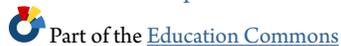

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Assistive technology: effects of training on education assistants' perceptions of themselves as users and facilitators of assistive technology and consequent transfer of skills to the classroom environment

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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.

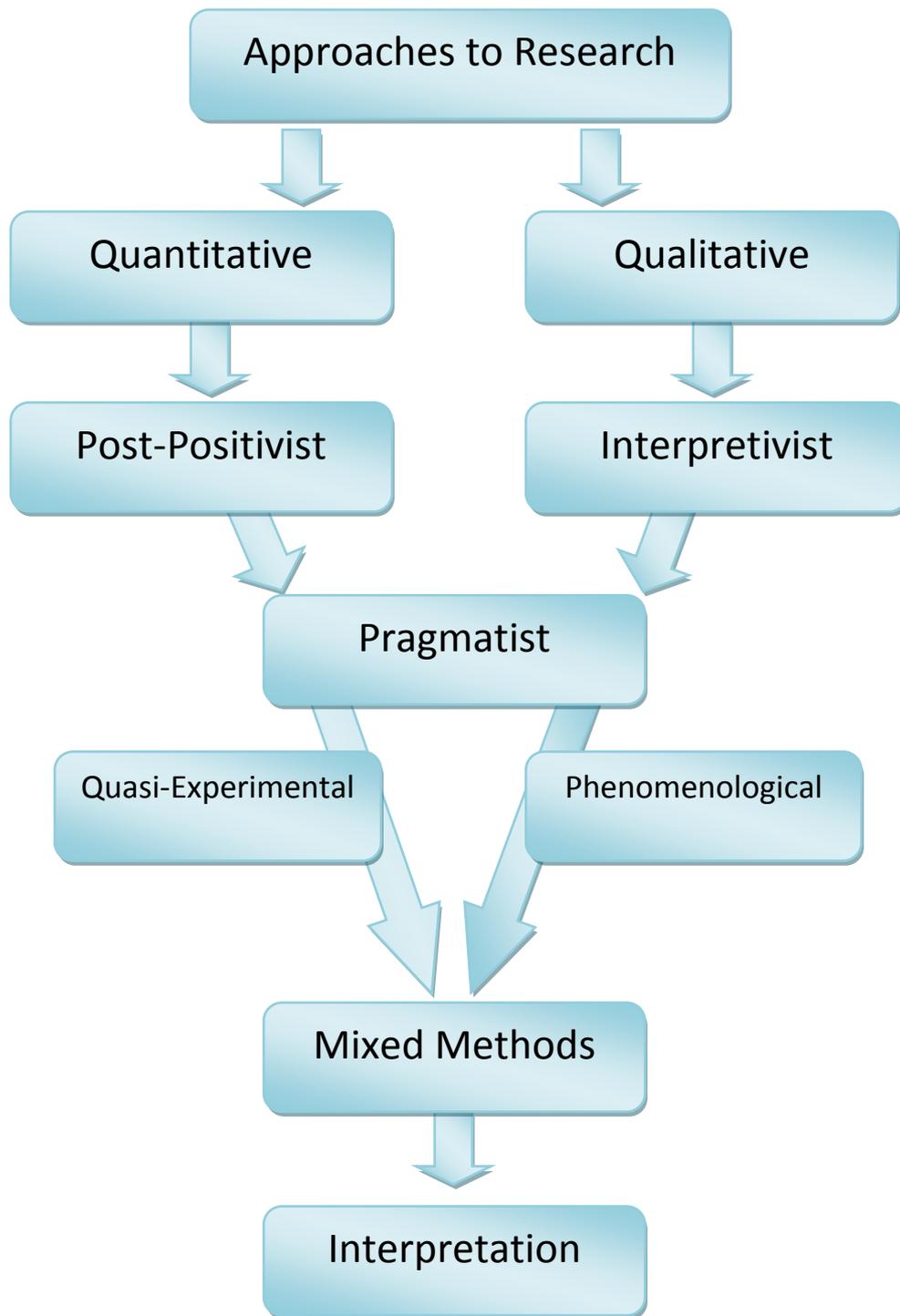


Figure 3.1. Theoretical framework for addressing research questions.

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; Gerner, 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 <ul style="list-style-type: none"> • 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.

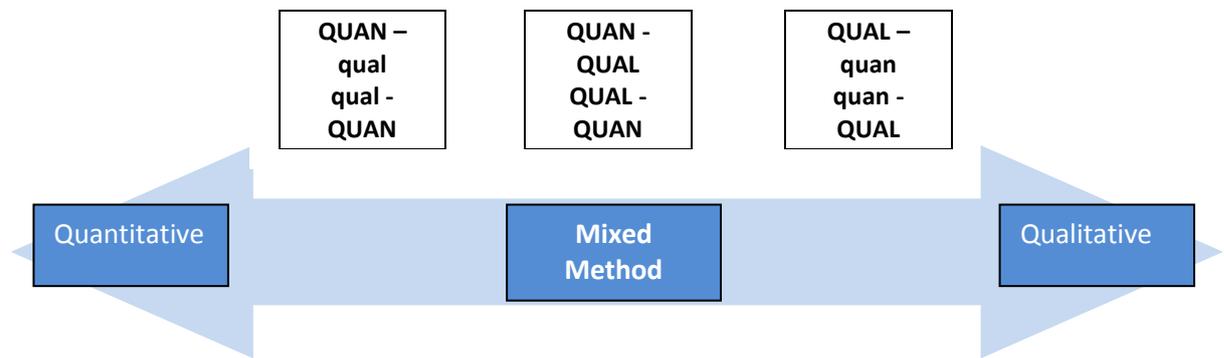


Figure 3.2. A continuum of methodology (Adapted from Johnson & Onwuegbuzie, 2004 and Teddlie & Tashakkori, 2009).

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.

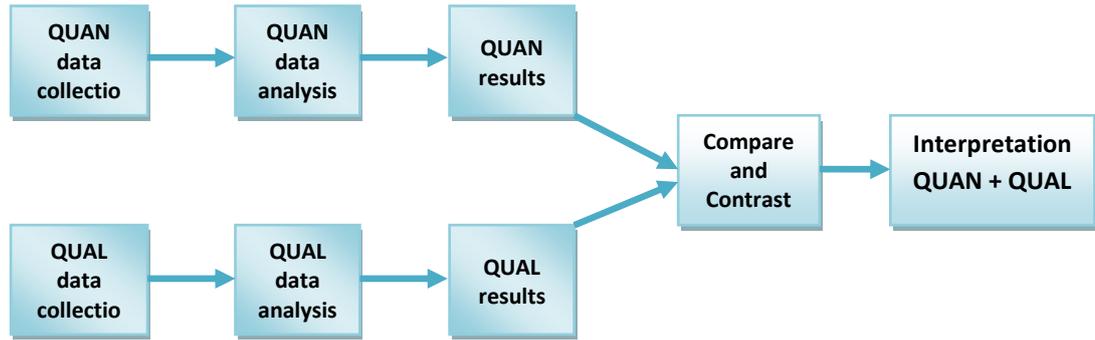


Figure 3.3. Triangulation design: Convergence model (Creswell & Plano Clark, 2007, p. 63).

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.

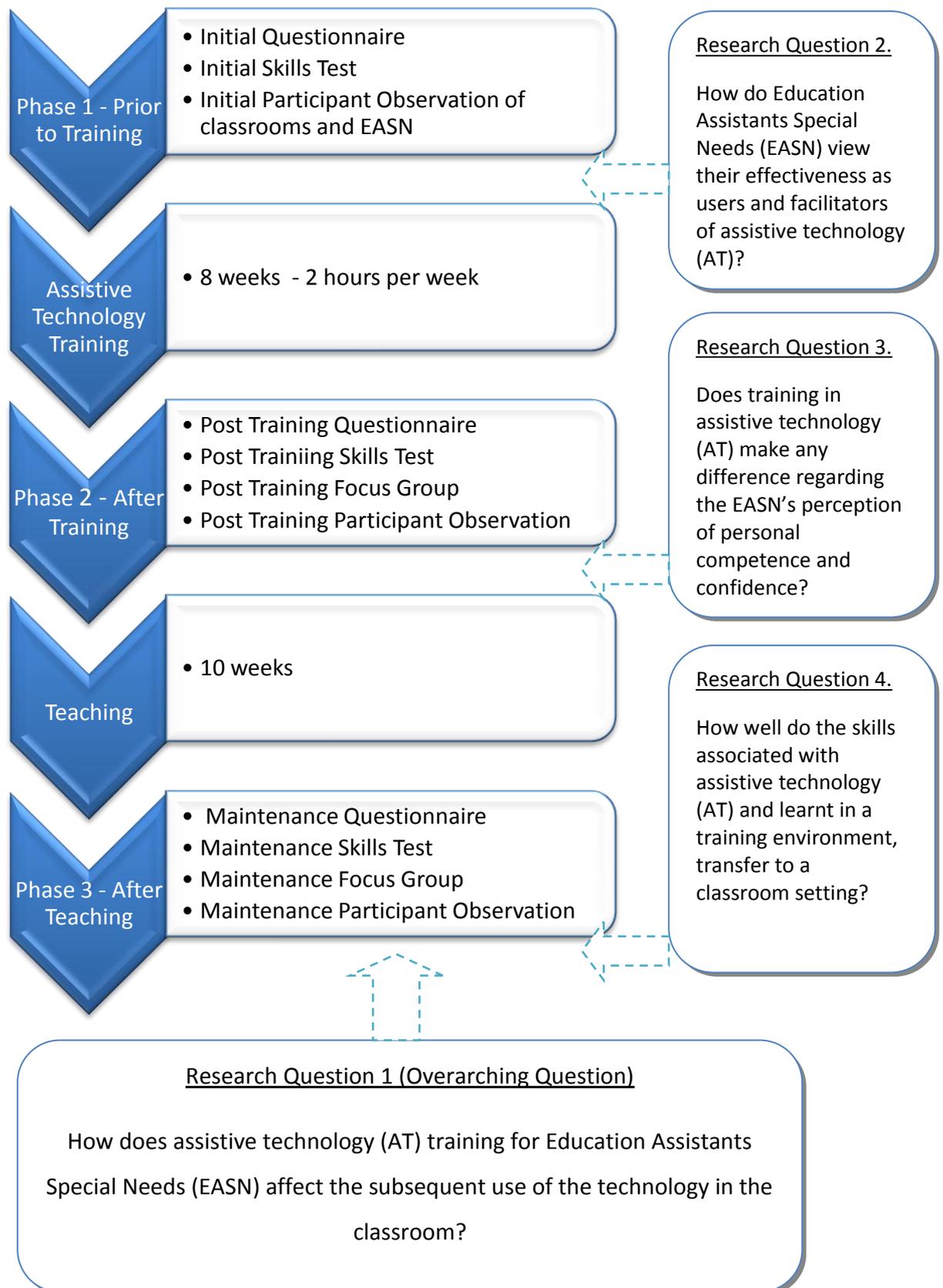


Figure 3.4. Phases of data collection.

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 pedagogical 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.

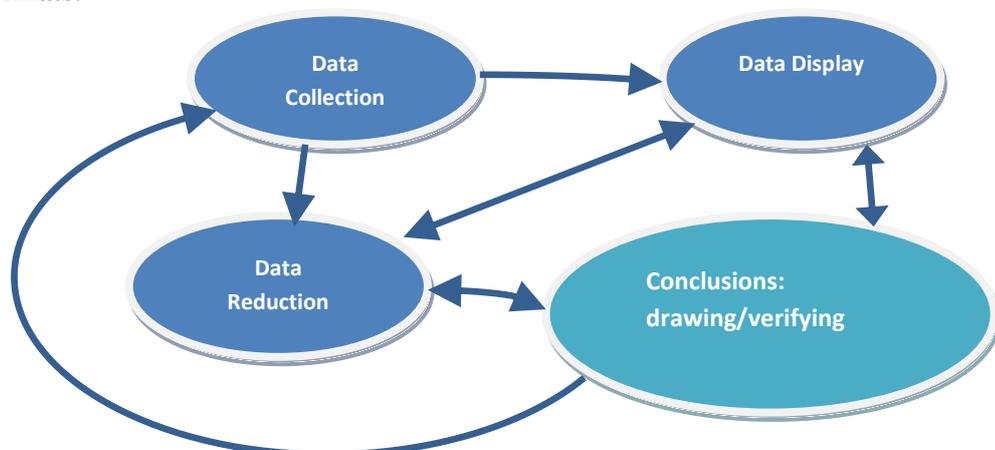


Figure 3.5: *Components of data analysis: Flow model* (Miles & Huberman, 1984, p. 23).

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 "highlight[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.