference. Feeling prepared to teach students to use AT also exhibited a significant increase for the EASN (Z = -2.972, p = .003). The median increased from 3.00 to 4.00 from the initial questionnaire responses to the post training responses.

There were, however, no significant differences in participants' perception of their confidence in learning more about AT (Z = -1.933, p = .053) or in their perceived ability to transfer what they had learnt to a classroom setting (Z = -.577, p = .564). The median in both cases was 4.00 during both initial and post questionnaire responses. This indicates that the participants already felt that their level of confidence in these areas was good, and therefore there was little change after the training.

4.4.2.1.2 Pre-post skills test.

Participants were also required to complete a skills test prior to the training and at the completion of the training. The skills test comprised of items in the areas of foundational skills, planning skills, assessment skills, practice and collaboration (qualitative only), knowledge of assistive technology, and ability to use selected assistive technologies. The selected ATs were determined with the assistance of the Department of Education's Assistive Technology Team, and were identified as being

those most likely to be used by participants. Table 4.6 describes the results of the skills test in each of the areas prior to training and post-training.

Table 4.6

Measured skill level of participants prior to training and after training

Skill Type	N	Pre-training Median	Post-training Median	Max. Possible	Z (Wilcoxon)	P
Foundational	18	15.00	17.00	18.00	-3.315	.001*
Planning	18	6.00	8.00	9.00	-3.067	.002*
Assessment	18	2.00	3.00	3.00	-1.000	.317
Knowledge of specific assistive technology	18	14.00	20.5	36.00	-3.751	.000*
Use of assistive technologies	18	14.00	19.00	28.00	-3.524	.000*

*indicates significant at the $p < .05$ level.

The classification of foundational skills comprised six items. The items consisted of basic skills such as turning on/off and logging in to a computer and identifying parts of computers, inserting CD-ROMs and running programs, creating and saving documents, accessing help functions and websites, modifying settings on a computer to cater for individual differences and closing programs and logging off the computer. These were combined to give a total pre and post result for that classification. There was found to be a significant difference ($Z = -3.315$, $p = .001$) in the foundational skills of participants from the pre-testing to the completion of the

training. The median increased from 15.00 to 17.00 over this period as a result of the training in these skills.

There were three items in the planning category. The items consisted of identifying specific features of assistive technology, matching technology to student needs and providing contingencies in case of failure of technology. There was a significant difference between the pre and post skills test for participants in the area of planning ($Z = -3.067$, $p = .002$). The median increased from 6.00 to 8.00 indicating that the EASN were better able to identify and match technology as a result of the training.

The assessment category contained only one quantitative item where participants were asked to identify methods to determine whether or not AT was assisting a student. There was no significant difference ($Z = -1.000$, $p = .317$) on this item from pre-testing to post-testing, although there was a median change from 2.00 to 3.00.

A further item asked participants to respond verbally in regards to how they would monitor the use of assistive technology, examine solutions to problems, and identify people involved in making modifications. Participants often gave one word answers (or a series of one word answers) to these questions, or used short phrases in response. In order to display this data a table format has been used, as it provides a succinct overview of the scope of responses. Responses that were duplicated have not been included. Table 4.7 provides examples of responses to these questions that illustrate an increased number and depth of responses from participants at the post-

testing point, which reflects the impact of the training. Responses for changes pre-maintenance testing can be found in Table 4.11 and post-maintenance testing in Table 4.15.

Table 4.7

Examples of responses on assessment of assistive technology – pre-post testing

	Pre-testing	Post-Testing
Monitoring *(How would you monitor the use of assistive technology in the classroom?)*	• Recording/Recording sheets to track day to day • Sitting with them • Improve on their work/see improvement • What fits in with the teachers daily routine • Use anecdotal notes/write it down	• Records-times, dates • Anecdotal/observational records • Sit next to them. See benefit • GPAT, running records • Checklists, rating scales • chart/tally • Quality, compliance, overuse-overreliance • Video • Ask the child
Solutions to problems (*How would you identify changes or modifications to the assistive technology that may be required for a student with a special need?*)	• Progress or regression/frustrated or seeing no benefit. • Not completing the task • Observe • If it wasn't helping/When not meeting needs • Writing notes • If too difficult to use or access, not fitting (growth)	• Progress of student • If the child is not completing work • Outcomes, social and academic/ If the objective is not being met • If child couldn't do it • Behaviour of the student • Whether they liked doing it • If student's independence if hindered • If student struggling, not progressing or bored
Identifying who is involved in making modifications (*Who would be involved in making changes to the assistive technology used by the student with*	• Therapists (Occupational , Speech and Language, Physical) • Teacher • Education Assistant • Parents • Assistant Principal	• Teacher • Education Assistants • Parents/ carers • Principal (admin)/co-ordinator, Learning Support Coordinator • Student

	Pre-testing	Post-Testing
Monitoring *(How would you monitor the use of assistive technology in the classroom?)*	• Recording/Recording sheets to track day to day • Sitting with them • Improve on their work/see improvement • What fits in with the teachers daily routine • Use anecdotal notes/write it down	• Records-times, dates • Anecdotal/observational records • Sit next to them. See benefit • GPAT, running records • Checklists, rating scales • chart/tally • Quality, compliance, overuse-overreliance • Video • Ask the child
Solutions to problems (*How would you identify changes or modifications to the assistive technology that may be required for a student with a special need?*)	• Progress or regression/frustrated or seeing no benefit. • Not completing the task • Observe • If it wasn't helping/When not meeting needs • Writing notes • If too difficult to use or access, not fitting (growth)	• Progress of student • If the child is not completing work • Outcomes, social and academic/ If the objective is not being met • If child couldn't do it • Behaviour of the student • Whether they liked doing it • If student's independence if hindered • If student struggling, not progressing or bored • Therapists • Tech person • Everybody- key stakeholders
special needs?)		

Qualitative data were collected in the area of practice and collaboration. The EASN were questioned as to who they would work with in order to ensure the AT was appropriate for the student/s, who would be involved with implementing AT in the classroom and if it was their role to instruct others in the use of assistive technology. Once again, participants often gave one or two word answers or used short phrases in response. Responses that were duplicated have not been included. Table 4.8 provides examples of responses to these questions illustrating an increased

awareness of the collaboration required to ensure that AT is appropriate and implemented in the best manner possible. Responses for changes pre-maintenance testing can be found in Table 4.12 and post-maintenance testing in Table 4.16.

Table 4.8

Examples of responses to questions on practice and collaboration – pre-post testing

	Pre-testing	Post-Testing
Appropriateness (*Who would you work with in order to ensure that the assistive technology was appropriate for the student?*)	• Teacher • Specialists, Speech Therapist, Occupational Therapist • Outside person • Parents • Visiting teacher • Principal, deputy • Student • Me • Colleagues, co-workers	• Student • Specialists, speech, Occupational Therapist • Teacher • Admin, principal • Assistive tech person, Visiting teacher • Primary Behaviour Centres • Parent • Education Assistant • Associates, other Education Assistants • Nurse • Rocky Bay (therapy provider) • Caregiver • Disability experts
Implementation (*Who would be involved with implementing the use of assistive technology in the classroom?*)	• Colleagues, Other Education Assistants, • Teacher • Principal, deputy • Students • Myself • Specialists, speech, OTs, physio. • Parents	• Teacher • Education Assistants • Parent/family • Other kids in the class • Therapists, speech, occupational, physio. • Other Education Assistants • Student • Any other teachers (relief) • Administrators • Specialised trainer • Nurse • Rocky Bay (Therapist provider)

	Pre-testing	Post-Testing
Instructing Others (*Is it your role to instruct others in the use of the assistive technology? Why/ Why not?*)	• No. Not trained yet. • Personally yes, but depends on teacher • If asked to instruct other EAs I would do it. • Yes (in a way) to help • No- because EAs get advice and guidance from specialists. Not unless requested. • Not at this school, but have before • Yes, as long as competent and trained, if confident • Yes, because we are level 3 • No- have to come from others unless trained • Yes, If asked. • Should come from teacher.	• If I had more knowledge then yes • Yes, to another Education Assistant • Yes- with parents – to help the child • Personally not confident – yes if competent • No, cause I'm just an assistant. Possibly if trained and asked by teacher or principal • It is if they are not aware of it, yes • Yes, if you know a program • Yes, need to share and help each other • Yes, if we have been given OK to • Yeah, because there is no point only one person knowing • Yes, if you feel confident or had training • Need OK from the teacher • Yes, Education Assistants are level 3, should be able to • Yes, if I know something they don't • No, it wouldn't go down well. Rather suggest the program

A number of specific assistive technologies commonly used in regular settings were identified through contact with the Assistive Technology Team at the Centre for Inclusive Schooling and experience of the researcher. Participants were given the name of the technology and asked to indicate whether they had heard of the technology, not heard of the technology, used it occasionally or used it extensively. These technologies included Clicker 5 (Crick Software, 2010), Boardmaker (Mayer-Johnson, 2010), Microsoft PowerPoint, and Microsoft Reader.

As the EASN had exposure to each of these technologies throughout the training it was found that there was a significant change after training in the EASN's identification of knowledge of, and use of, the technologies ($Z = -3.751$, $p < 0.001$).

The functional and potential use of a number of assistive technologies was examined by asking the EASN to perform certain functions and scoring their ability to do so. These assistive technologies were similar to those the EASN had been asked to identify in the previous section (i.e. Clicker 5, Boardmaker, and PowerPoint). The EASN's ability to use the technology increased significantly after training ($Z = -3.524$, $p = .001$). The median changed from 14.00 to 19.00. This indicated that the EASN were more effective in using the technology after the training.

4.4.2.2. Pre-training to Maintenance.

4.4.2.2.1 Pre – Maintenance questionnaire responses.

To determine the overall change in perception of the EASN, responses from participants prior to the training and after a 10 week maintenance period were examined for change. A Wilcoxon signed-rank test was used to determine if there was a change (positive or negative) in the participants' perceptions of their skills and confidence for using AT (Table 4.9).

Over the course of the study, participants showed a significant increase in their overall confidence with using AT ($Z = -2.721$, $p = .007$). Complete data were available (18 cases) for all initial and maintenance questionnaire responses. Median response at initial questionnaire was 3.00 and at maintenance questionnaire was 4.00.

This finding is consistent with the increase in confidence for using AT that was indicated in the pre-post testing.

Table 4.9

Questionnaire Responses from Participants Prior to Training and After a Ten-Week Maintenance Period.

	N	Pre-training Median	Maintenance Median	Z (Wilcoxon)	P
Confidence for using assistive technology	18	3.00	4.00	-2.721	.007*
Skills in using assistive technology	18	3.00	4.00	-2.437	.015*
Confidence teaching students to use assistive technology	18	3.00	4.00	-3.082	.002*
Confidence for learning more about assistive technology	18	4.00	4.00	-2.309	.021*
Ability to transfer to classroom	18	4.00	4.00	-1.000	.317

*indicates significance at the $p < .05$ level

The participants felt that their skill level had increased significantly ($Z = -2.437$, $p = .015$) over the period of the study. The median response for the initial questionnaire was 3.00 and the maintenance questionnaire was 4.00. This increase in skill level may be attributed to the content that was taught. Both confidence for teaching students to use AT ($Z = -3.082$, $p = .002$) and learning more about AT (Z =-

2.309, p = .021) increased significantly over the study. Confidence for teaching students yielded a median response of 3.00 for the initial questionnaire and 4.00 for the maintenance questionnaire. Confidence for learning more about AT yielded a median of 4.00 for both initial and maintenance questionnaires, with the difference indicated in changes for individual participants.

The only item that did not reach significance was the ability to transfer the knowledge learnt to the classroom (Z = -1.000, p = .317). The median score was high for this item, being 4.00 for both the initial and maintenance questionnaire. There was little difference between participants on this item from initial testing to maintenance testing. This is consistent with the difference between pre and post testing.

4.4.2.2.2 Pre- maintenance skills test.

Table 4.10 illustrates the results of the skills test taken by the participants before training and at the maintenance point. The participants were asked to perform tasks to give a final overview of their skills and knowledge of assistive technology.

The foundational skills of the participants, which includes turning on/off and logging in to a computer and identifying parts of computers, inserting CD-ROMs and running programs, creating and saving documents, accessing help functions and websites, modifying settings on a computer to cater for individual differences and closing programs and logging off the computer, were found to have increased significantly (Z =- 3.783, p = .000) from testing prior to the training to the end of the ten-week maintenance period. There is an increase from the initial testing period to

the post testing period (Z =-3.315, p =.001). This indicates that the participants' foundational skills are continuing to improve even after the training has concluded.

Table 4.10

Measured Skill Level of Participants Prior to Training and After a Ten-Week Maintenance Period.

Skill Type	N	Pre-training Median	Maintenance Median	Max. Possible	Z (Wilcoxon)	P
Foundational	18	15.00	16.50	18.00	-3.783	.000*
Planning	18	6.00	8.00	9.00	-3.369	.001*
Assessment	18	2.00	3.00	3.00	-3.000	.003*
Knowledge of specific assistive technology	18	14.00	20.00	36.00	-3.709	.000*
Use of assistive technologies	17	14.00	20.00	28.00	-3.555	.000*

*indicates significance at the p < .05 level

The planning skills of the EASN have also significantly changed from testing before the training to the maintenance testing (Z =-3.369, p =.001). The planning skills involved the participants in identifying features of AT that make it useful for students with disabilities. It also contained items that related to matching of technology with particular needs. The difference continued to increase after the

training had concluded as evidenced by the change in difference from pre-post testing as compared to pre-maintenance testing.

In the area of assessment, the participants were required to demonstrate that they could determine whether a piece of technology was assisting a student with special needs. There was no significant difference on this item during the pre-post testing, however, in the pre-maintenance testing there was significant change (Z =-3.000, p = .003), indicating that the EASN have continued to consider the needs of students and how these would be assessed. Within the area of assessment, the participants were also asked to describe how they monitor the use of assistive technology, what they would do if the technology did not work, and to identify people who would be involved in making changes to the assistive technology. Examples of their responses during the pre and maintenance skills tests are contained in Table 4.11. Participants often gave one word answers (or a series of one word answers) to these questions. Responses that were duplicated have not been included. These responses indicated a heightened awareness of the methods available to the EASN to monitor the effectiveness of the AT use in the classroom. There was not only an increase in the number of responses, but also in the variety and quality.

Table 4.11

Examples of Responses on Assessment of Assistive Technology – Pre-Maintenance Testing

	Pre-testing	Maintenance-Testing
Monitoring *(How would you monitor the use of assistive*	• Recording/Recording sheets to track day to day • Sitting with them • Improve on their work/see	• Checklist • Work completion schedule • Anecdotal notes

	Pre-testing	Maintenance-Testing
technology in the classroom?)	improvement • What fits in with the teachers daily routine • Anecdotal notes	• Graph • Observation • Comparison of progress • Reporting • Charts • Observation • Photos • Network meetings • Video/camera • Tally sheets
Solutions to problems (*How would you identify changes or modifications to the assistive technology that may be required for a student with a special need?*)	• Progress or regression/frustrated or seeing no benefit. • Not completing the task • Observe • If it wasn't helping/When not meeting needs • Writing notes • If too difficult to use or access, not fitting (growth)	• If not working • Child not progressing • Not passing level/stage • Observation • If frustrated - don't want to do it • If not able to complete tasks independently and is struggling • Behaviour-wise, make changes, trial again, involve him/her • Requiring too much support • If they get bored • If it was transferrable • Student telling you • If they found it difficult to use
Identifying who is involved in making modifications (*Who would be involved in making changes to the assistive technology used by the student with special needs?*)	• Therapists (Occupational, Speech, Physical) • Teacher • Education Assistant • Parents • Assistant Principal	• Teacher • Education Assistant • Psychologist • Visiting teacher • Deputy • Principal • Parents • Speech Pathologists • Student • Therapists • Computer specialist • All staff involved

Practice and collaboration were examined through the responses of the EASN regarding with whom they would collaborate when planning for AT use, who would be responsible for the implementation of AT and who would be responsible for instructing others in the use of assistive technology. Examples of the responses to these questions for both the pre- testing and maintenance testing periods are presented in Table 4.12. Participants provided brief responses in the first two areas, with slightly more information provided for the last area. Responses that were duplicated have not been included. The responses to the aspects of practice and collaboration indicated that the EASN were more aware of who would be involved in determining AT allocation and modification and that their own role is important. There were some further positive responses when the EASN were asked who would be responsible for training staff and other people involved in the student's education in the use of assistive technology, with many replying that they themselves were.

Table 4.12

Examples of Responses to Questions on Practice and Collaboration – Pre-Maintenance Testing

	Pre-testing	Maintenance-Testing
Appropriateness (*Who would you work with in order to ensure that the assistive technology was appropriate for the student?*)	• Teacher • Specialists, Speech Therapist, Occupational Therapist • Outside person • Parents • Visiting teacher, • Principal, deputy • Student • Me • Colleagues, co-workers	• Therapists, relevant specialist • Teachers • Parents • Occupational Therapist • Education Assistant • All key stakeholders • Principal • Learning Support Coordinator • Psychologist • Centre for Inclusive Schooling

	Pre-testing	Maintenance-Testing
		• Doctor • Autism association • Admin
Implementation (*Who would be involved with implementing the use of assistive technology in the classroom?*)	• Colleagues, Other Education Assistants • Teacher • Principal, deputy • Students • Myself • Specialists, speech, Occupational, Physical • Parents	• EAs • Teachers • Therapists, Speech, Occupational, Physical • Student • Parents • All key stakeholders • Outside agency • Classroom team • Administration
Instructing Others (*Is it your role to instruct others in the use of the assistive technology? Why/ Why not?*)	• No. Not trained yet • Personally yes, but depends on teacher • If asked to instruct other Education Assistants I would do it • Yes (in a way) to help • No- because Education Assistants get advice and guidance from specialists. Not unless requested • Not at this school, but have before • Yes, as long as competent and trained, if confident • Yes, because we are level 3 • No- have to come from others unless trained • Yes, If asked • Should come from teacher	• Depends – if it is welcomed • Can be. I might have knowledge • Yeah, cause I know how to do it • Yes, if you feel confident and know what you are doing • Yes, definitely because working at school it is my duty to assist students and to learn more • Yes, if you have been taught/trained • Yes, we help all the time • If the responsibility is handed to me and if I am proficient • No, because I think it is the teacher's job Happy to show others if I know how • Yes, because I work with the child and know him • Only another Education Assistant – to help out • Mine probably, cause I am the one using it the most • I don't see why not,

	Pre-testing	Maintenance-Testing
		might have something they don't know • I would support, encourage and share info. Yes, if I have learnt and done the course

As displayed in Table 4.10, participants were asked to indicate whether they had heard of a specific technology, not heard of a specific technology, used it occasionally or used it extensively (as chosen by the researcher in collaboration with the Centre of Inclusive Schooling) . These technologies included Clicker 5 (Crick Software, 2010), Boardmaker (Mayer-Johnson, 2010), Microsoft PowerPoint, and Microsoft Reader. There was a significant change from the pre to maintenance phase in the EASN's identification of knowledge of, and use of, the technologies (Z = -3.709, p =.000). The median response increased over this time from 14.00 to 20.00. This is a large increase and indicated the EASN's increased knowledge of a wide range of AT of which they had previously been unaware.

The EASN were also asked to perform a range of tasks aimed at assessing their ability to use assistive technology. The assistive technologies were similar to those the EASN had been asked to identify in the previous section (i.e. Clicker 5, Boardmaker, and PowerPoint). The EASN's ability to use AT increased significantly between the pre-testing and the maintenance phases (Z = -3.555, p = .000) and the median response changed from 14.00 to 20.00. This is a large increase in skill level as a result of the training the EASN received over the eight week period. The skill level of the EASN increased from the start of the training and this increase was maintained.

4.4.2.3 Post training to Maintenance.

4.4.2.3.1 Post-maintenance questionnaire responses.

In order to determine whether any improvements/changes were maintained over a period of time, participants were asked to complete a questionnaire approximately ten weeks after the completion of the training. The questionnaire consisted of both quantitative and qualitative response forms. The quantitative component required the participants to indicate their perceptions of themselves in a number of areas. These are the same areas as contained in the pre-testing and post training assessments. Table 4.13 displays the results of the post training and maintenance questionnaire responses. These were examined to determine if there had been a change in participants' perceptions of themselves in the area of AT use, after a reasonable period of time since completing training (10 weeks).

There was no significant difference in regards to participants' feelings of confidence ($Z = -.583$, $p = .560$) and perceptions of their skills ($Z = -.312$, $p = .755$) for using AT from the post training to the maintenance phase. The median for both post training and maintenance in each of these areas was already high at 4.00. Similarly the participants' confidence for teaching others how to use AT ($Z = -.556$, $p = .579$), and for learning more about AT ($Z = -.000$, $p = 1.000$), were not significantly different. The median remained unchanged at 4.00 for each of these items. These findings indicate that the EASN maintained any changes that had occurred as a result of the training.

Table 4.13

Questionnaire Responses from Participants Post Training and After a Ten-Week Maintenance Period.

	N	Post-training Median	Maintenance Median	Z (Wilcoxon)	P
Confidence for using assistive technology	16	4.00	4.00	-.583	.560
Skills in using assistive technology	16	4.00	4.00	-.312	.755
Confidence teaching students to use assistive technology	16	4.00	4.00	-.556	.579
Confidence for learning more about assistive technology	16	4.00	4.00	-.000	1.000
Ability to transfer to classroom	16	4.00	4.00	-1.667	.096

*indicates significance at the $p < .05$ level

4.4.2.3.2 Post to maintenance skills test

The EASN completed an identical skills test after the training was completed and at a ten week period following the post-test. These results are reported in the five areas under investigation (Table 4.14).

Table 4.14

Measured Skill Level of Participants' Post Training and After a Ten-Week Maintenance Period.

Skill Type	N	Post-training Median	Maintenance Median	Max. Possible	Z (Wilcoxon)	P
Foundational	18	16.00	16.50	18.00	-.758	.449
Planning	18	8.00	8.00	9.00	-.812	.417
Assessment	18	2.00	3.00	3.00	-1.897	.058
Knowledge of specific assistive technology	18	20.50	20.00	36.00	-.359	.719
Use of assistive technologies	18	19.00	20.00	28.00	-1.117	.264

*indicates significance at the $p < .05$ level

There was no significant change in any of the skills of the participants from after the training until the maintenance testing. Foundational skills, consisting of 6 items, had a median at post-testing of 16.00 and at maintenance testing of 16.50 ($Z = -758$, $p = .449$). Planning skills, with three items, had an unchanged median of 8.00 on both testing occasions ($Z = -.812$, $p = .417$). Assessment, which consisted of only one item, had a median of 2.00 at post-testing and of 3.00 at maintenance testing ($Z = -1.897$, $p = .058$). Participants' knowledge of specific technology had also not changed ($Z = -.359$, $p = .719$). The median values actually decreased marginally for this item, from 20.50 to 20.00. Although there was a slight increase in median

values for participants use of AT (19.00 to 20.00) the change was not significant (Z = -1.117, p = .264).

During the skills test, the participants were required to respond to a qualitative question on how they would monitor the use of assistive technology, how they would identify changes that needed to be made and who would be involved in making these. Table 4.15 presents examples of responses. Many of the responses were brief, even one-word answers. Duplicated responses have not been included. The participants were able to provide a greater number of responses during the maintenance testing period, although these were of comparable quality with those given during the post-testing period, suggesting that they had expanded their knowledge base of tools to monitor student progress. The responses at both the post-testing and maintenance phases, for example, included reference to charts, tallies, video, observation and anecdotal records.

Table 4.15

Examples of Responses on Assessment of Assistive Technology – Post Training To Maintenance Testing

	Post-testing	Maintenance-Testing
Monitoring *(How would you monitor the use of assistive technology in the classroom?)*	• Records-times, dates • Anecdotal records • Observational records • Sit next to them. See benefit • GPAT, running records • Checklists, rating scales • Chart • Tally • Quality, compliance, overuse-overreliance • Video	• Checklist • Work completion schedule • Anecdotal notes • Graph • Observation • Comparison of progress • Reporting • Charts • Observation • Photos

	Post-testing	Maintenance-Testing
	• Ask the child	• Network meetings • Video/camera • Tally sheets
Solutions to problems (*How would you identify changes or modifications to the assistive technology that may be required for a student with a special need?*)	• Progress of student • If the child is not completing work • Outcomes, social and academic/ If the objective is not being met • If child couldn't do it. • Behaviour of the student • Whether they liked doing it • If student's independence if hindered • If student struggling, not progressing or bored	• If not working • Child not progressing • Not passing level/stage • Observation • If frustrated -don't want to do it • If not able to complete tasks independently and is struggling • Behaviour-wise, make changes, trial again, involve him/her • Requiring too much support • If they get bored • If it was transferrable • Student telling you • If they found it difficult to use
Identifying who is involved in making modifications (*Who would be involved in making changes to the assistive technology used by the student with special needs?*)	• Teacher • Education Assistants • Parents/ carers • Principal (admin)/co-ordinator, Learning Support Coordinator • Student • Therapists • Tech person • Everybody- key stakeholders	• Teacher • Education Assistant • Psychologist • Visiting teacher • Deputy • Principal • Parents • Speech Pathologists • Student • Therapists • Computer specialist • All staff involved

The EASN were asked to provide descriptive information at both the post testing and maintenance phases on who they would work with to ensure the AT was appropriate, who would be involved with implementing the AT and whether or not it

was their role to instruct others in the use of assistive technology. Table 4.16 provides examples of the responses received. The responses from the participants are similar in number and quality for both data collection points. Often one-word responses were given, and duplicated responses are not included.

Table 4.16

Examples of Responses to Questions on Practice and Collaboration – Post Training-Maintenance Testing

	Post-training	Maintenance-Testing
Appropriateness (*Who would you work with in order to ensure that the assistive technology was appropriate for the student?*)	• Student • Specialists - Speech, Occupational, Physical • Teacher • Admin, principal • Assistive tech person • Centre for Inclusive Schooling, Visiting teacher • Primary Behaviour Centre • Parent • Education Assistant • Associates, other Education Assistants • Nurse • Rocky Bay (therapist provider) • Caregiver • Disability experts	• Therapists, relevant specialist • Teachers • Parents • Occupational Therapist • Education Assistant • All key stakeholders • Principal • Learning Support Coordinator • Psychologist • Centre for Inclusive Schooling – Visiting Teacher • Doctor • Autism association • Admin
Implementation (*Who would be involved with implementing the use of assistive technology in the classroom?*)	• Teacher • Education Assistants • Parent/family • Other kids in the class • Therapists, speech, Occupational, Physical • Other Education Assistants • Student	• Education Assistants • Teachers • Therapists relevant specialist • Student • Parents • All key stakeholders • Outside agency • Classroom team • Admin

	Post-training	Maintenance-Testing
	• Any other teachers (relief) • Admin • Specialised trainer • Nurse • Rocky Bay (therapist provider)	• Peers
Instructing Others (*Is it your role to instruct others in the use of the assistive technology? Why/ Why not?*)	• If I had more knowledge then yes • Yes, to another Education Assistant • Yes- with parents – to help the child • Personally not confident – yes if competent • No, cause I'm just an assistant. Possibly if trained and asked by teacher or principal • It is if they are not aware of it, yes • Yes, if you know a program • Yes, need to share and help each other • Yes, if we have been given OK to • Yeah, because there is no point only one person knowing • Yes, if you feel confident or had training • Need OK from the teacher • Yes, Education Assistant are level 3, should be able to • Yes, if I know something they don't • No, it wouldn't go down well. Rather suggest the program	• Depends – if it is welcomed • Can be. I might have knowledge • Yeah, cause I know how to do it • Yes, if you feel confident and know what you are doing • Yes, definitely because working at school it is my duty to assist students and to learn more • Yes, if you have been taught/trained • Yes, we help all the time • If the responsibility is handed to me and if I am proficient • No, because I think it is the teacher's job Happy to show others if I know how • Yes, because I work with the child and know him • Only another Education Assistant – to help out • Mine probably, cause I am the one using it the most • I don't see why not, might have something they don't know • I would support, encourage and share info. Yes, if I have learnt and done the course

4.4.3 Post Training Qualitative Questionnaire Responses.

In addition to determining the EASN's statistical changes in perception of skill and confidence levels using non-parametric statistics, they were also asked to comment qualitatively on these aspects by addressing a number of written response questions (Appendix 3). The responses from the participants were submitted to an NVIVO (QSR International, 2008) database and coded according to key themes in each of the areas addressed in Table 4.17. These themes were identified by examining the data and determining the most frequently reported responses. The questions served as a form of data reduction (Miles & Huberman, 1984).

Table 4.17

Themes Identified in Qualitative Questionnaire Responses

Questions	Themes
Was the training relevant to your needs? If so, how?	• Personal impact • Impact on students • Relevancy of low-tech assistive technology
Was the training relevant to the students with special needs with whom you work? If so, how?	• Use of high-tech assistive technology • Use of low-tech assistive technology • Feelings about the use of assistive technology
Have your perceptions of personal competency in the area of assistive technology changed as a result of the training? If so, how?	• Knowledge of assistive technology • Confidence to use assistive technology • Motivation to use assistive technology
Do you feel prepared to teach a student with a disability to effectively use assistive technology to the fullest extent possible? Why?	• Knowledge of resources • Confidence to use assistive technology • Improved skill levels
Will the skills covered in the training be used in	• High-tech assistive technology

the classroom in which you are situated? If so, how?	• Low-tech assistive technology • Barriers to the use of assistive technology in the classroom

The first question asked participants to describe how relevant the training was to their needs. Three main themes emerged from the responses: personal impact on EASN, impact on students, and the relevance of low-tech AT. The EASN strongly indicated that the training was very relevant to their personal needs and that the information was relevant to their individual situations in the classroom. They felt better able to respond to students' needs as a result of the training. One participant stated that "Yes, it was very informative. I feel better equipped to help with a child's needs as a result of this training. This training has opened my eyes to not only high tech but also low and medium tech that we can so often over look. It is great to think there is so much at our finger tips if we are creative. I had completed my cert 4 special needs 2 years ago and this training has been a fantastic extension".

It was also noted that the students were helped by the EASN's increased knowledge and skills, and that this in turn allowed the EASN to function more effectively in the classroom. As one of the participants commented, "I have been able to take away useful ideas to implement from every week. Even when we were learning about visual and hearing impaired there were things that would still be helpful to R". The last theme identified was that of the relevance of the low-tech AT. The participants, in their responses, suggested that the use of low-tech AT would be very beneficial for the students, as well as being very accessible for themselves, as EASN. As one participant stated, "I was surprised at how much can be done with simple or low tech things to assist children and make things easier for them to learn

and do everyday activities", while another expressed that "knowing that AT doesn't just mean computers and cameras is great. Lots of ideas given for low AT and websites".

The second question asked participants to state if and how the training was relevant to the students with whom they worked. Most of the EASN felt that the training was beneficial in some way for the students. Those who were unsure of the benefits further commented that they could see how the training may be beneficial for future students with whom they may work. Three themes emerged from the data in regard to the relevancy to students. These were: use of high-tech assistive technology, use of low-tech AT and feelings towards the use of assistive technology.

The participants felt that a number of medium to high AT devices and tools would be of great benefit for the students. Often these were indicated as potential tools for future use. Comments made included that "I thought text to voice would be helpful. Also the useful internet sites for students with physical disabilities is helpful; knowing where to get the resources", and "it will assist with communication and indicating their needs. E.g., talking devices". Participants felt that low-tech AT was equally beneficial and many were already incorporating aspects of the use of low-tech AT into their teaching activities: "it has given me the tools to help the child to develop and enhance control and independence with their behaviour monitoring". Participants commented that they thought the students would feel better about themselves as a result of being able to access activities and that the training was beneficial for both the students and themselves. As noted by one EASN, "Some of the information wasn't relevant to the student I am working with this year, however it

will be extremely helpful in subsequent years. I will have a wealth of ideas and knowledge of some fabulous tools right from the beginning".

The third question required participants to comment on their perceptions of competency in the area of AT and whether these had changed as a result of the training. Three key themes emerged from the data: Knowledge of assistive technology, confidence to use AT and motivation to use assistive technology. Knowledge of the AT was overwhelmingly cited by the participants as being a key factor in a positive change of perceptions. This knowledge included what AT actually was and its purpose, understanding the range of AT, and knowing what to use to assist a student. In particular, one EASN stated that "I have a lot more knowledge of what is around in the area of assistive technology", while another suggested that "although I know some resources are useful, I did not realise that so many technologies can be used to enhance and maintain their everyday lifeskills".

The participants also explicitly stated that an increase in confidence for both using the AT and sourcing appropriate technology was an outcome of the training. Comments such as "Although I'm not a guru, I feel I have the confidence to try certain programs not previously known to me before this training", and "I am comfortable finding resources" serve to illustrate this point. Some of the participants felt that they were more motivated to use AT as a result of the training: "I feel more motivated and re-energised". Although within the theme of motivation, one participant also commented that it could be difficult to remain motivated if there were barriers to implementing assistive technology. She stated that "Sometimes I

feel frustrated that it is sometimes difficult to access programs; funding, and time constraints make it hard to stay motivated long term".

The fourth question asked the EASN if they felt prepared to teach students with disabilities to effectively use AT and to elaborate upon their answers. The themes which emerged from the responses were: knowledge of resources, confidence to use AT and improved skill levels. The EASN felt that their improved knowledge in the area of AT allowed them to appropriately select and use the technology with students. A participant suggested that she felt better equipped to teach students with disabilities to use AT because she "better understands why it is used and also how to use it or find it". The participants stated that their confidence for assisting the students had also increased, and that they were able to approach unfamiliar technology with confidence. Some of the EASN commented that they would be better prepared to assist students as their own skill level improved, for example, "I feel better prepared but not entirely comfortable. I will be better once I put some of it into action".

The fifth and final question required participants to discuss whether the skills they had learnt in the training would be used in the classrooms in which they were situated. The themes which were identified were: use of high-tech assistive technology, use of low-tech AT and barriers to the use of AT in the classroom. Many of the participants stated that they were already, or would be agreeable to, use medium to high-tech AT in the classroom. Often mentioned technology included Clicker 5, computer programs, writing support devices and Boardmaker, as illustrated by a comment from one participant, "A lot of technology used in our

classroom is based on computer programs (Smartboard). Symwriter and Boardmaker will be very useful programs". Many of the participants stated that they were already using a number of low-tech assistive technologies, including reading windows, rulers with handles and pencil grips, and that they would continue to do so - "we are already using reading windows, visual aids on desks and pen grips". A few of the participants also described potential barriers to the use of assistive technologies in the classroom, namely, the wishes of the classroom teacher and access to the technology. An EASN articulated this thought, "Hopefully so, I just need to know what is available in some way, and whether the teacher would be open to a lot of it. I'm sure they would be if we had the resources or backing from the school". These views were explored further through a focus group interview.

4.4.4 Post Training Focus Group Interview.

In order to extend previous collected data and to ensure that multiple sources of data were used, participants were asked to voluntarily take part in a small focus group at the completion of the training. Seven of the eighteen EASN elected to participate in the sessions. The focus groups were semi-structured, with participants asked focused questions (Appendix 4) regarding their perceptions of their experiences during the training and how this may have impacted upon them.

Participants were initially asked if they felt prepared to teach students with special needs using AT after receiving the training. The majority of participants stated that they felt more confident in using AT and more aware of what was available to them. One EASN stated "I definitely think I feel more confident and I'm more capable of working with students and teaching them to actually use it".

The remainder of the participants stated that the lack of access to some of the software that is available in the school, and the time required to use it were barriers to their ability to practice with, and use, assistive technology. They felt that this then impacted on their confidence to use AT with students. As one EASN indicated, however, "the knowledge is always there for us, for another situation".

The EASN were then asked if the training had an impact on their feelings of efficacy and personal competence for using assistive technology. Unlike the questionnaire responses, this was a difficult question for them to answer and the focus group required re-direction on a number of occasions. Generally the EASN felt that what they learnt had been beneficial to them, but there were few comments on their actual feelings of personal competence. This was referred to obliquely in a number of ways, such as EASN stating that they liked knowing how to use something, and that the training really helped. It may be that it is difficult to verbalise feelings of efficacy.

Similar to the questionnaire responses, all of the participants felt that the training provided could be used in a number of situations and with a number of students. One respondent stated that "I think we could adjust the equipment or whatever we are using for that purpose. So it was quite useful". Others suggested that the knowledge and skills learnt in the training could be used across a wide range of settings, including regular education settings and education support settings. The teachers' responses to the EASN'S increased level of knowledge in the area of AT were quite polarised. Some participants stated that their teacher was grateful for the EASN contributing ideas to the classroom, while others felt that their opinions were

not asked for or respected. This is emphasised by the statement that "I get a lot of teachers who think I've been doing this for years and there's no need for you to tell me anything cause I know it all". EASN who felt that the classroom teacher responded well to their training stated that these teachers "...are quite happy when I give them the ideas. They are quite open to suggestions and things like that". Teacher attitudes towards EASN in the classroom appeared to have been a factor in the ability of the EASN to utilise the AT in the classroom.

When asked if they had increased the use of AT in the classrooms the EASN were generally able to name at least one form of AT (usually low-tech) that they had utilised after the completion of the training. Where the EASN were unable to name any devices/systems that they had used as a result of the training, they were generally aware that they had increased levels of knowledge which could be used at a later stage. Some of the technology that was being utilised at this stage in the research included pencil grips, rulers with handles, visual supports (COMPIC), shaving cream (for fine motor development), deodorant paint bottles and computer programs (Timez Attack). The EASN suggested that some of the barriers to implementation included time to explore and learn new technologies, lack of budget to purchase expensive AT, and teacher resistance. The EASN suggested that ways to address some of these barriers included sharing of resources with better resourced settings/schools, and by having pre-made devices on hand or offering to make them for the teacher. These barriers were similar to those previously identified by participants during questionnaire responses.

4.4.5 Field Notes.

The observational notes for the post training period suggested that the EASN are eager to apply new skills and knowledge in the classroom. There was some comment on the large amount of information covered in the training sessions, and that it would take some time for them to assimilate the information and determine applicability for individual situations. Most of the EASN had used at least one form of AT in the classroom already, that they had not previously used, and one school group of EASN had put together a 'kit' of AT items that could be used by all members of the school community.

Observation of this school in which three of the EASN were situated revealed that all of the EASN had utilised some of the training in different ways to assist with the students with special needs. One of the EASN was using low-tech aids, such as pen grips, another had set up visual schedule son the computer, while another had implemented behaviour management tools with the student with whom she worked. In another school one classroom was observed where two of the EASN were implementing visual cue cards as reminder systems, and slant boards for two students who would benefit from these. The EASN also showed the researcher around the classroom and commented on what computer applications and programs had been utilised since their training. The EASN demonstrated a sense of 'comfortableness' around AT that was not evident at the beginning of the study, with those who had previously not contributed providing their opinion, and an eagerness to put what they had learnt in place. The EASN were also keen to explore possibilities for the students with whom they worked, and collaboratively discussed ideas to support the needs of the students.

4.4.6 Between Group Differences.

There were two identifiable groups within the participants. One group (n=10) was comprised of EASN who had only worked in regular settings, and the other group (n=8) comprised of EASN who had previously worked in special education settings such as Education Support Centres and Education Support Schools. Participants who worked in the latter settings tended to work with students who had higher levels of need, and generally had greater access to a wider range of assistive technologies. As the number of participants was small, a Kruskal-Wallace nonparametric statistical analysis was undertaken to determine if there were any differences between the two identified groups in the area of confidence and skills. Table 4.18 presents the differences between groups, pre-and post, on the Likert-type scale questionnaire responses.

Table 4.18

Differences between Groups on Pre-Training Questionnaire, Post-Training Questionnaire and Maintenance Questionnaire Likert-type Responses.

	N	df	χ^2 (Kruskal-Wallace)	P
Pre Training				
Confidence for using assistive technology	18	1	.927	.336
Skills in using assistive technology	18	1	.509	.475
Confidence teaching students to use assistive technology	18	1	.722	.395
Confidence for learning more about assistive technology	18	1	.962	.327
Usefulness of training for classroom situation	18	1	.039	.844

	N	df	χ^2 (Kruskal-Wallace)	P
Post Training				
Confidence for using assistive technology	16	1	4.733	.030*
Skills in using assistive technology	16	1	5.051	.025*
Confidence teaching students to use assistive technology	16	1	1.838	.175
Confidence for learning more about assistive technology	16	1	5.000	.025*
Usefulness of training for classroom situation	16	1	2.232	.135
Ability to transfer to classroom	16	1	.385	.535
Maintenance				
Confidence for using assistive technology	14	1	.000	1.000
Skills in using assistive technology	14	1	.567	.451
Confidence teaching students to use assistive technology	14	1	.088	.767
Confidence for learning more about assistive technology	14	1	.227	.633
Usefulness of training for classroom situation	14	1	1.083	.298
Ability to transfer to classroom	14	1	.000	1.000

*indicates significance at the $p < .05$ level

Few between group differences surfaced. The only significant differences between the groups' perceptions were in the post training data collected. There was a significant difference between the two groups' reporting of their confidence in using AT χ^2 (1, N=16) = 4.733, p = .030. Group 1, those who had not previously worked with children with high support needs, indicated that they had a higher level of confidence than group 2 after the training was completed. This difference

disappeared at maintenance testing. There was also a significant difference between the groups in the post-training phase in the area of reported skills χ^2 (1, N=16) = 5.051, p = .025, and in EASN's confidence in learning more about AT χ^2 (1, N=16) = 5.000, p = .025. There were no significant differences between the groups in any other area of the questionnaire responses.

Table 4.19 describes the results of a Kruskal-Wallace analysis conducted on the data collected from the skills test administered to all participants at the three data collection points: skill level of the two groups prior to training, after training and after the 10 week maintenance period.

Table 4.19

Differences between Groups Skills for Pre-Training, Post-Training and Maintenance.

	N	df	χ^2 (Kruskal-Wallace)	P
Pre Training				
Foundational Skills	18	1	1.901	.168
Planning	18	1	.293	.588
Assessment	18	1	2.100	.147
Knowledge of Specific Technology	18	1	.073	.787
Use of Specific Technology	17	1	2.128	.145
Post Training				
Foundational Skills	18	1	1.592	.207

Planning	18	1	.055	.814
Assessment	18	1	.638	.425
Knowledge of Specific Technology	18	1	.018	.893
Use of Specific Technology	18	1	2.892	.089
Maintenance				
Foundational Skills	18	1	2.063	.151
Planning	18	1	.148	.701
Assessment	18	1	.744	.388
Knowledge of Specific Technology	18	1	.450	.502
Use of Specific Technology	18	1	1.352	.245

*indicates significance at the $p < .05$ level

Results indicated there were no significant differences between the groups when they were skill tested. This indicates that the groups were similar in their ability to use computers and assistive technology. Although group 2 had greater access to assistive technology, the results do not indicate a difference in skill level between the two groups. The EASN from both groups also reported that they were rarely given opportunities in class to practice or use assistive technologies.

4.4.7 Summary of the Impact of Training.

The training significantly improved the EASN's skills in all of the areas assessed. The participants were able to demonstrate performance of a higher level of skills at both the post-training and maintenance testing. This increased level of skill indicates that the training had a positive effect on the participants. In addition to observable skills, the EASN rated their own confidence for using assistive technology, teaching others to use AT and to learn more about AT as all being

significantly higher ten weeks after the training. There was no significant difference found in the areas of skills or confidence between the post-training and maintenance period. There was also no significant difference found between the two identified groups.

4.5 The Use of AT in the Classroom by Education Assistants Special Needs after Training

4.5.1 Introduction.

In addition to appropriate training to assist the EASN to use and facilitate the use of assistive technology, an equally important consideration is their ability and willingness to transfer this knowledge to the 'real' classroom environment. This was examined in a number of ways. Firstly the EASN were asked to rate their ability to transfer the information that they would learn in the training to the classroom situation. They were then asked to rate the usefulness of the training received for their individual situations. The EASN also provided written responses to questions and a representative sample participated in small focus groups. The researcher also visited a number of classrooms in which the EASN were working and observed the participants using a variety of assistive technology. During the training period none of the EASN had exposure to any other training in the area of assistive technology, either face-to-face or online. Other than using AT in the classroom setting, the EASN were not exposed to any other AT apart from that discussed and used during training sessions.

4.5.2 Wilcoxon Signed-Rank Test Analysis of the Questionnaire Responses.

Participants were asked to rate their ability to transfer the information learnt in the training to the classroom. As was seen in previously reported results, the participants rated this item highly on all data collection points, and there was no significant difference between the initial questionnaire, the post-training questionnaire and the maintenance questionnaire responses. These results are represented graphically in Figure 4.9.

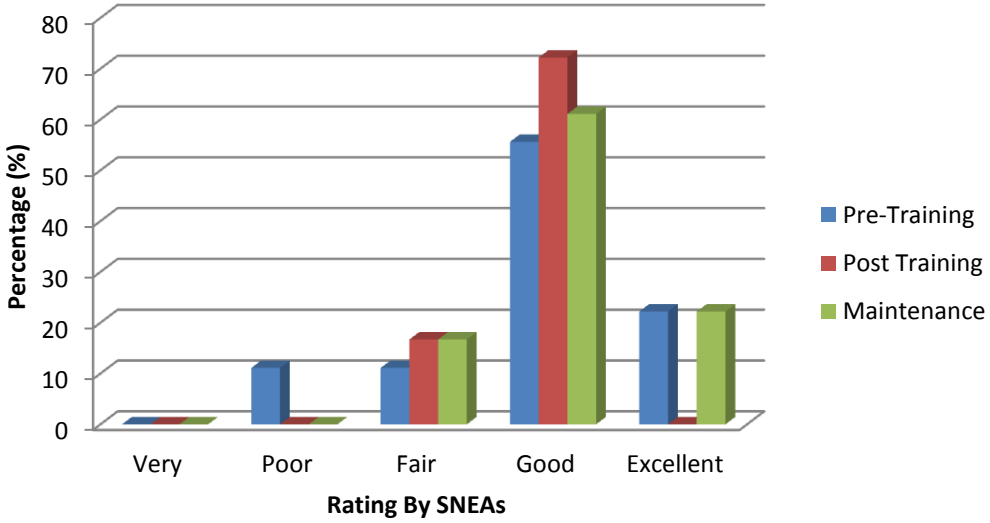


Figure 4.9. EASN's rating of their ability to transfer information learnt in the training to the classroom, pre-training, post-training and at maintenance.

In addition to the EASN's ability to transfer the information used in the training, the participants were also asked to rate the training that they received for usefulness in their own classroom situation, both during the post-training and maintenance testing (Table 4.20). This item was not included at pre-testing as participants had not yet experienced any of the training. The participants indicated at both the post-training and maintenance assessments that the training was of good

value for their classroom situations (median=4.00). There was no significant change in this item (Z = -1.667, p = .096) from the post-training to the maintenance assessment. The participants also rated themselves highly on being able to transfer the skills and knowledge learnt in the training to their classroom situations (median = 4.00).

Table 4.20

Questionnaire Likert-type Responses from Participants in Regards to the Usefulness of the Assistive Technology for the Classroom Post Training and After a Ten-Week Maintenance Period.

	N	Post-training Median	Mainten. Median	Z (Wilcoxon)	p
Usefulness of training for classroom situation	16	4.00	4.00	-.723	.470

4.5.3 Maintenance Qualitative Questionnaire Responses.

While asking the participants to rate their skills and perceptions of confidence, the maintenance questionnaire also provided the opportunity for the EASN to present some feedback on their use of AT in the classroom after the training was been completed. The questionnaire was administered to the participants approximately ten weeks after the training. In order to focus the participants' feedback, they were asked a number of questions. The responses to these questions were analysed using NVIVO to identify repetitive themes (Table 4.21).

Table 4.21

Themes Identified in Qualitative Questionnaire Responses

Questions	Themes
Did you use what you learnt in training in assistive technology in the classroom? If so, how?	• Use of low-tech assistive technology • Use of medium-high-tech assistive technology • Ability to contribute to programs
Was the training relevant to your long term needs? If so, how?	• Increased awareness • Types of students • Improved skills
If your perceptions of personal competency in the area of assistive technology changed as a result of the training, do you still feel this is so? If so, how?	• Increased confidence • Increased knowledge
Do you feel prepared to teach a student with a disability to effectively use assistive technology? Why?	• Increased confidence • Awareness of assistive technology and benefits associated • Reservations

The first question asked the EASN if they had used what they had learnt in the training in the classrooms in which they worked. Most of the participants (72%) responded that they had indeed been using their new skills and knowledge. Just over a quarter of the participants (28%) stated that they had not used the skills or knowledge gained. Various reasons were given for these barriers to transfer for the participants, including moving classrooms, time of year (late in term 4), no longer working in the role of EASN, and working with a teacher who was unreceptive to implementing assistive technology. For those who did use the information and skills

obtained throughout the training, three themes were identified in their responses as being important. These were the use of low-tech assistive technology, the use of medium to high-tech AT and the EASN ability to contribute more actively to the use of AT in programs for the students with whom they work.

The participants stated that they used a wide variety of low-tech AT in the classroom after the training. Some of the technologies used included reading windows (sheet of paper with a slot for restricting viewing area), rulers with handles, visual cue cards, slant-boards, self-opening scissors, magnifying glasses, adapted paper (thicker lines) and pencil grips. One participant also reported using low-tech "Aides for daily living – adapted books, seating and positioning – cushions and wedges that provide body support."

As well as low-tech assistive technology, many participants reported an increased use of medium to high-tech assistive technologies after completing the training. These included both software and technological devices (e.g. BigMack). Computer software or online programs that supported students in the areas of maths, reading, spelling, comprehension, behaviour and memory were utilised and Boardmaker (used for constructing visual supports) and writing support devices were also used more frequently. One of the EASN stated that she "started using the 'Writer' on a regular basis. I set-up a spelling program on the Writer and assisted the student to self-learn". The last theme identified by the EASN indicated that they felt more able to contribute to the students' programs and the use of AT as a result of their training. This contribution was both in the area of planning and monitoring the students. For instance, one participant felt that her monitoring of the student's

progress was enhanced. When asked what she had learnt in training that had been used she stated “Writing daily reports so I can see what needs to be looked at and how I can make it easier for the student and me. If it's not working, don't use it”.

All of the participants stated that the training was relevant to their long term needs. Three main themes were identified: increased awareness of assistive technology; the types of students the EASN worked with; and improved skills. Increased awareness of the AT that is available to support students’ learning and how this works was a key theme identified. This finding is exemplified by an EASN who felt “The training will be beneficial to students with special needs. I have a better understanding of how assistive technology works for the specific needs of students”. This awareness included increased knowledge of the types of AT available and ways to obtain or access the assistive technology. For example, “I know more of what is available to apply with different students needs”.

The EASN described the increasing number and variety of children with special educational needs who are (or will be) under their instruction, as being able to benefit from the training they had received. An EASN articulated the requirement to have a broad understanding of AT because “In our job we work with many different children with many different special needs that require all kinds of assistive technology”. Improved skills in the area of using AT such as computer use, construction of low-tech AT and use of various devices were seen as being relevant to the EASN in their current and future roles. One participant stated that “the training was relevant because I am able to use the knowledge and skills I learnt”.

The EASN were asked if they had previously identified a change in their perceptions of personal competency, and if this was still the case 10 weeks after the completion of the training. They were also asked to describe how they themselves had changed. The EASN felt that their perceptions of their own personal competency were still good, with all but two of the participants answering this question positively. Two themes, confidence and knowledge, were identified as being important aspects of this personal competency. The EASN felt that they were more confident with their own abilities and were more willing to use AT as a result of this confidence, for example, "I feel more confident when working with students who require AT. I have the confidence to try new types of AT". Those who did not answer positively cited their own lack of confidence as being the barrier for them when using assistive technology; "it's more my lack of confidence in myself through a lack of action and use". The EASN also stated that knowledge of the AT available and ways to use this has impacted positively on their perceptions of personal competence. One comment in particular illustrated this theme; "My perception of personal competence has changed as a result of this training. I am now more confident and aware of my ability in the area of assisted technology and thus, I am able to be more confident when teaching my students".

Participants were asked to state whether they were prepared to teach a student with a disability to use AT and why this was the case. All of the participants stated that they felt prepared to teach others. The reasons given for this perception were identified as composing of two main themes: increased confidence and awareness of AT and the benefits. There were also four participants who had some reservations about teaching others to use AT and this was identified as a third theme within the

responses. Participants stated their increased awareness of what constituted AT and the benefits of this, as being strong impetus for their preparation in teaching others about assistive technology. In regards to using assistive technology one participant said that "It has great value and addresses many children's needs". An increased level of confidence was also cited as being of particular importance. One EASN stated that "I have a broader knowledge and skills in assessing students' needs and available technology. I feel confident in implementing the program". Some of the participants said that they would feel confident in teaching others, but had some reservations in regards to the type of AT (more comfortable with low-tech as opposed to high-tech) and the technical support and training that would be available. In particular one comment was that "the low-tech stuff is very basic and so is a lot of the medium tech stuff. I may be a little wary of the high tech stuff but would be ok after some training".

The final question in the maintenance questionnaire asked the participants to comment on any areas related to AT that they felt should have been covered more thoroughly throughout the training. There were no main areas identified, although four participants indicated that they would have liked further training in specific programs/technologies. Some of these were Boardmaker, Clicker 5, touch screens and augmentative communication devices. Two of the participants also suggested that further reference to AT that could be used to enhance students' social skills would also have been useful. Generally, the participants stated that they were happy with the training program and the scope of the information covered.

Participants were given an opportunity at the end of the questionnaire to make general comments. The comments were positive in regards to the content of the course and the delivery. Two main themes of enjoyment and understanding were identified in the responses. Comments made included "I have learnt so much more during this assistive technology PD. It was very interesting and helpful"; "Would like to see PDs each term dedicated to areas of assistive technology which EASN could request"; and "Enjoyed the course and so glad that I did attend. It has been very beneficial. Dianne did very well and thanks to her I feel very confident". The EASN also now understood AT in more depth than before the training was undertaken, as illustrated by the comment "I have enjoyed learning about assistive technology. I use my knowledge by sharing it with other staff at this school. I have been using skills I learnt in the classroom".

4.5.4 Final Focus Group.

Participants were invited to take part in a final focus group to provide further feedback on their experiences during and after the AT training. Nine of the eighteen EASN participated in the final focus group sessions. There were three sessions held to accommodate the times that the participants were available. The focus groups were semi-structured, with participants asked to respond to some questions similar to those asked during the first focus group (Appendix 6) and also some questions drawn from the questionnaire responses to allow for elaboration and clarification. An open-ended discussion was encouraged towards the end of the focus group session to further explore issues raised.

The participants were firstly asked if they still felt better prepared (as was previously indicated in post-testing) to assist students with disabilities to use AT in the classroom. All of the participants indicated their preparedness to do so. There were, however, a number of conditional responses, where the EASN suggested that they would be prepared to use it more, if AT was readily available, or if they were able to access specific technology.

The EASN were asked to describe whether the training affected their feelings of efficacy in relation to using and facilitating the use of AT with children with special needs. Some of the participants found this question difficult to answer and it had to be re-phrased slightly to clarify what was meant by efficacy. They were then asked if the training had affected their feelings of confidence and competence in relation to using assistive technology. The EASN replied that they felt both more confident and better prepared to use assistive technology. As one participant stated "I think for me personally, absolutely. I really think that it made me a lot more confident, especially going from general EA into special needs". In regards to being better prepared, six participants commented that they would be better able to tailor a program to suit a variety of children with differing special needs as a result of their training and that this has increased their self-efficacy in the area of assistive technology.

The EASN were asked if they had increased their overall use of AT as a result of the training. The majority (14) of participants had increased their use in the classroom. Thirteen participants were able to identify specific technologies which they have increasingly used in their respective classrooms. These consisted mainly

of low-tech AT in the form of reading and writing supports and the use of visual cues. The EASN also suggested that their use of monitoring tools had increased in relation to the use of the assistive technology. There were four participants who had not increased their use. These participants were able to identify a number of barriers to the use of AT in their classrooms. The barriers consisted of lack of time to practice skills, lack of time to use within the classroom, lack of access to resources (such as Boardmaker, Clicker 5), teacher resistance to suggestions for use, and no longer being in the classroom. These barriers correlate with those indentified in regards to the use of skills within the classroom, in that teachers were perceived in some instances as blocking the EASN's opportunities to practice and use their skills effectively. This was stated in a number of ways including the teachers not listening to their suggestions and not using AT effectively themselves. There was reference to some teachers being 'old school' and not wishing to incorporate new technologies into the classroom. When asked if they had used their newly obtained skills within the classroom the participants had mixed responses. Time available to use skills was indicated as a negative factor. On the positive side though, collaboration between EASN was seen as a benefit in regards to skill practice and improvement, with the participants indicating that working together was a useful way of learning from each other and improving overall knowledge and skill level.

There were many barriers to implementing AT in the classroom. These included time to use and practice with the assistive technology, the availability of AT and access to this in the school setting and teachers' understanding of the AT and how it may be used in a classroom. The EASN stated that they were generally fully involved with the students in the classroom for most of their time at the school and

that they did not have any free time available to practice with the AT or to construct assistive devices. They found this to be the most limiting factor in implementing the assistive technology. If they did find some time to devote to using and accessing the AT it was potentially unavailable, particularly in relation to the more expensive and less common high-tech assistive technology. Access to the systems at the schools was an issue, with the EASN not able to change settings or access common programs (e.g. to change display setup on a computer), as they did not have Administrator rights which would allow them to do so. The attitudes of teachers towards the use of AT in the classroom were also identified by the participants as a barrier to implementation. Teachers were cited as not listening to the EASN's suggestions and not having an understanding of the technology.

Only one of the participants felt that the students under their tutelage had not benefitted in any way from their increased knowledge and skills in the area of assistive technology. She stated that she never got to use her new-found skills in the classroom at all, so the students could not have benefitted. The remainder of the participants, however, felt that the students had received some benefit, either directly or indirectly from their training, or that they would do so in the future. This was epitomised by a quotation from one participant, "Oh, definitely, I would definitely say, well look at M. She doesn't need me now...". Although possibly unable to state that the training had direct and immediate effect, many of the EASN commented that it would be useful and relevant for them in future situations and that this would have a positive impact on the students.

Lastly, the EASN were asked if they would be willing to take on further training opportunities in the area of assistive technology. There was very enthusiastic response from all participants in the focus groups. Some of the suggestions put forward by different focus group participants included a refresher course of the content they had previously covered, additional information as an update on a regular basis, and further training in specific assistive technologies that they identified as being of particular relevance to their situations (e.g., Boardmaker, Clicker 5, KidTools).

4.5.5. Field Notes

Observations of four of the classrooms in which the EASN worked indicated that the use of AT was continuing to be implemented by the EASN. In one of the integrated classrooms the EASN had sourced a variety of appropriate Smartboard activities for students with special needs. These included activities in which the student took a central role in determining responses. The EASN had placed the activities into a central depository where all staff could access them for any student. In another kindergarten classroom the EASN had modified an existing tool (a headband) and converted it to a pencil holder support for a student with fine motor difficulties. When questioned she said that she had been shown a commercial support by an occupational therapist and had modified it herself. In the remaining two classrooms a variety of mainly low-tech assistive technology was evident, including rulers with handles, roll-on deodorant paint tubs, visual cue cards, slant boards and behaviour management tools on the computer.

4.5.6 Summary of the Use of Technology.

Many of the EASN indicated positive outcomes for both themselves, and the students with whom they worked, in regards to the increased use of AT in the classroom. These outcomes consisted of increased knowledge and skills and improved confidence which all led to a reported increase in the use of some AT in the classroom. There are, however, many barriers to the implementation of even more targeted AT and AT at a higher level within the classrooms. These barriers consisted of aspects such as allocated time available to use assistive technology, teachers resistance to the use of assistive technology, availability of particular technologies (especially the high-tech assistive technologies), and access to school systems that would enable further utilisation of assistive technologies.

4.6 Overall Summary of Results

The results of this study have been reported using the three sub-questions for the research:

- How do Education Assistants Special Needs view their effectiveness as users and facilitators of assistive technology (AT)?
- Does training in assistive technology (AT) make any difference regarding the EASN's perception of personal competence and confidence?
- How well do the skills associated with assistive technology (AT) and learnt in a training environment, transfer to a classroom setting?

Prior to the training, the EASN reported that they were not overly effective in their use of AT and were not confident in facilitating the use of AT with other staff or students. As a result of the training, the EASN reported that they felt more effective in both of these roles. The training has made significant differences to the EASN's perceptions of personal competence, and confidence to use technology has increased

as a result. Both effectiveness and confidence did not change significantly from the post training to the maintenance phase, indicating that these attributes were maintained at post training levels. These results indicate that the training has impacted upon the EASN in a positive manner.

The transfer of the skills to the classroom was evident, with the use of low-tech AT being prominent. A number of barriers were described by the participants over which they generally had little to no control. These barriers included availability of the AT, teachers, and time to work with AT and students. Observation of participants and questioning via focus group interview and questionnaire suggests that they are more willing than before the training to consider and promote the use of AT in the classroom. Having presented the results, the next chapter analyses these results with a view to addressing the research sub-questions directly.

CHAPTER FIVE

DISCUSSION AND IMPLICATIONS

5.1 Introduction

The purpose of this research was to investigate Education Assistants Special Needs' (EASN) perceptions of themselves as users and facilitators of assistive technology (AT) in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. The results of the study will be discussed in relation to what these mean for the EASN, schools and future training program design. The discussion is organised into five main sections as illustrated in Table 5.1.

Table 5.1.

Organisation of Discussion Areas

Section	**Sub-Section**
Prior experiences of the participants	• *Gender and Age Distribution* • *Prior Knowledge of AT* • *Prior Training Experiences in AT* • *Training Opportunities* • *Professional Experience and Role in the Classroom* • *Implications*
Education Assistants Special Needs' initial perceptions of their effectiveness as users and facilitators of assistive technology	• *Willingness to Learn* • *In-Service training* • *Confidence in Initial Skill Level* • *Teaching Others to use AT* • *Roles in the Classroom* • *Transferring Skills and Knowledge* • *Understanding and Use of AT* • *Identifying Student Needs* • *Communication and Relationships* • *Implications*
The impact of training on perceptions of personal competence and confidence	• *Confidence for Using AT* • *Skill Level*

	• *Types of AT Identified* • *Assessing Students Needs* • *Teaching Others to Use AT* • *Learning More about AT and Transferring to the Classroom* • *Identifying Collaborative Partners* • *Implementation of Programs* • *Overall Changes in Perceptions* • *Description of Perceptions* • *Relevancy of the Training* • *Utility of the Training* • *Opportunity for Practice* • *Perceived Responses of Classroom Teachers* • *Between Group Differences* • *Implications*
The use of assistive technology in the classroom by Education Assistants Special Needs after training	• *Ability to Transfer Skills and Knowledge* • *What has been transferred* • *Collaboration* • *Barriers to Transfer* • *Usefulness of the Training* • *Confidence and Competence* • *Design of the Training* • *Implications*
Chapter summary	

5.2 Prior Experiences of the Participants

Demographic information in relation to the participants was collected at the initial phase of the research. Participants were asked to provide personal information, including age and, gender and also their work history, detailing years of service, types of students with whom they worked and prior training experiences. This information gave an overall picture of the participants and their previous work-related experiences. This initial information provided a context for the training and served to offer a richer understanding of the participants for the researcher. Information was gathered via questionnaire and discussion with the participants.

5.2.1 Gender and Age Distribution.

The all female gender composition of the group was expected, given the generally high ratio of women to men working as EASN (Dalla, MoulikGupta, Lopez, & Jones, 2006), and was noted in the researchers journal as an assumption held prior to the beginning of the training. It is common in Education Support roles to find that the majority of positions are occupied by women. In the five schools where the training for the study was undertaken there was only one male working in the role of EASN and he was unable to attend the training due to timetabling issues. A number of factors have been suggested as possible reasons behind such an unequal distribution, including the poor remuneration, contracted nature of the work (no pay at uncontracted times), lack of career advancement and perception of the role as being one of a nurturing, rather than a skilled position (Dalla, MoulikGupta, Lopez, & Jones, 2006; Goss, 2003). Goss (2003) suggested that these factors need to be more closely examined and addressed by school systems to ensure that students with special needs are provided with appropriate role-models and educational opportunities delivered by both genders.

The age of the participants was not a significant factor in this study, as experience with AT can occur at any time, and is not age specific. It was interesting to note, however, that the majority of participants were in the 36 to 55 year age range. The EASN role is one which is popular with mothers whose children have started school, as it allows them to be at home with the children during school holidays and after school during term time (Ainscow, 2000; Patterson, 2006). It is also a position where extensive training has not been required to this point (Butt & Lance, 2005); as a result, unskilled workers have had opportunity to access this

workplace. Such a situation is changing, however, with the development of competency frameworks for EASN and with increasingly stringent requirements for employment in the role of EASN, that is, level 3 EASN must have specific skills (Department of Education and Training, 2008). A greater requirement for extended training may impact on the demographic composition of this particular workforce. The employment and demographic composition of EASN would be a useful area to track over a longitudinal period to determine if any demographic changes result from the development of a competency framework and increased training requirements.

5.2.2 Prior Knowledge of AT.

Most of the EASN expressed a concern at the beginning of the training that they did not have any idea what constituted AT, and that they associated AT only with computers. The researcher was quite surprised at this finding and noted in her journal for bracketing purposes that she had held a belief that EASN would be more au fait with the terminology and range of assistive technology available. The fact that they did not hold such prior knowledge and that this knowledge could not be assumed then impacted on the way that the training was introduced and background that was provided. That many of them were already using a variety of low-tech assistive technologies in the classroom was a revelation to the EASN. After discussion and explanation of AT and the various types of AT available and the role that it plays for students with special needs, the EASN were better able to articulate the types of AT and potential uses. These initial results indicated that the EASN would potentially benefit from extended training in the area of assistive technology.

5.2.3 Prior Training Experiences in AT.

The very low level of prior training in the area of AT was an unexpected finding. In the journal, the researcher had expressed an assumption that the EASN would have had a small amount of exposure to assistive technology as a result of undertaking an education assistant special needs qualification (particularly as the researcher had taught such a course), or that they had attended some training through their schools. The ten EASN who had completed an Education Assistant course, either at a Technical and Further Education (TAFE) College, or at an appropriate tertiary institution, should have all been exposed to components of study in the area of AT, at some point in their course according to a former TAFE (Technical and Further Education) lecturer (L. Thompson, personal communication, 15 February, 2011). Only one participant, however, indicated that they had received training in this area, and that this training was undertaken whilst working in her role as an EASN, not in her initial training to undertake that role. In addition, she described very specific and limited training that was offered, utilising specified computer software, rather than a wide range of assistive technologies.

That the EASN did not identify any prior study in AT in the initial questionnaire may suggest that they have no (or little) memory of this aspect of their course, indicating that there may be insufficient emphasis in this area, or that the content taught was perhaps inconsistent with their personal view of what constitutes AT. As the use of AT is potentially an important part of the role of an EASN (Department of Education and Training, 2008), AT may need to be assigned greater emphasis in training programs and in the identification of training needs for EASN, which is generally undertaken by the line manager (who is often the principal or

deputy principal of the school). Indeed, the EASN involved in the study indicated a keenness to learn more in this area and commented that they rarely had the opportunity or time available to do so.

5.2.4 Training Opportunities.

The assignment of EASN to the training (where thirteen were asked to undertake the training by the principal and five elected independently to do so), along with responses from the EASN indicating that they had limited choices in training, suggests some further attention is warranted in the training area in WA. Few of the EASN independently asked to undertake the training. When questioned informally, the EASN stated that they were either emailed the flyer or were simply approached by the principal and requested to participate. It appears that little autonomy in regards to the choice of training options is given to the EASN. Giangreco, Suter and Doyle (2010) support the requirement that high quality and consistent training for EASN should be given a higher priority in school settings. The training the EASN are offered ought to be substantial in nature and tailored to individual needs and requirements (Breton, 2010). These aspects were not sufficiently or routinely addressed in the workplace according to the experiences of the EASN involved in this study.

Most of the EASN indicated that the current training was the first time they (as a group) had been offered training that was specific to their needs. Generally, the training that was given was as part of whole school professional development, which was often not relevant to the role or needs of the EASN. As Butt and Lance (2005) and Giangreco, Suter and Doyle (2010) argue, it would be beneficial to provide

training which is appropriate for the EASN and for the work situations in which they expected to have proficient skills in a range of areas. A variety of training is offered through the Department of Education's *Centre for Inclusive Schooling*, but is quite generic in nature and rarely specifically targeted towards the EASN, but rather offered more widely to all school staff, including teachers and administrative staff (H. Epton, personal communication, 15 March, 2010). Examples of training which is available on a regular basis includes training in behaviour management strategies, catering for students with autism and first aid and manual handling (e.g. physically moving students with limited mobility) courses. Many EASN have specific requirements that relate to the students with whom they work (i.e. students with an intellectual disability, students with specific learning disability), and would greatly appreciate the opportunity to develop their skills in relation to the needs of these students and their own areas of limitation.

Although the Centre for Inclusive Schooling has an Assistive Technology Team which offers training, only one of the EASN had accessed this resource prior to the study. During focus group interviews and during training sessions, the EASN indicated that AT was not an area in which they were aware (or made aware) of training opportunities, or that it was not their responsibility to seek out such training. Dew-Hughes, Brayton and Blandford (1998) suggested that training in the area of information technology, incorporating AT, is of paramount importance to ensure that EASN are trained to a high level and that their professionalism is further developed. Appropriate and substantial training will assist the EASN to effectively support all students within an inclusive educational environment (Elkins, 2009) and enhance the likelihood that students with disabilities are able to be included in regular settings

(Anderson, Klassen & Georgiou, 2007). Appropriate methods to disseminate information about potential training opportunities could be developed at school level to ensure equity in access to the training available.

In addition to the attainment of skills and knowledge through training, is the increased status of EASN in the eyes of other staff members, which ultimately enhances the professional standing of this group (Groom, 2006). Enhanced professionalism is likely to lead to further opportunities for training, and development of a cohesive structure for enhancing working relationships within the classroom setting. Butt and Lance (2005) explain the importance of developing sound understandings of the training requirements for all staff and how these align to the role played by the EASN in the school system. They suggest that a great deal (up to 20%) of the workload of a teacher in England may be accomplished by support staff. Even if this was a goal for the education system, it is not achievable without appropriate training and support from the entire school staff and the school system as a whole.

5.2.5 Professional Experience and Role in the Classroom.

The overall experience level of the EASN in the classroom was extremely variable. The EASN reported having from less than one year of experience to having more than sixteen years of experience in the role of an EASN. Most reported between two and ten years of experience. It would seem logical that the more experienced the EASN, the more exposure they would have had to training (AT and other forms of training) and other experiences with AT (French, 2002). This exposure does not appear to be the case, with the cohort under investigation, with

only one of the more experienced participants reporting any form of prior training in AT.

While the use of AT may be common-place and/or legally mandated in the United States and United Kingdom, it is not so in Australia. The use of AT, however, is likely to increase with continued availability and cost reduction (Stanberry & Raskind, 2009), which is bound to impact upon the need to have knowledge in this field. That the EASN in this study had poor knowledge in this area indicates that further attention may need to be paid to AT training now and in the future. This requirement for training is relatively urgent, particularly as a range of AT is already available in schools (e.g. computers, voice output devices, low-tech devices), but without appropriate training these technologies may not be utilised or adapted appropriately for the needs of the students (Simpson, McBride, Spencer, Lowdermilk, & Lynch, 2009; Sze, 2009).

Although only a small cohort has been utilised for this study, it is surprising that the training in AT is so limited considering the length of time the cohort have been involved in the role of EASN and the variety of students with special needs with whom they were working or had worked with previously. Broadbent and Burgess (2003) stated that the EASN may spend a great deal of time with the student, independent of teacher supervision, and that they need to be trained in order to be effective during this time. Some further examination of the training systems developed for EASN would be useful to determine where there are gaps in training provision and how these may be filled by existing and new service providers. The results of this study indicate that current training in the area of AT is inadequate in

order for the EASN to meet the competency standards as set out in their Competency Framework (Department of Education and Training, 2008). Competency Standards 1 (Communication), 2 (Learning) and 6 (Administrative Tasks/ Managing Resources) all refer explicitly to an expected level of competency in utilising AT and other computer technologies to support the classroom-wide and individual programs.

The role of the EASN may have had an impact upon their use and access to training in AT, as this may still be seen to be primarily the domain of the classroom teacher (Takala, 2007). With the increased dissemination of some of the role traditionally undertaken by the teacher to the EASN (Breton, 2010; Giangreco, Smith & Pinckney, 2006; Keller, Bucholz & Brady, 2007), there would appear to be an increasing need to ensure that the skills that are required by teachers to be successful in catering for students with disabilities, are those which are held by all staff who support these students. Previous studies in other areas have shown that the overall confidence and competence of EASN can be enhanced through appropriate training schedules (Rose & Forlin, 2010; Collins & Simco, 2006; Weintraub, Moore & Wilcox, 2006). As such, it is likely that there would be an increase in confidence and competence as a result of AT training.

Adequate planning and funding in relation to training is vital if the requirements of the Competency Framework are to be realised by staff. When designing training, the EASN should not in any way be disadvantaged by having to attend sessions outside of their scheduled work hours (Butt & Lance, 2005). Some of the EASN stated, in informal conversation and in addressing questionnaire responses, that in order to access the training, they had to make accommodations.

One of the EASN, for example, commented on the need to enlist the help of friends to collect her own children from school as she was completing the training, while another stated that there was no-one to 'cover' her in the classroom, and that she had to catch up on her work when she returned. Lee (2003) is adamant that EASN pursue training as a component of their existing role rather than in addition to it, and that they are compensated for any inconvenience (either through time in lieu or through payment for time given). The EASN in this study were often required to undertake training opportunities either partly or fully in their own unpaid time, or not at all. This is a disincentive for EASN who have commitments and family obligations which may prohibit them from attending these training situations.

Schools may need to be creative in the way that resources are used to ensure that the EASN have access to the training that they require. They may hold training sessions at staggered times throughout the day, so that staff can 'cover' each other, or provide differentiated training options during professional development days, which are provided for all staff at the start of each term. On some occasions, it may be necessary for administrators to manage budgets to pay EASN for attendance at training sessions when there is no other cost effective means to organise these in work time. In all of these scenarios, the administration personnel play a significant role in not only determining the types of professional development/training that are offered to EASN, but also the logistical considerations to ensure that the training is accessible to as many staff as possible (Dyal, Bowden Carpenter & Wright, 2009). A clear process may need to be developed in some schools to accommodate these practices.

5.2.6 Implications.

Even before the training had begun, there were implications for schools in the way that the EASN were perceived and regarded as part of the staff structure; with reference to the training they received (Groom, 2006). These implications include the consideration of gender composition of the EASN workforce, systems of communication, choice in training, career opportunities and role definition and refinement. These may all be regarded as systemic issues for the larger part, but can often be addressed by some degree through individual school decision making teams. The school may, for example, actively seek out the opinions of the support staff in regards to their training needs in areas in which they feel they are deficient or that will enhance their existing skill set. Such action may consist of a very simple survey of staff conducted at the start of the term or semester which asks them to detail their training requirements and areas of perceived strength and weakness (Cobb, 2007; Griffin-Shirley & Matlock, 2004). Deficits can then be targeted effectively by the school and EASN to ensure that optimal outcomes are achieved with the available professional development budgets.

As Rose and Forlin (2010) found in their study on training EASN, the participants were able to clearly identify their own needs and expectations of the training, and to determine the benefits it may deliver. The current study also determined that the EASN were able to identify, to some extent, their needs, particularly if they were provided with a range of options. In addition to providing appropriate training, it may also be necessary to enhance the working relationship and status of the EASN within the school setting and ensure that there are appropriate avenues for communication available (Groom, 2006). Appropriate

communication between all parties involved with the education of students with special needs will work to promote positive and efficient work environments and can only lead to good quality outcomes for all involved.

5.3 Education Assistants Special Needs' Initial Views on their Effectiveness as Users and Facilitators of Assistive Technology

The EASN were asked to indicate their perceptions of themselves as users and facilitators of AT by rating their views of their own abilities along a quantitative continuum (Likert-type scale), and to describe prior training and work experiences in AT through a written questionnaire. They were also asked to complete a range of skill tasks and were assessed on their ability to perform these. The quantitative and qualitative responses were then examined together for interpretation (Creswell & Plano Clark, 2007), along with field notes collated by the researcher and the findings are described below.

5.3.1 Willingness to Learn.

The initial questionnaire and skill assessment took the EASN approximately one hour to complete, almost double the anticipated time. This is a positive finding, as it demonstrates that the EASN gave considered, rather than flippant responses, which are more likely to reflect their true perceptions. Using data from both Likert-type scale responses and field notes, one of the areas in which the EASN consistently stated that they had a high level of confidence prior to the training, was in their ability to learn more about AT. Throughout the initial testing phase, the EASN demonstrated great willingness to try new things and to push themselves beyond the boundaries of their previous knowledge base, which for some of them was quite a

daunting task. The researcher noted in the journal (for bracketing purposes) that prior to the training she thought the EASN would not be as receptive to the training as they appeared to be, and she subsequently found this assumption to be false.. This positive attitude towards further learning bodes well for future training of this group, as behaviour is influenced by attitude (Ajzen & Fishbein, 2005).

A positive attitude towards the training means that the EASN are more likely to actively participate in their knowledge and skill acquisition. The high level of confidence to learn more about AT indicates receptiveness to new knowledge and skills and as a result, a greater potential for more effective transfer of the training to the classroom setting. During the initial skills assessment, a few of the participants stated that at times they felt they would not be able to complete the tasks or use the technology, as they considered their own abilities to be poor. This attitude was not perhaps a lack of desire to learn more in the area of AT, rather it was a lack of confidence in their ability to master the technology, or an acknowledgement that the initial level of knowledge in this area was low.

A consistent theme of wanting to know more about AT, not only for themselves, but in order to assist the students they were supporting, was evident prior to the training and was a characteristic that Ashbaker and Morgan (2001) also note in their research with EASN. Concern for the students was often offered by the EASN as the impetus for increasing their knowledge and skill base (Broadbent & Burgess, 2003). This enthusiasm and willingness to extend their skills and knowledge can be drawn on and encouraged by school and sector systems. That the EASN were willing to participate in the training even though it was something new

and unfamiliar to them and that they chose to do so even in their own (partly) unpaid time was a credit to them. Ashbaker and Morgan (2001) suggested that EASN who willingly give up their own time to enhance their knowledge and skills should be looked upon favourably by teachers and schools.

5.3.2 In-Service Training.

In addition to the pre-service training that EASN may receive, on-the-job training and in-service training are the other primary ways that EASN access new skills and knowledge (French 2002; Trautman, 2004). On-the job training is generally effective as the skills are practised immediately. In the area of in-service training, however, Trautman (2004) stated that the EASN are often disadvantaged by training which is not relevant to their needs or that is delivered when the EASN are not scheduled to be at the workplace. Both of these scenarios were described by the participants in this study. The researcher had assumed that the EASN were provided with training that was specific to their needs and was challenged to reconcile this assumption when presented with evidence to the contrary. The assumption was duly noted in the researcher's journal.

Often the EASN were required to attend the same professional development as the rest of the staff, which was generally not relevant or specifically targeted towards the students they were working with. In one school, the number of EASN was almost equal to the number of teaching staff, yet their needs were still not perceived to have been given sufficient importance in the development and dissemination of training. It may be that the EASN see themselves as not having the same status as other staff and therefore do not assert themselves in requesting

appropriate training. Raising awareness of ways to identify training needs and providing options for a variety of appropriate training may be ways to address these perceptions.

It would appear that even though the importance of appropriate training (both pre-service and in-service) for EASN has been reported previously in the research (Cobb, 2007; Giangreco, Smith & Pinckney, 2006; Giangreco, Suter & Doyle, 2010; Kerry, 2005), that this training is not being made widely available to EASN, at least not to those in this study. Even if in-service training is offered, it is generally of a limited nature, being offered as a 'one-off' (only one session) or as a compromise (incorporated into teacher in-service training). Comprehensive in-service training, where there is a sustained examination of an area, is uncommon. A specified training coordinator in the school to assist EASN to identify and access appropriate training may be beneficial, and may add a 'mentoring' aspect to the role of the EASN (Burgess & Mayes, 2009). For many of the schools involved in this study, this mentoring-type role was undertaken by the deputy principal or principal as a small part of the many other roles they had to fulfil. As a consequence (and through no fault of the training coordinator), there was often very little time to devote to the training needs of the EASN. Giving a higher priority or more time allocation to this role has the potential to improve the identification and attainment of training for EASN.

5.3.3 Confidence in Initial Skill Level.

While the EASN were very confident about learning more about AT, they were much less confident about their initial skill level in relation to AT. They were

often hesitant in answering questions in this area and would downplay any prior knowledge or skills, even though these were identified by colleagues as having been displayed in the classroom. One participant, for example, stated that they were 'useless' when it came to technology, yet her peers identified her as the most knowledgeable and skilled of the group. This low level of confidence in skills to use AT may be a barrier in the use of AT in the classroom and with students with special needs. It has been shown by researchers examining skills in areas other than AT that through appropriate training, confidence and competence can be increased (Rose & Forlin, 2010; Weintraub Moore & Wilcox, 2006). The low initial level of confidence in their skill level is likely to have a significant impact on the use of AT in the classroom setting, as the EASN would be more likely to adhere to 'safe' methods, rather than attempting to use AT to address issues with learning.

5.3.4 Teaching Others to Use AT.

The low level of confidence in their own abilities was also evident in the EASN'S confidence in teaching others to use AT. The EASN were unsure of not only their ability in this area, but also whether this was actually part of their role. When asked whether they thought that they should be responsible for teaching others, including teachers, administration staff and students with special needs, to use AT, there was a large variation in responses. Some of the EASN felt that it was possibly part of their role to train others, if they had sufficient knowledge of the area under consideration. Others felt strongly that it was not their responsibility, and that they would not feel comfortable in doing so, even if they held appropriate levels of knowledge. The low level of confidence in teaching others to use AT paralleled the low level of personal confidence and competence that the EASN identified,

indicating that AT in general was not an area of strength for the EASN in the present study.

5.3.5 Roles in the Classroom.

The discussion around roles in the classroom arose many times within the initial testing phase and, indeed, throughout the training. The EASN felt that although they should know something about AT, it was not necessarily part of their duties or role to initiate or sustain the use of the AT within the classroom setting and that they would be intruding upon the teachers' work if they did so. Upon a closer examination of the generic Job Description Forms (JDF) devised by the Department of Education and Training (2002a; 2002b; 2002c) and the newly (at that time) established *Competency Framework for Education Assistants (Special Needs)* (Department of Education and Training, 2008), the EASN expressed surprise that their roles could, and possibly should, among many other tasks, include the use and facilitation of AT. The lack of knowledge in regards to roles was unexpected and noted in the researcher's journal as an assumption that had been debunked. Ignorance of the role that they are undertaking and the breath of the competencies required has implications for the classroom, such as poor response to students needs, inadequate support for class programs and reduced emphasis on professional learning for EASN.

Many of the EASN stated that they had never read the JDF or seen the *Competency Framework* and that they were unaware of the extent of tasks that they were expected to perform. This finding is consistent with previous research on roles in the classroom, where EASN were unaware of what tasks they were required or

able to perform within classrooms (Trautman, 2004). It is difficult for any member of staff to know what an individual role requires without some form of guidance. Some EASN stated that although the tasks were noted in the JDF, their teachers would not allow them to undertake these tasks within the classroom, for a variety of (often unspecified) reasons. One reason given for the reluctance of teachers to utilise the EASN to the full extent of their Job Description was the teacher's level of experience (i.e. it was thought that the more years of experience the teacher had, the less likely they were to use the EASN widely). A further reason was the perception that the EASN was less capable than the teacher at performing many of the required tasks. The EASN in these situations had a clear perception of being 'powerless' to have any sort of impact on assisting in the running of the classroom.

A closer examination of how roles in the classroom are defined is critical for both the teacher and the EASN if smooth and collaborative functioning is to occur. This is especially important in regards to learning, particularly in the area of AT (Groom, 2006); for building relationships; and to ensure that appropriate and consistent pedagogy is utilised to the benefit all students. Role definition assists not only the EASN to know what they may be expected to do in the classroom, but also provides the teacher with some guidelines for the tasks that EASN can be assigned, and the level of supervision that may be required (Causton-Theoharis, Giangreco, Doyle & Vadasy, 2007). Supervision of the EASN will depend on the level of competency they have achieved and their prior experiences in working with students with special needs (Department of Education and Training, 2008). When EASN have a greater level of training and experience in the area of AT, there is less of a reliance on close supervision to ensure they perform tasks to the level required. Nevertheless,

supervision of the work of an EASN should always remain a component of the teachers' role (French, 2001) because teachers have the ultimate responsibility for the educational program for the student with special needs.

Role definition was an area identified in the study that required further examination and action on the part of the schools involved. Close examination of the roles undertaken by various staff members within the school setting may be necessary. A consistent and cohesive policy may need to be developed by the schools, either on an individual basis or as an educational sector, in regards to the roles of the staff members (Patterson, 2006). Procedures for detailing who is responsible for assisting the student to complete discrete self-care tasks, or assigning classroom duties to an EASN on a weekly or daily basis (depending on the needs of the classroom), for example, may be developed by schools.

There was a large variation in roles as described by the EASN, with some having a great amount of autonomy in the classroom; taking responsibility for developing and implementing programs. Others, however, worked under intense teacher direction and had very limited autonomy. Those who had some autonomy in the classroom also felt more comfortable in making suggestions and presenting information in regards to AT to their classroom teacher. A greater level of contentedness in the job was expressed by EASN who felt they had a more collaborative working relationship with the classroom teacher and where they felt that their opinions were not only welcome, but were also sought by the teacher. For those who did not have such a relationship, it was a very disempowering experience,

and it appeared that some EASN were just ‘going through the motions’, rather than truly involving themselves in the life of the classroom.

5.3.6 Transferring Skills and Knowledge.

Even though there was some uncertainty in regards to role definition and status, the EASN felt very confident in being able to transfer skills they had learnt in the training setting to the classroom. The EASN were confident that they were going to have sufficient opportunities within the training itself to establish the skills they felt were lacking in order to be able to apply the new skills to the classroom setting. At times, however, this confidence to transfer learning was tempered with a caveat; the skills and knowledge could be transferred, but it was up to the teacher as to what was used and how. These perceived difficulties in transfer corresponded to the status of the EASN within the classroom setting and the role that they played. External factors, rather than individual ability to transfer learning were generally cited as being barriers to this transfer. Such factors included time, access to AT, role in the classroom and particular needs of the students.

The aspect of available time included time to learn and consolidate skills, along with time to explore the available AT and determine appropriate AT to use with the students with whom they worked. Many of the EASN were employed on a part-time basis, or were employed for defined hours within the work day (typically from when school started till when it finished). These working hours did not incorporate any preparation or learning time for the EASN. In addition to the lack of available time, was the concern that their role in the classroom was to do what the teacher requested, and that if the AT was not already a component of the classroom

or individual student program, that the EASN should not be using it. This aspect of the role of the EASN was a recurring theme of concern for the groups throughout the research, indicating that it is an area of some concern for them, and may need to be thoroughly addressed by the school (Carter, O'Rourke, Sisco & Pelsue, 2009; Patterson, 2006). The needs of the students with whom they worked was often a point of discussion for the EASN during the testing phases, with consideration given to how they would use their skills and knowledge within the contexts of their classrooms and with the variety of students under their charge. Although the EASN discussed the needs of the students as being important, they were often not able to clearly specify what these needs were and how they were currently being addressed.

5.3.7 Understanding and Use of AT.

Prior to beginning the training the EASN were unable to provide a clear definition of AT. Little prior knowledge was evident, with the EASN unable to clearly specify or identify types of AT for use with students with special needs. Some of the EASN commented that they were 'stupid' and that they 'didn't know anything'. These comments along with self reported quantitative Likert-type responses suggest that the EASN initially had poor perceptions of themselves in regards to the use of AT. Indeed, they often made reference to being hesitant to use all forms of technology, not just AT. Computers were generally discussed as being the only forms of AT of which the EASN were aware. They had little understanding prior to the training of the extent of assistive technologies that were available to teachers and students (King-Sears & Evmenova, 2007; Scherer, 2005). Even though the schools involved in the study had a variety of AT available, the EASN were often unaware of how to access the devices or software or even that it was available. In

some instances, software was stored in areas inaccessible to the EASN (e.g. principal's office, teacher's desk drawer, library), so there was limited opportunity to explore the software.

Before involvement in the training, the EASN described a low level of AT use in their individual work situations, comprising mainly of low-tech AT devices including pen grips, slant boards, and some visual cues. They required prompting in order to identify these items as being AT. The EASN expressed surprise and delight that items they were already using could be classified as AT. These findings indicate little prior knowledge of AT and are congruent with previous studies undertaken which examined knowledge of AT with cohorts other than EASN (Ashton & Wall, 2004; Chmiliar, 2007; Dyal, Bowden Carpenter & Wright, 2009). AT as a tool for students with disabilities may need to be more widely promoted in school settings in Western Australia. In this way, as many people as possible are likely to have a thorough understanding of AT and potential benefits for students, along with a process for allocating or determining appropriate AT for use with students.

5.3.8 Identifying Student Needs.

An awareness of student needs may be considered a requirement in order to effectively cater for their particular support needs and is increasingly becoming a requirement for EASN (Butt& Lance, 2005). Prior to training, the EASN had significant difficulty in clearly identifying student needs when presented with a specific scenario which would have been familiar to them. The EASN identified many environmental considerations, but did not fully address the academic adjustments that may be required for the student. They discussed environmental and

academic adaptations and modifications in a very superficial manner, only identifying the very obvious environmental adjustments such as the use of wheelchairs and pencil grips, without an in-depth examination of potential academic impacts. This indicates that the EASN have limited experience in determining the academic and social needs of the students. As indicated by Webster, Blatchford, Bassett, Brown, Martin and Russell (2010), the implications of an inability to clearly determine needs of the students may possibly adversely affect the benefits that the provision of an EASN may have on the development of the student.

Potentially, the identification of student needs is an area in which further training is required in order to clearly determine what adjustments and accommodations would be suitable for the students. This would entail a more sophisticated role for the EASN within the classroom, which some feel is already evident (Webster, et al. 2010). Without being able to effectively identify student needs the EASN would have difficulty in appropriately applying the SETT framework (Zabala, 2002) to determine assistive technologies that would be of benefit to the student. They might also have difficulty in adjusting curriculum and environment in order to differentiate content and access for the student.

5.3.9 Communication and Relationships.

Throughout the initial testing phase and prior to the training, the EASN were very forthcoming with responses to the researchers' questions. They were also very keen to confide in the researcher as they felt that there were some areas of the classroom that they were unable to discuss with the teacher. Some of the areas discussed by the EASN included a powerlessness to have any impact on

implementation of the different programs or AT within the classroom, the attitudes of the classroom teacher and the poor access to technology of any sort within the school setting. The ease of communication between the researcher and the participants was unexpected, as the participants had only recently met the researcher and had little knowledge of any ongoing relationships between the researcher and staff or administrators in the school. The open nature of the communication indicated to the researcher that the EASN felt very strongly about the areas under discussion and that they felt very comfortable and at ease with the researcher. The EASN were also keen to ensure that the researcher had as full a picture as possible of individual situations and settings; with some EASN staying after training sessions to discuss aspects of individual situations with the researcher. The positive attitude displayed towards the research and researcher was encouraging, as it was felt that the EASN are more likely to be honest and open in their responses as a result, whether they held positive or negative views. It was possible that the EASN saw the researcher as a knowledgeable and neutral person in the field of education and someone with whom they could feel comfortable discussing issues in the school.

Although the EASN may have felt capable of transferring the AT information they learnt in training they were also mindful of the teacher. Many felt that the teacher would not want their suggestions or would not listen to what they had to say. Those EASN who indicated that they experienced a good working relationship with the teacher, stated that the teacher was interested in their opinion and that they would share the information with him/her, but that they had little say in whether or not the AT was implemented as a result. In contrast, two of the EASN indicated that they were responsible for making direct decisions about the student's work programs with

minimal supervision from the teacher. It appears that developing a balance between the EASN having input into the program and working under supervision of the teacher is an area that requires further examination, along with the development of positive working relationships (Morgan & Ashbaker, 2001; Scherer, 2005; Trautman, 2003). Many authors have discussed the need for positive relationships among all staff in the classroom to ensure the most conducive learning environment is available for the students (Cremin, Thomas & Vincett, 2003; Moran & Abbott, 2002; Morgan & Ashbaker, 2002).

The EASN described a variable level (often poor) of resourcing for AT evident within the schools. Some of the schools had a wide variety of AT already available to them, while others had access to potential sources of funding to purchase AT. In some cases, however, the EASN indicated that it was unlikely that their schools would prioritise spending on AT in the future; often citing comments made by other staff that it would not benefit many children, only those with disabilities. In Australia, the requirement to consider AT for students with disabilities is not mandated as it is in other countries, such as the USA (Library of Congress, 1998). However, the *Disability Standards in Education 2005* (Department of Education, Science and Training, 2005) legislation requires that students with disabilities must be able to participate in the curriculum and social environment of the classroom. Such legislation has strengthened the need for schools to ensure that they cater effectively for students with disabilities in the area of AT. Not having a specific requirement to access AT for students with disabilities may also have a significant impact on the availability and use of AT in schools, which is reflected in the EASN'S poor prior knowledge of AT. It may be necessary for relevant authorities in

Australia (e.g. State or Commonwealth Governments) to develop policies or legislation to ensure that AT is at least considered when assessing the needs of the students with disabilities.

In addition to the variability of resourcing in regards to AT, the EASN also commented on their lack of ability to access the computer systems within the school. Many of the computer programs that may be used as AT, require a form of 'Administrator' access so that modifications can be made to the computer systems. Support from the school Administration (e.g. principal) to purchase devices/programs is a key element of access to AT. The EASN often cited access to the person who was the Administrator of the computer systems, or obtaining designation as an Administrator, as being problematic. An Administrator's role (designated person) in a school setting is to ensure that inappropriate material is not installed on school computers and that the Standard Operating Environment (a standard set of computer programs) is maintained. An example of the lack of attention to and by the EASN in regards to accessing the computer systems of the schools was when they were required to sign in for the first session and did not have appropriate log-in information or access to the systems. A closer relationship between the school administration (for purchasing of appropriate AT), the Administrator of the computer systems (for access to the computer systems of the school) and the EASN may need to be established if appropriate access to learning tools, such as AT, is to be provided.

5.3.10 Implications.

There were many factors for further consideration identified during the initial testing phase. These factors included: the potential to utilise the EASN's enthusiasm for learning more; the provision of better quality and quantity of training programs specifically targeted towards EASN; prior to training, the EASN had very low levels of confidence in regards to using AT, which may be linked to their poor knowledge in this area; low level of confidence for teaching others to use AT, although they had confidence in their abilities to transfer new skills to the classroom; and further clarification of roles and responsibilities is required along with the further development of appropriate working relationships within the school setting. These factors have implications for the training and professional development of EASN, particularly in reference to AT. Considering that the role of an EASN should ideally incorporate the ability to use and teach others to use AT, this is an area that requires much further examination in the schools.

5.4 The Impact of Training on Perceptions of Personal Competence and Confidence in Regards to AT

While it is expected that training would have some impact on skills and knowledge (Giangreco, Suter & Doyle, 2010), the extent of change cannot be predicted and it may not necessarily translate into positive perceptions of efficacy. While some researchers have shown an increase in efficacy as a result of training in specific areas (Rose & Forlin, 2010), the area of EASN perceptions of efficacy in regards to AT has not previously been addressed. Research undertaken by Ajzen and Fishbein (2005) suggested that having a positive attitude will impact upon the behaviour of an individual. It may be postulated that a positive attitude towards the

use of AT and their own self-efficacy will impact upon the behaviour of the EASN, potentially leading to increased use of AT within the classroom setting. A sense of competency and confidence in their abilities will encourage the EASN to utilise the skills and knowledge learnt in the classroom. Without a positive self-efficacy in relation to AT, the skills may not be accessed by the EASN, even when the opportunity presents itself.

5.4.1 Confidence for Using AT.

At the completion of the training, the EASN demonstrated a significant increase in confidence for using AT when compared to their pre-training level. Confidence to use AT was demonstrated in both the EASN's description of their increased capability and desire to use AT and also quantitatively, through improvement in scores on skills tests. The increase in confidence will potentially have an impact on the use of the AT in the classroom. Not only are the EASN more likely to use AT if they are more confident to do so, but they are also more likely to promote the use of assistive technologies within the classroom, as positive attitudes impact upon behaviour (Ajzen & Fishbein, 2005).

The increased level of confidence reported by the participants when completing Likert-type responses, indicates that the participants' self-efficacy in the area of AT has been enhanced in a positive manner (Bandura, 1989), and that they have a view of themselves as users of AT, rather than being peripheral to its use. These findings are supported by reference to feelings of increased confidence in their own abilities to use AT during focus group interviews and use of AT during participant observations in classrooms. EASN with a high self-efficacy are more

likely to adopt new approaches to teaching within the classroom (Swackhamer, Koellner, Basile & Kimbrough, 2009), including the use of AT.

Breton (2010) suggested that training which results in improved confidence in one area may enhance participants' confidence in tackling other areas of professional need. Improved confidence in the area of AT may translate into greater confidence in other areas of participants' work. For example, if EASN have developed competency in one aspect of supporting students, particularly if they originally had low confidence in this area, they are more likely to build upon this experience when addressing other areas of competency (Breton, 2010). In relation to an area of study where confidence was previously low, an enhanced sense of self-efficacy, such as that described by Bandura (2001), demonstrates to the EASN that they are capable of learning and applying new knowledge and skills. An increased self-efficacy may manifest in many ways in relation to AT. For example, increased desire to try new technologies or increased belief in ability to effectively use the available technology may be evident. This impact upon self-efficacy is vital if the AT is to be used to maximum benefit for the students with special needs.

5.4.2 Skill Level.

In addition to an increase in confidence for using AT, there was a subsequent increase in measured skills such as basic knowledge of computer function, planning for the use of AT, and the use of specified assistive technologies and in observed AT use in the classroom The use of these skills was more fully described by the EASN during training and focus group discussions. Further, a sense of learning skills that were relevant and useful to them prevailed throughout the focus groups. Particularly

relevant was the personal understanding of many of the EASN that they already had a number of skills in relation to AT, that they had not previously identified as such. This understanding allowed them to be not only more confident in their abilities, but to also build more fluently on their existing skill level. It should be noted that the increase in skill level occurred for all participants, but that some improved more than others. Lee, Vega and Ashton (2005), when describing a study undertaken with teachers, stated that "the largest barrier to AT use was lack of knowledge" (p. 61). It is likely that their finding may also apply to EASN. The improvement in skills and knowledge is a positive step towards greater incorporation of AT.

Generally, the improvement in skill level was related to how often the participants had access to technology and practised the skills. It is important also, that the participants knew that they would be re-assessed in regards to their skill level at the completion of the training. Research suggests (Kromann, Jensen & Ringsted, 2009) that the effect of participants knowing there is a test at the completion of a unit of work has a greater impact on skill attainment than does practice with the skill alone. As suggested by Helsdingen, Van Gog, and Van Merriënboer (2011) "Post-training performance on test tasks that resemble the training tasks and transfer to new tasks may be better indicators of a durable change in behavior or knowledge" (p. 1).

After the training was provided for the EASN, a number of participants sought out further training in the area of basic computer skills and more advanced skills. These participants stated that they could see the value in undertaking further training and that they now felt better equipped to take on these tasks or to work

towards a higher level of knowledge. The increase in skills, particularly those which are the foundational skills which underpin the use of AT, is of vital importance in not only enhancing self-efficacy of the EASN but as building blocks for further development in this area (Swackhamer, Koellner, Basile & Kimbrough, 2009).

5.4.3 Types of AT Identified.

During the training and skills testing the EASN expressed wonder and amazement at the scope of assistive technologies that were available to assist students with disabilities. That they were already using some AT was something that they had not previously considered, or labelled as such. Knowing that some of the tools, devices and computer software they were already using were considered to be assistive technologies may have assisted the EASN to make appropriate cognitive connections with the training material (Perkins & Salomon, 1992; Schunk, 2012), as they were able to organise the information within existing cognitive structures. Many of the participants were engaged in developing and/or implementing programs for students with special needs that incorporated specific or generalised AT, often unbeknownst to them, and they were able to connect these with the AT being described during the training. Examples of these include: the use of slant boards; pictorial cues; electronic white boards; pen holding devices; ankle-foot orthotics; wheelchairs; voice-output devices; computer programs; online learning programs; and, seating supports.

While the participants had a wide variety of previous experiences working with students with special needs, they also had varied exposure to different types of AT. The most common types of assistive technologies identified by the participants,

and as would be expected due to low cost and easy accessibility of the products (Netherton & Deal, 2006), were the low-tech assistive technologies such as pen grips and slant boards. At the high-tech end of the AT spectrum, participants identified more sophisticated computer programs such as Boardmaker, Clicker 5, and more expensive voice output devices, such as the GoTalk and Dynavox (Bryant, Bryant, Shih & Seok, 2010; King-Sears & Evmenova, 2007).

Given that the schools involved in this research had very diverse student populations, with the associated variety in student needs, it comes as no surprise that the EASN also had diverse prior experiences (Morrison, 2007). These different experiences potentially have an impact on how AT is utilised and what types of AT are provided in the classroom. A number of factors impacted on the availability of AT in the schools, particularly in relation to the more high-tech AT. These factors included: the number of students requiring AT to access the curriculum; funding available to the schools; and staff advocacy for AT. Scherer and Glueckauf (2005) note that an ability to clearly match the type of AT with the needs of the users is extremely important; a skill that the EASN did not initially demonstrate well. If AT is not closely matched with the user, there is a greater chance of abandonment of the technology or poor progress for the student.

5.4.4 Assessing Student Needs.

The assessment of needs and environmental factors affecting the use of the AT must be considered to avoid the abandonment of technology in the future and to ensure that the most appropriate type of AT is utilised for the maximum benefit of the students with disabilities (Verza, Carvalho, Battaglia, & Uccelli, 2006). When

determining the EASN's ability to appropriately assess a student's progress when using AT, both academic and technical, it was found that there was no significant change from pre-testing to post-testing on the skills test measure. Only one item was used to measure change in assessment of student needs, which may have been insufficient to determine change in this area.

While there was no quantitative change in determining the needs of the students, there were qualitative differences when the EASN were asked to articulate how they would monitor students' progress, determine when changes were required to the use of the AT, and identify the people responsible for making those changes. When asked how they would monitor student progress in the pre-testing phase, for example, a common response was to "sit with them and see if they improved their work". At post-testing the EASN included more sophisticated monitoring tools such as checklists, rating scales, charts, observational records, video, consultation with the student, quality of output of work, and commercial assessment programs such as the Georgia Project for Assistive Technology - GPAT (Georgia Department of Education, 2008a). Having a range of monitoring and assessment tools may assist in ensuring that the AT prescribed for students closely matches their needs and is applicable to the purposes for which it is being used (Scherer, 2005).

The enhanced ability to identify the different types of AT possibly accentuated the more complex qualitative responses given by participants in the area of assessing student needs, as the EASN could more clearly picture the AT and what the student was able to do with it, as a result of the training. The EASN were more likely to match closely the type of AT with the form of assessment for the student.

For example, one of the EASN suggested that a checklist would be appropriate for determining competency in using a specific computer program, whereas previously she had only identified "looking at what the student is doing" as a way of monitoring and assessing whether changes were required. While observation is a useful tool (Barry & King, 1998), it has limitations and is restrictive in regards to the type of valid and reportable information that can be gathered. By implementing appropriate and effective monitoring and assessment of student needs and progress, the EASN are more likely to assist the students to enhance their learning (Scherer, 2005) by adapting techniques and resources when required. The use of evidence-based practice is also highlighted by a number of researchers in the field of special education (Kretlow & Blatz, 2011; Odom, 2009).

5.4.5 Teaching Others to Use AT.

Prior to the training, the EASN felt that they were poorly prepared to instruct both students and other adults in the use of AT. They were not keen to do so anyway because they did not feel this task was part of their role within the classroom. A few participants indicated that their lack of knowledge and experience in using AT would be a barrier to assisting others in using the technology, even after training in the area. For others, the circumstances within the classroom and school settings inhibit the opportunities for them to contribute to teaching others. Many of the EASN felt that the teacher would be resentful if they attempted to display knowledge that the teacher possibly did not possess, or that they would not want to know about the AT. This reluctance to share knowledge reflects the roles of the teacher and EASN in the classroom.

After training, there was a significant increase in the EASN's sense of preparedness to instruct others. Indeed, there was a distinct perception that if they held knowledge that was of use to others, they should share such knowledge. The EASN were more likely to nominate themselves as being responsible for some of the instruction (perhaps even a majority) in AT for students with special needs as a part of their own practice. One participant stated that she would be very prepared to assist students using AT "...if we can use it. If we can get on and have admin rights to use it". On occasion, this instructional role also extended to other adults, including other EASN, teachers and other support staff. A small number of the EASN indicated that they would only feel capable of instructing others in the skills or sharing knowledge with which they felt comfortable.

Providing opportunities for the EASN to teach others is useful for a number of reasons, including: practice for the EASN so that skills and knowledge can be maintained; an increase in skills and knowledge through the development of materials to teach others; access to constantly updated information; and the acknowledgement of the EASN as a valuable member of staff and holder of important knowledge (Ghere & York Barr, 2007). Keller, Bucholz and Brady (2007) describe EASN as essential members of the educational team, who are able to contribute effectively to the teaching practices in the classroom. The EASN are able to train other EASN in the school, or demonstrate their newly acquired skills and knowledge with a small group of teachers. The EASN can also contribute information and website links to AT via staff newsletters and during staff meetings where appropriate. Skills such as these are advantageous because they allow the

EASN to be seen as a contributing member of staff and can enhance professionalism of the EASN.

In light of the changing nature and increasing competency requirements for EASN, it is important that the EASN are seen as playing a role which is not that of simply a bottle washer/paint-pot cleaner, but as an active, participating member of the school and classroom (Giangreco, Suter & Doyle, 2010). In one of the schools which participated in the research, an EASN was already sharing the information obtained during training with teachers and was known in the school as a person to approach in order to seek information in this area. For this individual, the act of sharing the information not only made her feel useful, but also enhanced her standing in the school community and assisted her in consolidating and even expanding on her own learning. This EASN had developed a 'toolkit' of low-tech resources which was kept in a communal area within the school which all staff members could access. The toolkit consisted of devices such as a variety of pen grips, drinking aids, rulers with handles, reading windows and adapted writing papers.

5.4.6 Learning More About AT and Transferring to the Classroom.

The survey results indicated that the EASN felt extremely confident, both before and after training, in their ability to learn more about AT and in their capabilities for transferring their new knowledge and skills to the classroom setting. This confidence was rated highly by a majority of the participants, but by no means did all feel this way. A small number of the EASN were less confident about their own competency, stating during the training and focus group sessions that they had "never been very good at computers". However, they indicated that they would

attempt to learn and implement the knowledge and skills acquired during the AT training to the best of their ability. That they suggested a willingness to attempt and apply new skills and knowledge is encouraging in that they found the training relevant and able to be applied to their individual classroom settings.

The quantitative data collected for the question of transfer indicated that the EASN felt that they were capable of transferring the information acquired; however, the qualitative data suggested a higher level of reservation in regards to transfer. This discrepancy suggests that the EASN would like to believe that they can transfer the skills, but when they have time to consider what this transfer may entail they identify more potential difficulties. The AT training may need to explicitly address solutions to some of these difficulties, so that the EASN have strategies to apply when encountering problems with implementation. During focus group interviews, some of the participants indicated that there were many barriers that would stop them from transferring their knowledge and skills into the classroom. These included: teacher responses; time; availability of AT; access to AT; and, administration support. Most of these barriers are congruent with those identified by other researchers (Copley & Ziviani, 2004; White, Wepner, & Wetzel, 2003). The issue of teacher acceptance of the EASN and their newly acquired knowledge and skills, however, has not been as clearly identified in the literature. A study undertaken by Giangreco, Suter and Doyle (2010) described teachers as relying heavily upon the EASN to undertake teaching tasks and responsibilities for the student with special needs within the classroom, and accepted them as having responsibility for catering for the student with special needs. That in the current study the teachers were not necessarily accepting of the EASN's input may be due to poor role definition and degree of professional

collaboration within the classroom setting. A close examination of the roles of each party and developing collaborative working environments may need to be explicitly addressed by schools.

It appears that the teachers encountered during this research, rather than relinquishing control to the EASN, as had previously been documented (Giangreco, Suter & Doyle, 2010; Suter & Giangreco, 2009), have worked to maintain individual control over what happens in 'their' classroom. The teachers, in this study, may not be including the knowledge and observations of the EASN in their planning and implementation of curriculum. This is quite at odds with what Giangreco, Suter and Doyle (2010) described as an increasing reliance on EASN to perform duties normally associated with the classroom teacher. While an over-reliance on EASN may be the case in other schools or settings, it was certainly not the case with the 18 participants of this study. As described by the EASN, some of the teachers with whom they worked were very collaborative, and welcomed the ideas and input of the EASN, but these situations were not in the majority. Further in-service education for teachers in regards to the role of the EASN in the classroom would be advantageous.

Time was identified as an important consideration in regards to access and practice using the AT. The EASN indicated that they were generally busy with tasks from the moment they arrived (generally collecting children from buses, or settling them in to class), until the end of their working day. Many of the participants felt that they had insufficient time to become proficient with the use of AT to the point where it could be used effectively in the classroom. For some of the EASN the solution was to access the AT (where possible) at home. For others, it meant giving

up their own time before and after school to access the technology. The lack of time allocated to explore and practise with AT suggests that the schools do not see EASN's AT use as a priority for their staff.

As noted earlier, in the USA, there is legislation requiring the consideration of AT for students with identified disabilities (Library of Congress, 1998). Such legislation means that greater consideration has to be given to the training of staff and the availability of the AT for schools. Australia does not have comparable legislation to the *Assistive Technology Act* (1998), although the *Disability Standards for Education 2005* (Department of Education, Science and Training, 2005) is supporting the need for schools to cater effectively for students with disabilities. This support may possibly include the use of AT. The increasing availability of AT in Australia will hopefully also equate to increased access and availability for EASN in schools. Administration support for the EASN in accessing AT is also vital, as the administrators of the school (including, Principals, Deputy Principals and Registrars) are the people who decide where funds, for personnel, training, and equipment are spent. If the administrators do not clearly see the benefit in providing for these resources in the school budget, then there is little chance of the EASN having appropriate access to the training and AT. While the schools involved in the study all supported greater knowledge and understanding in the area of AT, they were not always allocating funds to support the development of AT as a whole school initiative. Addressing such a deficit would enhance the availability of AT and emphasise the importance of using the AT with students with special needs.

5.4.7 Identifying Collaborative Partners.

An increased awareness of the need to collaborate in regards to the use of AT with students with special needs was evident after the EASN completed the training phase. Not only was the need for collaboration recognised (Angelides, Constantinou, & Leigh, 2009) but the EASN were also better able to identify appropriate people with whom to collaborate. For example, other EASN were not identified as being collaborative partners prior to the training, but were often cited as potential collaborators after the training. In addition, the EASN were more likely to suggest other professionals such as members of the Department of Education AT team as being people they would work with more closely. Such a scenario suggests that the EASN have broadened their views on collaborative partnerships within their professional context.

That the EASN were unable to initially identify collaborative partners in regards to AT indicates that they were unaccustomed to doing so within the daily context of their work. This lack of identification has implications for the broader working relationships of the EASN, as they rarely collaborated with anyone except the classroom teacher. One recommendation of this study is that more effective and efficient, collaborative partnerships should be developed between key stakeholders in the education of the child with special needs, with particular reference given to AT. Only through these partnerships can the needs of the student be fully recognised and addressed (Ashton & Wahl, 2004; Scherer, 2005; Scherer & Glueckauf, 2005). EASN may work collaboratively with many stakeholders, including but not limited to, teachers, other EASN, general Education Assistant (EA), therapists, parents, administration staff and Department of Education staff.

5.4.8 Implementation of Programs.

Along with an understanding of the need to collaborate is the requirement to know who is responsible for implementing AT programs. Prior to the training, the EASN had a somewhat narrow view of who was responsible for implementing AT in the classroom. The majority of EASN felt that the teacher had the prime responsibility; however, when questioned further after training, they described a much wider variety of people who were involved in implementing programs within the class, with themselves as primary people responsible for implementation. Clearly, a change in regards to their perception of themselves as facilitators of the AT had come about as a result of the training.

The fact that the EASN suggested that they played an important role in implementing AT use with students with special needs was a step forward in potentially taking personal responsibility (even in part) for AT. The EASN even included other students within the class, parents, administration staff, and outside agencies as having an impact on how and when assistive technologies were to be implemented. This broader understanding indicates that the EASN had an expanded view of the role that others played regarding the use of assistive technologies. This expanded view is extremely beneficial in that the EASN not only have a greater understanding of their own role, but they are also able to approach and discuss difficulties and successes and implementation with appropriate parties. Through discussion and collaboration, the implementation of AT, when approached in team fashion, is much more likely to be successful for all involved (Weintraub Moore & Wilcox, 2006).

5.4.9 Overall Changes in Perceptions.

In order to determine whether the changes in confidence and skills could be maintained after the training, maintenance testing was undertaken, which entailed a repeat assessment of perceptions of confidence and skills, and a skill assessment. When examining the results of the study over the entire research period, from pretesting to maintenance testing, there were significant differences in all areas of self-efficacy (perceptions of themselves) as reported by the EASN, except for transfer to classroom settings (which was already at a very high level). These results extended to the assessment in all skill areas, indicating that the EASN had not only increased skills and knowledge as a result of the training, but had maintained these at a high level over the 10 week maintenance period. The maintenance of these skills and knowledge is vital to ensure that the EASN are able to build upon these existing levels of skills and knowledge and utilise this information to the fullest extent possible. As such, continual examination of AT availability and refresher courses on a regular basis will assist in maintaining the increases brought about through training.

When examining changes in perception, one area of note was the increased variety and number of ways that the EASN indicated they could assist students with disabilities who were using AT. Thorough and substantive assessment of the needs of students and their subsequent use of the technology is required in order to ensure it is the most appropriate technology available for them and that is not abandoned in the course of its use (Verza, Carvalho, Battaglia & Uccelli, 2006). As the abandonment of AT is a concern amongst researchers in the AT field, it is imperative that those involved in providing and facilitating the use of assistive technologies

with students with disabilities have the tools required to make appropriate judgements on the efficacy of the AT for the students (Scherer, 2004; Scherer, Sax, Vanbiervliet, Cushman & Scherer, 2005). The EASN were provided with a variety of tools throughout the training that better equip them to make these judgements.

That the confidence level of participants was maintained at high levels 10 weeks after training was extremely important as it meant that the participants felt comfortable and confident in their newfound skills without the presence of the trainer, in this case the researcher. If the EASN feel comfortable with their skills they are more likely to use skills and knowledge more appropriately (Rose & Forlin, 2010), leading to a greater likelihood of these skills being maintained (Alberto & Troutman, 2008).

The responses of the participants to the measures of confidence were high both at post-testing and maintenance testing, although the ceiling was not reached for any one measure. The areas closest to achieving a ceiling measure were those of 'confidence for learning more about AT', and 'usefulness of the training for the classroom'. These measures indicated that the EASN felt that the training was beneficial for the students with whom they worked, and that they felt capable of increasing their knowledge in this area. Both of these areas are critical for the enhancement of practice in the area of AT for students with disabilities (Edyburn, 2005; Layton, & Wilson, 2009), particularly in relation to the support staff who are such close partners in the education of students with disabilities. Of particular consideration is the understanding of the EASN of what constitutes AT and the difference it can make to the functioning of students in the classroom. Being able to

see the usefulness of the AT is necessary for ensuring that it is considered as part of the overall pedagogical approach (Edyburn, 2005; Edyburn, 2009).

The EASN, while very confident in their abilities, still felt that learning in the area of AT is an ongoing journey. There was no decline in the skill assessment undertaken by the EASN from the end of the training until the maintenance period. The maintenance of skills and knowledge is a key consideration for any training program, as without this maintenance the training program is likely to be only minimally effective (Burke & Hutchins, 2007). It should also be noted that the EASN did not achieve a ceiling height for any skill assessment measure, also leaving room for improvement in their attainment of skills in relation to assistive technology. Further training might allow the EASN to attain greater levels of skill in AT use.

5.4.10 Description of Perceptions.

When asked to describe (rather than quantify) perceptions of their own personal competency in regards to the use and facilitation of AT, the EASN described a better knowledge base, higher levels of confidence, and that they were more highly motivated as being key agents in their increased competency. A small number of EASN found it difficult to discuss their level of competency, referring instead to the beneficial nature of the training, rather than the impact on them alone. When further questioned, they were able to describe the impact the training had on them personally, including changes in knowledge and confidence.

The EASN suggested that they were highly capable of using the AT and that even if they did not use it immediately, that the skills and knowledge they had

gained were able to be utilised at a later date, with students displaying many types of disability. That the EASN realised the potential of the training for future situations is encouraging, as it indicates that they were already considering how AT could be incorporated into the classroom. To translate the training to future circumstances indicates a high level of thought given to the AT area (Perkins & Salomon, 1992; Schunk, 2009). Consideration for future classroom situations also suggests that a form of 'high-road' or purposeful transfer has occurred, as the explicit connections have been made between the knowledge and situations in which it can be utilised (Perkins & Salomon, 1992). Bell and Kozlowski (2008) suggested that a positive self-efficacy can have a strong impact on an individual's motivation which relates to learning and the transfer of this learning.

The perceptions of increased personal efficacy also translated into a greater preparedness to teach others about AT and about how to use AT. A better knowledge of the available resources and improved skills, alongside an increase in confidence, were identified by the EASN as being pivotal in assisting students within the classroom setting. Such resources were also of benefit in being prepared to provide support to others, such as teachers, family members and other EASN, or general EAs. A small number of the EASN indicated that they had already started to provide support to other staff working with AT, either through suggestions for the use of AT, or through hands-on support in the form of teaching others and constructing resources/devices for others to access. While the EASN were describing this increased capacity, they exhibited characteristics indicating excitement and enthusiasm, such as the use of elaborate hand gestures and increased volume and speed of voice.

5.4.11 Relevancy of the Training.

The EASN found the training to be very relevant for their personal situations. They felt that there was a positive impact on their skills and confidence and that this would ultimately translate into benefits for the students with whom they worked. A large number commented that they found low-tech devices and ideas to be of particular value to them in the classroom. Some of the reasons given for the preference for low-tech devices include the versatility, ease of access, replaceable nature and ease of manufacture of many low-tech devices. The low-tech devices also had relevancy for a wide variety of students within the school settings. As previously mentioned, 'toolkits' of low-tech devices are easy to construct and provide a stepping stone to the use of other, more sophisticated, AT devices.

During feedback following the training, the EASN indicated that the training had been very relevant for them. They noted a significant personal impact on their skills and confidence for using AT, and that the AT was useful for the students with whom they worked. When discussing the needs of the students and the relevance of the training for them, the use of both high-tech and low-tech devices were cited as were changed feelings about use of AT to cater for student needs. The EASN commented that they were surprised that they had not been made fully aware, prior to the training, of the relevancy and variety of AT in their settings, and as a part of their role in working closely with students. Many suggested that they would be pursuing the use of AT and further training, if such was available.

5.4.12 Utility of the Training.

In regards to the use of the skills within the classroom setting, both high-tech and low-tech devices were listed as being able to be used within individual settings. The EASN described how the knowledge and skills acquired as a result of the training could be used in a variety of situations, with a range of students. That the utility of the training was recognised was significant, as it indicated that the EASN considered that they were able to apply their training in a wide range of environments and generalisation of the skills and knowledge was taking place (Schunk, 2009).

Along with the enthusiasm to try and implement new AT resources within the classroom were a number of potential barriers to doing so. Among these barriers, as previously mentioned, is access to assistive technologies that may be of benefit to students, further training, the classroom teacher and his or her reaction to the EASN's new knowledge and skills, and the ability to apply these skills to the classroom. In addition, a lack of time available to practise and implement knowledge and skills learnt and to explore the full range and variety of AT available so that it can be correctly matched to the needs of the students, was cited as being a significant barrier to using the AT.

5.4.13 Opportunity for Practise.

The EASN felt that the lack of opportunity to practise the skills and to become fluent in the use of AT, would impact upon their level of confidence in using the AT. This lack of opportunity for practice has implications for the school, as the EASN themselves indicated that appropriate time and opportunity to practise and

develop skills in the area of AT needs to be provided in order to maintain and enhance existing knowledge and skill bases. Although the maintenance test showed that the EASN had maintained skills and knowledge over a period of ten weeks, sometimes with limited opportunity for practice, it would be worthwhile to conduct further maintenance probes at longer time periods to determine if the skills and knowledge are maintained over longer time frames and if the opportunity for practice impacted upon maintenance.

Providing appropriate opportunities for supporting practice may impact on the way the school arranges professional development for its staff; both the type of professional development offered and the configuration of the professional development (i.e. ongoing basis, individually targeted, group targeted, one-off sessions). Currently, there appears to be little continuity in the professional development offered to EASN, including monitoring the requirements of the EASN in regards to developmental needs. It is necessary to build in opportunities for the EASN to practise acquired skills in order to promote the skills as important for the classroom (Bugaj, 2002; Trautman, 2003).

5.4.14 EASN's Perceived Responses of the Classroom Teachers.

One area of interest in the study was the perceived responses of the classroom teachers to the EASN's improved knowledge and skills in the area of AT. The EASN described highly polarised responses from the teachers in regards to the training. These perceptions described the reality of the lived experience from the point of view of the EASN, and therefore were valid for them in the context of their work in the classroom (Ajzen & Gilbert Cote, 2008). Some of the responses from

teachers were described in regards to the training itself, while others appeared to be more associated with the relationships in the classroom; in particular, the relationship between the EASN and the teacher.

In regards to the training, the EASN described some teachers as being grateful for the EASN contribution to the classroom. For example, one EASN solved a problem that the teacher had been having with a piece of AT, by showing her how to connect it to a computer. Some of the teachers were thought to be open to new ideas and would generally welcome input from the EASN. A number of EASN shared notes and ideas with their teachers and these were enthusiastically received. A few of the teachers were described as not asking for, or respecting, the opinion of the EASN. Some EASN were told that it was not their business to deal with AT in the classroom, and that it should be the responsibility of the teacher alone.

A few EASN suggested that teachers with whom they worked 'felt they already knew everything' and did not need further input from the EASN. This was made clear to the EASN by teachers ignoring the EASN's efforts to contribute to the classroom programs, and occasionally responding in a sarcastic or angry manner. Anecdotally, the EASN suggested that some of the teachers, who had been teaching for a long period of time, were less willing to embrace the new technology and were also less likely to involve the EASN in planning for the student. This lack of willingness to incorporate new technology into the classroom has also been noted in the literature, and is possibly related to teachers' own low level of knowledge and competency in this area (Morrison, 2007; Weintraub Moore & Wilcox, 2006).

The reactions from the teachers affect how AT is used within the classroom and also whether or not the EASN has the opportunity to apply and practise the knowledge and skills learnt in the training. One way to combat difficulties with opportunities to practise and apply the AT knowledge and skills is to train both the teachers and the EASN at the same time, highlighting ways in which they can collaborate to achieve appropriate outcomes for the students (Angelides, Constantinou, & Leigh, 2009). Unfortunately, in the current study, joint training was not able to be accomplished due to logistical and funding difficulties, including the fact that the EASN were not paid for attending after school professional development. In order to ensure that training is not undertaken in vain, a whole school approach and a plan of action for the implementation of training would be useful. The incorporation of all parties involved in AT application and implementation would strengthen the transfer of the training, and promote the use of assistive technologies within the school.

5.4.15 Between Group Differences.

Two discrete groups of participants were identified during the study. The first group (who was also the first group involved in the training) consisted of EASN whose experience was primarily in inclusive or regular settings. The second group had greater experience assisting students with more severe disabilities and had often had substantial experience in segregated settings (i.e. Education Support Schools, Education Support Centres), prior to working in an integrated setting. These two groups were examined for differences as it was thought that the second group's results may differ from the first group, due to an increased exposure to more AT, and

AT that was more high-tech (e.g. Boardmaker software, voice output devices) than that used in the regular settings.

Quantitative and qualitative data were examined in order to determine if there were any differences between these two groups of participants. There were no significant differences found at any stage (i.e. pre-training, post-training, maintenance) for either group in regards to the skills assessed by the researcher. It is possible that neither group had sufficient exposure to the AT to become skilful in the use of the technology. Previously mentioned concerns in regards to time allocation, and teacher expectations of the role of the EASN may also have limited both groups to tangential, rather than extensive, experiences with AT.

Participants' responses in regards to their assessment of their own competency, confidence and skills as indicated on a Likert-type scale for the pre-training and maintenance phases of the study also indicated that there were no significant differences between groups. There were, however, significant differences between the two groups at the post-testing phase for the items of using and learning more about AT and for the assessment of their skill and confidence levels. Interestingly, the group that scored itself more highly was the group that had a background in regular settings, rather than the group that had more exposure to students with higher support needs. This difference had disappeared by the time of maintenance testing, suggesting that both groups had similar levels of perception at the completion of the study. This finding has implications for training designers and professional development coordinators. The environment in which participants were situated had no impact on the level of skills or perception of competence that were

present at the beginning of the study. It is therefore important to determine each individual's level of knowledge prior to delivering training, so that the training is effectively aimed at the target audience.

5.4.16 Implications of Training on Perceptions of Personal Competence and Confidence.

This study has shown that training in the area of AT can have positive impacts upon the self-efficacy and overall perceptions of competency of the EASN. As alluded to by social cognitive theory (Bandura, 2001), this increase in confidence has the potential to impact upon the use of AT in the classroom, and possibly extend into other aspects of the role of the EASN. Alongside the increase in confidence to use AT is a subsequent measured increase in skill level of the participants. The skills measured in the study included foundational skills, such as basic computer use, increasing in complexity to more specific skills, such as use of particular software programs and devices. Acquiring these skills provides a platform upon which the EASN can build further learning, in addition to providing the EASN with increased knowledge of the AT available to schools.

The importance of the EASN to be able to assess the needs of students was highlighted in the study. Without the ability to determine the areas in which the student requires support, the EASN cannot effectively cater for their needs (Scherer, 2005; Waldron & Layton, 2008). Further examination of this skill is warranted within schools to ensure that all staff have the ability and range of resources that allow them to accurately determine needs and how to address those needs. Enhanced

understanding in this area will also hopefully promote greater collaboration between key stakeholders in the child's education.

A number of barriers to the implementation of AT were again identified by the EASN, including the attitudes of classroom teachers, time, practice, collaboration and access to resources. The EASN elaborated on some of these barriers, including those involving teachers. The barriers identified implied that not all teachers are receptive to the EASN undertaking training that they themselves may not have accessed, and that they may not wish to incorporate AT in the classroom because of possible threats to their work in the classroom. Such issues need to be addressed by schools if they wish to ensure that the students who require the use of AT are able to access curricular or social aspects of the classroom.

5.5 The Use of Assistive Technology in the Classroom by Education Assistants Special Needs after Training

One aspect considered by the researcher to be extremely important is that AT use by the EASN was enhanced as a result of the training. It would be a pointless exercise conducting extended training in the area of AT if it would then not be used by the participants (Burke & Hutchins, 2007; Lee**,** Vega & Ashton, 2005; Randi & Corno, 2007). It is not enough to just have available technology; people with appropriate pedagogical tools and an understanding of the purposes of the technology are required, before it is of use to the students (Edyburn, 2009; Scherer, 2005; Zabala, 2002).

In order to facilitate the transfer of skills and knowledge, the last training session with the EASN involved planning for the transfer of what they had learnt into the classroom. Part of this planning involved the completion of a form which required the EASN to describe the students with whom they had worked, areas in which they provided assistance to the students, types of AT that may be used, times (or teaching sessions) when the AT may be used, people that they needed to liaise with and to identify any further training they may need to complete these tasks (Appendix 2). The completion of this form required the EASN to consider how and when they could use AT in the classroom and to plan effectively for this use.

In order to determine whether or not the more positive self-perceptions of the EASN as users and facilitators of AT were maintained, along with the skills and knowledge taught in training, a maintenance probe was utilised. A maintenance probe replicates the data collection format used in the pre and post-training data collection routines, and allows the researcher to determine if there has been a change (either positively or negatively) in regards to theses skills (Alberto & Troutman, 2008). For this study the maintenance probe consisted of the reapplication of the skills test, completion of a final Likert-type scale and questionnaire and final focus groups. Not only did the maintenance phase allow the researcher to determine use of the AT in the classroom after training, it also provided an opportunity to re-examine the effects of the training on skills and perception levels and acted as a form of closure for the participants. A discussion of the findings follows.

5.5.1 Ability to Transfer Skills and Knowledge.

One encouraging indication that the transfer of skills and knowledge would be possible was through the high self-rating of ability to transfer by participants at each phase of the study (prior to the training taking place, after the training, and at 10 week interval post-training). The participants felt confident that they would be able to transfer skills and knowledge learnt to the classroom in some form. This high level of confidence is encouraging, given that a number of barriers had been described by the participants, and indicates that the EASN are willing participants in and optimistic about being able to use what they had learnt. This finding also has implications for managers, as it indicates that the EASN had a low level of 'resistance to change' (Collarbone, 2009). Involvement of the EASN in the training may have served to reduce any resistance felt.

5.5.2 What has been Transferred?

The understanding and use of AT was the primary goal of this study; however, it is also important to note the impact of the training on the way that the EASN approached their work and colleagues. The training required the EASN to examine their students in ways that they had not previously considered and to discuss difficulties (not always associated with AT) encountered in assisting these students with a concerned and interested group of peers in a professional setting, leading to the development of critical thinking and problem solving skills. There were not many opportunities for this type of collaborative discussion in the working day for the EASN, and the social nature of the sharing of information was one that they commented on frequently as being highly beneficial. Indeed, Bandura (1989) in his description of social learning theory, suggested that the participants' self-efficacy

is affected by the input from others in the social group. Grusec (1992) concurs, stating, "Individuals are believed to abstract and integrate information that is encountered in a variety of social experiences, such as exposure to models, verbal discussions, and discipline encounters" (p. 781).

The EASN were able to transfer newly learnt skills to the classroom, with approximately 72% describing the use of low-tech devices such as reading windows, handles on rulers and visual cue cards as being of particular use. Some of the participants were also using medium to high-tech devices such as specific computer software and voice output devices. In the final focus groups, the participants indicated that they felt confident about using their skills, ten weeks after the completion of the training, and in some cases their confidence had even grown. They also indicated that the training had provided them with different directions and ways of thinking about difficulties that the students faced and strategies to address these. One consistent message was that even if the skills and knowledge had not been utilised immediately, that they would be useful for future students and situations. One of the EASN, for example, suggested that "when you come across a child then we can think back and go 'I know what you can do'".

Not only were the EASN more likely to use AT in the classroom but they also contributed more effectively to aspects such as planning for and monitoring students' use of AT. Previously, these were aspects that the EASN had little if any input into, indicating that a wider scope of role for the EASN was more apparent within the classroom setting. As a result of the training, the EASN were able to assist the teacher and the student in a variety of ways that they would not have

previously attempted. Scherer and Glueckauf (2005) suggested that it is necessary to closely match a device with a user. The EASN are utilising and acquiring further skills in matching devices with students, through the increased knowledge base and application of AT in the classroom. The increased use of AT demonstrated critical changes in the mind-set of the EASN, as the EASN indicated that they felt this is a part of their role, and that they have further skills to address difficulties faced by the student. Overall, the greater confidence identified by the EASN, along with the willingness to use their newly developed skills and knowledge, demonstrated an increase in self-efficacy (Bandura, 2001). One of the EASN for example, stated that she found that by monitoring the students closely, she was more able to determine where changes needed to be made and communicated this information to the teacher.

5.5.3 Collaboration.

A welcome side-effect of the training, as reported by the participants, was the increased collaboration between EASN within the school. A group of EASN within one school met regularly to discuss what they had learnt and how they would apply this knowledge. Their discussions also consisted of other aspects of their roles such as behaviour management, curriculum support and personal care for students under their tutelage. Enhanced collaboration can lead to improved outcomes, such as increased knowledge of strategies and skills, for all parties involved in the education of students with special needs (American Federation of Teachers, 2010; Friend & Bursuck, 2011). Programs developed for students are reinforced if all stakeholders have a common understanding of the needs and characteristics of the students with whom they are working (American Federation of Teachers, 2010; French, 2001).

A number of the EASN found collaborating with the classroom teacher to be a useful and worthwhile experience, given their own increased knowledge in the area of AT. For example, one EASN stated that "the teachers I work with are really open-minded and they let me do what I really want to do, because they know it benefits the child" and another commented that "She's open to whatever suggestions. We work together on everything; we discuss everything before its implemented". The area of collaboration, however, was definitely not universal, with many of the EASN describing poor classroom relationships with the teacher, particularly in regards to more experienced teachers and contributing to the class program (Burgess & Mayes, 2007). As one EASN commented in respect to offering a suggestion to the classroom teacher, "you actually get more off the younger teachers than you do the older teachers who have been teaching for thirty years, they say I've been teaching for twenty years, don't tell me what to do". Wilson and Bedford (2008) described a teacher's negative reaction to the use of the EASN as fear which manifests as a threat to their own professionalism. The authors suggest that increasing utilisation of EASN support may add to the teacher's fear that teaching is perceived by others as easy (anyone can do it), or that the teacher is not capable of performing the necessary tasks in the classroom.

In relation to collaboration in the classroom, a few of the EASN also collaborated with others while taking more of a mentorship role. One EASN in particular was tasked with being the AT coordinator in the school, and offered to share with all staff her increasing knowledge and skills. Others took a less prominent, but still significant role, offering to assist fellow EASN who were unable to attend the training. The extent of the collaboration is an important area that can be

nurtured within training for EASN. Further collaboration can be encouraged, both within and between schools (Burgess & Mayes, 2007; Wilson & Bedford, 2008).

5.5.4 Barriers to Transfer.

EASN who had difficulty implementing the transfer of training into the classroom were able to identify a number of reasons for this. For some, movement from one classroom to another, and in one instance cessation of employment in the role of EASN, led to a lack of opportunity to implement skills and knowledge learnt. The time of year was also indicated as being a difficult time in which to implement changes to existing programs as for some of the EASN (particularly those in the second group) it was the final term of the school year and they felt that major changes were inappropriate at this time. Such information suggests that the training should be conducted at the beginning of the school year in order to maximise the implementation of the knowledge and skills learnt in the training.

Once again, as indicated in the post-training feedback, participants felt that adequate time to practise the skills with the students and having specific time set aside to use AT devices within the classroom would be of great benefit. As one EASN stated, "We need DOTT [Duties Other Than Teaching] time for learning sessions". They felt that this time would allow them to build upon existing skills and knowledge, as well as maintain what they had already learnt in the training. The lack of time to practise the skills, however, did not appear to affect the maintenance of skills in this case, as the EASN did not demonstrate a loss of skills or knowledge during maintenance testing. Wilson and Bedford (2008), stated that the provision of 'non-teaching time' for both the EASN and the teacher is necessary to collaborate

successfully on classroom tasks. Finding appropriate time to develop skills and knowledge is an ongoing issue, for all staff. As this long term training has shown, the EASN have a great capacity to develop their skills and benefit from appropriate opportunities that are offered.

Alongside practise time, was the concern about the lack of availability and access to the AT. In all of the schools involved in the training, the computer systems were only able to be modified (e.g., accessibility options in word documents, magnifying screen, changing mouse functions) by a person with Administrator rights. None of the EASN had Administrator rights and therefore were restricted in their ability to use some of the information that they had been taught. Not only were they unable to make simple changes to existing programs, but they were also unable to download or install web-based AT to benefit students. In some instances, the Administrator in the school installed requested programs on computers and in one school computer software was held in the library so that all staff members could access this on a loan basis. The use of the school library was seen as a more equitable way of distributing the resources that also allowed for tracking and monitoring of the resources so that there was less chance of them being lost or stolen.

Schools may need to consider developing a system of support for the EASN to assist them in making changes to AT systems in a timely manner. It is unreasonable to expect schools to give all staff Administrator access, as this restriction is in place for valid reasons, including safety issues for staff and students, and to ensure consistency of systems for staff who move from one classroom to

another. A designated staff member with responsibility for assisting with access in regards to AT would, however, be appropriate and extremely valuable for the EASN. This role could be incorporated into the workload of an existing staff member. The person designated to assist the EASN may be another EASN, with sufficient knowledge to assist all staff to access appropriate AT.

5.5.5 Usefulness of the Training.

When the participants were asked to rate the usefulness of training for their individual situations and settings, at both post-testing and maintenance-testing phases, positive feedback in the form of high ratings was given. These results were supported by questionnaire and focus group responses from the participants, with enthusiasm in the form of describing what they were doing with the students as a result of what they had learnt. They also suggested that the researcher "…should come back every year" and provide a refresher course for the EASN as well as provide training for the teachers in the schools. The EASN felt that the training was relevant for their long term needs and increased their awareness of the types of AT available and how to access AT. An EASN stated "I think the course is a great way for us to learn about something that is completely necessary in our line of work", which was a view supported by many other EASN involved in the study. They suggested that the types of students with whom they work are constantly changing and that they needed to be equipped with skills to accommodate this vast variety of needs. Such students include those with physical difficulties, cognitive impairments, social difficulties, behaviour problems, Autism, and learning disabilities. The needs of the students are highly variable and as such, the skills required to address students' needs will be different for each case.

Through an improved skill set which includes increased computer use, construction of low-tech devices, and the use of a number of different medium to high-tech devices, the participants were better able to apply appropriate differentiation, modification and adaptation to classroom lessons. As suggested by one participant, "I now know what to look for as far as if it's working or not working and I am able to see the changes that need to be made". One of the EASN commented that a visiting teacher from the Autism Association had been pleased with the AT she had put in place for a child under her tutelage. Not only was the EASN catering for the student's needs more effectively, but she was also demonstrating the usefulness of her training, in a real-world situation.

5.5.6 Confidence and Competence.

A substantial increase in personal competency came about during the study through increased confidence and self-efficacy in the participants' ability to use AT. This was a common theme throughout data collected in the post-training and maintenance phases. The EASN described confidence in their abilities or improved self-efficacy as leading to a greater willingness to use AT in the classroom. A common thought expressed by the EASN was that "I feel my perceptions have changed dramatically. I am so much more confident in trying and implementing new strategies and ideas". Also having a very positive impact on perceptions of personal competency was their increased knowledge in the area of AT, "I guess I know more what I'm talking about. Even just down to the label 'assistive technology'".

A lack of confidence in using AT was noted as a potential barrier to the transfer of the training to the classroom situation. A few of the EASN felt that they

would require some further training to use more sophisticated AT in their classrooms, such as Boardmaker, Clicker 5 and Dynavox. This lack of confidence generally related to more complicated computer programs that required more training than was possible given the time available (2 hours per week for 8 weeks). Such extended training is available should the EASN require it, either from companies selling the software/device, or from the Centre for Inclusive Schooling's Assistive Technology Team. Consideration must be given when accessing the training from the organisations or AT team to cost and time factors. The EASN who shied away from the high-tech AT were very enthusiastic about the use of low to medium-tech devices. It is possible that once their confidence in using low and medium-tech devices has grown, they would be more likely to attempt the use of high-tech devices and software.

Along with increased feelings of competency, there was a greatly improved preparedness to teach others, in particular students, to use AT assuming that the technology was accessible and available to the student. One commented, "I am confident with my knowledge I am able to pass that confidence on to my student". The benefits of using AT and an awareness of the different types of AT available, in concert with increased confidence, were among reasons given for this preparedness. Some of the reservations that participants had in teaching others related to technical aspects, such as technical support being available, and the type of AT (e.g. Low-tech, medium-tech, high-tech) that they would be required to train others to use. The participants felt that if they had appropriate support from a suitably knowledgeable person, who they could contact at times of need, that they would feel comfortable in delivering training to others. The application of a buddy or mentor-type system

within the school setting would work to support the EASN and encourage the sharing of information in a supportive environment (Burgess & Mayes, 2009).

A number of participants had already shared a variety of low-tech AT with other staff members and were very enthusiastic about doing so. For medium to high-tech devices, most participants would like further training on the specific device before helping others. This training would be necessary to ensure that they had sufficient knowledge and skills to effectively teach others. A variety of further training sessions was a suggestion made during focus group interviews. Other opportunities for training in the area of AT were discussed with the participants during maintenance focus group interviews. Many of the participants suggested follow-up sessions to ensure their skills were kept up-to-date and to introduce them to new technologies. Training for the teachers was also suggested as a way of more effectively bringing AT into the classroom.

5.5.7 Design of the Training.

The EASN expressed contentment with the structure of the training and the areas covered. A small number of specific requests for further specificity of training with particular devices and assistive technologies such as Boardmaker, Clicker 5, and voice output devices were made. In general, the participants were very happy with the variety of assistive technologies presented throughout the training and with the opportunities that they had to interact with these assistive technologies. Further interaction with the devices and software would have been useful but was restricted by the time available and access to computer systems at schools and access to expensive electronic tools and devices such as voice output systems and specialised

computer software. Overall, the participants enjoyed the sessions and developed a deeper understanding of AT and their own students as a result of undertaking the training. These feelings were obvious in comments such as, “The course widened my experiences. There is something that can assist anyone”; and, “I have enjoyed learning about assistive technology. I use my knowledge by sharing it with other staff at this school and I have been using skills I learnt in the classroom”.

5.5.8 Implications.

After a ten week period following the training, the EASN stated that they had maintained perceptions of competency and confidence acquired after training. They were able to transfer a wide variety of the skills and knowledge learnt to the classroom setting, although the majority of these were in the area of low-tech AT. Some of the EASN also utilised medium to high-tech skills and knowledge, where the opportunity presented itself, for example, through the use of voice output devices, electronic whiteboards and advanced computer software. This transfer indicated that the skills and knowledge learnt in the training sessions were successfully incorporated into the classroom settings and that the participants were able to apply their knowledge in both similar and new situations (Perkins & Salomon, 1992).

The training had provided the EASN with alternate means to determine the needs of the students and to address these accordingly. Aspects of planning and monitoring students’ progress were also enhanced as a result of the training, and were also applied in areas other than AT, such as communication, and behaviour

management. In addition to working with the students, further collaboration between staff members, both EASN and teachers, was reported as an outcome of the training.

A number of barriers to the transfer of the skills and knowledge were identified. These included unreceptive teachers, time to practise the skills and enhance knowledge, the lack of availability of the AT, poor access to the AT, and lack of support from administration. A lack of confidence in using AT was also a potential barrier to implementation in the classroom. Such barriers can act to work against the transfer of skills and knowledge of AT into a classroom, and may need to be addressed by schools.

The EASN increased their awareness of types of AT and how to access AT as a result of the training. They felt that the training was very relevant for their long term needs and that they experienced an increase in personal competency and confidence as a result of the training. As part of this confidence came an increased preparedness to teach others to use AT. This is an important consideration, as the knowledge of AT use should be shared amongst staff, rather than being the domain of a single 'expert'. The AT is more likely to be used consistently and longitudinally if there are staff that have the knowledge and skills to do so. The EASN are more likely to instruct a student on how to use AT, if the AT is a component of the classroom and school curriculum.

In regards to the training, the EASN expressed overall satisfaction with the structure and content of the training. They felt that a wide variety of AT had been covered and that it was relevant to their roles. The EASN suggested that instruction

in AT should be an ongoing part of their professional development, and that all staff in the school should have training in this area.

5.6 Chapter Summary

There are a number of implications of this study. The first and foremost of these is that training for staff (including EASN) in the area of AT is both relevant and necessary. The increased proliferation of support staff, such as EASN, to assist students with special needs to access inclusive settings is likely to increase even further in the future, alongside the increasing availability and complexity of AT devices. Training for EASN, therefore, which is targeted to their specific needs and provides choice is required. Currently, there does not appear to be consistently appropriate or sufficient training offered to this group. The lack of specific training has direct implications for the ability of the EASN to meet the required competencies as set out by the Department of Education and Training (2008), particularly in reference to skills in technologies, especially AT.

The role of the EASN in the school and individual classroom needs refinement and definition, so that all parties are 'on the same page' in regards to roles and responsibilities. Definition and refinement of roles is, by necessity, a task that needs to be undertaken with both EASN and teachers working together for the benefit of the students in the classroom. In addition to the clarification of roles, is providing the EASN with opportunities for a career progression in a field that is seen as important and valued by the school community. One way that the EASN can feel valued is to be fully included in the life of the school, and be seen as part of the staff structure and communication network, rather than peripheral to it. In order to

facilitate the sense of inclusion of all staff, time may need to be provided so that the staff can work together on ways to achieve an appropriate balance and understanding of the classroom.

The following chapter addresses the overarching research question of the study, which focuses on how AT training for EASN affects the use of the technology in the classroom. Limitations and recommendations that the study has motivated are also considered. Future areas of research in relation to EASN and AT are highlighted.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS AND FUTURE DIRECTIONS

6.1 Introduction

The purpose of this research was to investigate Education Assistants Special Needs' (EASN's) perceptions of themselves as users and facilitators of assistive technology (AT) in the classroom and to examine how skills learnt in a training situation might transfer into a classroom setting. This chapter draws together the findings to address the overarching research question: How does assistive technology (AT) training for Education Assistants Special Needs (EASN) affects the subsequent use of the technology in the classroom? This chapter is organised into four main sections:

- Major Findings (Relating to the Overarching Research Question)
- Recommendations
- Limitations
- Future Directions

6.2 Major Findings

Assistive technology training for EASN has had a number of impacts on the use of the technology in the classroom. These impacts indicate that the AT training for EASN has resulted in a variety of benefits for the classroom and for the EASN themselves. These impacts are displayed in Table 6.1.

Table 6.1.

Key Research Outcomes

Outcomes
• Greater awareness of the types of technologies available • Enhanced pedagogical understanding for the use of AT • Increased capacity to identify needs and monitor progress of students with special educational needs in relation to AT use • Increased use of technology in inclusive settings • Changes in self-perception of EASN

The EASN have exhibited a greater awareness of the types of technologies available as a result of completing the training. The EASN performed better after the training when asked to identify particular technologies that would be useful for students with specified difficulties (e.g. low muscle tone, vision impairment, organisational difficulties, and behavioural problems). Increased awareness was evident in the EASN responses to qualitative questionnaires along with an improved knowledge of how to access support in relation to AT. One of the EASN stated that the training "made me more aware of what is available and how to obtain the assistance that is available"; while another said that "I know more of what is available to apply with different students needs". Ashton and Wahl (2004) have found low levels of awareness of AT in staff supporting students with special needs. An increased awareness, such as that demonstrated by the EASN in the current study, has the potential to lead to better and more frequent use of AT in classroom contexts.

In addition to displaying a greater awareness of the types of technologies available, the EASN also demonstrated an enhanced understanding of the pedagogy

that would be appropriate for using AT. This understanding included the need to appropriately match the technology with the user so that the best possible outcomes could be achieved. In an inclusive classroom setting, this skill is useful for a large number of students, not just the student with a disability, as the EASN is able to consider needs more effectively. Two of the EASN stated that based on the needs of students with whom they were familiar; they would use specific ATs to support difficulties the students were having (e.g. finger grip support for poor hand grasp function and the inclusion of a Smart board activity for students to engage them in a class lesson on letters). Scherer and Glueckauf (2005) stated that ATs can have a large impact on the ability of the students to access classroom curriculum and that "effective use of ATs and other supports will be maximized by matching device and support features to users' goals, preferences, and environmental resources" (p. 132). As one EASN stated, the AT used with support can "help students with special needs to be more confident in classroom activities".

The EASN involved in the study demonstrated an increased capacity for identifying the AT requirements and monitoring progress of students with special educational needs in relation to AT use. When asked, for example, if they considered the training useful for the future, one of the EASN replied that "it is because it makes you think of the students individually instead of just as a class whole. Each student needs assessing for assistive tech based on his/her own needs"; while another suggested that "I have a better understanding of how AT works for the specific needs of students". A striking example of consideration for the needs of a student (and having confidence to express her opinion) was when an EASN stated "therapists came to visit L to look at his seating. I felt confident to voice my concerns and add

to the design of a new chair". Scherer (2005) suggested that the matching of the technology and student needs, coupled with consideration for the context in which the AT was being used, are paramount to ensuring a successful outcome for the student. Field notes and skill tests results have also shown that the EASN have an improved capacity to describe monitoring tools that may be appropriate for students using AT. Before the training, only very basic forms of monitoring were suggested by the participants. After the training, and at maintenance, the EASN were more likely to include more sophisticated forms of monitoring of students as appropriate ways to assess progress; both for using the AT and for academic or behavioural achievement.

An important effect that came about as a result of the training in AT with EASN, was the increased use of AT within the classroom settings. It should be noted that most of the increase in AT use described was in the area of low-tech assistive technology, as opposed to medium and high-tech assistive technology. Possible reasons for the use of low-tech AT include the easy access to this technology and the utility of the AT for the students served by the EASN. Some examples of the low-tech devices or tools used by the EASN after the training include: reading windows (cards with slots cut into them to focus reading); magnifying glasses; Velcro prompt cards on the student's desk; rulers with handles; and, self-opening scissors. All of these items are able to be constructed by the EASN or purchased at a low cost. It may be that the low-tech devices also suited the inclusive settings that the EASN were in, by ensuring that the students did not 'stand-out' within the classroom as they may do with high-tech devices.

Although not mentioned as frequently, the use of medium to high-tech AT was also discussed by the EASN. The more sophisticated AT was generally in the form of computer software (e.g. Boardmaker, Clicker 5) or specific communication devices (e.g. BigMack, GoTalk). Other high-tech AT used included computer-based reading and mathematics programs, online behavioural management tools, and writing supports (e.g. The Writer). The high-tech devices that were mentioned were those that would not generally be found in inclusive classroom settings, aside from the computer-based software and online tools. That the inclusive setting was embracing these devices to cater for the needs of the students is encouraging. The EASN generally indicated that they were using more AT after the training than they were prior to the training. Those who were not using the AT currently, stated that "some of the information wasn't relevant to the student I am working with this year; however, it will be extremely helpful in subsequent years. I will have a wealth of ideas and knowledge of some fabulous websites right from the beginning"; and, "I work with a variety of children with special needs and you can never have too much knowledge".

A major finding resulting from the research which may affect the use of AT is the change in perception of themselves as users and facilitators of AT as expressed by the EASN. The increase in self-efficacy in the area of AT use and facilitation has the potential to increase the frequency of the use of AT in the classroom. Research conducted by Bandura (1982) on self-efficacy suggested that a person who believes he or she is capable of performing a task (has high self-efficacy) is more likely to succeed at that task. Similarly, Ajzen and Fishbein (2005) have studied the influence of attitudes on behaviour, and have found that a positive attitude towards a

task (or object, as they call it), leads to an increase in the behaviour related to that task or object. In this case, that development of positive attitudes towards the use of AT may lead to the increased use of the AT in the classroom. Both the EASN's self-efficacy and their attitude towards AT has been impacted positively by the training. These impacts are evident in statements made by the EASN such as, "I feel more knowledgeable and capable of accessing the assistive technology"; and, "I've learnt that no matter what the issue, there will be some form of AT that can help. Although I'm not a guru, I feel I have the confidence to try certain programs not previously known to me before this training. I feel I have a high level of competency in making low-tech/visual assistive technology".

6.3 Recommendations

Alongside the positive effects of the training, a number of areas where further action is required were also identified (Table 6.2). Recommendations for action to address these areas will now be discussed.

Table 6.2

Recommendations for Action

Recommendations
• Training in the area of AT
• Improved provision and access to AT
• Examination of the role of the EASN
• Development of collaborative approaches between staff working in classrooms

Training available in the area of AT for staff in schools was not always made known to the staff, particularly the EASN. Although the availability of training in many facets of AT is becoming more broadly available, mainly as a result of dedicated staff in the government and not-for-profit sectors, the training that is available is not always tailored to the needs of the individual schools and classes. Schools may need to dedicate an individual staff member to coordinate the training undertaken by the staff in the school, to ensure that it meets the requirements of the staff and students and that all staff have access to the training (if required). It is especially important that the staff in the school have an understanding of what AT is and what the AT means for the students in their classrooms, particularly with the inclusion of more students with special needs into regular settings (Department of Education and Training, 2004; 2007). Providing joint training, where the EASN and classroom teachers work together to improve knowledge and skills, is suggested as a beneficial way of ensuring that there is a common foundation from which to implement the AT.

In order to ensure that the students with special needs are able to access the most appropriate AT to suit their needs, improved provision and access to AT may need to be considered. This consideration could be made at a number of levels within the current government educational system including: Central Office (in particular, the legal requirements for including students with special needs); District Offices (in particular, the support given to schools to implement AT); School Administration (in particular, the support given to individuals to implement AT); and, the classroom staff (in particular, collaborating for optimum outcomes for students using AT). In addition to providing AT to schools and students, access to

the AT that is currently available may also need to be streamlined. In the government school system, only a few staff have the ability to make changes to the computer systems of the school, which includes modifying the accessibility features of commonly used programs (e.g. Microsoft Word, PowerPoint) and installing new programs onto systems. Although there are sound reasons for maintaining control over a large computer system, procedures for staff to access the system can be made clearer through school policy and a dedicated person who can perform this role may be beneficial to the smooth use of AT for all.

In light of this study and in reference to the *Competency Framework for Education Assistants Special Needs* (Department of Education and Training, 2008), further examination in schools of the role of the EASN is warranted. Clarification in regards to the role of the EASN in the classroom is likely to benefit both classroom teachers and EASN by ensuring all parties are aware of the capabilities and requirements of the role of the EASN. It is useful for the classroom teachers to have a thorough understanding (if they do not already) of the nature of the work that can be undertaken by the EASN in the classroom and the conditions that they work under (i.e. under teacher direction, under general teacher guidance, under limited teacher guidance). Ensuring that staff are cognizant of these roles is important so that all staff share a common understanding, there is limited role confusion in the classroom and appropriate training opportunities can be provided, if so required. The competency framework "…articulates professional practice for EASN who work in Western Australian public schools and outlines the varying roles and responsibilities they may undertake when applying their professional knowledge, skills and understandings to their specific working context" (Department of Education and

Training, 2008, p. 6). Many stated roles and responsibilities included in the competency framework relate to the EASN implementing programs of work using technology, including AT. Further training for the EASN would allow them to better achieve the outcomes set out in the competency framework, particularly in regards to AT.

The benefit of developing collaborative approaches between staff working in classrooms cannot be underestimated. Those classrooms where the teacher and EASN worked in partnership were reported by the EASN as the classrooms where the training they undertook in AT was most likely to be utilised. As stated by one of the EASN, "It's a teacher to teacher thing isn't it? It's like she lets me do whatever I want, and then others are very structured and tell you exactly what they want you to do". Role definition, although important, is not necessarily sufficient to ensure all parties are aware of the tasks they will perform in a collaborative classroom. There are many ways that collaborative classrooms can be cultivated by teachers and EASN, including: developing an open relationship; setting aside time to discuss experience strengths or weaknesses and other areas of interest; using active listening; and, practicing open communication (American Federation of Teachers, 2010). Due to the necessity of having more than one adult in the classroom to assist in catering for students with special needs, it is requisite that staff establish appropriate working relationships that are going to be conducive to learning (Cremin, Thomas, & Vincett, 2005).

6.4 Limitations

As with any study, there are a number of limitations that must be considered when interpreting the results. These limitations include:

- A relatively small number of participants drawn from only one education district;
- Public education system only; and,
- Lack of long term follow-up.

A potential limitation of the study in regards to determining the EASN's perception of efficacy is that it seeks to determine the perceptions of a small cohort in relation to the larger pool of EASN working within the Government education system. Due to the small cohort, the findings may not be able to be generalised (transferred) to the wider cohort. Even though this is a small group of participants, they were drawn from a number of different schools and exhibited a variety of levels of experience and knowledge and skills, and therefore represented some variety within the sample. A follow-up study might seek to examine a wider range of EASN, in identified settings to add to this body of knowledge and to more clearly determine if the setting in which the EASN are working has a differential impact on their knowledge of AT.

That the public (or government) education system was used to conduct the study is also a potential limitation of the study. A broader examination of EASN and AT in Catholic and Independent school systems would allow for a greater range of data to be collected and would enhance the transferability of the findings to a broader range of settings and staff. There is also the potential for the resource allocation in each of the sectors to be different, which may also impact upon the results of the

study. In the public school system, for example, there is a team of people at the upper management level who provide support for the identification and implementation of appropriate AT for individual students, on a visiting teacher basis. The Catholic and Independent sectors do not have this dedicated team available to them, although a number of inclusive education consultants hold knowledge in the area of AT. Such sector differences may have implications for the EASN working within these sectors, and in the way in which AT is acquired and implemented, which the current study has not addressed.

Although a maintenance probe was conducted ten weeks after the completion of the training to determine whether the perceptions, skills and knowledge had changed, a longer term follow-up study may allow examination of whether the training outcomes were maintained over greater periods of time. A long-term study would also allow more in-depth examination of the transfer of the skills and knowledge to the classroom. On some occasions, the current work situations of the EASN were not conducive to transfer, but future situations may have allowed this transfer to be more obvious. A work situation which was not conducive to transfer of skills was highlighted by a small number of the EASN who indicated that they would use the skills and knowledge in the future, but that they were currently unable to do so. Studies conducted by Brehmer, et al. (2008) indicated that maintenance of skills was achieved by participants who were similar in age to those in the present study. In some instances, a 'refresher' or follow-up course may be required to re-initiate memory of the skill processes (Brehmer, et al., 2008).

6.5 Future Directions

Many future avenues of research are suggested by the current work. These include further study of the AT in use in schools, cross-sectoral use of AT and EASN (i.e. Catholic and Independent schools sectors in addition to Government schools), expanding the participant group, expanding the context (setting) of the study, and training all staff simultaneously. These areas of research would provide further insight into the use of AT and how EASN are utilised in school settings to support students with special educational needs who are using AT.

An in-depth examination of AT use by schools in Western Australia and in other states of Australia would be useful to determine the current usage of the AT within the school sectors, as opposed to just the availability of the AT. A study examining AT use in schools would supplement the current study and allow comparisons to be made between school sectors (e.g. Catholic, Government and Independent), staff using the AT, and individual schools within these sectors. From the data collected, schools who were intense users of AT could be more closely examined to determine factors which enhanced the use of the AT. These factors may assist other schools to improve upon their use of AT to support students with special educational needs.

The current study could be improved by working with a larger number of EASN. By increasing the number of participants, the credibility and dependability of the data is improved. In addition to increasing the number of participants, the range of contexts in which the participants are employed would also be a useful area of study. These contexts may range from a regular classroom setting in a small

school, to an education support centre based in a larger school, to a segregated education support school. The variety of school settings provide the opportunity for seemingly endless combinations and varieties of contexts, and the use of AT in a wide variety of contexts would be a valuable area for further study, so that a variety of AT training can be developed for individual situations.

One aspect of the current study that requires further examination is the interaction between all staff in the schools. Ideally, future studies would be directed towards training both the EASN and the classroom teachers at the same time. This would be a relevant area of study as the effects of the training may be quite different if all parties are accessing the same information and skills training simultaneously. It would also allow the classroom teacher and the EASN to view each other's skill level and progress on skill development, which they may not always have opportunity to observe.

6.6 Conclusion

Training for EASN in the area of AT has resulted in the increased use of technology, greater awareness of the types of technologies available, enhanced pedagogical understanding for the use of AT, and an increased capacity for identifying needs and monitoring progress of students with special educational needs in relation to AT use. The current study has provided insight into the EASN's perceptions of themselves as users and facilitators of assistive technology. Prior to the training, the EASN did not consider themselves proficient users of AT, whereas after training they were not only more aware of assistive technologies, but saw themselves as skilled users of AT in relation to the students in their classroom. This

change in perception is considered to be an important factor in regards to the overall use of AT to support students with special educational needs.

Recommendations in relation to the findings of the study include further training in the area of AT, improved provision and access to AT, the need for an examination of the role of the EASN, and development of collaborative approaches between staff working in classrooms. These recommendations serve to strengthen the existing skills and knowledge of the EASN and also extend the development of both EASN and teachers in regards to the use of AT.

CHAPTER 7

REFERENCES

Ahern, K. J. (1999). Ten tips for reflexive bracketing. *Qualitative Health Research, 9*(3), 407-411.

Ainscow, M. (2000). *Poor tactics let down mum's army*. Retrieved from http://www.tes.co.uk/article.aspx?storycode=332984

Aird, R. (2000). The case for specialist training for learning support assistants employed in schools for children with severe, profound and multiple learning difficulties. *Support for Learning, 15*(3), 106-110.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology, 52,* 27-58.

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 173-221). Mahwah, NJ: Erlbaum. Retrieved from http://people.umass.edu/aizen/publications.html

Ajzen, I., & Gilbert Cote, N. (2008). Attitudes and the prediction of behavior. In W. D. Crano & R. Prislin (Eds.), *Attitudes and attitude change* (pp. 289-311). New York: Psychology Press.

Alberto, P. A., & Troutman, A. C. (2008). *Applied behaviour analysis for teachers* (8th ed.). Upper Saddle River New Jersey: Pearson Merrill Hall.

Algozzine, R. (2009). *Tips for developing Likert rating scales.* Retrieved from http://education.uncc.edu/rfalgozz/ADMN8699/likerttips.pdf.

American Federation of Teachers. (2010). *Creating a classroom team: Classroom tips*. Washington, DC: American Federation of Teachers. Retrieved from ERIC database. (ED516931)

Anderson, C. J., Klassen, R. M., & Georgiou, G. K. (2007). Inclusion in Australia: What teachers say they need and what school psychologists can offer. *School Psychology International, 28*(2), 131-147.

Angelides, P., Constantinou, C., & Leigh, J. (2009). The role of paraprofessionals in developing inclusive education in Cyprus. *European Journal of Special Needs Education, 24,*(1), 75-89.

Archilles, C. M., Finn, J. D., & Gerber, S. (2000). *It's time to drop the other shoe: The evidence on teacher aides*. Retrieved from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/16/a1/cf.pdf

Ashbaker, B. Y., Morgan, J. (2001). Growing roles for teachers' aides. *The Education Digest, 66*(7), 60-64.

Ashton, T. M., & Wahl, L. (2004). Surveying special education staff on AT awareness, use, and training. *Journal of Special Education Technology, 19*(2), 57-58.

Ashworth, P. (1999). "Bracketing" in phenomenology: Renouncing assumptions in hearing about student cheating. *Qualitative Studies in Education, 12*(6), 707-721.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122-147.

Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology, 25*(7), 729-735.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52,* 1-26.

Bandura, A., Ross, D., & Ross, S.A. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal and Social Psychology, 63,* 575-82.

Bandura, A., & Walters, R. (1963). *Social learning and personality development.* New York : Holt, Rinehart and Winston.

Barry, K., & King, K. (1998). *Beginning teaching and beyond* (3rd ed.). Tuggerah, NSW: Social Science Press.

Bausch, M. E., Ault, M. J., Evmenova, A. S., & Behrmann, M. M. (2008). Going beyond AT devices: Are AT services being considered? *Journal of Special Education Technology, 23*(2), 1-16.

Bausch, M. E., Mittler, J. E., Hasselbring, T. S., & Cross, D. P. (2005). The assistive technology act of 2004: What does it say and what does it mean? *Physical Disabilities: Education and Related Services, 23*(2), 59-67.

Bednall, J. (2006). Epoche and bracketing within the phenomenological paradigm. *Issues in Educational Research, 16*(2), 123-138.

Bell, B. S., & Kozlowski, S. W. J. (2008). Active learning: Effects of core training design elements on self-regulatory processes, learning, and adaptability. *Journal of Applied Psychology, 93*(2), 296-316.

Bergman, M. M. (2010). On concepts and paradigms in mixed methods research. *Journal of Mixed Methods Research, 4*, 171-175. doi: 10.1177/1558689810376950.

Berlach, R. G., & Chambers, D. J. (2010). Interpreting Inclusivity: An endeavour of great proportions. *International Journal of Inclusive Education*, DOI: 10.1080/13603110903159300

Berlach, R. G., & Chambers, D. J. (2011). Inclusivity imperatives and the Australian national curriculum. *The Educational Forum, 75*(1), 52-65.

Besio, S., & Salminen, A. (2004). Children and technology and youngsters. *Technology and Disability, 16*, 115-117.

Blackhurst, A. E. (2001). *What is assistive technology?* Retrieved from http://natri.uky.edu/resources/fundamentals/defined.html#continuum.

Blackhurst, A. E. (2005). Perspectives on applications of technology in the field of learning disabilities. *Learning Disability Quarterly, 28*(2), 175-178.

Borg, J., Larsson, S., & Östergren, P. (2011). The right to assistive technology: For whom, for what, and by whom? *Disability & Society*, *26*(2), 151–167.

Bowers, T. (1997). Supporting special needs in the mainstream classroom: Children's perceptions of the adult role. *Child: Care, Health and Development, 23*(3), 217-232.

Bradburn, N., Sudman, S., & Wansink, B. (2004). *Asking questions: The definitive guide to questionnaire design – For market research, political polls, and social and health questionnaires*. San Francisco, CA: Jossey-Bass.

Breton, W. (2010). Special education paraprofessionals: Perceptions of pre-service preparation, supervision, and ongoing developmental training. *International Journal of Special Education, 25*(1), 34-45.

Broadbent, C., & Burgess, J. (2003). *Building effective inclusive classrooms through supporting the professional learning needs of teacher assistants*. Paper presented at the 43rd Annual National Conference of Adult Learning Australia.

Brodin, J. (2010). Can ICT give children with disabilities equal opportunities in schools? *Improving Schools, 13*(1), 99-112.

Brodwin, M. G., Cardoso, E., & Star, T. (2004). Computer assistive technology for people who have disabilities: Computer adaptations and modifications. *Journal of Rehabilitation, 70*(3), 28-33.

Broussard, L. (2006). Understanding qualitative research: A school nurse perspective. *The Journal of School Nursing, 22*(4), 212-218.

Brownlee, J., & Carrington, S. (2000). Opportunities for authentic experience and reflection: A teaching programme designed to change attitudes towards disability for pre-service teachers. *Support for Learning, 15* (3), 99-104.

Bryant, B. R., Bryant, D. P., Shih, M., & Seok, S. (2010). Assistive technology and supports provision: A selective review of the literature and proposed areas of application. *Exceptionality, 18*(4), 203-213.

Bugaj, S. J. (2002). Improving the skills of special education paraprofessionals: A rural school district's model for staff development. *Rural Special Education Quarterly, 21*(2), 16-24.

Burgess, H., & Mayes, A. S. (2007). Supporting the professional development of teaching assistants: classroom teachers' perspectives on their mentoring role. *The Curriculum Journal, 18*(3), 389-407.

Burgess, H., & Mayes, A. S. (2009). An exploration of higher level teaching assistants' perceptions of their training and development in the context of school workforce reform. *Support for Learning, 24*(1), 19-25.

Burke, L. A., & Hutchins, H. M. (2007). Training transfer: An integrative literature review. *Human Resource Development Review, 6*(3), 263-296.

Burns, R. B. (2000). *Introduction to research methods* (4th ed.). Frenchs Forest, NSW: Pearson Education Australia.

Butcher, J., & Prosser, M. (1993). *Identifying teacher and student thinking from qualitative analyses of open-ended written responses.* Paper presented at the Annual Conference of the Australian Association for Research in Education, Perth, Western Australia, 22nd November, 1993.

Butt, G., & Lance, A. (2005). Modernizing the roles of support staff in primary schools: Changing focus, changing function. *Educational Review, 57*(2), 139-149.

Campbell, W. K., Bonacci, A. M., Shelton, J., Exline, J. J., & Bushman, B. J. (2004). Psychological entitlement: Interpersonal consequences and validation of a self-report measure. *Journal of Personality Assessment, 83*(1), 29-45.

Campbell, P. H., Milbourne, S., Dugan, L. M., & Wilcox, M. J. (2006). A review of evidence on practices for teaching young children to use assistive technology devices. *Topics in Early Childhood Special Education, 26*(1), 3-13.

Calder, I., & Grieve, A. (2004). Working with other adults: What teachers need to know. *Educational Studies, 30*(2), 113-126.

Carter, E., O'Rourke, L., Sisco, L. G., & Pelsue, D. (2009). Knowledge, responsibilities, and training needs of paraprofessionals in elementary and secondary schools. *Remedial and Special Education, 30*(6), 344-359.

Center for Applied Special Technology (CAST). (2010). *Transforming education through universal design for learning.* Retrieved from http://www.cast.org/index.html

Causton-Theoharis, J. N., & Malmgren, K. (2005). Building bridges: Strategies to help paraprofessionals promote peer interaction. *Teaching Exceptional Children, 37*(6), 18-24.

Causton-Theoharis, J. N., Giangreco, M. F., Doyle, M. B., & Vadasy, P. F. (2007). Paraprofessionals: The "sous-chefs" of literacy instruction. *Teaching Exceptional Children, 40*(1), 56-62.

Chambers, D. J. (2011). Designing assistive technology training for paraprofessionals. In *Educating every learner, every day: A global responsibility: Proceedings for the 12th biennial conference of the International Association of Special Education.10 – 14 July, Windhoek, Namibia.* (pp. 3-6). USA: International Association of Special Education.

Chenail, R. J. (2011). Interviewing the investigator: Strategies for addressing instrumentation and researcher bias concerns in qualitative research. *The Qualitative Report, 16*(1), 255-262.

Chmiliar, L. (2007). Perspectives on assistive technology: What teachers, health professionals, and speech and language pathologists have to say. *Developmental Disabilities Bulletin, 35*(1), 1-17.

Christie, K. (2005). Paraprofessionals on the front line. *Phi Delta Kappan, 87*(3), 181-182.

Clough, P., & Nutbrown, C. (2004). Special educational needs and inclusion: Multiple perspectives of pre-school educators in the UK. *Journal of Early Childhood Research, 2*(2), 191-211.

Cobb, C. (2007). Training paraprofessionals to effectively work with all students. *The Reading Teacher, 60*(7), 686-689.

Collarbone, P. (2009). *Creating tomorrow: Planning, developing and sustaining change in education and other public services.* London, GBR: Continuum International Publishing.

Collins, J., & Simco, N. (2006). Teaching assistants reflect: The way forward? *Reflective Practice, 7*(2), 197-214.

Colorado State University. (2012). Differences between experimental and quasi-experimental research. Retrieved from http://writing.colostate.edu/guides/research/experiment/pop3e.cfm.

Commonwealth of Australia. (1992). *Disability discrimination act.* Retrieved from http://www.austlii.edu.au/au/legis/cth/consol_act/dda1992264/.

Commonwealth of Australia. (2005). *Disability standards for education 2005.* Retrieved from http://www.dest.gov.au/sectors/school_education/programmes_funding/forms_guidelines/disability_standards_for_education.htm.

Copley, J., & Ziviani, J. (2004). Barriers to the use of assistive technology for children with multiple disabilities. *Occupational Therapy International, 11*(4), 229-243.

Cormack, M., Couch, M., & McColl, M. (2000). *Technology for learning: Students with disabilities – A report from the Ministerial Advisory Committee: Students with disabilities.* South Australia: DETYA.

Craig, E. (Ed.). (2005). *The shorter Routledge encyclopedia of philosophy*. London: Routledge.

Cremin, H., Thomas, G., & Vincett, K. (2003). Learning zones: An evaluation of three models for improving learning through teacher/teaching assistant teamwork. *Support for Learning, 18*(4), 154-161.

Cremin, H., Thomas, G., & Vincett, K. (2005). Working with teaching assistants: Three models evaluated. *Research Papers in Education, 20*(4), 413-432.

Creswell, J. W. (2009). Editorial: Mapping the field of mixed methods research. *Journal of Mixed Methods Research, 3*(2), 95-108.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research.* Thousand Oaks, CA: Sage.

Crotty, M. (1998). *The foundations of social research: Meaning and perspectives in the research process.* London, UK: Sage Publications.

Curriculum Council. (1998). *Curriculum framework*. Perth, Western Australia: Curriculum Council.

Dalla, R. L., MoulikGupta, P., Lopez, W., & Jones, V. (July, 2006). ''It's a balancing act!'': Exploring school/work/family interface issues among bilingual, rural Nebraska, paraprofessional educators. *Family Relations, 55,* 390-402.

De Corte, E. (2003). Transfer as the productive use of acquired knowledge, skill, and motivations. *Current Directions in Psychological Science, 12*(4), 142-146.

Denzin, N. K., & Lincoln, Y. S. (Eds.) (2005). *The sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Department for Education and Skills. (2003). *Working with teaching assistants in primary schools.* Nottingham: DfES.

Department for Education and Skills. (2004). *Every child matters: Change for children*. Nottingham: DfES.

Department for Education and Skills. (2005). *Common core of skills and knowledge for the children's workforce*. Nottingham: DfES.

Department of Education. (2010a). *Schools online*. Retrieved from http://www.det.wa.edu.au/schoolsonline/home.do.

Department of Education. (2010b). *Centre for inclusive schooling*. Retrieved from http://det.wa.edu.au/studentsupport/statewidespecialistservices/detcms/navigation/centre-for-inclusive-schooling/?oid=MultiPartArticle-id-8026117.

Department of Education. (2010c). *Eligibility criteria*. Retrieved from http://det.wa.edu.au/schoolsplus/detcms/navigation/category.jsp?categoryID=1409999 .

Department of Education. (2010d). *Learning support coordinators*. Retrieved from http://www.det.wa.edu.au/inclusiveeducation/detcms/inclusiveeducation/ies/building-inclusive-learning-environments/building-inclusive-classrooms/learning-support-coordinators.en?oid=Article-id-253705.

Department of Education (2011). *Department of education annual report 2010-2011*. Retrieved from http://www.det.wa.edu.au/education/annualreport/docs/doe_annual_report_2010-11.pdf.

Department of Education and Training. (2002a). *Job description form: Education assistant – level 1.* Perth: Department of Education and Training.

Department of Education and Training. (2002b). *Job description form: Education assistant – level 2.* Perth: Department of Education and Training.

Department of Education and Training. (2002c). *Job description form: Education assistant – level 3.* Perth: Department of Education and Training.

Department of Education and Training. (2002d). *Building inclusive schools.* Perth: Department of Education and Training.

Department of Education and Training. (2003). *Building inclusive schools: A professional learning package.* Perth: Department of Education and Training.

Department of Education and Training. (2004a). *Pathways to the future: A report on the review of educational services for students with disabilities in government schools.* Perth, Western Australia: Department of Education and Training.

Department of Education and Training. (2004b). *10 point action plan.* Perth, Western Australia: Department of Education and Training.

Department of Education and Training. (2006). *Annual report 2005 -2006.* Perth, Western Australia: Department of Education and Training.

Department of Education and Training. (2007). *Building inclusive schools.* Retrieved from http://www.det.wa.edu.au/inclusiveeducation/ccm/navigation/category.jsp?categoryID=274346.

Department of Education and Training. (2008). *Competency framework for education assistants (special needs): Practice and professional learning 2008.* Perth, Western Australia: Department of Education and Training.

Department of Education, Science and Training. (2005). *Disability standards for education 2005.* Canberra: Government Publishers.

Dew-Hughes, D., Brayton, H., & Blandford, S. (1998). A survey of training and professional development for learning support assistants. *Support for Learning, 13*(4), 179-183.

Dugan, L. M., Campbell, P. H., & Wilcox, M. J. (2006). Making decisions about assistive technology with infants and toddlers. *Topics in Early Childhood Special Education, 26*(1), 25-32.

Duhaney, D. C. & Duhaney, D. C. (2000). Assistive technology: Meeting the needs of learners with disabilities. *International Journal of Instructional Media, 27*(4), 393-401.

Dyal, A., Bowden Carpenter, L., & Wright, J. V. (2009). Assistive technology: What every school leader should know. *Education, 129*(3), 556-560.

Edyburn, D. (2005). Special education technology competencies. *Special Education Technology Practice, 7*(1), 16-27.

Edyburn, D. (2009). Introduction: Instructional design advances in special education technology, *Exceptionality, 17,* 63-65.

Elkins, J. (2009). Legislation, policies and principles. In A. Ashman & J. Elkins (Eds.), *Education for inclusion and diversity* (3rd ed.), (pp. 35-56). Frenchs Forest, NSW: Pearson Education Australia.

Ellis, P., & Kershaw, P. (2005). From lip-service to in-service. *Education Review, 18*(2), 75-81.

Evans, C., Williams, J. B., & Metcalf, D. (2010). Using high- and low-technology tools to enhance self- and peer assessment and feedback for pre-service teachers. *Journal of Special Education Technology, 25*(4), 55-60.

Eyres, I., Cable, C., Hancock, R., & Turner, J. (2004). 'Whoops I forgot David': Children's perceptions of the adults who work in their classrooms. *Early Years, 24*(2), 149-162.

Farrell, P., Dyson, A., Polat, F., Hutcheson, G., & Gallannaugh, F. (2007). The relationship between inclusion and academic achievement in English mainstream schools. *School Effectiveness and School Improvement, 18*(3), 335-352.

Fishbein, M., & Ajzen, I. (1972). Attitudes and opinions. *Annual Review of Psychology, 23,* 487-544.

Fishbein, M., & Middlestadt, S. (1995). Non-cognitive effects on attitude formation and change: Fact or artifact? *Journal of Consumer Psychology, 4* (2), 181-202.

Forbes, F. (2007). Towards inclusion: An Australian perspective. *Support for Learning, 22*(2), 66-71.

Foreman, P. (2008). *Inclusion in action* (2nd ed.). South Melbourne: Thomson.

Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. *Australian and New Zealand Journal of Psychiatry, 36,* 717-732.

Fox, G. (1998). *A handbook for learning support assistants: Teachers and assistants working together.* London: David Fulton Publishers.

Foxon, M. (1993). A process approach to the transfer of training. *Australian Journal of Educational Technology, 9*(2), 130-143.

French, N. K. (2001). Supervising paraprofessionals: A survey of teacher practices. *Journal of Special Education, 35*(1), 41-53.

French, N. K. (2002). 20 ways to maximise paraprofessional services for students with learning disabilities. *Intervention in School and Clinic, 38*(1), 50-55.

Friend, M., & Bursuck, W. D. (2011). *Including students with special needs: A practical guide for classroom teachers* (6th ed.). Englewood Cliffs, N.J.: Prentice Hall.

Garavaglia, P. L. (1993). How to ensure transfer of training. *Training and Development, 47*(10), 63-68.

Gay, L. R., & Airasian, P. (2003). *Educational research: Competencies for analysis and applications.* Upper Saddle River, NJ: Merrill Prentice Hall.

Gearing, R. E. (2004). Bracketing in research: A typology. *Qualitative Health Research, 14*(10), 1429-1452.

Georgia Department of Education. (2008a.). *Georgia project for assistive technology.* Retrieved from http://www.gpat.org/Index.aspx

Georgia Department of Education. (2008b.). *Assistive technology consideration checklist.* Retrieved from http://public.doe.k12.ga.us/DMGetDocument.aspx/Consideration_Checklist%20(1).pdf?p=6CC6799F8C1371F653BF7EA11B6181D2351EFF21D37219EA2FF7E8E0A4F71469&Type=D

Georgia Department of Education. (2008c.). *AT manual.* Retrieved from http://public.doe.k12.ga.us/DMGetDocument.aspx/assistive%20Technology%20Guidelines%20and%20Procedures%20Manual.pdf?p=6CC6799F8C1371F6E934155D4AFFD7B92F34F7490991F1A8CDCE3297E5A620CD&Type=D

Gerber, S. B., Finn, J. D., Archilles, C. M., & Boyd-Zaharis, J. B. (2001). Teacher aides and students'academic achievement. *Educational Evaluation and Policy Analysis, 23*(2), 123-143.

Gessler Werts, M., Harris, S., Young Tillery, C., & Roark, R. (2004). What parents tell us about paraeducators. *Remedial and Special Education, 25*(4), 232-239.

Ghere, G., & York-Barr, J. (2007). Paraprofessional turnover and retention in inclusive programs: Hidden costs and promising practices. *Remedial and Special Education, 28*(1), 21-32.

Giangreco, M. F. (2003). Working with paraprofessionals. *Educational Leadership, 61*(2), 50-53.

Giangreco, M. F., & Broer, S. M. (2005). Questionable utilization of paraprofessionals in inclusive schools: Are we addressing symptoms or causes? *Focus on Autism and Other Developmental Disabilities, 20*(1), 10-26.

Giangreco, M. F., Yuan, S., McKenzie, B., Cameron, P., & Fialka, J. (2005). "Be careful what you wish for…": Five reasons to be concerned about the assignment of individual paraprofessionals. *Teaching Exceptional Children, 37*(5), 28-34.

Giangreco, M. F., Smith, C. S., & Pinckney, E. (2006). Addressing the paraprofessional dilemma in an inclusive school: A program description. *Research and Practice for Persons with Severe Disabilities, 31*(3), 215-229.

Giangreco, M. F., Suter, J. C., & Doyle, M. B. (2010). Paraprofessionals in inclusive schools: A review of recent research. *Journal of Educational and Psychological Consultation, 20*(1), 41-57.

Giorgi, A. (1999). Concerning variations in the application of the phenomenological method. *The Humanistic Psychologist, 34*(4), 305-319.

Goldman, K. D., & Schmalz, K. J. (2005). Yes, you can take it with you! Transfer of learning: From workshop to workplace. *Health Promotion Practice, 6*, 5-8.

Goode, S. (2006). Mini-bibliography: Assistive technology and diversity issues. *Topics in Early Childhood Special Education, 26*(1), 51-54.

Gorner, P. (2001). Reid, Husserl and phenomenology. *British Journal for the History of Philosophy, 9*(3), 545-555.

Government of Western Australia. (1984). *Equal opportunity act*. Perth, WA: Author.

Government of Western Australia. (1999). *School education act 1999.* Perth, WA: Author.

Graham, L., & Slee, R. (2008). An illusory interiority: Interrogating the discourse/s of inclusion. *Educational Philosophy and Theory*, 40(2), 277-293.

Griffin-Shirley, N., & Matlock, D. (2004). Paraprofessionals speak out: A survey. *Re:view, 36*(3), 127-136.

Groom, B. (2006). Building relationships for learning: The developing role of the teaching assistant. *Support for Learning, 21*(4), 199-203.

Grusec, J. E. (1992). Social learning theory and developmental psychology: The legacies of Robert Sears and Albert Bandura. *Developmental Psychology, 28*(5), 776-786.

Guba, E. G. (1978). *Toward a methodology of naturalistic enquiry in educational evaluation*. Los Angeles, CA: University of California.

Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic enquiry. *Educational and Communication Technology Journal, 30*(4), 233-252.

Hackman. J. R., & Anderson, L. R. (1968). The strength, relevance, and source of beliefs about an object in Fishbein's attitude theory. *The Journal of Social Psychology, 76*, 55-67.

Hager, P., & Hodkinson, P. (2009). Moving beyond the metaphor of transfer of learning. *British Educational Research Journal, 35*(4), 619-638.

Hancock, R., & Eyres, I. (2004). Implementing a required curriculum reform: Teachers at the core, teaching assistants on the periphery? *Westminster Studies in Education, 27*(2), 223-235.

Hannan, A. (2006). *Observation techniques*. Retrieved from http://www.edu.plymouth.ac.uk/resined/observation/obshome.htm

Heaven, P. C. L. (Ed.) (1992). *Life span development.* Marrickville, NSW: Harcourt Brace Jovanovich.

Helsdingen, A., Van Gog, T., & Van Merriënboer, J. (2011). The effects of practice schedule and critical thinking prompts on learning and transfer of a complex judgment task. *Journal of Educational Psychology*, Advance online publication. doi: 10.1037/a0022370

Her Majesty's Government. (2011). *What are special educational needs?* Retrieved from http://www.direct.gov.uk/en/Parents/Schoolslearninganddevelopment/SpecialEducationalNeeds/DG_4008600

Hopkins, J. (2006a). Assistive technology: 10 things to know. *Library Media Connection, 25*(1), 12-14.

Hopkins, J. (2006b). All students being equal: Help your special needs students using these resources. *Technology and Learning, 26*(10), 26-28.

Howe, K. R. (1988). Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational Researcher, 17*(8), 10-16.

Huber, K. D., Rosenfeld, J. G., & Fiorello, C. A. (2001). The differential impact of inclusion and inclusive practices on high, average, and low-achieving general education students. *Psychology in the Schools, 38*(6), 497-504.

Independent Living Centre WA. (2010). *Making choices finding solutions*. Retrieved from http://www.ilc.com.au/

Jackson, R. L., Drummond, D. K., & Camara, S. (2007). What is qualitative research? *Qualitative Research Reports in Communication, 8*(1), 21-28.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.

Jordan, A., Carlile, O., & Stack, A. (2008). *Approaches to learning: A guide for teachers.* Berkshire, England: Open University Press

Jost, M. B., & Mosely, B. F. (2011). Where IT's AT? Teachers, assistive technology, and instructional technology. *Journal of Technology Integration in the Classroom, 3*(2), 5-16.

Kaplan, K. J., & Fishbein, M. (1969). The source of beliefs, their saliency, and prediction of attitude. *Journal of Social Psychology, 78* (1), 63-74.

Keller, C. L., Bucholz, J., & Brady, M. P. (2007). Yes I can! Empowering paraprofessionals to teach learning strategies. *Teaching Exceptional Children, 39*(3), 18-23.

Kelly, S. M., & Smith, T. J. (2008). The digital social interactions of students with visual impairments: Findings from two national surveys. *Journal of Visual Impairment and Blindness, 102*(9), 528-539.

Kendler, H. K. (2005). Psychology and phenomenology: A clarification. *American Psychologist, 60*(4), 318-324.

Keppel, G., Saufley, W. H., & Tokunaga, H. (1992). *Introduction to design and analysis: A student's handbook* (2nd ed.). New York: W.H. Freeman and Company.

Kerry, T. (2005). Towards a typology for conceptualizing the roles of teaching assistants. *Educational Review, 57*(3), 373-384.

Kervin, L., Vaille, W., Herrington, J., & Okely, T. (2006). *Research for educators.* South Melbourne, Victoria: Thomson Social Science Press.

Kim, Y., & Baylor, A. L. (2006). A social-cognitive framework for pedagogical agents as learning companions. *Educational Technology Research and Development, 54*(6), 569-596.

King-Sears, M. E., & Evmenova, A. S. (2007). Premises, principles, and processes for integrating TECHnology into instruction. *Teaching Exceptional Children, 40*(1), 6-14.

Kretlow, A. G., & Blatz, S. L. (2011). The ABCs of evidence-based practice for teachers. *Teaching Exceptional Children, 43*(5), 8-19.

Lance, C. E., & Vandenberg, R. (2009). *Statistical and methodological myths and urban legends: Doctrine, verity and fable in organizational and social sciences.* UK: Routledge.

Lankutis, T., & Kennedy, K. (2002). Assistive technology and the multi-age classroom. *Technology and Learning, 22*(8), 38-45.

Layton, N., & Wilson, E. (2009). Re-conceptualizing disability and assistive technology: Australian consumers driving policy change. *Technology and Disability, 21*, 135-141.

Leberman, S. I., & Martin, A. J. (2004). Enhancing transfer of learning though post-course reflection. *Journal of Adventure Education and Outdoor Learning, 4*(2), 173-184.

Lee, B. (2003). Teaching assistants in schools. *Education Journal, 68*, 25-27.

Lee, C., & Bobko, P. (1994). Self-efficacy beliefs: Comparison of five measures. *Journal of Applied Psychology, 79*(3), 364-369.

Lee, Y., Vega, L. A., & Ashton, T. M. (2005). Perceived knowledge, attitudes, and challenges of AT use in special education. *Journal of Special Education Technology, 20*(2), 60-63.

Leech, N. L., & Onwuegbuzie, A. J. (2009). A typology of mixed methods research designs. *Quality & Quantity, 43*(2), 265-275.

Library of Congress. (1975). *Education for all handicapped children act.* Retrieved from http://thomas.loc.gov/cgi-bin/bdquery/z?d094:S0006.

Library of Congress. (1998). *Assistive technology act*. Retrieved from http://thomas.loc.gov/cgi-bin/query/z?c105:S.2432.ENR:

Library of Congress. (2004). *Individuals with disabilities education act*. Retrieved from http://thomas.loc.gov/cgi-bin/query/z?c108:h.1350.enr.

Lieberman, L. J., James, A. R., & Ludwa, N. (2004). The impact of inclusion in general physical education for all students. *Journal of Physical Education, Research and Development, 75*(5), 37-55.

Liska, A. E., Felson, R. B., Chamlin, M., & Baccaglini, W. (1984). Estimating attitude-behavior reciprocal effects within a theoretical specification. *School Psychology Quarterly, 47*(1), 15-23.

Lobato, J. (2006). Alternative perspectives on the transfer of learning: History, issues, and challenges for future research. *The Journal of the Learning Sciences, 15*(4), 431-449.

Loeding, B. L. (2002). The use of educational technology and assistive devices in special education. In J. L. Paul (2002), *Rethinking professional issues in special education.* Westport, USA: Greenwood Publishing Group.

Logan, E., & Feiler, A. (2006). Forging links between parents and schools: A new role for teaching assistants? *Support for Learning, 21*(3), 115-120.

Loreman, T., Earle, C., Sharma, U., & Forlin, C. (2007). The development of an instrument for measuring pre-service teachers' sentiments, attitudes and concerns about inclusive education. *International Journal of Special Education, 22*(2), 150-159.

Marino, M. T., Marino, E. C., & Shaw, S. F. (2006). Making informed assistive technology decisions for students with high incidence disabilities. *Teaching Exceptional Children, 38*(6), 18-25.

McGarvey, B., Marriott, S., Morgan, V., & Abbott, L. (1996). A study of auxiliary support in some primary classrooms: Extra hands and extra eyes. *Educational Research, 38*(3), 293-305.

McKenzie, A. R., & Lewis, S. (2008). The role and training of paraprofessionals who work with students who are visually impaired. *Journal of Visual Impairment and Blindness, 102*(8), 459-471.

Melles, G. (2008). New pragmatism and the vocabulary and metaphors of scholarly design research. *Design Issues, 24*(4), 88-101.

Miles, M. B., & Huberman, A. M. (1984). Drawing valid meaning from qualitative data: Toward a shared craft. *Educational Researcher, 13*(5), 20-30.

Miller, S. D. (2003). Partners in reading: Using classroom assistants to provide tutorial assistance to struggling first-grade readers. *Journal of Education for Students Placed At Risk, 8*(3), 333-349.

Miller, S. I., & Gatta, J. L. (2006). The use of mixed methods models and designs in the human sciences: Problems and prospects. *Quality & Quantity, 40,* 595-610.

Moore, D., Cheng, Y., McGrath, P., & Powell, N. J. (2005). Collaborative virtual environment technology for people with Autism. *Focus on Autism and Other Developmental Disabilities, 20*(4), 231-243.

Moran, A., & Abbott, L. (2002). Developing inclusive schools: The pivotal role of teaching assistants in promoting inclusion in special and mainstream schools in Northern Ireland. *European Journal of Special Needs Education, 17*(2), 161-173.

Morgan, J., & Ashbaker, B. Y. (2001). 20 ways to…Work more effectively with your paraeducator. *Intervention in School and Clinic, 36*(4), 230-231.

Morgan, J., & Ashbaker, B. Y. (2002). *Supervision: A model for the teacher's role as supervisor of paraprofessionals-Final report.* Utah: Utah State University.

Morrison, K. (2007). Implementation of assistive computer technology: A model for school systems. *International Journal of Special Education, 22*(1), 83-95.

Muijs, D., & Reynolds, D. (2003). The effectiveness of the use of learning support assistants in improving mathematics achievement of low achieving pupils in primary school. *Educational Research, 45*(3), 219-230.

Miyasato, E. (2003). History and philosophy of a collaborative learning laboratory: ECELL 1997-2001. *Educational Perspectives, 35*(2), 26-31. (EJ877592)

Nelson, B. (2006). On your mark, get set, wait! Are your teacher candidates prepared to embed assistive technology in teaching and learning? *College Student Journal, 40*(3), 485-494.

Netherton, D. L. & Deal, W. F. (2006). Assistive technology in the classroom. *The Technology Teacher, 66*(1), 10-15.

Neuman, W. L. (2011). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Boston, MA: Pearson International Editions and Allyn & Bacon.

Novitatech. (2004). *Product trial/rental*. Retrieved from http://www.novitatech.org.au/trial.asp?p=254.

Odom, S. L. (2009). The tie that binds: Evidence-based practice, implementation science, and outcomes for children. *Topics in Early Childhood Special Education, 29*(1), 53-61.

Onwuegbuzie, A. J., Burke Johnson, R., & Collins, K. M. T. (2009). Call for mixed analysis: A philosophical framework for combining qualitative and quantitative approaches. *International Journal of Multiple Research Approaches, 3*(2), 114-139.

Onwuegbuzie, A. J., & Leech, N. L. (2005). Taking the 'Q' out of research: Teaching research methodology courses without the divide between quantitative and qualitative paradigms. *Quality & Quantity, 39*, 267-296.

Ormrod, J. E. (2004). *Human learning* (4th ed.). Upper Saddle River, New Jersey: Pearson Education Ltd.

Parette, H. P., & Stoner, J. B. (2008). Benefits of assistive technology user groups for early childhood education professionals. *Early Childhood Education Journal, 35*, 313-319.

Parsons, S., & Cobb, S. (2011). State-of-the-art of virtual reality technologies for children on the autism spectrum. *European Journal of Special Needs Education, 26*(3), 355-366.

Parsons, S., Daniels, H., Porter, J., & Robertson, C. (2008). Resources, staff beliefs and organizational culture: Factors in the use of information and communication technology for adults with intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities, 21*, 19-33.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, London: SAGE Publications.

Perkins, D. N., & Salomon, G. (1992). Transfer of learning. *International Encyclopedia of Education* (2nd ed.). Oxford, UK: Pergamon Press

Petress, K. (2003). An educational philosophy guides the pedagogical process. *College Student Journal, 37*(1), 128 – 134.

Phillips, D.C. (1986). *Philosophical issues in educational research: Is there room for truth in the soft sciences?* Bentley, Western Australia: Western Australian Institute of Technology.

Pihlstrom, S. (2008). How (not) to write the history of pragmatist philosophy of science? *Perspectives on Science, 16*(1), 26-69.

Poggenpoel, M., Myburgh, C.P.H., & van der Linde, C. H. (2001). Qualitative research strategies as prerequisite for quantitative strategies. *Education, 122*(2), 408-413.

Potter, C. A., & Richardson, H. L. (1999). Facilitating classrooms assistants' professional reflection through video workshops. *British Journal of Special Education, 26*(1), 34-36.

Puckett, K. S. (2002). *Integrating assistive technology with curriculum standards*. Paper presented at the Annual Meeting of the Mid-South Educational Research Association.

QIAT. (2010). *Quality indicators for assistive technology services: Guiding the provision of quality AT services*. Retrieved from http://natri.uky.edu/assoc_projects/qiat/

QSR International. (2008). *Nvivo 8*. [Computer software]. SA: QSR International Pty Ltd.

Queensland Government. (2012). *Disability facts and terms.* Retrieved from http://www.qld.gov.au/disability/community/terms/.

Quinn, B. S., Behrmann, M., Mastropieri, M., & Chung, Y. (2009). Who is using assistive technology in schools? *Journal of Special Education Technology, 24*(1), 1-13.

Randi, J., & Corno, L. (2007). Theory into practice: A matter of transfer. *Theory Into Practice, 46*(4), 334-342.

Rapp, W. H. (2005). Using assistive technology with students with exceptional learning needs: When does an aid become a crutch? *Reading & Writing Quarterly, 21*, 193-196.

Raschke, D., & Bronson J. (1999). *Creative educators at work: All children including those with disabilities can play traditional classroom games.* Retrieved from www.uni.edu/coe/inclusion/preparing/

Raskind, M. H. (2006). *Matching assistive technology tools to individual needs.* Retrieved from http://www.schwablearning.org/articles.aspx?r=1093.

Richards, G., & Clough, P. (2004). ITE students' attitudes to inclusion. *Research in Education, 72*, 77-86.

Riemer-Reiss, M. L., & Wacker, R. R. (2000). Factors associated with assistive technology discontinuance among individuals with disabilities. *The Journal of Rehabilitation, 66*(3), 44-50.

Rohrer, D., Taylor, K., & Sholar, B. (2010). Tests enhance the transfer or learning. *Journal of Experimental Psychology: Learning, Memory and Cognition, 36*(1), 233-239.

Rose, D., & Meyer, A. (2000). *The future is in the margins: The role of technology and disability in educational reform*. Retrieved from http://udlonline.cast.org/resources/images/future_in_margins.pdf

Rose, R., & Forlin, C. (2010). Impact of training on change in practice for education assistants in a group of international private schools in Hong Kong. *International Journal of Inclusive Education, 14*(3), 309-323.

Rose Plaxen, J. (2005). *Adapt my world: Homemade adaptations for people with disabilities.* Maryland: Seven Locks Press.

Russotti, J., & Shaw, R. (2004). In-service training for teaching assistants and others who work with students with visual impairments. *Journal of Visual Impairment & Blindness, 95*(8), 483-487.

Sanford, K. (2010). Assessing conflict communication in couples: Comparing the validity of self-report, partner-report, and observer ratings. *Journal of Family Psychology, 24*(2), 165-174.

Sale, J. E. M., & Brazil, K. (2004). A strategy to identify critical appraisal criteria for primary mixed method studies. *Quality & Quantity, 38*, 351-365.

Scherbaum, C. A., Cohen-Charash, Y., & Kern, M. J. (2006). Measuring general self-efficacy: A comparison of three measures using item-response theory. *Educational and Psychological Measurement, 66*(6), 1047-1063.

Scherer, M. J. (2004). *Matching person and technology process and accompanying assessment instruments, revised.* New York: Institute for Matching Person & Technology. Retrieved from http://members.aol.com/IMPT97/MPT.html#news

Scherer, M. J. (2005). Assessing the benefits of using assistive technologies and other supports for thinking, remembering and learning. *Disability and Rehabilitation, 27*(13), 731-739.

Scherer, M. J., & Glueckauf, R. (2005). Assessing the benefits of assistive technologies for activities and participation. *Rehabilitation Psychology, 50*(2), 132-141.

Scherer, M. J., Sax, C., Vanbiervliet, A., Cushman, L. A., & Scherer, J. V. (2005). Predictors of assistive technology use: The importance of personal and psychosocial factors. *Disability and Rehabilitation, 27*(21), 1321-1331.

Schunk, D. H. (2009). *Learning theories: An educational perspective* (5th ed.). London: Pearson Education.

Schunk, D. H. (2012). *Learning theories: An educational perspective* (6th ed.). London: Pearson Education.

Shulman, J. S. (1981). Disciplines of inquiry in education: An overview. *Educational Researcher, 10*(6), 5-12.

Siegel, S., & Castellan, N. J. (1988). *Nonparametric statistics for the behavioural sciences* (2nd ed.). Singapore: McGraw Hill Inc.

Simpson, C. G., McBride, R., Spencer, V. G., Lowdermilk, J., & Lynch, S. (2009). Assistive technology: Supporting learners in inclusive classrooms. *Kappa Delta Phi Record, 45*(4), 172-175.

Skau, L., & Cascella, P. W. (2006). Using assistive technology to foster speech and language skills at home and in preschool. *Teaching Exceptional Children, 38*(6), 12-17.

Smeyers, P., & Leuven, K. U. (2008). Qualitative and quantitative research methods: Old wine in new bottles? On understanding and interpreting educational phenomena. *Paedagogica Historica, 44*(6), 691-705.

Stanberry, K., & Raskind, M. H. (2009). Assistive technology for kids with learning disabilities: An overview. Retrieved from http://www.ldonline.org/article/Assistive_Technology_for_Kids_with_Learning_Disabilities%3A_An_Overview?theme=print.

Stanford Encyclopaedia of Philosophy. (2008). *The history and varieties of phenomenology*. Retrieved from http://plato.stanford.edu/entries/phenomenology.

Starr, K. (2011). Principals and the politics of resistance to change. *Educational Management Administration & Leadership, 39*(6), 646–660.

Stoner, J. B., Beck, A. R., Dennis, M., & Parette, H. P. (2011). The use of instructional technology in direct vocabulary instruction. *Journal of Special Education Technology, 26*(3), 35-46.

Students with Disabilities Working Group. (2010). Strategies to support the education of students with disabilities in Australian schools. Retrieved from http://www.deewr.gov.au/Schooling/Programs/Pages/MoreSupportforSWD.aspx

Suter, J. C., & Giangreco, M. F. (2009). Numbers that count: Exploring special education and paraprofessional service delivery in inclusion-oriented schools. *The Journal of Special Education, 43*(2), 81-93.

Swackhamer, L. E., Koellner, K., Basile, C., & Kimbrough, D. (2009). Increasing the self-efficacy of inservice teachers through content knowledge. *Teacher Education Quarterly, 36*(2), 63-78.

Sze, S. (2009). The effects of assistive technology on students with disabilities. *Journal of Educational Technology Systems, 37*(4), 419-429.

Takala, M. (2007). The work of classroom assistants in special and mainstream education in Finland. *British Journal of Special Education, 34*(1), 50-57.

Tashakkori, A., & Creswell, J. W. (2007). Editorial: Exploring the nature of research questions in mixed methods research. *Journal of Mixed Methods Research, 1*(3), 207-211.

Tashakkori, A., & Teddlie, C. (2003). Issues and dilemmas in teaching research methods in social and behavioural sciences: US perspectives. *International Journal of Social Research Methodology, 6*(1), 61 -77.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences.* Thousand Oaks, CA: Sage Publications.

Thomas, E. (2007). Thoughtful planning fosters learning transfer. *Adult Learning, 18*(3/4), 4-8.

Twine, R. (2001). *What is essentialism?* Retrieved from http://www.lancs.ac.uk/staff/twine/ecofem/essentialism.html.

UNESCO (United Nations Educational, Scientific and Cultural Organisation). (1994). *Salamanca statement and framework for action on special education needs.* http://unesdoc.unesco.org/images/0009/000984/098427eo.pdf (accessed January 22, 2009).

UNESCO (United Nations Educational, Scientific and Cultural Organisation). (2005). *Guidelines for inclusion: Ensuring access to education for all.* Paris: UNESCO.

United States Congress. (2004). *Individuals with Disabilities Education Improvement Act of 2004 (PL108-446).* Retrieved from http://www.nichcy.org/reauth/PL108-446.pdf.

University of Kentucky. (2002). *UKAT toolkit*. Retrieved from http://edsrc.coe.uky.edu/www/ukatii/.

University of Nebraska-Lincoln. (n.d.). *Project para*. Retrieved from http://para.unl.edu/index.lasso.

Usher, E. L., & Pajares, F. (2008). Self-efficacy for self-regulated learning: A validation study. *Educational and Psychological Measurement, 68*(3), 443-463.

Verza, R., Carvalho, M. L., Battaglia, M. A., & Uccelli, M. (2006). An interdisciplinary approach to evaluating the need for assistive technology reduces equipment abandonment. *Multiple Sclerosis, 12*, 88-93.

Waldron, D., & Layton, N. (2008). Hard and soft assistive technologies: Defining roles for clinicians. *Australian Occupational Therapy Journal, 55*, 61-64.

Wall, C., Glenn, S., Mitchinson, S., & Poole, H. (2004). Using a reflective diary to develop bracketing skills during a phenomenological investigation. *Nurse Researcher, 11*(4), 20-29.

Wang, Y., & Wang, H. (2008). Developing and validating an instrument for measuring mobile computing self-efficacy. *CyberPsychology & Behavior, 11*(4), 405-413. doi: 10.1089/cpb.2007.0061.

Webster, R., Blatchford, P., Bassett, P., Brown, P., Martin, C., & Russell, A. (2010). Double standards and first principles: Framing teaching assistant support for pupils with special educational needs. *European Journal of Special Needs Education, 25*(4), 319–336.

Wehrmann, K. C., Shin, H., & Poertner, J. (2002). Transfer of training: An evaluation study. *Journal of Health & Social Policy, 15*(3/4), 23-37.

Weintraub Moore, H., & Wilcox, M. J. (2006). Characteristics of early intervention practitioners and their confidence in the use of assistive technology. *Topics in Early Childhood Special Education, 26*(1), 15-23.

Westwood, P. (2010). *Commonsense methods for children with special needs* (6th ed). London: Routledge Falmer.

White, E. A., Wepner, S. B., & Wetzel, D. C. (2003). Accessible education through assistive technology. *T H E Journal, 30*(7), 24-27.

Wilson, E., & Bedford, D. (2008). New partnerships for learning: Teachers and teaching assistants working together in schools - the way forward. *Journal of Education for Teaching, 34*(2), 137-150.

Wolfensberger, W. (1972). *The principle of normalisation in human services.* Toronto: National Institute on Mental Retardation

Woolfson, R. C., & Truswell, E. (2005). Do classroom assistants work? *Educational Research, 47*(1), 3-75.

Zabala, J. (2002). *A brief updated introduction to the SETT framework.* Retrieved from http://sweb.uky.edu/~jszaba0/SETTupdate2002.html.

Zahavi, D. (2003). *Husserl's phenomenology.* Stanford, CA: Stanford University Press.

APPENDIX 1

Assistive Technology Initial Questionnaire

Name: _____ **Date:** _____

Age: ☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56 +

Gender: ☐ Female ☐ Male

Number of years as an Education Assistant (Special Needs):

☐ 0-1 ☐ 2-5 ☐ 6-10 ☐ 11-15 ☐ 16+

Primary disabilities of students you provide services to (choose one):

☐ Learning disability/difficulty ☐ Physical ☐ Intellectual ☐ Autism

☐ Communication ☐Vision/Hearing ☐ Other (please specify)_____

Please select the appropriate response from those below:

☐ I was requested by a principal or teacher to attend this training

☐ I asked to attend the training

Have you had any other formal training in Assistive Technology? IF yes, please state the type and duration: ☐ YES ☐ NO

_____

_____

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_____

What educational experiences have you had? (i.e. Certificate IV).

☐ Completed to Year 10 ☐ Completed year 11 & 12 ☐ Education Assistant Course

☐ Other (please specify) _____

Describe your ongoing educational professional development commitment over the past 3 years. (i.e. seminars, workshops attended, etc).

_____

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_____

Question	Excellent	Good	Fair	Poor	Very Poor
1. How would you rate your confidence in using assistive technology for educational purposes?					
2. How would you rate your skills in using assistive technology for educational purposes?					
3. How would you rate your confidence in teaching students how to use assistive technology?					
4. How would you rate your confidence for learning more about assistive technology?					
5. How would you rate your ability to transfer the information learnt in the training to the classroom?					

Please describe what training you would like that is relevant to your needs:

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Please describe what training you would like that is relevant to the needs of the students with special needs with whom you work:

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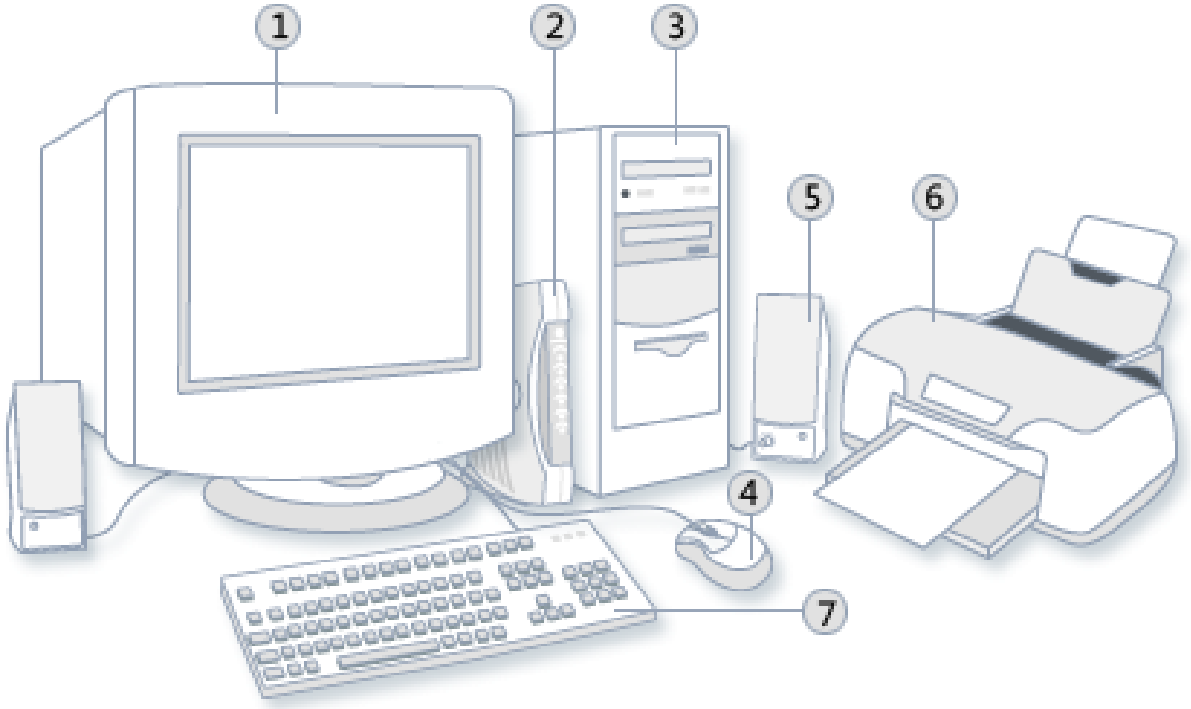
THANK YOU FOR YOUR PARTICIPATION AND ASSISTANCE!

APPENDIX 2 Instructions for Education Assistants (Special Needs)

Name: _____ Date: _____

1. Please complete the labels for this diagram.



1 _____ 3 _____ 5 _____ 7 _____

2 _____ 4 _____ 6 _____

2. Insert the CD Rom into the correct drive and run the program. Change the volume and speed of the program.

3. Create a new Word document and type three sentences about yourself. Save the document and print it in landscape.

4. Using the help feature in Microsoft Word, find out how to make the text larger.

Open a new PowerPoint slide. Using the help feature find out how to add a sound to your presentation.

Open Internet Explorer or Mozilla Firefox (web browsers). Go to www.do2learn.com and then to http://www.songsforteaching.com/friendshipsongs.htm

Use a search engine to look for assistive technology devices.

5. Modify the size of the text in your word document and change the volume of the speakers. Identify 3 different forms of assistive technology that you are aware of.

6. Close the Word and PowerPoint documents that are open. Log off as the user and shut down the computer.

SECTION 2: PLANNING

7. Describe two (2) features of assistive technology that make it useful for the following students:

a) A cane for a student who is visually impaired
b) Text-to-speech function for a student with a learning disability
c) Switches for a student who has cerebral palsy

8. Read the following vignette and a) identify the student's needs and b) suggest two (2) types of assistive technology that may be useful:

Jack is in Year 3. He has been diagnosed with a Global Developmental Delay and Cerebral Palsy. Jack is able to stand independently for periods of up to 15 minutes. He is working at a year 1 academic level for reading, writing and maths. Jack can become easily distracted by activities going on around him.

His needs are: Two (2) useful types of Assistive Technology may be:

9. What would you do if you were helping a student who used a voice output device and the device failed to work?
How could you assist a student with vision impairment to access a worksheet if they had left their magnifying lens at home?
When a computer does not work and a student who requires it to complete their work has to write an essay, what would you do?

SECTION 3: ASSESSMENT

10. Name three (3) ways of determining whether assistive technology was assisting a student with special needs.

11. How would you monitor the use of assistive technology in the classroom?

How would you identify changes or modifications to the assistive technology that may be required for a student with a special need?

Who would be involved in making changes to the assistive technology used by the student with special needs?

SECTION 4: PRACTICE AND COLLABORATION

12. Who would you work with in order to ensure that the assistive technology was appropriate for the student?
Who, apart from yourself, would be involved with implementing the use of assistive technology in the classroom?
Is it your role to instruct others in the use of the assistive technology? Why/ Why not?

SECTION 5: SPECIFIC TECHNOLOGIES

You will be asked to use a variety of assistive technologies. Please do not worry if you are unfamiliar with them.

Thank you for completing the skills and knowledge assessment.

APPENDIX 3

Assistive Technology Questionnaire Post training

Name: _____ **Date:** _____

As a result of training:

Question	Excellent	Good	Fair	Poor	Very Poor
1. How would you rate your confidence in using assistive technology for educational purposes?					
2. How would you rate your skills in using assistive technology for educational purposes?					
3. How would you rate your confidence in teaching students how to use assistive technology?					
4. How would you rate your confidence for learning more about assistive technology?					
5. How would you rate the training provided for usefulness in your classroom situation?					
6. How would you rate your ability to transfer the information learnt in the training to the classroom?					

Was the training was relevant to your needs? If so, how?

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Was the training was relevant to the students with special needs with whom you work? If so, how?

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Have your perceptions of personal competency in the area of assistive technology changed as a result of the training? If so, how?

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Do you feel better prepared to teach a student with a disability to effectively use assistive technology to the fullest extent possible? Why?

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Are there any areas related to Assistive Technology that you feel should have been addressed more thoroughly?

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Please discuss whether the skills covered in the training package will be used in the classroom in which you are situated. If so, how?

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Are you willing to participate in a small focus group to discuss further aspects of the training in assistive technology? The session should not run for longer than 1 hour.

☐ YES ☐ NO

THANK YOU FOR YOUR PARTICIPATION AND ASSISTANCE!

APPENDIX 4

Small group focus interview 1

1. Introduce all parties

2. Provide description of purpose of the Focus Group Interview
    a. Education Assistant perspective
    b. Identify potential useful training practices
    c. Identify feelings of efficacy

3. Formal questions to be asked of participants:
    a. Do you feel prepared to teach students with special needs using available assistive technology?
    b. Has the training changed these feelings of efficacy for better or worse?
    c. Do you feel that the training was suitable for varied situations and participants?
    d. Are the skills learnt in the training situation able to be implemented in the classroom? If not, why not?
    e. Have you increased the use of assistive technology in the classroom as a result of the training?
    f. What are the teachers' responses to the increased level of knowledge of the Education Assistants?
    g. Do you feel that the students you work with have benefited from the training that you have received?

4. Questions that are drawn from responses to the questionnaire:
    a. Further exploration of feelings of efficacy?
    b. What aspects will be utilised in the classroom?
    c. Any further needs identified after the training?
    d. Why not sought out opportunities?

5. Open forum

APPENDIX 5

Assistive Technology Questionnaire Maintenance

Name: _____ **Date:** _____

As a result of training:

Question	Excellent	Good	Fair	Poor	Very Poor
1. How would you rate your confidence in using assistive technology for educational purposes?					
2. How would you rate your skills in using assistive technology for educational purposes?					
3. How would you rate your confidence in teaching students how to use assistive technology?					
4. How would you rate your confidence for learning more about assistive technology?					
5. How would you rate the training provided for usefulness in your classroom situation?					
6. How would you rate your ability to transfer the information learnt in the training to the classroom?					

With reference to the Assistive Technology training that you completed with Dianne Chambers:

Did you use what you had learnt in training in assistive technology in the classroom? If so, how?

_____

_____

_____

_____

_____

_____

_____

_____

_____

Was the training relevant to your long term needs? If so, how?

_____

_____

_____

_____

_____

_____

_____

_____

If your perceptions of personal competency in the area of assistive technology changed as a result of the training, do you still feel this is so? If so, how?

_____

_____

_____

_____

_____

_____

_____

_____

Do you still feel prepared to teach a student with a disability to effectively use assistive technology? Why?

_____

_____

_____

_____

_____

_____

Are there any areas related to Assistive Technology that you feel should have been addressed more thoroughly, now that you have had time to consolidate your learning?

_____

_____

_____

_____

Are there any general comments you would like to make?

_____

_____

_____

_____

_____

_____

_____

_____

_____

Are you willing to participate in small focus groups to discuss further aspects of the training in assistive technology after 10 weeks in action?! The session should not run for longer than 1 hour.

☐ YES ☐ NO

THANK YOU FOR YOUR PARTICIPATION AND ASSISTANCE!

APPENDIX 6

Small group focus session 2 - Maintenance

1. Introduce all parties

2. Provide description of purpose of the small group sessions
    a. Education Assistant perspective
    b. Identify potential useful training practices
    c. Identify feelings of efficacy post training

3. Formal questions to be asked of participants:
    a. Do you still feel prepared to teach students with special needs using the available assistive technology?
    b. After the 10 week period do you feel the training has affected your feelings of efficacy for better or worse?
    c. Have you increased the use of assistive technology in the classroom as a result of the training?
    d. Were the skills learnt in the training situation able to be implemented in the classroom? If not, why not?
    e. What were some of the barriers to implementation and how do you think these could have been overcome?
    f. Do you feel that the students you work with have benefited from the training that you have received?
    g. What are your feelings about pursuing extra training in the future?

4. Questions that are drawn from responses to the questionnaire (to be determined after questionnaire has been completed):
    a. Further exploration of feelings of efficacy?
    b. What aspects were utilised in the classroom/most relevant for you?
    c. Is there any specific AT that you would like to know more about?
    d. What could be done to enhance the use of AT in your classroom?
    e. Are there any ways to ensure a good working relationship between teachers and EASN – particularly in regards to AT?

5. Open forum

APPENDIX 7

Assistive Technology Application in the Classroom

Name:

Year levels worked with:

Brief description of the needs of the students: (i.e. physical difficulties-writing, painting, physical education)

Areas in which I need to provide assistance:

Types of Assistive Technology that may be useful:

Sessions or times when the AT may be used:

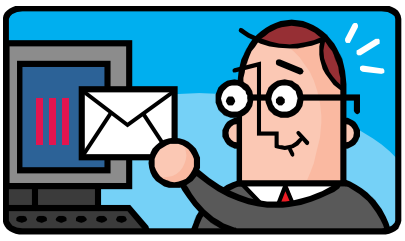
People I need to liaise with:

Further training that I may need:
Other relevant information:
Date: **Review date:**

TECH - For considering student's needs

- **T**arget the students' needs and the learning outcome.
- **E**xamine the technology choices, then decide what to use.
- **C**reate opportunities to integrate technology with other instructional activities.
- **H**andle the implementation, and monitor the impact on the student's learning

(King-Sears & Evmenova, 2007)



APPENDIX 8

THE UNIVERSITY OF NOTRE DAME AUSTRALIA

19 Mouat Street (PO Box 1225)
Fremantle, Western Australia 6959
Telephone: +61 8 9433 0555
Facsimile: +61 8 9433 0544
Email: enquiries@nd.edu.au
Internet: www.nd.edu.au

ABN: 69 330 643 210
CRICOS PROVIDER CODE: 01032F

2nd July 2008

Mrs Dianne Chambers
45 Piesley Promenade
Canning Vale WA 6155

Dear Dianne,

I am writing to you in regard to your Application for Ethical Clearance for your proposed research project to be undertaken for the research component of your course at the University of Notre Dame Australia.

The title of this project is: *"Assistive Technology: Effects of Training on Education Assistants and Consequent Outcome Improvements for Children with Special Needs"*

I am pleased to advise that your proposal has been reviewed by the University's Human Research Ethics Committee and approval has been granted for this proposed study subject to the following conditions:

1. Applicant is requested to advise the Research Office in writing the process intended for obtaining consent. This advice will be tabled at the next meeting of the HREC (2nd September 2008) for ratification. It is suggested that the researchers will need to carefully consider the capacity of children to give meaningful consent and provide a plan for how this vulnerability will be addressed if encountered.
2. Applicant to expand the information sheet to include reference to use of video/audio taping.
3. Applicant to give consideration to reducing the complexity of the language in the information sheet.

Should the design of the study, the choice of instrument, or its manner of administration be altered in any significant way as the study progresses, you will be required to provide an update of your clearance application for fresh consideration by the University.

On behalf of the Human Research Ethics Committee, I wish you well with what promises to be a most interesting and valuable study.

Yours sincerely,

Lorraine Mayhew
Executive Officer, Human Research Ethic Committee
Research Office

cc. Associate Professor Richard Berlach

APPENDIX 9

Department of Education and Training
Government of Western Australia

Your ref:
Our ref: D08/0060464
Enquiries:

Ms Dianne Chambers
Coordinator of Special Education
University of Notre Dame Australia
PO Box 1225
FREMANTLE WA 6959

Dear Ms Chambers

Thank you for your completed application received 26 June 2008 to conduct research on Department of Education and Training sites.

The focus and outcomes of your research project titled, *Assistive technology; Effects of training on Education Assistants and consequent outcome improvements for children with special needs,* are of interest to the Department, and I give permission for you to approach site managers to invite their participation. However, it is a condition of approval that the results of this study are forwarded to the Department upon conclusion.

Consistent with Department policy, participation in your research project will be the decision of the particular schools invited to participate and the individual staff members.

Responsibility for quality control of ethics and methodology of the proposed research resides with the institution supervising the research. The Department notes a copy of a letter confirming that you have received ethical approval of your research protocol from the Notre Dame University Australia Human Research Ethics Committee.

Any proposed changes to the research project will need to be submitted for Department approval prior to implementation.

Please contact Warren Brown, Policy Analyst, on 9264 5344 or researchandpolicy@det.wa.edu.au if you have further enquiries.

Very best wishes for the successful completion of your project.

Yours sincerely

NORMA JEFFERY
EXECUTIVE DIRECTOR
POLICY, PLANNING AND ACCOUNTABILITY

27 June 2008

151 Royal Street, East Perth, Western Australia 6004

APPENDIX 10

Site Manager Information Sheet

INFORMATION SHEET

Dear Site Manager

My name is Dianne Chambers. I am a student at The University of Notre Dame Australia and am enrolled in a Doctor of Philosophy. As part of my course I need to complete a research project. I would like to invite your school to take part in the project. I am interested in the views of Education Assistants (Special Needs) in relation to assistive technology use in the classroom.

The title of the project is *Assistive Technology: Effects of Training on Education Assistants and Consequent Outcome Improvements for Children with Special Needs.* My research concerns training Education Assistants (Special Needs) in the area of assistive technology and examining the effects of this training. The purpose of the study is to investigate the views of education assistants as they see themselves as users and facilitators of assistive technology in the classroom and examine the transferral of skills learnt in training into a classroom setting. Your school is one of 30 schools in the Fremantle/Peel District that have been approached for this project.

I seek access to Education Assistants (Special Needs) and possibly one or two children with special needs, with whom the Education Assistants work. The Education Assistants (Special Needs) will be invited to participate in an eight week training program (2 hours per week) in the area of assistive technology. This training will take place during school hours. After the training, participants will be requested to complete a questionnaire and a short skills test.

A small number of participants will be sought to form a focus group to discuss issues and comments brought up in the questionnaire responses. This information will be audio recorded. Information collected through the questionnaire and the focus groups will be strictly confidential. This confidence will only be broken in the instance of legal requirements such as court subpoenas, freedom of information requests or mandated reporting by some professionals. To protect the anonymity of participants in a project with a small sample size, a code will be ascribed to each of the participants to minimise the risk of identification. The protocol adopted by the University of Notre Dame Australia Human Research Ethics Committee for the protection of privacy will be adhered to and relevant sections of the *Privacy Act* are available at http://www.nhmrc.gov.au/.

A small number of students (5 in total out of 30 schools approached) will be sought to aid in determining the impact of the training on students. This will involve observation of the students using assistive technology before and after the Education Assistant has had training in assistive technology. Parental permission will be sought for the students to participate.

I will keep the school's involvement in the administration of the research procedures to a minimum. However, it will be necessary for the school to provide time (2 hours a week for 8 weeks) for the Education Assistants to attend the training sessions.

THE UNIVERSITY OF NOTRE DAME AUSTRALIA

Assistive Technology: Effects of Training on Education Assistants and Consequent Outcome Improvements for Children with Special Needs

SITE MANAGER INFORMED CONSENT FORM

- I have read and understood the aims, procedures and risks of the project as described in the Information Sheet.
- For any questions I may have had, I have taken up the invitation to ask those questions, and I am satisfied with the answers I received.
- I am willing for this school to become involved in the reserach project, as described.
- I understand that the school is free to withdraw from participating in the project at any time within 5 years from project completion, without prejudice.
- I understand that all information gathered by the researcher will be treated as strictly confidential, except in instances of legal requirements such as court subpoenas, freedom of information requests, or mandated reporting by some professionals.
- I understand that the protocol adopted by the University Of Notre Dame Australia Human Research Ethics Committee for the protection of privacy will be adhered to and relevant sections of the *Privacy Act* are available at http://www.nhmrc.gov.au/
- I agree that any research data gathered for the study may be published provided the school or other identifying information is not disclosed.
- I understand that a summary of the findings from the research will be made available to me upon its completion.

PARTICIPANT'S FULLNAME:		DATE:	
PARTICIPANT'S SIGNATURE:		DATE:	

RESEARCHER'S FULL NAME:			
RESEARCHER'S SIGNATURE:		DATE:	

If participants have any complaint regarding the manner in which a research project is conducted, it may be given to the researcher or, alternatively, to the Provost, The University of Notre Dame Australia, PO Box 1225 Fremantle WA 6959, phone (08) 9433 0941.

THE UNIVERSITY OF NOTRE DAME AUSTRALIA

INFORMATION SHEET

Dear Education Assistant (Special Needs),

My name is Dianne Chambers. I am a student at The University of Notre Dame Australia and am enrolled in a Doctor of Philosophy. As part of my course I need to complete a research project. I would like to invite you to take part in the project as I am interested in the views of Education Assistants (Special Needs) in relation to assistive technology use in the classroom.

The title of the project is *Assistive Technology: Effects of Training on Education Assistants and Consequent Outcome Improvements for Children with Special Needs.* My research concerns training Education Assistants (Special Needs) in the area of assistive technology and examining the effects of this training. The purpose of the study is to investigate the views of education assistants as they see themselves as users and facilitators of assistive technology in the classroom and examine the transferral of skills learnt in training into a classroom setting. Your school is one of 30 schools in the Fremantle/Peel District that have been approached for this project.

Participants will take part in an eight week training program (2 hours per week) in the area of assistive technology. This training will take place during school hours. After the training, participants will be requested to complete a questionnaire and a short skills test. A small number of participants will be sought to form a focus group to discuss issues and comments brought up in the questionnaire responses. This information will be audio recorded. You will be offered a transcript of the focus group, and I would be grateful if you would comment on whether you believe we have captured your experience. Information collected through the questionnaire and the focus groups will be strictly confidential. This confidence will only be broken in the instance of legal requirements such as court subpoenas, freedom of information requests or mandated reporting by some professionals. To protect the anonymity of participants in a project with a small sample size, a code will be ascribed to each of the participants to minimise the risk of identification.

The protocol adopted by the University of Notre Dame Australia Human Research Ethics Committee for the protection of privacy will be adhered to and relevant sections of the *Privacy Act* are available at http://www.nhmrc.gov.au/

Before participating I will ask you to sign a consent form. Participation is completely voluntary and you may withdraw from the project at any time. If you wish to participate, the decision will need to be made by January 15, 2009 for you to be included in the project. Participants will be provided with support after the training in the form of email and phone contact from the researcher. Once a decision is made to participate, you can change your mind at any time within the minimum five year storage period of the research data (see below). All contributions made to the project will be destroyed unless explicitly agreed to by you. If the project has already been published at the time you decide to withdraw, your contribution that was used in the reporting cannot be withdrawn.

Data collected will be stored securely in the University's School of Education for five years and can only be accessed by the researcher, Dianne Chambers. After a period of five years the data will be destroyed. This will be achieved by secure shredding of any data. Information that identifies anyone will be removed from the data and the results from the study will be made freely available to all participants approximately 6 months after completion of the training. This data will only be used for this project and will not be used in any extended or future research without first obtaining your consent.

This research will benefit you in your role as an Education Assistant (Special Needs) through the provision of increased knowledge and skills in this area. This will enable you to work more effectively with students who require teaching and learning adjustments to access the curriculum. There are no risks associated with your participation in this project.

The Human Research Ethics Committee of the University of Notre Dame Australia has approved the study and it has met the policy requirements of the Department of Education and Training.

Dr Richard Berlach of the School of Education is supervising the project. If you have any queries regarding the research, please contact me directly or Dr Berlach by phone (08) 9433 0151 or by email at rberlach@nd.edu.au.

If you have had all questions about the project answered to your satisfaction, and are willing to become involved, please complete the Consent Form on the next page. This information letter is for you to keep

Yours sincerely,

Mrs Dianne Chambers
Tel: (08) 9433 0170
Email: dchambers2@nd.edu.au

If participants have any complaint regarding the manner in which a research project is conducted, it may be given to the researcher or, alternatively, to the Provost, The University of Notre Dame Australia, PO Box 1225 Fremantle WA 6959, phone (08) 9433 0941.

THE UNIVERSITY OF NOTRE DAME AUSTRALIA

Assistive Technology: Effects of Training on Education Assistants and Consequent Outcome Improvements for Children with Special Needs

EDUCATION ASSISTANT (SPECIAL NEEDS) INFORMED CONSENT FORM

I, *(participant's name)* _____hereby agree to being a participant in the above research project.

- I have read and understood the aims, procedures and risks of the project as described in the Information Sheet.
- For any questions I may have had, I have taken up the invitation to ask those questions, and I am satisfied with the answers I received.
- I understand that I may withdraw from participating in the project at any time within 5 years from project completion, without prejudice.
- I understand that all information gathered by the researcher will be treated as strictly confidential, except in instances of legal requirements such as court subpoenas, freedom of information requests, or mandated reporting by some professionals.
- I understand that the protocol adopted by the University Of Notre Dame Australia Human Research Ethics Committee for the protection of privacy will be adhered to and relevant sections of the *Privacy Act* are available at http://www.nhmrc.gov.au/
- I agree that any research data gathered for the study may be published provided my name or other identifying information is not disclosed.
- I understand that a summary of the findings from the research will be made available to me upon its completion.

PARTICIPANT'S SIGNATURE:		DATE:	

RESEARCHER'S FULL NAME:			
RESEARCHER'S SIGNATURE:		DATE:	

If participants have any complaint regarding the manner in which a research project is conducted, it may be given to the researcher or, alternatively, to the Provost, The University of Notre Dame Australia, PO Box 1225 Fremantle WA 6959, phone (08) 9433 0941.