

**A STUDY OF THE INFLUENCES OF COMPUTER TECHNOLOGY ON THE READING
ABILITY OF INTELLECTUALLY CHALLENGED LEARNERS**

by

ALBERT MARIUS WARNICK

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Supervisor: Dr Cina Mosito

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ABSTRACT

The aim of this qualitative study was to assess the influence of a particular form of computer technology on the reading ability of intellectually challenged learners. The study sought to answer the questions:

- (i) what direction for change does the reading of intellectually impaired learners take when a particular assistive technological device is used as a teaching-learning tool? And,
- (ii) what can educators of these intellectually impaired learners learn from this change or lack thereof?

In order to answer these questions the study was conducted using an Action Research design. An intervention based on assistive technology was used for

- (i) testing learner abilities; and
- (ii) measuring performance and possible change(s).

A comparison of learners' performance and effort following testing suggests that the assistive technology used has the potential to positively influence the reading ability of some segments of learners with an intellectual impairment. Furthermore, the findings make it clear that assistive technology does not take away the need for teachers to differentiate where a variety of learner abilities is concerned.

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CHAPTER ONE

ORIGIN AND BACKGROUND OF THE STUDY

1.1 Introduction

The South-African Education Policy highlights that all learners' needs are to be met in pursuit of realizing the full potential of all learners. Closely linked with this policy are the underpinnings of the South African constitution which emphasizes respect for the rights of all learners irrespective of their diversity. Accordingly, this right implies an inclusive approach to education through which all learners are entitled to a supportive learning environment (South Africa, 1995 in Prinsloo, 2001). Inclusive education and training according to White Paper 6 indicates amongst others that all children and youth can learn if provided with the necessary support. Secondly inclusive education and training serves to ensure that all learners in the various educational institutions are able to optimally engage in the curriculum. The focus should also be on the learners' strengths as well as to ensure that they participate actively in their own learning (DoE, 2001:16).

Directly linked with inclusion is the issue of whether learners with special educational needs ought to remain in special schools or be taught in mainstream schools (DoE, 2001). Currently a significant number of learners with special educational needs receive schooling in special schools (DoE, 2001:9). Such learners are being grouped and taught within these institutions according to the learner's unique disability i.e. whether they are mentally and or physically impaired. White Paper 6 differentiates between mainstreaming and inclusion on several grounds. These are systemic/institutional parameters of support and lastly the individual learner needs.

1.1.1 Systemic/Institutional

Insofar as *mainstreaming* is concerned, the learners have to fit into a particularly defined system or they have to integrate into an existing one. *Inclusion* on the other hand serves to acknowledge the uniqueness of the learners and build on their similarities.

1.1.2 Parameters of support

Within the *mainstream model* the learners are being provided support with the purpose of integrating them back into the "normal" classroom. *Inclusion* in turn has the whole system inclusive of the learners' and educators' needs at heart. One of the primary objectives is that of the development of teaching strategies that would facilitate and benefit all learners.

1.1.3 Individual learner needs

Mainstreaming focuses on the learner. The learner ought to change in order to be acceptable within the system. In sharp contrast to mainstreaming *inclusion* focuses on overcoming the challenges within the system that are stumbling blocks to the learner's needs. Importantly, there is a shift towards adaptation and **provision of** support systems within the classroom environment (DoE, 2001:17).

Inclusion within a mainstream class environment includes multi-level classroom instruction by educators in which the lessons are being adapted to the learners' specific needs. In special schools and or resource centres the educators concentrate on the development of learners' unique strengths rather than what they cannot do (DoE, 2001:18). Special schools provide education services to learners who require low to high levels of support. Some learners that are in need of high levels of support by professionals such as educators and therapists should ideally be housed in special schools. Part of the reason is that educators within the mainstream are unable to provide in the needs of these learners with high needs (DoE, 2001:21).

Most of the inclusion ideals as outlined by White Paper 6 are being conformed to at the special school where the study constituting this dissertation was conducted¹. A learner centred approach is being followed with the aim of meeting all the learners' needs. One of the aims is the creation of individual education plans for all learners, in order to service their needs. Another is to adapt the current National Curriculum Statement's assessment standards to further meet the needs of all learners. This is done because of the absence of a curriculum that caters for the specific needs of learners with special educational needs, in particular the intellectually impaired. The current curriculum in use at the school is foundation phase inclined, that is, Reception Grade to Grade 3. Yet a significant percentage of, if not all, the learners at our school have challenges in performing all the tasks in a given grade. The educator is compelled to amend the assessment standards by, for example, only doing a portion of a particular body of work.

Another critical part of inclusion as mentioned earlier is the adaptation of support systems within the classroom. This study underscores this point quite strongly by taking cognizance of assistive technology (speech technology) as a potentially successful medium of support. Central to the success of this supportive relationship is the role of the educator as a mediating agent. Underpinning this role of the educator as a mediating agent of learning is the development of teaching strategies that would fully support the learner's ability to learn. That is, in what way can

¹ The researcher is a teacher at the special school where the study was conducted.

the educator utilize the computer technology within the teaching learning situation, coupled with his/her own skills, to support the learner? The Centre for Studies on Inclusive Education (2000) in Prinsloo (2001) developed the Inclusion Charter in 1989, with the objective of “ending segregation in education for all children and young people with disabilities and/or learning difficulties.” This said charter was officially adopted and signed in November 1999 in Redland Bristol, Britain by political parties, local education authorities and various other organizations. The charter upholds the right that all children have equal value and status in society. Furthermore, the charter envisages a systematic transfer of resources, personnel and learners from special schools to the mainstream (Prinsloo, 2001). Accordingly, educators in South Africa were fully in support of the guidelines of the charter, primarily based on its underlying principles. Therefore, the exclusion of children from the mainstream because of a disability is a discriminatory practice. These concepts, “inclusivity” and “mainstreaming” all have serious implications for education within this country, particularly in so far as it concerns learners with special educational needs. Mainstreaming as discussed earlier, wherein the learner conforms to the system instead of the system adapting to the needs of the learner, appears to put learners with special educational needs at a disadvantage. Within the inclusive education framework the learners’ needs appear to be better catered for.

Supportive mechanisms of which adaptation systems form part of can prove to be significant in the successful delivery of the curriculum. Mainstreaming has the potential to further marginalize the learners with special educational needs. These learners have particular barriers to learning which can spread across the learning areas of literacy, numeracy and life skills. These challenges are synonymous with the learners at my school. So, in terms of the statement made earlier, *the concepts of inclusivity and mainstreaming have far reaching implications for learners with special educational needs.*

Whether learners with disabilities are taught in special or mainstream schools is not the issue for the present discussion. Of significance is the quality of education such learners are given access to in schools. Therefore, what teachers do and how they do it as a way of catering for the unique needs and challenges of learners with disabilities is of essence. My interest is specifically on learners with both physical (of a neurological² origin) and intellectual impairments as I work at a special school that caters for this group of learners. Unless physical problems affect hearing and vision, very often reading, writing and language acquisition generally are not affected by physical

² Some of the physical disabilities of neurological origin include epilepsy, cerebral palsy, spina bifida and muscular dystrophy. The learners at my school are mostly cerebral palsy.

difficulties of either the skeletal, physical or muscular origin (Dednam, 2005). Intellectual impairments on the other hand have been noted to significantly affect learning as they are characterized by significantly sub-average intellectual functioning, existing concurrently with related limitations in two or more of the following adaptable skills areas: communication, self care, home living, social skills, community use, self direction, health and safety, functional academics, leisure and work (Jooste & Jooste, 2005:380).

Furthermore, intellectual impairments fall within a range of sub-categories, i.e. “mild”, “moderate”, “severe” and “profound” (Sue, Sue & Sue, 1990:485-486, Louw & Edwards, 1997, 348-349). Closely tied to these categories are the terms “educable” and “trainable”, which broadly serve to distinguish between intellectually impaired learners that are able to attain competent literacy levels (mild and moderate), and those that are only able to realize “self-help” skills (severe and profound). The continuum of abilities suggests that knowledge and skill acquisition for the intellectually impaired learners are as widely varied and often characterized by a higher level of challenges in literacy acquisition when compared to learners without disabilities. Throughout the study the terms intellectually/mentally impaired and intellectually challenged will be used interchangeably. Essentially these terms refer to learners with similar characteristics.

These descriptive definitions of the range of sub-categories of the intellectually impaired are consistent with the learners at my school. A significant percentage of the learners can be described as *educable* as far as academic performance is concerned. In this instance I refer particularly to literacy and numerical competency. A large part of the learners is able to execute simple numerical additions and subtractions. Some of them can even do additions at a grade 1-2 level. However, the biggest discrepancies exist within literacy, particularly reading. For example the same learner that is able to do numerical additions up to grade 2 level has challenges to identify certain words or to read a short segment out of a book. In fact a small group of learners can identify a few random words in a sentence or story. The level of competency is however well below the abilities of their age cohort. Part of the reason for this lack of competent literacy skill is due to the discrepancy between chronological (CA) and mental age (MA). Meaning, the learners are perhaps 13 years old chronologically, but function actually on the level of a 6-7 year old. Thus the level of successful task execution will be affected significantly. The parts of the sentences that the learners do identify are sometimes not enough to facilitate some understanding of the text. Manset-Williamson and Nelson (2005) holds that if learners were to garner meaning from the complete body of text then they have to read fluently from sentence to sentence (Martin, Martin & Carvalho (2008:113), something which learners with a big CA versus

MA discrepancy might not achieve. These groupings of learners that can identify some words in a story are sometimes also able to identify the names of shops or popular commercial outlets. It is also due to this latter reason that a lot of the teaching and learning at our school consists of facilitating a functional literacy programme. Meaning, the learners are being exposed more to *identify common words, names of places, their names, as well as the initial and primary letters of objects or items.*

Generally, the group of learners described as severe to profound has difficulty in academic performance. The concentration of teaching and learning is mostly of life skills rather than on literacy and numeracy. This means that a bigger emphasis is on teaching them to be functionally independent in most spheres of their lives. These learners are exposed to writing tasks (copy from the white board), but to a lesser degree to reading activities. In groups, *mild to moderate* and the *severe to profound* learners will be exposed to visual deductive “reading” tasks. This means, the learners have to deduce from the pictures in a story what the central points in the story are. Some educators expose their learners also to auditory/recorded stories as opposed to printed text. These learners are then assessed on how much information they can recall, the characters involved and the moral values they can elicit.

Given the differences of the intellectually impaired learners, a number of questions are worth pursuing:

- (1) Firstly, how would an educator of such learners deal with possible academic underachievement or failures?
- (2) Secondly, when and how does an educator intervene to prevent and ameliorate the failures?

Following these questions, of interest to me as an educator of mentally impaired learners is the utilization of other forms of quality knowledge and skills (specifically reading and writing literacy) transmission that seem to yield positive results for such learners. A common view in the literature is that technological resources can be utilized to support the learning of a mentally impaired learner (Phillips, Parette, Hourcade, Boeckmann & Blum, 2008:233). Technology, in particular the physical properties of colour, sound and imagery of computers can enhance a learner`s understanding of language within a particular context (Jewitt, 2006 in Phillips et al., 2008:233). Children with a disability according to Cook et al. (2004), sometimes experience difficulty in their development of literacy skills such as understanding of the text, identification and conceptualization of the alphabet and sound-symbol relationships (Phillips et al., 2008:233). Presentation software with its visually enhancing features, have the potential to improve the

literate proficiency of a learner with a disability (Turbill and Murray, 2006 in Phillips et al., 2008:233).

Lin, Podell and Rein's (1991) in Wehmeyer, Smith, Palmer and Davies (2004:14) have also conducted research to ascertain whether learners' performance on word recognition differs significantly if they were instructed with either the support of the computer or just the educator. It was found that the 45 intellectually challenged learners' showed an improvement in their response rate but not in their ability to recognize the words. The improvement in response rate was attributed to the fact that the feedback was immediate as well as that the learners received regular reinforcement. Given the diverse needs of the intellectually challenged learner, one has to look towards technology that can address their multi-faceted needs. Multimedia is one such technology. It is a type of technology that has benefits across the learning styles of all learners as well as providing a different method of instruction (Kamstrup, Mjovik & Rygold, 2002 in Thompson, 2005). One such multimedia programme is text-to-speech technology. Text-to-speech program is a software/hardware application that has the ability to convert electronic text to digitized speech. According to Topping (1997) in Thompson (2005) technology brought about the development of an "electronic literacy." Electronic literacy is all kinds of literary activities such as reading, writing and spelling that are preserved and that one can gain access to through computers. An important enabling character is that this program facilitates reading on every learner's level (Mckenna & Reinking, 1997 in Thompson, 2005). This is quite significant for the intellectually impaired learner who generally functions on different ability levels.

Against this background, the aim of the study and the focus questions that serve to guide the study follow.

1.2 Aim of the study

The aim of the study is to assess the influence of a particular form of assistive technology on the reading ability of intellectually impaired learners.

1.3 Research questions

The following research questions are proposed to guide the research activities:

- 1 What direction for change does the reading of intellectually impaired learners take when a particular assistive technological device is used as a teaching-learning tool?

- 2 What can educators of these intellectually disabled learners learn from this change or lack thereof?

1.4 Delimitation of the study

The study is limited to one special school within the Cape Metropole area that caters for learners who are physically and intellectually impaired. All learners at the said institution are intellectually impaired, but not necessarily physically impaired. The learners are part of a heterogeneous group, that is, from the band of intellectual impairment. The intermediate phase learners of the chosen school are part of the study. Due to the complexity of doing research with the target group, the study is limited to the influences of a type of computer technology on reading. The researcher however believes that reading and writing are linked; both are dependent on each other. Learners with learning challenges tend to have problems in both reading and writing (Forgrave, 2002:122). The influences of the peers during the intervention stage were not part of the analysis of the learners. Only the teachers were interviewed.

1.5 Clarification of terms

Intellectually Impaired learners

The learners are intellectually impaired and attend a special school within the Cape Metropole. Intellectually impairment has been defined as “significant subnormal cognitive functioning”. An IQ (intelligence quotient) of 70 or less as well as a shortcoming in “age-appropriate adaptive behaviour” for example communication, social skills and self care before the age of 18 years old can be regarded as indicators for the diagnosis (Louw & Edwards, 1997:347, Papalia, Olds & Feldman, 2002:336). Intellectually impaired has also been defined as “the presence of a significantly reduced ability to understand new or complex information, to learn new skills...” (Department of Health, 2001 in Madden & Parkes, 2010:28). Cognitive difficulties in reading, writing, spelling and the processing of numbers serve as common indicators of an intellectual disability (Sue et al., 1990:485).

Educators

The educators form part of the secondary sample group. The educators were directly involved in the pre-tests, intervention sessions and post-tests of learners in their respective classes.

Assistive Technology

The assistive technology in this instance is the recorded speech technology. Assistive technology as used in the study is in line with the definition of the United States Public Law stated as "... any item, piece of equipment or product system,... used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Hobbs, Close, Downing, Reynolds & Walker, 2009:153).

1.6 Organisation of the remainder of the dissertation

Chapter 2 presents the literature review. **Chapter 3** explains the methodology, design and implementation of the research process. **Chapter 4** presents the results of the study i.e. pre and post tests as well as the interviews. **Chapter 5** discusses the results and findings and draws conclusions, makes recommendations and discusses the limitations of the study.

1.7 Conclusion

Chapter 1 has provided an overview of the study. Chapter 2 will outline the literature being used to formulate a position for the influences that a type of assistive technology could have on the reading ability of intellectually challenged learners. The relevant theories pertaining to the study will also be explored.

CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

The intended study aims to investigate the extent and nature of change on the reading of intellectually impaired learners following mediation to reading using assistive technology. What follows is the review of literature that is conducted in order to develop a theoretical and conceptual framework with which to make sense of the ways in which assistive technology has or has not influenced the reading of the learners who participated in the study. The literature review also examines two issues which are pertinent to the teaching of learners with intellectual disabilities. These are:

- (1) specific needs and problems that intellectually impaired learners experience in the process of literacy development and learning generally and
- (2) a review of existing interventions involving assistive technology with intellectually impaired learners. With these in mind the layout of the literature review follows.

The chapter is organized in the following manner:

In 2.2 I explore literature that describes the target group of intellectually impaired learners. Of significance is how the learners in the study fit within the spectrum of intellectual impairment as well as the broad challenges that learners like them might experience. One of the primary focus areas of the study is to identify the literacy challenges of the learners and how one can ameliorate or support these difficulties.

Section 2.2.2 highlights how children learn to read as well as the difficulties that the intellectually impaired learner would have, to master the task of reading. This part of the review starts to ask critical questions, such as, what interventions can be employed with a learner who encounters reading difficulties. More specifically how would a teacher support such a learner(s) who encounters reading difficulties? And lastly, how would the teacher make use of the resources to the benefit of the target group of learners?

Sections 2.3, 2.4 & 2.5 provide a theoretical explanation of learners' and educators' roles in the learning and teaching processes. The questions that guide this part of the review are:

- a. What theories explain the role of learners, educators and or peers in the learning process?
- b. What mediational role could educators and/ or tools, for example, computers play?

In the final section, section 2.6 of the review I examine the different reading interventions that are employed to aid the learner`s reading. A combination of successful and challenging studies is discussed in this part of the review.

2.2 Specific Needs and Problems of the Physically and Intellectually Impaired Learners

2.2.1 Definitions of Physical and Intellectual Impairments

Intellectual impairment and the cognitive challenges it poses to the individual are central to the study. However, the majority of the participants in the study are both physically and intellectually impaired as a result of being cerebral palsy. For that purpose, definitions for physical and intellectual impairment will be provided in this section. But more specifically the focus will be placed on the latter and in which way being intellectually impaired influenced the participants` cognitive abilities or lack thereof.

Physical disabilities are defined and described in terms of whether they are as a result of neurological, skeletal and muscular problems. Cerebral palsy is a disorder of movement and posture, causing significant limitations of activity. This can be attributed to non-progressive disturbances occurring in the infant or fetal brain (Van Toorn, Laughton & Van Zyl, 2007:74). Waldman, Perlman and Chaudhry (2009:67) defines cerebral palsy as an overarching term, encompassing “non-progressive” conditions that are causative of physical and intellectual disabilities. An astounding ratio of 2 to 2.5 children per 1000 of the population in the developing world is cerebral palsy. Cerebral palsy is one of the commonest causes of physical disability (Stanley et al., 2000 in Madden and Parkes, 2010:28). Cerebral palsy appears to be associated with a range of other impairments of which intellectual impairment is the most common. Parkes and Hill (2010) in Madden and Parkes (2010:28) hold that half of all children with cerebral palsy have an intellectual impairment. These authors also implicitly posit that not all learners who are cerebral palsied are necessarily intellectually impaired. Insofar as the learners at my school are concerned there are a significant percentage of the learners with cerebral palsy.

The situation as it presents at the research site is both similar yet in contrast to what the authors, Madden and Parkes (2010) have indicated, and that is, not all learners that are cerebral palsied are intellectually impaired. All the learners are intellectually impaired, but not necessarily as a result of cerebral palsy. This contrasting phenomenon is partly based on the differing causes of the disability of the learners. The causes of the disabilities range from motor vehicle accidents,

alcohol abuse, to problems occurring during birth. Several causes, of which some are unknown, result in intellectual impairment. Some of these are genetic diseases such as Down's syndrome; diseases contracted by the mother for example German measles as well as injuries during pregnancy and birth (Louw & Edwards, 1997:349; Papalia et al., 2002:336). So what is intellectual impairment or otherwise known also as mental retardation? Furthermore, what are the specific challenges that this group of learners have particularly in so far as this study is concerned? Mental retardation has been defined as "significant subnormal cognitive functioning". An IQ (intelligence quotient) of 70 or less as well as a shortcoming in "age-appropriate adaptive behaviour" for example communication, social skills and self care before the age of 18 years old can be regarded as indicators for the diagnosis. A diagnosis can only be made on due consideration of both IQ and adaptive behaviour (Louw & Edwards, 1997:347, Papalia, Olds & Feldman, 2002:336). Intellectually impaired has also been defined as "the presence of a significantly reduced ability to understand new or complex information, to learn new skills..." (Department of Health, 2001 in Madden and Parkes, 2010:28). Cognitive difficulties in reading, writing, spelling and the processing of numbers serve as common indicators of an intellectual disability (Sue et al.,1990:485). Learners with intellectual disabilities typically have impairments in the following cognitive areas, that is,

- (1) language, communication and auditory reception,
- (2) reasoning, idea production and cognitive speed,
- (3) memory and learning,
- (4) visual perception and lastly
- (5) knowledge and achievement (Caroll, 1993 in Wehmeyer et al., 2004:8).

The literacy challenges of the sample group appear to be consistent with the definitions of intellectual impairment. This brings me now to the literacy specific needs and challenges of the learners in this study.

2.2.2 Literacy Specific Needs and Challenges

"Language, in the forms as ...writing and reading, is a multimodal tool of learning. In its multiple modes, language is a tool for analysing, interpreting and synthesizing what is heard or read in order to construct or express new interpretations" (Siliman, Butler & Wallach, 2002, p.6 in Wong, Graham, Hoskyn & Berman, 2008:175-176). So what does it mean to be **literate** and what is **reading literacy** specifically? What are the processes that one goes through to achieve a level of literate competency? Beyond these questions, the study explores the role of assistive technological devices to support a learner with reading challenges as well as what the educators can learn from the experience. Furthermore, if literacy challenges (reading in this instance) are

one of the primary reasons that would support a diagnosis of intellectual impairment, where exactly is the problem located for the target group of learners?

Reading according to Lessing and De Witt (2002:274-275) is a single aspect or learning outcome in literacy competence which can be described as the construction of meaning for which the learner must attain a necessary level of decoding proficiency. Kartal (2006) emphasizes that the mastery of reading is important for language development and refined mental skills.

“Language proficiency, the task of learning to **read** involves the development of skills in word recognition and comprehension” (Wong et al., 2008:176). Children **learn to read** by progressing through a number of developmental processes. These are “letter and word recognition”, “decoding”, “comprehension” as well as how fluent the learner engages with the text (DoE, 2002:32-33 in Long & Zimmerman (2009:4). More specifically, what is the nature of these developmental processes?

Word recognition refers to the “instant recall of words in which the reader resorts to no obvious mechanisms to recognize the word” (McCormick, 2007:225 in Wong et al., 2008:176). When the learner is able to recognize words without hesitation, they have developed a state called automaticity. Automaticity is the ability of the reader’s brain to quickly and automatically process the words. Word identification in turn refers to where the learner make use of phonics, structure of the sentence or one of the cue systems to help him\her to read the words (Wong et al., 2008:176).

Reading comprehension as being stated earlier is the ability of the child to understand the text being read. Learners with reading difficulties generally experience poor comprehension due to their lack of being able to read and monitor their understanding of the information. “Students with learning disabilities can experience comprehension problems ... because of difficulties in ... decoding and word recognition ..., deficits in vocabulary knowledge; fluency ...” (Wong et al., 2008:179).

Reading fluency being the last of the developmental processes relates to the speed and accuracy in the execution of the reading task (Chard, Vaughn & Tyler, 2002; Welsch, 2007 in Wong et al., 2008:181). “Slow reading rates make it difficult for students to retain information in working memory long enough for meaning to be constructed. This restricts students to low levels

of processing by focusing their attention on letters and words rather than on concepts and how these link together” (Wong et al., 2008, p.181).

In broad terms, the concentration at school level, in the foundation phase (Grade R– 3) is normally where the learners learn to read. Beyond this the focus in the other grades (e.g. grade 4 onwards) moves to reading to learn. For the purposes of the study I will only highlight the specific outcomes for the foundation phase since the curriculum taught at our school is from this particular phase. More specifically, the learning outcome for “Reading and Viewing” in the Foundation Phase (Grade R to 3) has amongst others the following requirements. These are:

- to be able to make meaning of written text (Grades R-3);
- starting to recognize and make meaning of letters and words (Grade R);
- developing and consolidating phonic awareness (Grade R-3);
- recognizing letters and words and make meaning of written text (Grade 1);
- reads for information and enjoyment (Grades 1-3)
- reading texts independently, and making use of different strategies to make meaning (Grade 3) (DoE, 2002:32-33 in Long & Zimmerman (2009:4).

Edyburn (2004:60) has posited that one of the primary reasons for learners to be transferred to a special school is because of the difficulty they have with reading. More specifically these affected learners struggle to meet the requirements of the “reading and viewing” learning outcome. Sue et al. (1990) have also indicated that difficulties with reading are one of the common denominators of an intellectual disability. Such learners need a systematic approach to learning to understand text (Browder et al., 2006; Farrell and Elkins 1995; Kliwer and Landis 1999 in Alfassi, Weis and Lifshitz, 2009:292). Furthermore these learners lack the necessary knowledge of reading strategies as well as the ability to monitor their own understanding of the body of text (Alfassi, 1998 in Alfassi et al., 2009:292). Learners with an intellectual disability struggle to memorise and rehearse text that they have read. They also struggle to organise text or instinctively elaborate on it to assist them to learn (Belmont & Butterfield 1971; Turner, Dofny & Durka 1994 in Alfassi et al., 2009:262). In general terms these learners process the information at a slower pace and also have difficulty to see the relationship among different concepts (Banikowski & Mehring 1999; Guzel-Ozman 2006 in Alfassi et al., 2009:262). Learners who have reading challenges also generally have difficulty in phonemic awareness and analysis, word identification, reading fluency and understanding of the text (Forgave, 2002; Higgins & Raskind, 2000; Manset-Williamson & Nelson, 2005 in Elder-Hinshaw, Manset-Williamson, Nelson, & Dunn, 2006: 7).

Given the literacy challenges, for example word identification, reading fluency and comprehension of the text that the intellectually impaired learner has to contend with, how would a teacher support the said learner(s)? What strategies would one employ to ameliorate the literacy of such learners? These are some of the questions one would seek to address. In order to address the question of necessary strategies for helping intellectually impaired learners, the discussion now moves to the theoretical underpinnings of the study. In this regard I discuss the concepts of “Zone of Proximal Distance” (ZPD) as well as Mediated Learning Experience (MLE) and the implication of these concepts. A comprehensive discussion is done on each of the concepts with particular reference to the relevance to the study.

2.3 Zone of proximal development (ZPD)

Vygotsky (1978) is of the opinion that learning and development are interrelated. In fact, learning takes place long before the child enters formal schooling. Any learning according to Vygotsky has a history. Before the child enters formal schooling s/he was exposed to some kind of learning experience. Learning should be matched in some way to the child’s developmental level. If one wishes to understand the relationship of the developmental processes to learning one should not limit oneself to only establishing developmental levels. One should be focusing on two levels i.e. actual developmental level and potential developmental level. Actual development is the level of a child’s mental functions that has already been established which generally is the outcome of completed developmental patterns (Vygotsky, 1978:85).

The second level would be reached by means of tasks supported or assisted by others, who could be teachers and/or peers. The nature of support has been described by Vygotsky as “...imitating adults and *through being instructed about how to act*, children develop an entire repository of skills...” (Vygotsky,1978:84). Vygotsky tried to make sense of children’s learning, that appears to be chronologically the same age but mentally on a different level. It also became clear that the capability of learners with the same level of mental development to learn varies under teachers’ support and guidance. This variance has shown that the children, perhaps of similar chronological age are not necessarily mentally the same. The subsequent learning of these children would also be different (Vygostky,1978:86). This difference is what Vygotsky refers to as the zone of proximal development. The zone of proximal development is

“...the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined

through problem solving under adult guidance or in collaboration with more capable peers” (1978:86).

The zone of proximal development characterizes mental development prospectively whilst actual development retrospectively. Furthermore, the zone of proximal development takes into account the completed “maturation processes” as well as those that are busy taking shape (1978:86-87). This concept of zone of proximal development gives us insight into the supportive capabilities of technology and educators and how this could influence the intellectually challenged learner’s learning. ZPD also acknowledges the variant levels of mental functioning which is quite typical of the intellectually challenged learner. Furthermore, it implies that even in the absence of any intellectual impairment there is a distance between what learners know on their own and what they could potentially know if they receive the necessary assistance from the more capable other be it technology or teachers. In the case study, the assistance of the more capable other becomes even more crucial given the challenges imposed by the learners’ intellectual impairments.

2.4 Relationship between “scaffolding” and zone of proximal development

Virtually two decades ago the term “scaffolding” was used and referred to as “tutorial interactions between an adult and child”. This term was used to make sense of the kind of support provided by an adult (eg. teacher & / parent) to a child on how to execute a task in instances where such a task could be performed without the support of the adult. Parallels were made between this metaphor (scaffolding) and Vygotsky’s ZPD (1978) (Wood, Bruner & Ross, 1976 in Hobsbaum & And, 1996:2). According to Wood & Wood (1996:2) the zone of proximal development allows one to identify the kind of assistance that advances development. Scaffolding in turn could be seen as a way of addressing the nature of support that the adult provides. The adult could fulfil the following functions, i.e.:

- 1) capturing the learner’s interest in the task at hand
- 2) exemplifying important aspects of the task the learner might be missing and lastly
- 3) showing the learner how to reach his/her objectives with the least amount of frustration (Wood & Wood, 1996:2).

The sample group of learners in this study is intellectually challenged. Cognitive difficulties are a common indicator for the sample group (Sue et al., 1990:485). Some of the learners tend to lose interest and/ or focus quite easily during a given task. It is thus imperative for the teacher to ensure that s/he fulfils the functions listed by Wood and Wood (1996). The question(s) is how does scaffolding take place amongst the chosen group of learners? And secondly, what is the

nature of scaffolding within the zone of proximal development insofar as this study is concerned? Furthermore how do the educators utilize the technological resources to scaffold mastering the reading tasks given? These are some of the questions one hopes to address through this study. Following on these questions is the concept of mediation as has been referred to in chapter 1. In chapter 1 I have made reference to the role of the educator as a mediating agent to support the learners' learning. In so far as this study is concerned how can the said educator utilize the technology as a way of supporting the target groups' learning/reading. So what is the mediated learning experience? I will now have a closer look at this concept.

2.5 Mediated Learning Experience

Mediated learning experience came about as a result of many years of clinical and educational work (Feuerstein, Rand, & Hoffman, 1979; Feuerstein, Rand, Hoffman, & Miller, 1980; Feuerstein, Rand, & Rynders, 1988; Feuerstein, 1990 in Kozulin & Presseisen, 1995:89). The primary question that MLE seeks to answer is: "*What is the cause of individual differences in cognitive development? Or as in the case of the present study what role does the variant level of intellectual impairment play on fulfilling the required reading tasks?*" The theory of MLE suggests that the person and the environmental factors make up only certain parts of a person's cognitive development. The mediated experience makes the learning experience for the person much more significant. "The effect of distal determinants on cognitive development occurs primarily through their influence on MLE" (Klein, Weider, & Greenspan, 1987 in Kozulin & Presseisen, 1995:69). The question now begs what is MLE? MLE is a type of mediated engagement between the child and the environment. This type of interaction has a particular quality to it. The "quality" of MLE is achieved by the initiation and deliberate action of an adult (eg. teacher) between the "environmental stimuli" and the child (Kozulin & Presseisen, 1995:69).

The mediated learning experience can be described in the following way:

"MLE processes describe a special quality of interaction between a mediator and a learner (Feuerstein et al., 1979; Tzuriel, 2002, 2011a). In this qualitative interactional process, parents or substitute adults or peers interpose themselves between a set of stimuli and the developing human organism (learner) and modify the stimuli for him or her (Tzuriel, 1999, 2001). MLE processes are considered as the proximal factor that explains cognitive modifiability. Cognitive modifiability is defined as the individual's propensity to learn from new experiences and learning opportunities and to change one's own cognitive structures." (Tzuriel, 2013:60)

For the interaction to meet the prescriptions of MLE, it has to meet the universal criteria of *intentionality and reciprocity, transcendence and meaning* (Kozulin & Presseisen, 1995:70). The universality of the experience means that these three criteria have to be present in any interaction for MLE to meet its mediational objective (Kozulin & Falik, 1995). The other nine recognized criteria of MLE, i.e. mediation of goal setting, of challenge, of control of one's behaviour, of developing sense of competence, of recognition of one's own individuality, of sharing behaviour, of awareness of change, of seeking optimistic alternatives, and of a sense of belonging are regarded as being contained within a specific cultural context (Kaufman & Burden, 2004). For the purposes of this study the focus will be placed on the three universal criteria of MLE i.e. intentionality of reciprocity, meaning and transcendence. Feuerstein defines the criteria of *intentionality* as the "deliberate and non-accidental character of the Mediated Learning Experience" (Kozulin & Falik, 1995). Intentionality has two focus areas i.e. one being the child and the other the object. Some traits of the object are being changed in such a way that the child actually experiences the object. The focus of the MLE interaction is not the object but rather the cognitive & / thinking processes of the child during this engagement (Kozulin & Presseisen, 1995:70).

Reciprocity in turn makes reference to how the "mediator" responds to the learner's responses. (Kozulin & Falik, 1995). That is depending on whether the learner reads the story correctly or incorrectly and how the teacher as mediator responds to that. Furthermore, what kind of measures does the teacher employ to support the learner in the reading process?

Transcendence focuses on how the learning experience is extended to other situations as well (Kozulin & Falik, 1995). The transcendent quality of learning in MLE is an important facet. The primary aim is always to establish the underlying principle of the learning experience and then to transfer it to other tasks in the child's life (Kozulin & Presseisen, 1995:70). That is, are the learners able to apply the acquired reading skills to other reading tasks? Or alternatively what has the learner gained from the story?

Lastly the mediation of *meaning* is believed to provide the learner with a reason for the interaction (Kozulin & Falik, 1995). "MLE becomes possible only when stimuli, events, or information are infused with meaning by the mediator" (Kozulin & Presseisen, 1995:70). The experience accordingly has to have meaning for the learner. That is, beyond the obvious objective of mastering the reading tasks, what other meaning, albeit virtues could be garnered from the stories?

The ultimate objective of MLE is to sensitize the child's learning through exposing the child directly to the "stimuli". Furthermore, the idea is to facilitate the necessary "cognitive prerequisites" for the learning. This study has strong links with the MLE perspective. Both teacher and technology serves the role of "interpositioning" between the child and the stimuli (reading). The teacher with the aid of technology aims to "transform" the learning experience for the learner. In Feuerstein's words the teacher fulfils the role of "mediating agent". The computer software programme at some levels also has a similar function. The aim is not to master the computer programme but rather how this programme can support (& or mediate) the child's learning experience. Furthermore, the programme also aims to support the reading of the learners by making the experience as concrete as possible.

2.6 Reading Interventions

Edyburn (2004:60) has posed a number of critical questions that in my view are significant for this discussion. Firstly, "what happens when a student fails to learn to read"? According to him the educator tends to resort to other methods of instruction. The problem is a new medium of instruction may not necessarily yield positive results. This is particularly true if the very problem of reading is part of the inherent nature of their disability. Another question is "if a child continues to fail to read and understand printed text, how much of such information do we need before we decide that he\she can't perform the task?" Furthermore when and how do we intervene? It is my view that, if one holds the position that all learners can learn, albeit at different levels, then any support mechanism or strategy would be worthwhile (DoE, 2001:16,24). People with cognitive disabilities have been making use of different kinds of assistive technologies to support them in functioning optimally in activities of daily living. These are for example to facilitate movement, reading, for communication and to be able to use a computer. The level and type of technologies that were used were either of a low-technological or high-technological capacity. The former group of technologies is for example picture communication boards or an adapted cutlery set for eating. The latter group of technologies, the high-tech devices included for example adapted software and devices that has voice output capabilities (Technology and Media Division, 2003 in Braddock et al., 2004:49). As was mentioned earlier in the background, technological resources could be utilized to support the intellectually disabled learner's learning (Phillips et al., 2008).

The United States Public Law defines assistive technology as "... any item, piece of equipment or product system,... used to increase, maintain, or improve functional capabilities of individuals

with disabilities” (Hobbs, Close, Downing, Reynolds & Walker, 2009:153). The Foundation for Assistive Technology in the United Kingdom extends this definition to the ability to enhance “independence for disabled”. Anson (1997) in Brodwin, Star and Cardoso (2004:29) indicates that assistive technology does not only involve computers with all its components, but involves an “integral process of assisting individuals with disabilities, ... to maximize their human potential”. Furthermore, computer assistive technology has due consideration for the learner and his\her individual traits, as well as his\her abilities and challenges (Bentz, 1998; Cook, 2002 in Brodwin, et al., 2004:29). For example there are hosts of computer software on the market that can meet the specific needs of different groups of persons with a disability. For the purposes of the study I will now highlight some of the technologies that have been in used to aid learners with a disability.

2.6.1 Text-to-Speech Technology

Thompson (2005) refers to text-to-speech technology as a type of multi-media program. The author also refers to it as a software/hardware application that has the functionality of converting computer text to *digitized speech*. Zhao (2007:35), in turn indicates that speech technology refers to “technology that enables machines to receive and accept human oral language as input and respond with human or human-like oral language as output”. Technology for output is referred to as speech synthesis or text-to-speech. Another important element of this technology is that it enables the learner to access software applications or content. The immediacy in the speech feedback will allow the learner to correct reading mistakes. This the person does by selecting a word with the mouse to hear its correct pronunciation. Forgrave (2002) in Zhao (2007:37) indicated that speech technology minimizes the decoding problems that disabled learners sometimes have, which allows for better comprehension. Furthermore it provides the learner with repetitive visual and auditory cues that can help him/her to better comprehend the text. The question is does empirical research support the intrinsic qualities of speech technology or technology in general?

2.6.2 Supportive e-Text

E-Text can be defined as “text that has been altered to increase access and provide support to learners” (Horney, 2007:153 in Edwards, 2008:36). Supportive electronic text aids the disabled learner in dealing much better with text with the use and support of computer technology. The computer software has the ability to change the way text is viewed and read, by modifying the font size and colour. The text can also be read aloud. Further to this, multiple images can be shown at any given time (Anderson-Inman & Horney, 2007:153 in Edwards, 2008:36). These

features are in contrast to printed text. The printed material in general does not give the reader the opportunity to customize the text let alone being read to them. Interestingly enough in instances of electronic text and printed text, the educator has to play a supportive role as well. With the first scenario, depending on the literacy level of the learners, the educator has to read the story to the learners, and provide the necessary supporting illustrations. This situation is synonymous with a reading session at my school, where a significant number of the learners are having difficulty to read. Modifiable electronic text, where the font size has been changed, coupled with colourful illustrations and auditory support holds a lot of potential for our learners. The educators' role will be to garner background information of the story and to assess for comprehension after the story has been read.

2.6.3 Electronic Books

E-books serve to replicate the printed paper-based storybooks into a digital format. In contrast to print paper-based books, e-books have additional multimedia effects to support the learners understanding of the text (Shamir & Korat, 2006 in Rhodes & Milby, 2007: 255). E-books have a number of intrinsic elements such as sound, animation and interactive activities. These elements can scaffold the learning of the learner, allowing him\her to eventually master the given task (Rhodes & Milby, 2007: 255). In the process the learner can be exposed to chunks of the reading task, for example to read one paragraph a few times then asking the learner to retell that part.

This process can be replicated for the whole story until such time as the learner knows the content of the story by heart. Learners with special educational needs such as struggling readers can benefit from the additional text features of electronic books (Larson, 2010:16). This particular feature could prove to be helpful for the learners at the school where I teach. The learners' intellectual disability as has been indicated in chapter 1 range from mild to severe. This implies that the learners' reading ability level also varies. Multiple opportunities to expose the learners to text, which they have experienced on an auditory and a visual level, could aid their reading ability. "E-books and other text-to-speech readers boost student's self-esteem while providing access to texts that were previously out of reach" (Technology Gives Disabled Students of All Ages a Brighter Future, 1998 in Rhodes & Milby, 2007:256). Furthermore, children's books that have been recreated into an electronic format allow the learner to "track print and view a visual representation of the story". Electronic books help the learner to build their vocabulary, aid the understanding of the text while at the same time show them how to read fluently (Horney & Anderson-Inman, 1999; Lefever-Davis & Pearman, 2005 in Rhodes & Milby,

2007:256). However, some limitations do exist in the use of talking books. For example, e-books have limited use in the classroom during the course of the delivery of the literacy curriculum. Accordingly the authors (Fox et al., 2002) hold that the true value of talking books having real educational potential still has to be realized (Fox, 2002; Wood et al., 2005 in Littleton, Wood, & Chera, 2006, 383). Chera (2002) in turn has developed a series of talking books based on a reading scheme publication. The objective of the process was to promote phonological awareness in children during their initial reading experience of learning to read. Phonological awareness is the ability of the person to focus explicitly on the phonological structure of the spoken word and to understand that the verbal language are made up of individual letters (Venter, 2007 in Marthinussen, 2011:25). Learners that have well developed phonological awareness, recognize on auditory level that words can rhyme, start or end on the same letter and that letters can be manipulated to form new words. This unlocks future developmental skills that allow the learner to reflect and manipulate letters to create and new words (Stahl, 1992 in Marthinussen, 2011:25).

The talking book software made provision to integrate different levels of speech feedback to the “reader”. The children could thus read a complete page, parts of a page or individual words. Post evaluations of this particular story series indicated that even brief periods of contact has the potential to support phonological awareness in children aged 4-6 years old (Chera & Wood, 2003 in Littleton et al., 2006: 383). Another study investigated the individualized use of the Chera (2000) “Bangers and Mash” talking book series conducted with a group of eighteen 5-6 year old boys. One of the aims was to ascertain whether boys who showed initial lower phonological awareness would present any improvement following a talking book intervention as opposed to boys who showed higher phonological awareness.

The reason for focusing on phonological awareness is that the literature points to such awareness as a significant antecedent skill to the successful acquisition of reading (Adams, 1990; Goswami & Bryant, 1990; Blachman, 2000; & Snowling, 2000 in Littleton et al., 2006: 384). Demont and Crombert (1996:31) in Marthinussen (2011:25) also indicated that phonological awareness is important for reading success. Accordingly the reader has to learn to master phonological skills that will enable him\her to break up the speech or the spoken word into phonological segments. The authors Demont and Crombert (1996) further hold that the learner should be exposed to the phonological structure of language during literacy training.

Another focus area was whether there is any relationship between the children's levels of achievement, as well as, whether their reading strategies (as indicated by the errors made) had been affected. The type of errors in children's reading provides one with insight into their approach to decode the text (Littleton et al., 2006:384). The results of this investigation show that the boys who had a lower phonological awareness pre-test score had a significant improvement in phonological awareness as opposed to the boys who had initial higher achievement scores. The talking books were thus more beneficial for the former group of boys. Another interesting result was the appropriate use of the software by the former group. This group used the software in line with their unique developmental level, making use of a strategy called "bookbinding" (Littleton et al., 2006:388).

Bookbinding is a type of interaction where the computer is solely responsible for "reading" the story and "stands in for the author" (Guppy & Hughes, 1999:27 in Littleton et al., 2006:386). In this instance the learners are generally silent and observant. The authors argue that bookbinding supports the initial development of phonological and alphabetic awareness. It does this by supporting the child's ability to recognize letters as well as to build his/her sight vocabulary. The children with a higher phonological attainment level were seen to use the computer to engage in more advanced styles of learning, and only sometimes making use of the speech feedback. The less proficient group made use of the software more often because they needed the programme to help them to read. Besides the differing attainment levels of the group of boys, it is evident from these results that talking books have the potential to support their reading development (Littleton et al., 2006:388).

2.6.4 Video Technology

Within the video technology framework resides video feedback, video modelling and / or video prompting through, for example, an interactive computer based program. Video technology is a medium of instruction in which the learning environment can be created, which has a mirror image of the learners' natural environment in which they will perform a given task (Mechling, 2004:23). A digital recording of a given learning environment, for example, appropriate handling of books can be modelled and replayed to the learner. Video modelling in particular holds promise in that one can demonstrate the correct way of performing a task of which the learner then has to copy similar behaviour or execute a task (Morgan & Salzberg, 1992 in Mechling, 2004:23). A series of computer based simulation studies have been conducted to teach a number of skills that can be generalized to the broader community. The aim was to evaluate amongst others, how effective the technology is to impart skills such as

- (a) reading community sight words, (Cuvo & Klatt, 1992 in Mechling, 2004) and
- (b) the reading of a grocery list (Kyhl, Alper & Sinclair, 1999 in Mechling, 2004:23).

Another study was conducted with the support of a multi-media computer based program that made use of video captions and still photographs. The objective was to teach mild to moderately intellectually impaired learners to read aisle sign words as well as to locate grocery items in the store (Mechling, 2004:23). The ability to purchase groceries at a shop is regarded as a functional skill for the learner with a disability. This very ability aids the learner to be functionally independent within his\her community (Morse, Schuster, & Sandknop, 1996; Snell & Brown, 2000; Westling & Fox, 2000 in Mechling, 2004:24). The emphasis placed by these authors on functional independence is in line with the programme taught at our school, for example to identify and read sight words, safety signs or to be able to work with money. The results of this study signify an increase in the target groups' ability to read and locate the 12 grocery items in the shop. It appeared that the multimedia computer based instruction had a significant impact in the fluency of task execution by the learners. However, one of the study's shortcomings is that the generalization measures were limited to 3 sessions only, as well as the fact that only one shop was targeted. It is thus unclear whether the learners will be able to generalize the skills learnt across other shops as well (Mechling, 2004:30).

2.7 Chapter summary

In Chapter 2 I have looked at the needs and challenges of the intellectually impaired learner. I have also reviewed how the literatures have defined the referenced group of learners. Further to this I have discussed the learners' literacy needs and challenges as it pertains to the study. In the final section I have presented a range of research reports on the interventions that could be employed to support the learners. It is clear from this review of relevant studies that computer technology has a huge potential in assisting learners to reach cognitive milestones related to literacy. I will now turn to describing the appropriate research methodologies as they relate to my study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The purpose of this study, as mentioned in Chapter 1, is to assess the influence of a particular form of assistive technology on the reading ability of learners who are both intellectually and physically impaired. In this chapter that describes the research design and methodology, the level of fit between the research questions and a particular research paradigm under which the study was executed is outlined. In addition, other key attributes of design and method such as sampling, quality assurance, data collection, analysis and interpretation and ethical considerations are described.

3.2 Research design

The research design according to Wiersma (1995:91) is “a plan or strategy for conducting research”. Kerlinger (1986:276) in Kumar (1999:74) extends the definition of a research design a little further. The author holds that a research design is “...a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. The plan is the complete scheme or program of the research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of data”. The research design seeks to provide a strategy to find answers to the research questions of the study. The section to follow will discuss the particular design mentioned in the study.

3.2.1 Action research

Mills (2000:3) in Beylefeld, Bitzer and Hay (2007:147) describes action research as an “ongoing creative activity...” Calhoun (2002:18) in Merrill (2004) defines action research as “a continual disciplined enquiry conducted to inform and improve our practice as educators”. The underlying purpose according to Calhoun (2002) is that action research is reflective in nature. Meaning, educators (in this instance) must reflect critically on their current practice and explore ideas for possible change. The key principle underpinning action research thus involves a cyclical process with the express purpose to improve teaching and learning for, example, to the learners’ ability to recognize the words in a story. Mcniff et al. (2003:18-33) in Beylefeld et al. (2007) hold that the aims of action research are to improve the learning of the participants in the study as well as involving informed, committed and intentional action.

Fraenkel and Wallen (2006:13) add to these aims, and that is to improve the reading capabilities of students in a class or to identify different ways to cater for learners within a special education environment. Wiersma and Jurs (2005:148) in turn indicate that action research can make use of any methodology i.e. qualitative or quantitative. The first research question of the study asks:

- *what direction for change does the reading of ... learners ... take when a particular assistive technological device is used as a teaching-learning tool*

and speaks directly to the objectives of action research mentioned by Calhoun (2002) and Mcniff et al. (2003). The second research question asks:

- *what can educators of these ...learners learn from this change*

and is also aligned with Calhoun's (2002) notion of action research in that the focus is on effecting improvement and change. Accordingly, the aim is to improve teaching and learning.

Cohen, Manion and Morrison (2003:226) in Condy (2006:87) defined action research as "a small scale intervention in the functioning of the real world and a close examination of the effects of such an intervention". Action research was regarded as the most appropriate design as it allowed for the constant and scientific assessment of whether there was change or not in learners' reading, following the use of a type of assistive technology to conduct this study because it was done with a small sample group of learners and educators.

Action research at its basic level involves a multi-cyclical process that involves planning, acting, observing and reflecting. As the research process gets underway and a need for revision arises during the reflection stage, re-planning, further action, observation and reflection will take place (Hopkins, 1993:44-45; Noffke & Stevenson, 1995:4-5; Elliot, 1978:356; Carr & Kemmis, 1986:184 in Rossouw, 2009:9). A revised action research model as illustrated in Figure 3.1 below was followed in conducting the study (Elliot, 1991: 69-86; Parsons & Brown, 2002:158-169; Knowles, Gilbourne, Borrie & Neville, 2001: 185-187 in Rossouw, 2009:9).

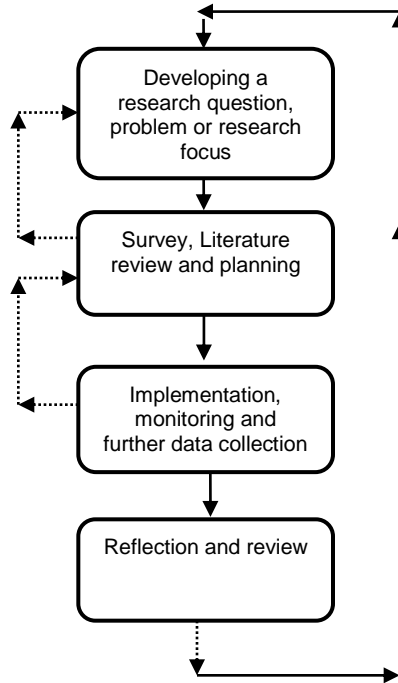


Figure 3.1: Action research model adapted from Elliot et al. (1991) in Rossouw (2009)

3.2.1.1 The action research cycle

Step 1: Developing a research question/problem or focus

In the first cycle, the idea is to identify clearly where the problem is located. That is, what the problem is with the current sample group of learners and why it is necessary to engage in a research study is being dealt with. Essentially a focus for the study is being established at this stage of the action research cycle. Following on from isolating the problem and developing a focus for the study, research questions are identified.

As indicated earlier in this chapter as well as in the preceding chapters, two research questions have been devised. These questions were informed both by the particular challenges that the target group of learners have, that is, amongst others difficulty to recognize words within the reading context. Furthermore the problem\background information captured in chapter 1 has helped me to arrive at these two questions. The first research question seeks to identify the possible effects of an intervention strategy. The second question in turn aims to ascertain what the educators of the target group of learners have learnt from the study.

Step 2: Survey, Literature review and planning

During the initial stages within the cycle I explored the possible logical data collection instruments to be utilized. The exploration enabled me to refine my instruments for data collection. "At this stage the most likely strategy ...identified by the educator for use... may be selected" (Parsons & Brown, 2002:11 in Rossouw, 2009:11). A **review of the literature** assisted me to contextualize the target group of learners' specific reading challenges as well as the theories central to the study. Some of the studies that were highlighted in the literature review were significant in giving shape to my data collection instruments. According to Parsons and Brown (2002:18) in Rossouw (2009) a review of the literature is critical for data collection as well as providing the necessary information on the research issues at hand. Following on the initial process within the cycle, that is identifying the problem, formulating the research questions and establishing the data collection instruments, it is necessary to engage in the planning phase. Central to the **planning phase** is to devise clearly defined research objectives which one hopes to achieve (Parsons & Brown, 2002:21; Elliot, 1991:74 in Rossouw, 2009). A plan of action was looked at, for example, a pre-test, intervention and post-test of the target group of learners took place as well as interviews with their educators. Elliot (1991:75) in Rossouw (2009) indicates that the researcher's plan should involve all aspects that warrant change. In addition to these the course of action should involve the required resources, for example, stop watches for keeping time during the pre & post-test and the methods of data collection (Parsons & Brown, 2002:45-70; Elliot, 1991:75 in Rossouw (2009).

Step 3: Implementation, monitoring and further data collection

The third stage in the AR cycle is to **implement and monitor** all the plans that have been designed (Elliot, 1991:76 in Rossouw, 2009:12). This involves collecting the data from the primary target group (learners) through the pre-tests, intervention of oral readings and post-tests. Both the pre- & post-test were conducted by exposing the learners to a story that they have to read to the assessor. The intervention sessions took the form of the learners participating in individual and shared reading sessions on the computer. In addition to the data from the learners, data has also been collected from the secondary target group (educators) through an interviewing process conducted at the research site.

Step 4: Reflection and review

The final stage in the AR cycle is the **reflection and review** process. This process serves to indicate whether the initial plans that have been devised and implemented as highlighted in step 3 have worked out to the satisfaction of the researcher. Reflecting and reviewing the actions

(testing, interventions and interviews) will help to keep one focused on the primary aim of improving a given situation or practice, for example, the learners' word recognition and reading skills. "Modified solutions and successive understandings could be created..." (Battaglia, 1995: 90 in Rossouw, 2009:12). For example, during the pilot it was discovered that it was too challenging to follow the learner's reading and record the information at the same time. The process of assessing the learner's reading was amended accordingly. Another was when a second post-test was employed during the second story to see whether the learner's ability to identify the words in the story was true or merely by chance. Reflection is on-going and if the researcher wants to try a different strategy or approach based on some of the findings during the initial stages of the cycle one would have to start to recycle some of the stages.

3.3 A description of the sample

Sampling can be described as a means of obtaining data from a smaller group from the total population (e.g. intermediate phase) in such a way that the information gained would be representative of the total population (Cohen, Manion & Morrison, 2007:100). In this study purposive sampling is used. Purposive sampling occurs when "the researcher selects a sample to meet the purpose of the research" (Wiersma & Jurs, 2005:311). According to Henning, Van Rensburg and Smit (2004:71) purposive sampling has at the heart of it, "people ... suitable to wonder with ...at the time that they are needed". The concern is thus not to be able to generalize the findings to the larger population, but rather to acquire in-depth information from the chosen group. These notions of purposive sampling are consistent with the objectives of action research. Calhoun (2002) as well as Wiersma and Jurs (2005) have indicated that the participants in action research tend to "self-select" themselves to the study. Based on the parameters of purposive sampling, the primary sample group were 35 and 34 learners respectively across the (5) intermediate phase classes of the school. To ensure that none of the learners is put at an advantageous or disadvantageous position in relation to one another, the following measures were undertaken:

- all learners are exposed to the same reading activity, albeit dependent (active teacher support) or independent (less active teacher support)
- no undue attention is granted to anyone beyond the level of support that would have been granted to all in the class during class activities

The consideration of the particular phase (intermediate phase which refers to Grades 4-6) is based on the following notions:

- the learners have been referred to the special school from a primary school (foundation or intermediate phase) in the area
- the learners have been exposed to reading activities either at the previous primary school or in the junior phase at the current school

In collaboration with the chosen phase the learners have met the following criteria:

- ³prior to their participation in the study the learners have been diagnosed as being intellectually impaired and are chronologically between 10 and 14 years old,
- the average mental age of the group of learners is quite fragmented between 4-7 years old
- the learners are in the intermediate phase, but are being exposed to the foundation phase (grade R-3) curriculum
- Have difficulty identifying some letters and words, or
- are able to read but either not on the level of their age appropriate peers, or are not reading fluently enough
- the current foundation phase curriculum has been adapted to suit the learners

The secondary sample group will be the four educators of the learners. The reasoning behind the selection of this group is based on their daily direct involvement with the learners. The function of the educators is to assist the researcher to perform the pre- and post-tests as well as to engage the learners during the intervention sessions.

3.4 Gaining access and ethical considerations

Lowe (2007:19) indicates that a researcher has a series of responsibilities that should be adhered to, when engaging in a research study. These responsibilities include:

- “Avoiding ... misrepresentation of evidence, data, findings...”
- “Reporting ... procedures, results and analyses accurately and in ... detail...”
- “Honesty and openness should characterize the relationship between researchers and their participants”

By virtue of the fact that I would be engaging with people (educators and learners) one has to make sure that all ethical issues and procedures were being followed. First, ethics clearance

³ The diagnosis of intellectually and physical disability was carried out independently to participation

was sought from the university in order to have what I was proposing to do and how to do it examined for ethical compliance. Once the university had ethically cleared the study, permission to conduct research was sought from the Western Cape Education Department (WCED). With WCED's permission, a meeting was held in 2009 with the principal and deputy-principal of the school to seek consent to pursue the study at the school. Following on this meeting, consent was also sought from the educators within the intermediate phase. Permission was granted at all these levels.

The respondents have to give informed consent to participate (Henning et al., 2004:73). However, one should note that informed consent for the minor learners would come from the parents or guardians. Lowe (2007:22) in turn indicates that a child's agreement to participate in a research study is referred to as "informed assent". Meaning, one has the responsibility for the welfare of the learners throughout the research study. My next task was to send letters of consent to all parents and guardians of the learners assuring them of complete confidentiality and anonymity and requesting permission to work with their children.

A copy of the permission letters is inserted in Appendix E. In line with principles of research ethics, I have ensured that complete **anonymity** is assured for all participants (Henning et al., 2004). Accordingly all personal names and or identities were changed to ensure anonymity in the study. Further to this one also has to guard against physical and psychological harm to the participants concerned (Goddard & Melville, 2006, 47-49). In that sense, learners were treated with respect throughout the research process. Noteworthy is the fact that all learners in the mentioned grade were included in the study so that they all have access to the benefits of the intervention. These ethical considerations have been communicated to all participants (including consenting parents\guardians). Such communiqué are in keeping with the right that participants have, i.e. to be informed of the objectives and findings of the research study (Lowe, 2007:20).

3.5 Gathering the data

Before embarking on the actual study, the researcher saw it fit to engage in preparatory work that would pave the way to gather the data from the sample group of learners and educators. A part of the preparatory work was to conduct a small pilot study. The significance of the pilot was essentially to inform the main study. The presentation to follow will be to a) define a pilot study, b) explain the sub-units i.e. surveying the literature, experience of experts, preliminary exploratory studies and a study of the strategic units.

Following on from these will be an explanation of the actual pilot that was conducted with a small group of learners that would not form part of the main study. The lessons learnt have influenced the way the main study was conducted. In keeping with the assessment of the “strategic units” the researcher also “piloted” the interview schedule to be used with the educators following the pre- and post- tests.

3.5.1 Pilot study

Bless and Higson-Smith (2000:155) in De Vos et al. (2002:211) define a pilot study as “a small study conducted prior to a larger piece of research to determine whether the methodology, sampling, instruments and analysis are adequate and appropriate.” The purpose(s) of a pilot study as has been described by Huysamen (1993:25) in De Vos et al. (2002:211) fits my project well. The author advances that the pilot study serves as “an investigation of the feasibility of the planned project.” Furthermore it allows the researcher to isolate and identify any shortcomings in the assessment procedure. Insofar as my study is concerned the model advanced by Cilliers (1973:132-137) in De Vos et al. (2002:211) has been followed. The following units were applied:

- a) Surveying the literature
- b) Experience of experts
- c) Preliminary exploratory studies
- d) Study of the strategic units

a) Surveying the literature

Cilliers (1973) in De Vos et al. (2002:212) holds that the researcher should engage in a broad search of the literature during this phase of the project. A range of sources should be consulted, for example, computerized databases, journals and books. The primary aim according to the author is to orientate the researcher, but also at the same time to inform him/her of the main study. In terms of my project a search for material i.e. dissertations and journals that are more or less similar to the study has been undertaken. This process has enabled me to get an idea of how these researchers have conducted their research.

b) Experience of experts

According to Cilliers (1973) in De Vos et al. (2002:213) a prospective researcher could consult a number of experts to learn from. However, if all else fails a strategy such as the “snowball method” should be employed i.e. “each expert puts him onto the next one.” All means necessary such as telephonic contacts could be made with the relevant persons (and / or expert)

in the field. Cilliers (1973) in De Vos et al. (2002:213) holds that the utilization of experts can help to "...gain more technical and practical aspects of the prospective research endeavour." I set out initially to use software called the "Profiler"⁴ (type of software) to do the pre and post-testing with the learners. When I was about to do the actual data collection I was informed by the company that was supposed to supply me with Profiler that the software was being upgraded.

I consulted telephonically and via electronic correspondence other software companies (creators & or third party distributors) that would be able to provide me with assessment software that would enable me to assess the learners reading skills level before and after intervention. The resources available from these companies however had a few shortcomings. For example the software was written primarily in English meaning all activities would be communicated or read to the learners in English, whilst a significant percentage of the sample group is Afrikaans speaking. The other challenges were that the assessments have been developed for learners from grade 2 or 3. Since the school makes use of an adapted curriculum, which is more consistent with the reception grade and/or grade 1. Grade 2 and 3 tasks were potentially too advanced for my sample. I had to resort to designing my own customized pre-and-post test instrument based on ideas from other assessment instruments. I will explain the design of the instrument later in more detail. Suffice to say at this stage the design of the instrument was influenced by Cami Reader (reading software) as well as research conducted by Good and Kaminsky (2007) with the Dynamic Indicators of Basic Early Literacy Skills. Both these instruments had some elements that appeared to be useful for my study. These were:

- that the learners were given a short story to read
- learners had to retell the story as a way of ascertaining their level of understanding
- learners' understanding was also assessed by means of comprehension questions
- the comprehension segment concentrated on all the key elements, for example main characters, central focus and key words
- the amount of words read during the oral reading activity were then tallied after a certain amount of time had lapsed
- and lastly, errors made during the oral reading were closely monitored for further analysis of the learners' reading competency.

⁴ Profiler is a type of literacy &/ reading assessment software. It enables the user to assess a learner's current and future reading achievements.

c) Preliminary exploratory studies

The pilot study addressed issues such as "...resources, research population, procedures of data collection, the data gathering itself ... and possible errors that may occur (Moser & Kalton, 1973:43-47; Polansky, 1975: 146 in De Vos et al., 2002:213). Having finalized the instrument for data collection it was important for me to look at other aspects of the project. These were

(a) to finalize the data collection programme/schedule with the educators i.e. pre-testing, intervention and post-testing,

(b) making sure the educators understood their role in the process,

(c) how the data gathering will be undertaken e.g. recording of information from learners and lastly

(d) developing the programme of interviews with educators.

The testing of a similar group of learners in the pilot study allowed me to isolate the errors in the data collection instrument for example, not to record the learners' reading responses verbatim but rather to have the same story available that can just be marked. This allowed me to concentrate on noting all the various types of errors the learners made during the course of the reading sessions.

d) Study of the strategic units

"...the researcher should expose a few cases that are similar to the planned main inquiry, to exactly the same procedures as are planned for the main investigation, in order to modify the measuring instrument (Yegidis & Weinbach, 1996:132 in De Vos et al., 2002:214). Austin and Crowell (in Grinnell, 1981:253) describe this process as the "field-testing of the instrument prior to using the final instrument in the actual study (De Vos et al., 2002:214). Due to the fact that I had to design my own data collection instrument, it was important to establish whether the instrument does assess for the required abilities. It was realized from the outset that the pre- and post-test could be done either on the computer within a Microsoft word document or on a hard copy.

3.5.2 Process of Pilot study

For the pilot study I opted to do the pre-test and post-test on the computer. The learners would be given a story to read from the computer screen. This means the story was prepared in a Microsoft Word document. The story was short enough (8 singular lines) to fit on one page. This meant that the learner did not need to press the spacebar, cursor(s) or enter key on the keyboard of the computer to gain access to any part of the page. Once the screen/page was made available to the learner then s/he could start to read when prompted to do so. The observer (researcher & or teacher) had a tally chart available to record the learner's reading

responses/words read. It however appeared to be more challenging to observe and record all the words being read by the learner at the same time. This was particularly so since the assessor/educator aspired to be as accurate as possible. One was not able to write the words down as the learner reads from the computer monitor especially considering observing and writing down the responses at the same time. The pilot study has however granted me the opportunity to make a number of changes to the original design of the data collection instrument. The first was not to have a tally chart with the criteria, for example, words identified, number of sentences read as events to be recorded. These would be used for post- analysis. This means that after the story has been read one should analyse and record the learner`s reading responses within the chosen categories, for example, how many words has the learner read before and after the intervention.

Furthermore one should not have to write down the story as the learner reads it but rather have the same story available for recording the reading responses. It becomes too challenging to observe, record and time the learner`s reading responses all at once. The final design of the instrument reflected several changes. These changes will be explained in the data collection instrument section to follow. Rubin (1983:285) further states that the individual items of, for example, a questionnaire should be pre-tested with individuals who are representative of the target population. This would enable the researcher to say that he expects the same kind of cases in the main investigation (De Vos et al., 2002: 215). Babbie (2001:250) in De Vos et al. (2002:215) adds that respondents should also be asked to comment on the wording of the questions, missing and confusing questions.

3.5.3 Assessment of interview schedule items

As stated before, the 4 educators working directly with the learners would be interviewed following the post-tests. The interview questions were designed by the researcher and the concern was whether the research question i.e. "What can the educators learn from this change?" will in fact be answered. As such, a decision was made to "interview" a different staff member at the research site to ascertain how the person would answer the questions and if the desired answers were given. The feedback gained from the "pre-testing of the interview schedule" enabled me to make adjustments on the type of questions asked as well as the way the questions were phrased. For example, initially the question "do you think that an additional person in your classroom will interfere with the smooth running of your class?" was asked. The question garnered a "yes" "no" answer and would not provide much information to answer the second research question.

3.5.4 Assessment of equipment

Neuman (2000:241) in De Vos et al. (2002:216) also adds that all equipment should be tested, for example, computers and tape recorders which will be used during a study. Initial testing of the reading software programme caused some of the computers to freeze. Some of the headphones were also dysfunctional. These challenges gave me insight into how to change the way the pre- testing and post-testing, as well as, the intervention should be conducted. Apart from these challenges the logistical arrangements with the computer lab also made me change the way the pre- and post-testing were conducted. All 14 classes in the school are given a timeslot in the computer lab. The implication is that a teacher only has one session for the week in the computer room. To be able to perform the pre- and post-testing, together with the intervention in the computer room, would have meant that I would not have had sufficient time to complete the data collection with all 5 classes. Pre- and post-testing have thus taken place in the educators' own classrooms. As mentioned earlier, the learners had to read the story which was printed on an A4 sheet. Only the interventions took place in the computer room. For this purpose the story was displayed on all the computers, but the sound was transmitted through a speaker system. Insofar as the interviews were concerned the recorder was checked for the appropriate distance from both interviewee and interviewer and sound clarity. All the technical aspects of the transcription software (Express Scribe) were assessed before the main interviews. The experience gained from this exercise helped me to engage in a reasonably error free interview and transcription process. I will now discuss the data collection instrument that was used during the pre- and post-testing. For this purpose I will explain the primary research that influenced the development of my instrument. Following on this discussion will be an explanation of the instrument utilized in the study.

3.5.5 Data collection instrument

The design of the instrument utilized during the pre- and post-test was influenced as mentioned earlier by Cami Reader and research conducted by Good & Kaminsky & Dill (2002) with the DIBELS (Dynamic Indicators of Basic Literacy Skills). More emphasis was however placed on the design of the Dynamic Indicators of Basic Literacy Skills owing to its simplicity. The instrument made provision for the oral story as well as an area where one could record the reader's results. For example, the amount of words read, errors made, retell tally and time utilized. The comprehension segment consisted primarily of the reader retelling what s/he has read. The retell information (words recalled) of the reader was captured on the flip side of the same page. So what is the Dynamic Indicators of Basic Literacy Skills? The DIBELS is a

standardized assessment tool for learners at the level of preschool through to grade 3. Of interest to me were the DIBELS Oral Reading Fluency (ORF) and the DIBELS Retell Fluency (RTF) assessment tools. The ORF is a standardized assessment tool for accuracy and fluency of text. ORF serves to identify learners that need additional support as well as to monitor the learner's progress. Another objective of the Oral Reading Fluency assessments is to identify learners that are not in need of support, those that need additional support as well as those that need intensive support in, for example, identifying the alphabet, vocabulary and understanding of the text (Coulter, Shavin & Gichuru, 2009:71). The learner's reading performance is measured by her/him reading a short passage for one (1) minute. Words that are omitted, or substituted were marked as errors. Words that were self-corrected within the allocated time frame of one minute were marked as correct. The number of correctly read words of the passage within the 1 minute was then tallied.

Following on the Oral Reading Fluency assessment was the check for comprehension with the intention of judging whether the learner understood what s/he has read during the oral reading. One of Retell Fluency measure's objectives was to identify whether the learner's understanding of the text was consistent with her/his fluency. There is no point in the learner reading as fast as s/he can and not understanding anything that has been read. Another purpose is that by prompting a learner to retell the story s/he is more likely to realize that reading a story as fast as s/he can does not necessarily imply that the text will be mastered. The learner thus has to concentrate on reading as accurately as s/he can, and at the same time try to remember the information (Good et al., 2002:30-31).

Insofar as the instrument designed for the testing of a learner's reading was concerned, a story activity was prepared for each learner on an A4 sheet. The Talking Story series (Koopedi, 2007) are made up of short 8 line stories consisting of between 33 and 44 words. The story "*In ons klaskamer*" consisted of 33 words and the English version "*In our classroom*" 35 words. The second story "*Can you help me?*" consisted of 34 words and the Afrikaans version "*Kan jy vir my help?*" contains 44 words. The stories that were read by the learners on the A4 sheet had a similar layout to the electronic story in the Talking Story series created by Margaret Koopedi (2007). This means that the learner would be attempting in all three instances (pre-test, post-test and intervention) to read a similar story. For example the start of a sentence on paper would be similar to the one on the computer. Because the computer room is utilized by different classes during the day it became easier to rather have the pre- and post-tests in the learners'

own classes. The intervention, that is, the exposure of the learners to an electronic medium of the story was done in the computer room.

In order to record the reading responses of the learners the whole story (similar to the learner's one) was created as a recording sheet. A space was created next to every word in the story. Essentially this enabled the assessor to record every learner's response as s/he was reading. As the learner read the story the observer would make a tick (✓) for words correctly read and a cross (×) when the word(s) were incorrectly read. A time allocation of 60 seconds (1 minute) similar to the Oral Reading Fluency assessment (Coulter et al., 2009), as mentioned earlier, was given for each learner to read the story. Substitutions for words were written next to a particular word. Self-corrections, that is, when a learner initially made a mistake and corrected her/him within the allocated time, was also recorded. The letters "sc" was written next to the affected word. At the end of this reading period, all the words correctly and incorrectly read, were tallied. The real time utilized by the learner to read the whole story was also recorded.

3.5.6 Pre- test and Post- tests

The third stage in the action research cycle is the implementation stage of which the pre-tests, interventions and post-tests form part of. The discussion to follow will explicate the administration of the pre- and post-tests. Having finalized the data collection instrument, it was necessary to make arrangements to undertake the pre-tests with the sample group of learners. Letters seeking permission to conduct the study were given to the school and the respective educators. Once this process had been completed the discussions as to how the data collection would unfold, took place with the educators. The data collection programme as agreed with the educators can be observed in Table 3.1 & 3.2 below. The tables reflected when the pre- and post-tests took place, across the two stories. The interviews, as mentioned before took place shortly after the tests were concluded. The semi-structured interviews were about 30 minutes each. Table 3.3 reflected the exact days and time of the interviews conducted with the educators.

Table 3.1 Dates of pre- and post- testing during the first story

CLASS	PRE-TEST	POST-TEST	POST-TEST 2
1	28-Apr-10	06-May-10	31-May-10
2	06-May-10	24-May-10	
3	27-May-10	28-May-10	
4	19-Jul-10	23-Jul-10	
5	29-Apr-10	05-May-10	31-May-10

Table 3.2 Dates for pre- and post- testing during the second story

CLASS	PRE-TEST	POST-TEST	POST-TEST 2
1	16-Aug-10	23-Aug-10	
2	31-Aug-10	07-Sep-10	
3	30-Aug-10	06-Sep-10	
4	17-Aug-10	20-Aug-10	27-Aug-10
5	28-Aug-10	30-Jul-10	13-Aug-10

3.6 Procedure for administering the pre- tests

Having finalized all logistical arrangements with the respective educators, the pre-tests got underway. Most of the pre-tests were conducted in the learners` own classes. During the *initial discussion* process with the educators it was revealed that most of the learners in the respective classes had some challenges in reading. We (teacher and researcher) agreed nevertheless to still do the pre-testing given the aim of the study in assessing the extent to which this form of intervention could improve learners` reading. The learners appeared to be anxious yet not resistant to perform the task. The educator set the stage by informing the learners what activities they would be engaging with in class. Learners were informed that they would be given a short story of which each learner would be given a chance to read. The educator also indicated that they would be observed during these engagements to assess how they perform these activities. Of significance during the pre-test is that the educator(s) did not give the learners any background of the story. Under normal circumstances the educator would have given a background of the story, do some pre-reading activities like showing them the cover of the book. This would have provided the learners with an idea of what the story was about. Instead the learners were given a short story typed on an A4 page. The page also had no

pictures or clues of what it was about. The idea was to assess the learners' true reading ability before the intervention. During the intervention stage, as will be explained later, the learner would be exposed to many more cues, for example teacher and technological involvement. The educator(s) and the researcher assessed learners individually. Learners were called aside in the class where s/he was requested to read the short story. Each learner was timed using a stop watch. The learners were given 1 minute each to complete the story. Upon completion of the stories being read learners were asked to re-tell the story. Re-telling, as was previously indicated by Good et al. (2002) in chapter 1, is a component of comprehension. To be able to share information about a given segment of a story one needs to be able to have decoded and / or read some or most of the words in the story. Some learners were not in a position to read any or all of the words or were only able to identify some of the words of the story. This group of learners was not requested to participate in the re-telling section of the assessment, because the lack of words read would not provide them with enough information to share with their respective assessor(s).

The criteria for the observation of the learner`s reading behaviour was as follows:

1. The learner reads all the words in the story within the allocated 1 minute.
2. Being able to decode the text and identifying the words in the story
3. That the learner gets a good overview of the story.
4. The learner being granted the opportunity to re-tell the content of the story and lastly
5. To show a reasonable amount of understanding of the story being read

Based on the *initial analysis*, most of the learners struggled a bit with the activity. The learners were still eager to complete the task, and even at times making up their own story. As one learner read "table, chair, name..." This was in contrast to what was actually on the page. In other instances learners were honest and said "I don't know ...". The learners were encouraged to continue reading until they were told to stop.

3.7 Administering the interventions

The intervention process followed during this study was set against the background of research conducted by Thompson (2005), Littleton et al. (2006) as well as Zhao (2007). I will provide a synopsis of these studies as a way of illustrating the intervention process in my study. The objective of Thompson's (2005) research was to ascertain the outcome of a text-to-speech computer program with first grade at risk learners to recognize sight words and to establish their sight word fluency. Beyond these objectives the researcher was also interested to know how

fluently the learners read. Essentially the learners made use of a text-to-speech program that has stimulated them both visually and acoustically to printed information. In the process the learners could listen to electronic text on a computer screen whilst following the highlighted words at the same time. During the intervention the learners used headphones to listen to a story at least three times for twenty minutes. The learners were assessed two weeks prior to the interventions as well as when the intervention was concluded on sight word recognition, sight word fluency and reading fluency. The research reported by Zhao (2007) was in many ways similar to that of Thompson (2005). In this instance a group of learners were exposed to books with text-to-speech capabilities during the intervention process. The focus was to improve the learners' phonological (sound-symbol) ability as well as to recognize words (Barker & Torgesen, 1995; Higgins & Raskind, 2000 in Zhao, 2007:36). The emphasis on word recognition has been highlighted by Forgrave (2000) as significant to a learner's understanding of the text (Zhao, 2007:37). The research discussed by Littleton et al. (2006:385) had as a focus area the use of electronic text (text read from a computer monitor) as part of a reading programme. More specifically the intervention centred around the use of the Chera (2000) "Bangers and Mash" talking books (published by Longman) by 5 and 6 year old boys, with the objective of promoting their phonological awareness. Demonstrations of the software were done with the learners, after which they were left to use the books independently. An adult was always present during the course of the interventions. The learners were exposed to two computer sessions per book lasting about 15 minutes in total. They were post-tested after 1 week at the completion of a given intervention session.

Insofar as my study is concerned the pre-tests, dates and times for the interventions were arranged with the class teachers based on their availability. One also had to synchronize the sessions amongst all other school activities, for example, concert practices, physical education and with the computer lab times of the respective classes. In keeping with the objective of my study, I needed to assess if computer technology had any significant influence on the reading ability of the target group of learners. With that in mind learners would be exposed to two short stories (+- 30 words) during a pre-test, post-test and intervention process. The intervention sessions took place in the computer classroom where the learners were now exposed to the same stories as during the pre-test. The difference in this instance was that in the interventions the stories had text-to-speech elements included. As the story was read by the computer, the individual words were highlighted. Similarly in research reported by Littleton et al. (2006) of the "Bangers and Mash" reading scheme developed by Chera (2000) that was used as an intervention for their study, I too made use of a reading series. The reading series in this

instance were the Talking Stories (developed by Mcmillan) and written by Margaret Koopedi (2007). The choice for this particular reading series was based on a number of reasons, as mentioned earlier in the chapter. Additionally the reading scheme had a few advantages. Some of these were:

- that the stories were done in three of the official languages of South-Africa, being English, isiXhosa and Afrikaans. The target group of learners' home language was either English or Afrikaans.
- the stories had different difficulty levels, starting from level 1-3. Within these levels, the stories were categorized as core, beginner, intermediate and advanced.
- during the initial levels the stories have visual and acoustic support. As a given story is being read the word is also highlighted in bright yellow. One could also re-read a specific word by clicking on it.

The focus was not to establish whether the learners were able to master or recognize specific words, but rather all the words in the story. Sight word recognition as highlighted by Thompson (2005) and Forgrave (2000) in Zhao (2007) plays an important role in a learner's reading comprehension.

Prior deliberations with the educators involved explaining the following:

- a) How the Talking Stories work, that is, how to move from one page to the next and how to activate the sound of a given story
- b) That the focus area would be two (2) stories that form part of **level 1**, the **beginner group** will be used. The chosen stories, "**Can you help me**" and "**In our classroom**" by Margaret Koopedi (2007), are in keeping with the thematic concepts that the school where I teach were using at the time of the study.
- c) An intrinsic element of level stories is that they are accompanied with visual and auditory support or otherwise known as recorded speech technology.
- d) Teachers need to deal with stories as they would with any other story for example to set the stage by asking initial probing questions like "what do you think the story is about?" They should also ask some content related questions at the completion of a given story, for instance, "who were the characters in the story?" This would enable the teacher to assess whether they remember and/or comprehended the story. Beyond these the educators needed to make sure that the learners actually were reading the specific words by pressing on each one on the computer monitor. Furthermore if a learner made a mistake whilst reading the story then s/he needed to get more opportunities to read, by replaying that

specific segment. An assessment for the type of errors made by the learners would not take place during the intervention but rather when the pre- and post-tests would be conducted.

- e) Since all the classes have learners that are English or Afrikaans home language speakers, the teachers had to make sure that they exposed the learners to both mediums of the stories.

Initial testing of the process revealed that some computers freeze up when all 15 computers are running the software programme. This would mean troubleshooting the affected computers and a delay for the whole class to continue the session. Although in the above-mentioned studies reported by Zhao (2007), Littleton et al. (2006) and Thompson (2005) the learners worked individually with the stories, I decided to rather facilitate the reading sessions as a group activity. The teacher would activate all 15 computers from a central computer with the aid of a demonstration software programme called Netops. The learners would still follow the story (words read) on their own computer screen, but hear the story being read from the teacher's computer through a speaker system. The advantage of a group reading session was that all the learners can listen and view the story quite a few times until they had shown a reasonable level of mastery. All educators engaged the learners in the story as per the initial discussion. Meaning the teacher(s) asked the learners if they could gather what the story is about. Essentially the process that unfolded during the intervention sessions was:

- That the learners were told that the stories would be conducted within the whole group and not individually
- The story was read through a few times to allow the learners to get a good sense of the content
- The last time the teacher "read" the story more systematically by "reading" a page and asking the learners what that part of the page is about.
- At the completion of this reading cycle the teacher indicated to all the learners that each one would now get a chance to read the story aloud. When a learner struggled to identify a given word that particular word was "read" again. This process took place for all 15 learners in the class. With the result that all the learners were exposed to the story more than 30 times within a 45 minute session.
- The exposure to the electronic story was significantly more than that of the group of 5-6 year old learners as reported in the Chera (2000) study.
- The learners were exposed to the words of the story on three levels. The first level was when the teacher "read" the story to the learners a few times and then following the story

on the computer. The second level was when the individual learners got an opportunity to listen, follow and read the story whilst the rest of the group listened to their peers. The third level of exposure was when the teacher explained and re-read the parts not properly read by the learners.

The learners generally appeared focused and relaxed. Some learners who are normally restless were looking at their screens and listening attentively. The educators asked some probing questions after the story. Of interest at this stage was that one was able to get much more positive responses from the learners, compared to the pre-assessment. The learners were able to give the teacher some content feedback, which was not possible during the pre-testing phase.

3.8 Administering the first post tests

Post-tests were performed with all 5 classes. Prior engagements with the educators involved discussing the following salient points:

- a) The process would be similar to the pre-test
- b) The forms would be the same as in the pre-test
- c) All learners' reading responses had to be recorded meticulously
- d) An assessment for comprehension would also be done since learners have had several interactions with the stories during the intervention phase
- e) An assessment of random visual discrimination of words would also be performed in story 2.

The initial discussions with the teachers covered most of the processes to be followed for this particular assessment. Having been involved in the pre-testing of the learners it proved to be easier for the educators to be involved with the post-test assessments. The educators informed the learners that they would be re-assessed to establish how much of the story they were able to read after the intervention activities. The researcher and teacher had collaboratively assessed the learners in the class. The learners were called aside to be assessed. Part of the reason for this was to ensure that the learners were undisturbed during their assessment.

The learners were given an A4 sheet with the typed story which was prepared with a Century Gothic font of 28. No pictures or visual cues were reflected on the page. The researcher and teacher had the same story available for recording of the learners responses.

The following areas were assessed during the post-test:

- a. Words identified

- b. Number of words and sentences read
- c. Errors i.e. number and type of errors made
- d. Self-correction words i.e. words corrected by learner within allocated time frame of 1 minute
- e. Re-tell words i.e. words (type and amount) retold by learner after reading the story
- f. Time utilized reading the story
- g. Visual discrimination of words (story 2 only).

Having had some opportunity to practice ones' observation skills during the pre-test proved to be invaluable during the post-test. Some of the learners appeared much more confident reading the story. Other learners were still not able to decode the text or identify words properly. Where a learner's word count scores showed some significant improvements, that particular learner was requested to randomly identify words otherwise referred to as **visual discrimination**. This additional assessment was done to ascertain whether the learners were actually identifying the words in the story.

According to Wiersma and Jurs (2005: 205-206) data collection and analysis run concurrently. That is, as the data is collected, an initial analysis is being applied to it and amendments are made accordingly.

As the data collection and initial analysis of the results of story 1 was done, it became clear that additional measures had to be taken to ascertain that the results achieved were true achievements. The question to be answered in this regard was whether the learners actually were able to decode the written text or were they merely articulating words that they remembered. These and other analyses are elaborated on during the analysis phase in Chapter 4. The learners were thanked for their co-operation after the activity. Learners were asked whether they had enjoyed the story, to which most replied positively.

3.9 Administration of second post tests

I have mentioned previously that the variety of school programme activities compelled me to make use of every opportunity to collect as much data as possible. Furthermore I had to devise the assessments and intervention activities according to the teachers' programmes. For example the pre-test had to be conducted just before the teachers took their classes to the computer lab. Each class teacher only has one opportunity in a given week to take her/his class

to the computer lab. If the teacher misses this session then that particular class has to wait another week to have a computer session. It was for these reasons that every available time had to be utilized for the pre- and posts as well as the interventions. The only constant was the fact that learners in a given class were pre-tested, were exposed to intervention activities and were post-tested about a week later, similar to the study reported in Littleton et al. (2006). For these reasons and in keeping with step 4 (reflection and review) of action research, I wanted to establish whether the learners' responses were actual changed responses. That is, at the completion of the first story I reflected on the results of the learners and was interested to ascertain whether the words read by the learners were not just by chance, but that a real change had taken place. I also needed to see if there was a significant difference between the pre-and-post tests.

In order for me to do these I had exposed some of the learners to another round of post-tests a few weeks after their last post-test. This post-test did not involve any prior interventions. The learners were told by the educator that they would be assessed again by reading a story from a page. The learners complied eagerly. The teacher and researcher had assessed the learners collaboratively using the same test that was used during the first post test. The results of these tests were interpreted together with the initial pre and post test. Tables 3.1 and 3.2 presented earlier in this chapter reflect the schedule for the 2nd round of post tests.

3.10 Interviews with the educators

The purpose of the interviews was to answer the second research question:

What can educators of these intellectually impaired learners learn from this change or lack thereof?

In order to answer this question a series of semi-structured interviews were conducted with the second sample group. Grebenik and Moser (1962:16) in Lowe (2007:80-81) refer to a "continuum of formality" with regard to the different types of interviews. These are unstructured, structured and semi-structured interviews. According to Lowe (2007:81) interviews can be identified as:

"structured with a pre-designed set of questions that should be followed exactly" and the ***semi-structured*** interview, as consisted of "a set of questions to guide the interview but where the researcher is free to follow up responses to the questions".

Semi-structured interviews can also be defined as "those organized around **areas of particular interest**, while still allowing considerable flexibility in scope and depth" (De Vos, Strydom,

Fouche & Delport, (ed.) 2002:298 in Morse, 1991:189). Another definition furnished by Denscombe (1998:112) in Arnott (2004:54) indicates that: In the semi-structured interview the interviewer is prepared to be flexible in terms of the order in which topics are considered, and perhaps more significantly, to let the interviewee develop ideas and speak more widely on the issues raised by the researcher. The answers are open-ended, and there is more emphasis on the interviewee elaborating on points of interest.

The choice of *semi-structured interviews* was influenced by the description of De Vos et al. (2002) i.e. searching for information around “areas of particular interest”. In this instance I was interested to know how much the educators had learned from the experience. Implicitly one hoped that what had been learnt would be applied directly within their teaching. Further to this I was also guided by the objectives of this study and the composition of my second research question. According to De Vos et al. (2002:302) semi-structured interviews will have a set of predetermined questions on an interview schedule. Of interest for this study was the second assertion by De Vos et al. which says the “interview will be guided by the schedule...”. The interview schedule contained a set of 10 questions, structured according to the suggestions made by De Vos et al. (2002). These were, to arrange questions from, simple to complex and from broad to more specific. The first question of the schedule was quite simple and attempted to relax the educator(s). Systematically more specific questions were asked, building from what they already know and what they have experienced during the course of the reading sessions. The questions were also designed in such a way that they link up with the central concepts of the study, which is, **reading** and **technology**. In addition the questions were structured in a “logical order” as highlighted by De Vos et al. (2002). These were:

- a) The current state of affairs i.e. what knowledge and skills educators attempt to impart as well as the reading focus
- b) Their views about technology and how it is used as a teaching learning tool
- c) What they have learnt from the sessions during the study and lastly
- d) Some final comments

The **interview schedule** was as follows:

1. How long have you been teaching at the current school?
2. What in your view are the reasons for the placement of learners in your school and not in a “mainstream school”?

3. What do you regard as important *knowledge and skills* that a learner with special educational needs should have on completion of their schooling?
4. What in your view as an educator is the importance of *reading literacy instruction* for the mentally and physically challenged learners at your school?
5. How would you group your learners in terms of their ability to read?
6. What in your view is the importance of *technology*, specifically computers, in the learning and teaching of mentally and physically challenged learners?
7. What, if any, has been the *general achievements* that your learners had made when using *technology & / or computers* as a learning tool?
8. Have you observed any change in your learners' reading ability whilst being part of the reading sessions? What have you learnt from this change?
9. How would you describe your learners' reading competency (before and after intervention) in relation to the following units:
 - a. The ability to decode text,
 - b. Word recognition,
 - c. Visual discrimination of words
 - d. Reading fluency and lastly,
 - e. Their understanding of the stories
10. Do you have any comments or observations?

I have attached a copy of the interview schedule as Appendix J. Letters of consent were issued to the four educators and they all consented to be interviewed. The interviews had been scheduled shortly after all three phases i.e. pre tests, interventions and post tests were completed with the learners. Table 3.3 reflected the exact dates and times of the interviews.

Table 3.3 Schedule of interviews with educators

EDUCATOR	DATE	TIME	TIME
		START	END
1	14-Sep-10	14h00	14H30
2	20-Sep-10	14h00	14H28
3	21-Sep-10	14h30	15H00
4	20-Sep-10	14h30	15H00

The reasoning behind this was to allow the educators to engage with the stories, and to observe how their learners perform. The interviews were conducted in the afternoon when the learners

had already left the school. The dates and times were negotiated with the relevant educators. The interviews were not more than 30 minutes. It was also indicated to the educators that the interviews would be digitally recorded. I had explained to them that this method would ensure that all the responses would be accurately captured. According to Lowe (2007:97-98) a recorded interview allows for data to be preserved.

At the commencement of the interview I mentioned to the educators that they should relax and speak naturally into the recorder. Prior testing of the recorder, gave me the satisfaction that the speaker just had to maintain a natural voice for the device to record their voices. Lowe's (2007:98) helpful hints in this regard were observed, which are:

- Position the microphone so that it records each voice evenly and clearly as well as
- To test the equipment to make sure that it is working which, in this regard, proved to be quite helpful.

The educators had not seen the questions before the actual interview. I opted to read the questions to them from the schedule. This was to elicit a natural spontaneous response from the educators. Additional notes were made to ensure that I could corroborate the captured information on the recording.

Transcriptions were done the same day following the interview. Denscombe (1998:130) indicates that transcriptions bring the researcher "closer to the data". In addition the transcriptions support the analysis process since it is easier to work with written information. In my search for finding additional material to aid me in the transcription process, I found a rather useful software tool on the internet. I have employed Express Scribe Transcription Playback Software that allowed me to download the recording and transcribe the interview on the same platform. Once the transcription was completed, it was copied, printed and prepared for further analysis. I have included a snapshot of an actual transcription in progress.

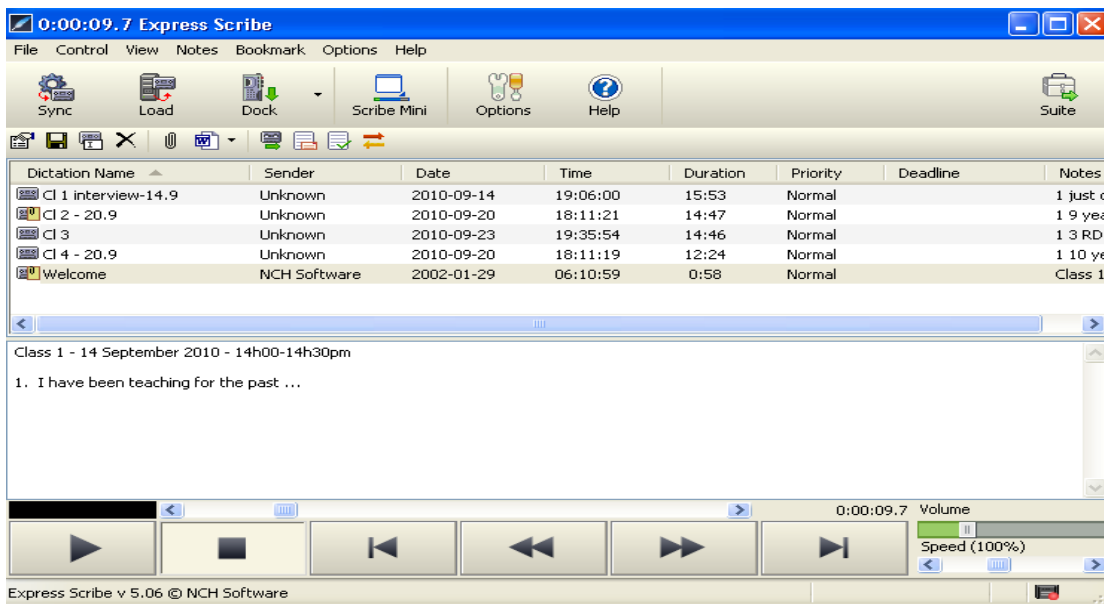


Figure 3.2 Snapshot of interview transcriptions

3.11 Quality assurance

The application of “rigor” in research is critical, hence the focus on reliability and validity (Morse, Barrett, Mayan, Olson & Spiers, 2008:14). During works conducted in the 1980’s Guba and Lincoln opt to rather use the terms “credibility”, “transferability”, “dependability” and “confirmability” as opposed to reliability and validity (Morse et al., 2008:14). Strategies such as “member checks when coding”, “confirming results with participants” and “peer debriefing” were used to ensure rigor in the research process (Guba and Lincoln, 1981; Lincoln and Guba, 1985; Guba and Lincoln, 1982 in Morse et al., 2008).

According to Guba & Lincoln (1981) the nature of knowledge between quantitative and qualitative research is different and for that reason different criteria are to be used to ensure “rigor” or “trustworthiness”. In quantitative research the criteria to follow would be internal & external validity, reliability and objectivity. On the other hand the criteria for qualitative research would be trustworthiness, credibility, fittingness, auditability and confirmability (Morse et al., 2008). According to Johnson (1997:282) validity within qualitative research refers to the research as “plausible, credible, trustworthy, and therefore defensible”.

Be that as it may, the researcher has to ensure that some level of thoroughness has been applied throughout the research process. The study has primarily been qualitative in nature and for that reason the focus of the discussion in this section will be based on the qualitative paradigm.

3.11.1 Validity

There are various kinds of validity relevant within qualitative research. These are descriptive, interpretative and theoretical validity.

3.11.1.1 Descriptive validity

This type of validity refers to the factual accuracy of the information shared by the researchers. Descriptive validity refers to “accuracy in reporting descriptive information (e.g. description of events, objects, behaviours, people, settings, times and places). One of the strategies to acquire descriptive validity is through **investigator triangulation**. This involves multiple observers\researchers for example the researcher and the educator observing and describing the sample group of participants in a given study. If corroboration of observations occurs then the research tends to be more credible and defensible (Johnson, 1997:284-285).

3.11.1.2 Interpretative validity

This area of validity refers to how accurately the meaning of the participants’ data is being portrayed. “...refers to the degree to which the research participants’ viewpoints, thoughts, feelings, intentions, and experiences are accurately understood by the ...researchers and portrayed in the research report”. One of the ways of achieving interpretative validity is through participant feedback. Participant feedback takes place when the researcher shares his\her interpretations of the participants’ viewpoints with other members of a given research group with the aim of clarifying key issues. Another strategy to ensure interpretative validity is to make use of “low inference descriptors” by using the participants’ own words verbatim, for example, the words of the educators that were interviewed. By using the participants’ own words verbatim one gets a sense of the participants’ interpretations and own understandings (Johnson, 1997:284-285).

3.11.1.3 Theoretical validity

In this instance a theoretical explanation such as the Mediated Learning Experience (MLE) and Zone of Proximal Development (ZPD) that was developed from a research study that matches the data are credible and defensible. “Theory usually refers to discussions of how a phenomenon operates and why it operates as it does. Theory is usually more abstract and less concrete than description and interpretation” (Johnson, 1997:286). One of the strategies that will add to the theoretical validity of the study is called theory triangulation (Denzin, 1989 in Johnson,

1997:286). Theory triangulation is when different theories are being used to explain a particular phenomenon for example reading. The different theories provide one with more insights and help the researcher to develop a clearer explanation. The researcher would then make predictions based on the theory and assess the accuracy of his\her predictions (Johnson, 1997:287).

3.11.1.4 Internal validity

This type of validity refers to the level in which a researcher is justified in his\her conclusions that an observed relationship was caused by something specific (Cook and Campbell, 1979 in Johnson, 1997:287). "Internal validity is relevant when qualitative researchers explore cause and effect relationships" (Johnson,1997:284). This type of validity together with external validity is generally use by quantitative researchers and to a lesser degree by qualitative researchers. The researcher tends to take on the role of so-called "researcher as detective". "The researcher develops an understanding of the data through careful consideration of potential causes and effects and by systematically eliminating "rival" explanations of hypotheses until the final "case" is made "beyond a reasonable doubt" (Johnson, 1997:283). Once the cause and effect relationship has been established then the researcher needs to make sure that the observed change in the "dependent variable" is as a result of the "independent variable" and not something else. In other words insofar as the study is concerned, the observed change in the learners' reading can be as a result of the assistive technology and with the guidance of the educator and not something else.

3.11.1.5 Methods triangulation

In this regard the researcher made use of different methods of research in a single research project. Accordingly, different methods of research i.e. ethnography and experimental as well as different data collection procedures such as interviews and observations, can be used. Triangulation, according to Wiersma and Jurs (2005:256) is "part of data collection" and involves "two or more techniques or sources". This means it is a process of validating the data sourced and thus making sure that the research process is robust. De Vos et al. (2002:341) goes further by stating that the most common type of triangulation is that of "measures". The significance of mixing the methods and/or collection strategies is that one is able to counter the weakness of one method and compliment the strengths of another (Brewer & Hunter, 1989 in Johnson, 1997:288). For example pre- and post- testing of the learners worked best with the sample group of learners as opposed to interviewing them. The interview data from the learners would not have elicited the required data. In turn the interview data of the educators compliment the data

gathered from the pre- and post- testing of the learners. The author De Vos et al. (2002:341) also added that “triangulation of method means mixing qualitative and quantitative styles of research and data.” Furthermore, because the methods may partially overlap, a “study using both is ... more comprehensive.”

Insofar as this study is concerned different “measures” were used.

These were:

- a) Quantitative (numerical capturing and presentation of pre- and post- tests) and qualitative methods (interviews) had been used.
- b) The same pre- test, intervention and post- test were used across all five classes
- c) A second round of post- tests was conducted with classes 1 and 5, to assess if the results achieved were a true reflection of the learners’ acquired abilities. No interventions were conducted prior to the second round of post tests
- d) Interviews conducted with the learners’ educators to corroborate the data from the pre and post tests
- e) Similar questions were put to all four educators
- f) Additional assessments of visual discrimination of words during the post- tests were done with all the learners in group 1 during story 2.

3.11.1.6 Data triangulation

This type of triangulation refers to making use of multiple data sources in a singular method (Johnson, 1997:289). For example multiple interviews with different educators as opposed to having only one interview with one educator. In this instance one complies with the notion of making use of “multiple data sources” as well as collecting data from different people (educators). The latter is also an important part of data triangulation, involving data from different people. Upon completion of the data gathering process, I began to prepare the data for analysis.

3.12 Data analysis

The process of data analysis involves a number of stages - data editing and analysing the learners test scores followed by the interview data of the educators. I will start by looking at how the learners’ test scores were edited as well the interviews conducted with the educators. The methods of analysis will follow, upon which I will take a closer look at the phases of analysis involved in working with the learners’ data. The process of analysis will end with an explanation of the stages that was followed in making sense of the interview data.

3.12.1 Data editing

Cohen and Manion (1994:101) in Arnott (2004:61) state that one needs to reduce or edit the data prior to the actual analysis process. De Vos et al. (2002:343) in turn refer to this process as a way of “managing the data”. Accordingly the process of data analysis commences at the start of the data collection process and continues when one leaves the research site. In order to manage the data one needs to organize it in a proper filing system albeit on the computer or file folder. Files then have to be converted in appropriate text. Insofar as this study is concerned, the organization of data started once I had completed a given test or interview for the day. The tally charts were checked (particularly those completed by the educators) for completeness and accuracy. Where information was unclear and incomplete that was clarified with the respective educator, and adjusted accordingly. The charts were filed separately according to the individual class groups.

The **learners’ test scores** were entered on the computer first together with their particular class group. The learner groups were later reorganized to reflect two separate groups. The compositions of these groups were based on their pre- test scores. Learners with similar pre - test scores were grouped together. **Interview recordings** were transcribed the same day of the interview. The notes made during the interview were used to check whether the transcriptions were accurate. Initial comments were made on the transcriptions. Denscombe (1998:130) refers to this phenomenon of making informal commentary alongside the interviewee’s words as “annotations”. De Vos et al. (2002:343) highlight that any type of method should allow one to organize the data in a way that can be retrieved and manipulated easily.

3.12.2 Methods of analysis

According to De Vos et al. (2002:342), as noted earlier in this chapter, that triangulation of method means the mixing of qualitative and quantitative styles of research and data. They go further to state that these two types of research can partially overlap. One key strategy is to use the methods consecutively, that is, first the one then the other. Campbell in De Vos et al. (2002:369) holds that “quantitative methods cannot exist without qualitative knowledge of ...analysis ... and making generalizations.” The author continues by stating that it is virtually impossible to convey ideas or draw conclusions that are not in part open to some kind of “quantitative representation.”

In this sense, the author's views of the methods and or styles are that of inclusion rather than exclusion. This study has made use of qualitative and quantitative techniques, particularly at the level of *data analysis*. Campbell and De Vos et al. (2002) have indicated that one of the best ways to present ideas is to make quantitative representations thereof. The representations could be in a tabular form or graph.

3.12.3 Analysis of learner data

The learners sampled to participate in this study went through a process of pre- testing, recorded speech technology intervention and post-testing. The significance of the assessment process was to ascertain what the learners' levels of reading performance were before and after the intervention of speech technology. Beyond the intervention process I had to ascertain whether the learners had achieved a significant change in their respective reading competencies. For these reasons the analysis process was conducted in several phases.

The *first phase* involved making sense of the number of times certain reading behaviours occurred and were recorded. The data has initially been captured per class group in tabular form and later in a frequency table. According to De Vos et al. (2002:226) when information is displayed or summarized appropriately it provides "for more sophisticated analysis...later stage". As the sessions progressed a pattern of results started to emerge. The achievements of the learners in the tests across the class groups and stories have followed the same pattern. Two clearly defined groups have evolved, i.e. particularly with regard to the performance in the pre-tests. De Vos et al. (2002:226) add that one can do little with data that is just lumped together. The data according to them has to be "organized... in order to be analysed and interpreted".

The *second phase* thus involved identifying the most significant aspects of each reading session within the two groups. These were achieved by plotting the learners' achievements in terms of the various units i.e. amount of words and sentences, errors, re-tell and time. The idea was to isolate trends of interaction and possibly clarify the effects of the reading sessions. Throughout this process the types of errors made by the learners were also listed. Lowe (2007:72) has indicated that one of the shortcomings of a tally chart is that it does not capture any "contextual information". For this reason I have recorded additional observations made next to each learner's response. These were particularly helpful going into a later phase of error analysis.

The key concepts used for further analysis of the learners' oral reading responses were omissions, substituting words in text with one's own words, self-correcting misread words,

reversal of words and additions/reversals. Two additional word reading errors are also when learners refuse to read, which can form part of an omission type error, as well as, when the learner identifies the individual words as opposed to reading whole words. These types of reading errors or miscues have been defined by Goodman (1995) in Girgin (2006:69) as the “word being read differently from its original ...during oral reading”. The focus of miscue analysis is to observe the learners interacting with the body of text and then to evaluate and assess what they do (Goodman et al., 1987; Goodman, 1995 in Girgin, 2006). The miscues during the oral reading provide the observer (educator/researcher) with insight into the learners’ thought processes and how s/he makes use of the different language cue systems (Goodman, 1995 in Girgin, 2006). The present study has only sought to identify the reading errors/miscues and to gain some insight into the reason why the learners made them.

1. Omission: This means that the learner omits either some or all the words in the text (Spache, 1981:146; Ekwall, 1981:17). Omissions have also been defined as the act of “skipping a word or phrase” (Goodman, 1995; Goodman et al., 1987 in Girgin, 2006:70)
2. Refusal to read: The learner refuses to read any part of the story and kept quiet for the remainder of the session.
3. Substituting words in text with own words: Substitutions occurs when one word or more words in the text are substituted for another (Spache, 1981:147; Ekwall, 1981:26; Goodman, 1995; Goodman et al., 1987 in Girgin, 2006:70).
4. Identification of letters as opposed to whole words: The learner identifies certain or all the letters in a given word instead of reading the whole word for example, “o”, “e”, in the word “onderwyser” (teacher).
5. Self-correcting misread words: In this case the learner reads a given word erroneously and then corrects the word shortly afterwards. Others stated that the reader corrects a mistake whilst s/he is reading (Goodman, 1995; Goodman et al., 1987 in Girgin, 2006:70)
6. Reversals: The learner tends to reverse letters\words in the oral reading session. According to Ekwall (1981:21) reversals reflect a tendency in the reader to read letters or words in reverse.
7. Additions or Insertions: This phenomenon refers to the learner adding a new word which is not present in a given sentence (Ekwall,1981: 24 & Spache,1981:147; Goodman, 1995; Goodman et al., 1987 in Girgin, 2006:70).

Poland (2002) in Henning et al. (2004:76) says that one should not see the pupil as the only source of information. Rather that the information should be viewed in relation to all the other

information such as the notes I made and the interview data of the educators. Following on the analysis of the learners' data, the **interviews** with the educators were also analysed.

3.12.4. Analysis of educator data

Bogdan and Biklen (2007:159) provided me with a clear understanding and “road map” of managing qualitative data. The authors refer to analysis as the process of “working with the data, organizing ..., breaking them into manageable units, coding ..., synthesizing..., and searching for patterns.” A second definition and model of analysis was also supplied by Lowe (2007). Lowe (2007:129-130) indicates that there are three clearly defined stages of analysis. These are, to *identify the units*, *grouping of responses into themes* and thirdly to *write the narrative*.

3.12.4.1 Identification of units

Denscombe (1998:211) says that identification of units is sometimes referred to as “unitizing the data”. Lowe (2007:129) adds that the process specifically involves identification of the units of meaning from the data. One achieves this (meaning) by reading through the data several times and listing the most salient ideas and events mentioned by the interviewees. After the transcription process I made initial remarks next to the interviewees' responses. This has aided me to formulate ideas of meaning. These initial ideas were further extended when I read and re-read the transcripts.

3.12.4.2 Grouping of responses into themes

According to Lowe (2007:131) the process of theme building starts to evolve when one compares interviewees' units of meaning. As one establishes similar and or different units, themes start to emerge. Of interest was the type of answers given by the interviewees to the same question(s). I have grouped the units captured earlier into primary and secondary themes.

3.12.4.3 Write the narrative

Having completed organizing the themes I was ready to write the narrative of the interviewees. A narrative would include some of the interviewees own words, captured as quotes (Lowe, 2007:132).

The fourth stage is when the data of both learners and educators are interpreted by making use of both the literature review as well as the theoretical framework used in the study.

3.13 Chapter summary

The focus of chapter 3 was to discuss the research methodology identified for my study. The design of the study was explained as well as how the data was gathered with the target group of learners and educators. I have also looked at the design of the instruments utilized for the pre- and post-tests. The research that has influenced the interventions applied with the learner group was explained in detail. The next chapter present the results from the tests conducted with the learners as well as the interviews with the educator grouping.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

The aim of this chapter is to present the results of the study following the analysis of the data. The results for the learners and the educators have been reported separately. The learner results presented some interesting phenomena, one of it being that they could not quite be grouped into homogenous groups based on their reading ability. The results presented of the learners in this chapter will therefore highlight two clearly defined groups. Suffice to say at this stage, that the learner groups were characterized according to their ability to decode text and / or read one or more words during the pre-test. The results across the two groups i.e. learner group 1 (ability to decode and / or read words during the pre-test) and learner group 2 (have difficulty to decode and / or read words during the pre-test) will reflect the differences across the pre-and post-test continuum.

The implications of these differences will also be pointed out later in this chapter. The quantitative data is presented first. Through the quantitative presentation will be shown how the learners scored across the pre- and post-test continuum. Following this process I shall proceed to present the qualitative data from the interviews held with the educators. The quantitative data sets of the learners will seek to answer the first research question, which is: What direction for change does the reading of intellectually challenged learners take when a particular assistive technological device is used as a teaching-learning tool? In this regard I look forward to determining among others whether the learner's ability to read changes positively, stays stagnant or deteriorates.

The second section is a presentation of the results of the interviews held with the educators. The analysis process that is to identify the units, grouping of responses into themes and thirdly to write the narrative described in chapter 3 has been adhered to. The *interviews* held with the educators will attempt to answer the second research question, which is, what can educators of these intellectually impaired learners learn from this change or lack thereof? The concluding remarks of the chapter will seek to summarise the results and highlight areas that will be taken forward into the next chapter.

4.2 Biographical information of the learners

The summative total of learners has varied across the pre and post-tests. A number of learners were absent during the course of the assessments. Some of the reasons were illness, missing the bus to school or just chronic absenteeism. I have opted not to include that particular learner's score if s/he missed out on any part of the assessment. The reason was that, if a learner stayed absent for a prolonged period of time, it might influence his/her results negatively. Apart from this reason, the learner might have also returned to school in the middle of, for example, the intervention process or had missed out on the intervention session(s) altogether. The learners were exposed to two sets of stories. Table 4.1 and 4.2 reflect the distribution of learners during the first and second story.

Table 4.1: Distribution of Learners across Pre- and Post-tests during story 1

Type	Total number of learners	Story 1				
		Class Group 1	Class Group 2	Class Group 3	Class Group 4	Class Group 5
Pre-test	35	7	7	5	11	5
Post-test	33	7	6	5	10	5

As can be seen in Table 4.1 35 learners participated in the pre-test and 33 in the post-test during their engagement with story 1. These groups of learners participated actively in both tests within the allocated timeframe. However, as indicated earlier, some learners did not participate in the post-tests as could be seen in class group 2 and 4.

Table 4.2: Distribution of Learners across Pre- and Post-tests during story 2

Type	Total number of learners	Story 2				
		Class Group 1	Class Group 2	Class Group 3	Class Group 4	Class Group 5
Pre-test	34	7	7	5	11	4
Post-test	27	7	6	5	6	3

The second story also saw a discrepancy in the number of learners involved during the pre-test and the post-test. Of the 34 learners in the pre-test, only 27 of them completed the post-test. In this instance class groups 2, 4 and 5 have been affected. Of these 3, class group 4 has been affected the most, with 11 learners doing the pre-test but only 6 completing the post-test.

4.3 Actual findings

4.3.1 Presentation of learner results

The presentation of results from the analysis of the learners' reading is from the pre- and post-tests. As was discussed in Chapter 3, two clearly defined groups emerged when the performance was analysed. The first learner group are learners who managed to read between 4 and 35 words, compared to the second learner group that had a very low to zero (0) reading pre-test score. From the outset it appeared that the strides made by learner group 1 (high pre-test) was much higher than learner group 2. That is, the learners who were able to identify more words during the pre-test, were able to replicate and improve on that score during the post-test. Although a comparison across the two groups will not necessarily be made, an analysis of a particular group with more or less the same ability made more sense. As part of the analysis the following questions would be of interest: What (technology) or who (educator) influenced the learners the most during the intervention process? And secondly, is there any link between the variant reading responses of the learners, the interventions employed and the learners' differential abilities? Having said this, the order of presentation will be:

- (a) presentation of story 1 results (learner group 1 & 2),
- (b) presentation of story 2 results (learner group 1 & 2),
- (c) interview results,
- (d) an analysis of the errors made by the learners
- (e) categorization of the errors.

4.3.1.1 Presentation of story 1 results: Learner Group 1

The presentation of both pre-test and post-test data of the 10 learners in group 1 across the two stories now follows. The areas that were assessed are:

- Words and sentences read
- Total recalled words
- Time utilized
- Errors

4.3.1.2 Criteria for Analysis

As has been explained in Chapter 3, learners were given the story on an A4 sheet to read during the pre- and post-test phase. Of interest during these assessments was whether the learners were able to recognize and read the words in the story. Learners were requested to press with their fingers on each word as they were reading the story. This enabled the assessor/researcher to assess whether the learner is in fact reading the correct word. I have also looked at the number of sentences that the learners were able to read. In this instance the purpose was to establish if there is a relationship between words and sentences read. Errors made by the learners were also recorded. A learner was seen as committing an **error** if s/he did one of the following:

- omitting a word,
- replacing the original word with another word,
- adding words to the original story

The learners were also asked to re-tell the story that they had read. Re-telling the story enabled one to assess if the learner had both remembered and comprehended the story. The words verbally reported by the learners were written down and eventually tallied by the assessor. Words and sentences that were repeated were not counted. And lastly, all the learners' readings were timed as was explained in chapter 3. The assessment for time utilized served as a way of assessing the learner's reading ability as well as to check how fluently the learner reads the story. All the units, that is, words and sentences read, errors made and the time utilized were assessed and compared across the pre and post-test continuum. A detailed explanation will follow.

4.3.1.3 Words and sentences

The amount of words in the Afrikaans version of the story was 33 and in the English version 35, with a total of 8 sentences. As has been indicated earlier the learners were required to read the story and the assessor would then in turn tick off the words correctly read. The numbers of words seem to have a direct relationship with the amount of sentences completed and this will be discussed together.

Table 4.3 Words and sentences tally: Learner group 1

STORY 1								
No	Test	Date	Name	Language	Total Words	Words Read	Sentences	Sentences read
1	Pre Test	19.7.10	Manuel	E	35	35	8	8
	Post Test	23.7.10			35	35	8	8
2	Pre Test	29.4.10	Bradley	E	35	31	8	8
	Post Test	06.5.10			35	35	8	8
3	Pre Test	05.5.10	Rhona	A	33	31	8	8
	Post Test	17.5.10			33	28	8	8
4	Pre Test	28.4.10	Leon	E	35	18	8	8
	Post Test	06.5.10			35	34	8	8
5	Pre Test	19.7.10	Quanita	E	35	13	8	5
	Post Test	23.7.10			35	32	8	8
6	Pre Test	19.7.10	Bruno	A	33	5	8	3
	Post Test	23.7.10			33	10	8	4
7	Pre Test	19.7.10	Alister	A	33	4	8	0
	Post Test	23.7.10			33	25	8	8
8	Pre Test	27.5.10	Harry	A	33	4	8	2
	Post Test	28.5.10			33	15	8	5
9	Pre Test	05.5.10	Jack	A	33	4	8	2
	Post Test	24.5.10			33	6	8	5
10	Pre Test	29.4.10	Lincoln	A	33	1	8	0
	Post Test	05.5.10			33	27	8	8
Key: A (Afrikaans); E (English)								

There appears to be a link between the number of words and sentences read by the learners. The learners that have read more words have also completed more sentences. One could see above (Table 4.3) that Manuel, Bradley and Rhona read more than 30 words out of possible 33 or 35 words respectively during their pre-test. Both Manuel and Bradley have repeated the same reading performance during the post-test, except for Rhona that read slightly less words. The number of words read during the pre- and post-test enabled the first three learners in the group

to complete all 8 sentences of the story. The two English speaking learners, Leon and Quanita managed to read slightly more than 10 words during their pre-test. Their word count tally virtually doubled during the post-test, with 34 and 32 respectively. The number of sentences read was directly linked to their words read tally, by reading between 5 and 8 sentences respectively. The increased number of words read during the post-test seems to be correlated with both learners completing all 8 sentences.

The last 4 learners recorded a pre-test score of between 1 and 5 words out of a total of 33 Afrikaans words. The low number of words read during the pre-test seems to have had a negative influence on the number of sentences completed as well. The sentences tally for these 4 learners varied between 0 & 2. The assessment after the intervention process showed a significant increase in both the number of words and sentences read. Their word count scores varied between 6 and 27 words which also resulted in more sentences being read. The results of these 4 learners presented some interesting phenomena. For one, Jack read fewer words as opposed to Bruno during their pre-test, yet the latter completed fewer sentences. Although Jack completed more sentences he made more errors during his reading session. Another was the fact that Lincoln had the lowest pre-test score (1) but made the most significant strides in the post-test. The question thus begs why was there such discrepancies in the learners' reading performance? As asked earlier, the same question arises here once again: what part of the intervention influenced the reading scores and what role has the teacher played in influencing the reading scores of the learners?

4.3.1.4 Errors in reading

The total errors were calculated from the complete story of either 33 Afrikaans words or 35 English words. Any deviation from the actual words as explained earlier in this chapter was recorded as an error. These errors were then subtracted from the actual word count of 33 and 35 respectively. The groups in this category were separated based on the number of errors made by the learners during the pre-test. This decision was made purely to ensure a more simplified explanation. A description of the errors made by the learners will follow as presented in Table 4.4.

Table 4.4 Errors in reading: Learner group 1

STORY 1							
No	Test	Date	Name	Language	Total Words	Words Read	Errors
1	Pre Test	19.7.10	Manuel	E	35	35	0
	Post Test	23.7.10			35	35	0
2	Pre Test	29.4.10	Bradley	E	35	31	4
	Post Test	06.5.10			35	35	0
3	Pre Test	05.5.10	Rhona	A	33	31	2
	Post Test	17.5.10			33	28	5
4	Pre Test	28.4.10	Leon	A	35	18	17
	Post Test	06.5.10			35	34	1
5	Pre Test	19.7.10	Quanita	E	35	13	22
	Post Test	23.7.10			35	32	3
6	Pre Test	19.7.10	Bruno	A	33	5	28
	Post Test	23.7.10			33	10	23
7	Pre Test	19.7.10	Alister	A	33	4	29
	Post Test	23.7.10			33	25	8
8	Pre Test	27.5.10	Harry	A	33	4	29
	Post Test	28.5.10			33	15	18
9	Pre Test	05.5.10	Jack	A	33	4	29
	Post Test	24.5.10			33	6	27
10	Pre Test	29.4.10	Lincoln	A	33	1	32
	Post Test	05.5.10			33	27	6

The trend as observed in the category words and sentences was replicated in the current unit as well. The more words correctly read by the learner implies that s/he completed more sentences as well. The first 3 learners (Manuel, Bradley and Rhona) in this group read much more fluently as opposed to the remaining 7 learners as indicated in Table 4.4. This was reflected in both their pre and post-test scores. The amount of errors made by these learners was between 0 and 4 words during their pre-test. The only discrepancy was with Rhona who read less words during the post-test with the result that she recorded 5 as opposed to the 2 in the pre-test. The two

prominent types of errors for this group of learners were omissions and replacement of words, particularly during the pre-test. The post-test in turn was characterized by minor replacements followed by self-corrections, for example, Bradley reading “here” then correcting it to “there”. Rhona initially read “prente” and corrected it to the proper word “penne”. Of interest is the fact that this group of learners had enough decoding ability to be able to isolate the erroneous letters.

The variance in words read and errors made by the last 7 learners during their pre-test in this group was much bigger. The amount of word errors made by these learners varied between 17 and 32. Most of the learners made a positive shift in the number of words read during the post-test, bringing their error count down significantly. Out of the 7 learners Jack made the least progress with an error total during the pre-test of 29 and 27 during the post-test. This learner’s score improved the least due to the bigger time-gap between intervention and the post-test. The other learners were all assessed within about 1 week following the intervention. Apart from the variance in error tallies I also looked at the type of errors that the learners made. Similar to the first three (3) learners in the group, the last 7 learners also made several replacement and omission type errors. These and other types of errors will be examined at the end of the first and second story results.

4.3.1.5 Re-tell

Immediately after the learners had read a given body of text they were asked to share what had been read. This was to ascertain how much they had comprehended from the story. Re-tell as has been indicated by Good et al. (2002:30-31) serves to establish whether the learners have any understanding of the text that they have read.

Table 4.5: Re-tell scores: Learner group 1

STORY 1							
No	Test	Date	Name	Language	Total Words	Words Read	Re-tell
1	Pre-Test	19.7.10	Manuel	E	35	35	30
	Post-Test	23.7.10			35	35	32
2	Pre-Test	29.4.10	Bradley	E	35	31	29
	Post-Test	06.5.10			35	35	31
3	Pre-Test	05.5.10	Rhona	A	33	31	5
	Post-Test	17.5.10			33	28	13
4	Pre-Test	28.4.10	Leon	A	35	18	9
	Post-Test	06.5.10			35	34	18
5	Pre-Test	19.7.10	Quanita	E	35	13	17
	Post-Test	23.7.10			35	32	27
6	Pre-Test	19.7.10	Bruno	A	33	5	0
	Post-Test	23.7.10			33	10	12
7	Pre-Test	19.7.10	Alister	A	33	4	0
	Post-Test	23.7.10			33	25	18
8	Pre-Test	27.5.10	Harry	A	33	4	0
	Post-Test	28.5.10			33	15	25
9	Pre-Test	05.5.10	Jack	A	33	4	1
	Post-Test	24.5.10			33	6	10
10	Pre-Test	29.4.10	Lincoln	A	33	1	10
	Post-Test	05.5.10			33	27	22

In most instances, as reflected in Table 4.5, there is a direct link between words read and the learner's ability to re-tell the same information. That is, where the learner has read more than 20 words the recalled words also increased similarly. For example, the first 5 learners in Table 4.5 read between 13 and 35 words and the re-tell pre-test word count was between 5 and 30. The two learners (Rhona & Leon) who had the lowest re-tell score because their feedback was in single words as opposed to the other 3 learners who gave full sentences.

Of significance was that all the five learners showed a general increase in words read as well as on the re-tell word count during the post-test. Rhona's re-tell word count improved substantially from 5 to 13, particularly since she gave her feedback in full sentences.

There appears to be a stark difference in performance between the first 5 learners and the last 5 learners in the group. Most of the latter group of learners read between 1 and 5 words during their pre-test, with the result that they also had a low (0-10) re-tell word count score. The majority of these learners recalled in single words. These words did not give them enough content information about the story that would have enabled them to share it in the re-tell category.

All the learners in Table 4.5 made strides both in the number of words read as well as in their recalled word count during the post-test. Of greater significance was the group of learners who read between 1-5 words during the pre-test and had a re-tell score of 0-10, and who read between 6 and 27 words during the post-test. They read more content information during the post-test, with the result that their re-tell word count also increased. The results of the learners reflected in Table 4.5 revealed some interesting phenomena. Firstly, there appears to have been a large variance in both the learners' words read score as well as their re-tell score. And secondly, the intervention sessions appear to have had varied influences on the learners. The final category of results is the time utilized by the learners during the reading sessions.

4.3.1.6 Time utilized

As indicated in chapter 3, all the learners were granted 60 seconds (1 minute) to read the short story during the pre- and post-test. The focus was essentially on establishing how fluently the learners could read the story.

Table 4.6: Time utilized - Learner group 1

STORY 1									
No	Test	Date	Name	Language	Total Words	Words Read	Errors	Time (sec)	Actual Time
1	Pre-Test	19.7.10	Manuel	E	35	35	0	60	27.8
	Post-Test	23.7.10			35	35	0	60	26.9
2	Pre-Test	29.4.10	Bradley	E	35	31	4	60	52.3
	Post-Test	06.5.10			35	35	0	60	31.9
3	Pre Test	05.5.10	Rhona	A	33	31	2	60	60
	Post-Test	17.5.10			33	28	5	60	29.8
4	Pre -Test	28.4.10	Leon	E	35	18	17	60	60
	Post-Test	06.5.10			35	34	1	60	32.5
5	Pre-Test	19.7.10	Quanita	E	35	13	22	60	60
	Post-Test	23.7.10			35	32	3	60	60
6	Pre-Test	19.7.10	Bruno	A	33	5	28	60	60
	Post-Test	23.7.10			33	10	23	60	60
7	Pre-Test	19.7.10	Alister	A	33	4	29	60	60
	Post-Test	23.7.10			33	25	8	60	60
8	Pre-Test	27.5.10	Harry	A	33	4	29	60	60
	Post-Test	28.5.10			33	15	18	60	60
9	Pre-Test	05.5.10	Jack	A	33	4	29	60	60
	Post-Test	24.5.10			33	6	27	60	60
10	Pre-Test	29.4.10	Lincoln	A	33	1	32	60	60
	Post-Test	05.5.10			33	27	6	60	60

There appears to have been a positive relationship between the time utilized to complete the story and the words being read by the learners. The first two learners (Manuel & Bradley) referred to in Table 4.6 used less time to read the story and also managed to decode and recognize the most number of words. Both learners completed the story between 27.81 and 52.3 seconds respectively during the pre-test. The level of reading fluency of these learners increased noticeably during the post-test, resulting in a decrease of errors made. As indicated in Table 4.5 these learners' re-tell scores also increased during the post-test, particularly since they

were using less time now to decode the text in the story. The remaining 8 learners in table 4.6 have utilized the full 60 seconds during their pre-test. Similarly most of them, except 2 learners (Rhona & Leon) still made use of the 60 seconds during the post-test. Of note was the fact that most of the learners, except Rhona made strides during the post-test. Her results showed some variance, because her time decreased substantially, but the number of errors increased. Now the question is, why did most of the learners in Table 4.6 read more words during the post-test, yet make use of the same amount of time as during the pre-test? Secondly, is there any relationship between time and the number of words read? And, lastly is there any relationship between the time utilized by a reader and the number of words being retold by the said person?

4.3.2 Presentation of story 1 results: Learner Group 2

I now proceed to present the data of the 26 learners reflected in Table 4.7 in relation to the following areas i.e. words and sentences read, total recalled words, time utilized and the errors made. The presentation of these areas is dealt with as a combined unit particularly since the strides made by learner group 2 across the pre-test and post-test continuum were in most cases small. The learners were separated into learner group 1 and 2 because the pre-test results across the above-mentioned areas were significantly different to each other. The post-test results have seemingly followed the same pattern.

Table 4.7 (a) and (b): Words and sentences-Learner group 2

(a)

Nr	Test	Date	Name	Language	Total Words	Words	Sentences	Errors	Re-tell	Time (sec)
1	Pre-Test	29.4.10	Oliver	A	33	6	2	27	11	60
	Post-Test	5.5.10			33	7	3	26	13	60
2	Pre-Test	15.7.10	Leila	A	33	0	0	33	0	60
	Post-Test	23.7.10			33	21	8	15	18	60
3	Pre-Test	19.7.10	Steve	A	33	0	0	33	0	60
	Post-Test	30.7.10			33	16	5	20	23	60
4	Pre-Test	6.5.10	Leo	A	33	0	0	33	0	60
	Post-Test	24.5.10			33	14	4	2	21	60
5	Pre-Test	15.7.10	Chantal	A	33	0	0	33	0	60
	Post-Test	30.7.10			33	13	5	23	25	60
6	Pre-Test	6.5.10	Tino	A	33	0	0	33	0	60
	Post-Test	24.5.10			33	10	3	23	12	60
7	Pre-Test	27.5.10	Busi	E	35	0	0	35	0	60
	Post-Test	28.5.10			35	8	4	27	3	60
8	Pre-Test	27.5.10	Sherley	A	33	0	0	35	0	60
	Post-Test	28.5.10			33	4	4	29	12	60
9	Pre-Test	27.5.10	Dino	E	35	0	0	35	0	60
	Post-Test	28.5.10			35	1	1	34	2	60
10	Pre-Test	19.7.10	Tamia	A	33	0	0	33	0	60
	Post-Test	30.7.10			33	7	0	29	14	60
11	Pre-Test	28.4.10	Shane	E	35	0	0	35	7	60
	Post-Test	6.5.10			35	1	0	34	8	60
12	Pre-Test	28.4.10	Alison	A	33	0	0	33	3	60
	Post-Test	5.5.10			33	1	0	32	9	60
13	Pre-Test	29.4.10	Arlene	A	33	0	0	33	2	60
	Post-Test	5.5.10			33	1	0	32	6	60

(b)

Nr	Test	Date	Name	Language	Total Words	Words	Sentences	Errors	Re-tell	Time (sec)
14	Pre-Test	28.4.10	Ronald	A	33	0	0	33	21	60
	Post-Test	5.5.10				33	0	0	33	9
15	Pre-Test	6.5.10	Lauraine	A	33	0	0	33	0	60
	Post-Test	24.5.10				33	0	0	33	16
16	Pre Test	15.7.10	Bella	A	33	0	0	33	0	60
	Post-Test	30.7.10				33	0	0	36	9
17	Pre-Test	19.7.10	Cindy	A	33	0	0	33	0	60
	Post-Test	23.7.10				33	0	0	33	7
18	Pre-Test	28.4.10	Harry	A	33	0	0	33	0	60
	Post-Test	5.5.10				33	0	0	33	6
19	Pre-Test	6.5.10	Liam	A	33	0	0	33	0	60
	Post-Test	24.5.10				33	0	0	33	4
20	Pre-Test	29.4.10	Carol	A	33	0	0	33	0	60
	Post-Test	5.5.10				33	0	0	33	3
21	Pre-Test	28.4.10	Winston	A	33	0	0	33	0	60
	Post-Test	5.5.10				33	0	0	33	2
22	Pre-Test	27.5.10	Nita	A	33	0	0	35	0	60
	Post-Test	28.5.10				33	0	0	33	0
23	Pre-Test	6.5.10	Astrid	E	35	0	0	35	0	60
	Post-Test	24.5.10				35	0	0	35	0

4.3.2.1 Words, Sentences, Re-tell and Time

Most of the learners reflected in Tables 4.7 had challenges in recognizing the words in the story during the pre-test. The learner's response to the reading material was either that of being silent or just indicated to me and the teacher that they could not perform the task. Those that made an attempt to read the story generally added their own text. Similar to the lack of words being read by the learners in this group, no sentences were completed. Hence, no score has been recorded for the sentences category. The post-test results were quite interesting. There was a general shift in most of the learners' words and sentences read scores. All 9 learners managed

to identify between 1-21 words and 1-8 sentences. Most of the learners completed about 4 sentences within the allocated timeframe of 60 seconds.

In contrast to the first 9 learners reflected in Table 4.7(a) the above-mentioned learners (Tamia, Shane, Alison & Arlene) recorded a significantly lower word count score within the allocated 60 seconds. None of the learners managed to read any words during the pre-test, but they all made slight improvements during the post-test. The improvements were not enough to complete any sentences during the post-test. The words identified were of a singular nature. All the learners' re-tell word count scores improved during the post-test. Three of the learners' (Shane, Alison and Arlene) pre-test word count score are somewhat contradictory. Firstly, none of them managed to identify or read any words during the pre-test yet they were able to share information when asked to re-tell the story. Another was the fact that there was such a major discrepancy between the number of words read during the post-test and the re-tell word count. Three learners only managed to read/identify one word, but shared much more content information of the story. Most of the learners had scanned over the text when they read the story, identifying only parts of it. The result was that they gave feedback of the auditory segment of the story.

Similar to the aforementioned learners (Tamia, Shane, Alison & Arlene) none of the latter group of learners in Table 4.7 i.e. Ronald (no.14) – Astrid (no. 23) recorded any word count score during the pre-test. However, in this instance none of the learners managed to identify any words during the post-test as well. For the purposes of completing the cycle of assessment the learners were requested to give feedback of the story. Of the 10 learners, 8 managed to give feedback after the post-test. Their feedback was based on what they remembered from the intervention sessions as opposed to the text that they had actually read.

4.4 Error analysis of oral reading tasks: story 1

Errors were made by learner group 1 and 2 across the pre- and post-test continuum. I provide both a graphic and descriptive account of the errors that both groups of learners made during their engagement in the first story.

With this in mind I will attempt to expound on the errors that the learners made during the sessions. The presentation seeks to *identify* and *clarify* the errors that the learners have made. Secondly, a further categorization of the errors as well as an initial explanation of the errors will follow. The focus at this stage is merely to present the errors and to provide a detailed

discussion in the chapter to follow. A similar type of presentation will follow at the end of the second story results.

4.4.1 Identification and clarification of errors

1. **Omission:** For example the learner leaves out the words “pieces”, “of”, “chalk” from the sentence “there are two pieces of chalk”.
2. **Substituting words in text with own words:** The learner in this instance replaces the words “there” with “here” in the sentence “there are four books”. Another example was to read “pencils” instead of “pictures” in the sentence “here are seven pictures”
3. **Refusal to read:** The learner refuses to read any part of the story and kept quiet for the remainder of the session. No reading took place.
4. **Identification of letters as opposed to whole words:** Meaning the learner identifies certain or all the letters in a given word instead of reading the whole word for example, “o”, “e”, in the word “onderwyser” (teacher).
5. **Self- correcting misread words:** An example of this is where the learner`s (for example Rhona and Bradley) reads “onderwyser” (male teacher) and corrects the word by reading “onderwyseres” (female teacher). The learner realized that s\he has omitted a segment of a word and corrected it without prompting.
6. **Reversals:** A learner tends to read letters or words in reverse (Ekwall 1981), for example “d” for “b” in the word “daar” (there) read as “baar” in the sentence “daar is een onderwyseres” (there is one teacher).
7. **Additions or Insertions:** The learner for example adds a word in the sentence “daar is twee bordkryte” (there are two pieces of chalk) reads as “daar is net twee bordkryte” (there are just two chalks).

4.4.2 Categorization of errors

According to Mosito (2005) the categorization of errors can be seen as the “first reading of, or first order imposition of meaning, on the data”. Meaning this process provides one with an initial understanding of the errors that the learners made during the oral reading engagement. Furthermore, the categorization process involves grouping errors which are similar in character and which express some similarity in meaning (Mosito, 2005). I have used the categorization process to group the errors, but also at the same time to provide an initial interpretation of the errors. The initial group of errors as discussed in chapter 3 were essentially omissions, substitutions\replacements and self-corrections. A closer look at the errors made by the learners

during the oral reading sessions revealed a few more errors. These were reversing of letters\words, adding words and the identification of letters as opposed to whole words. Both the identification and categorization of the errors were informed by Ekwall (1981), Spache (1981) and Good et al. (2002). In keeping with the presentation of the initial results within the two learner groups the errors were categorized similarly. One would be able to see in the error categorization that the numbers and types of errors were quite different across the two learner groups. Table 4.8 & Table 4.9 provide a broad overview of the errors made by learner groups 1 & 2 during the oral reading sessions. The errors will be discussed in more detail in the following chapter.

Table 4.8 Categorization of errors: Learner group 1

No.	Errors	Initial interpretations	Pre-test	Post-test
1	Omission of part\all text	Word recognition or decoding challenges	184	60
2	Substituting words with own text	Difficulty recognizing words. Attempting to read similar text of previous sentence. Reads text from memory. Word form type replacements.	9	12
3	Identification of letters as opposed to whole words	Challenge to identify whole words. Identify mostly vocals.	6	0
4	Self-correcting misread words	Word recognition difficulties	1	3
5	Reversals	Challenges with left-to-right sequencing, mirrors images of letters	1	0
6	Additions	Anticipation of context of text	0	3

It appears from the results in Table 4.8 that a significant amount of learners in group 1 had difficulty reading the words of the story during the pre-tests. This difficulty in word recognition was observed in their omission of words (184 words), replacing the text with their own words (9 words) as well as to identify letters (6 errors) instead of whole words. The remainder of the errors that is, reversing words, inserting their own words as well as self-corrections was in the absolute minority. There was generally a shift in the learners' reading performance during the post-tests. The initial high omission errors of 184 words decreased to 60 words during the post-tests. More words were recognized as opposed to the individual letters in the story. Self-correction and addition of words were limited to 3 and no reversals took place during the post-tests.

Table 4.9 Categorization of errors: Learner group 2 Story 1

No.	Errors	Initial interpretations	Pre-test	Post-test
1	Omission of part/all text	Word recognition or decoding challenges	697	550
2	Substituting words with own text	Difficulty recognizing words. Attempting to read similar text of previous sentence. Reads text from memory. Word form type replacements.	33	73
3	Identification of letters as opposed to whole words	Challenge to identify whole words. Identify mostly vocals.	4	4
4	Self-correcting misread words	Word recognition difficulties	0	1
5	Reversals	Challenges with left-to-right sequencing, Mirrors images of letters	0	0
6	Additions	Anticipation of context of text	0	5

Similar to the learners in table 4.8, the learners in table 4.9 also had difficulty reading the words of the story during the pre-tests. Word recognition errors were observed in their omission of words (697 words) as well as in them replacing the text (33 words) in the story with their own words. Most of the learners' errors made were in the first category, that is, by omitting words of the story as opposed to the latter group of errors which is identification of letters in words, self-corrections, reversals and additions.

The learners' initial high omission errors saw a drop during the post-tests, from 697 to 550 words. A segment of the learners increased their replacement type errors to 73 as opposed to 33. The latter group of errors i.e. self-corrections and reversals did not see much change during the post-tests. At first glance one would regard the upward shift in replacement errors as a negative, but a closer look would suggest that the learners have made an effort to identify the words of the story. Some of these substitutions could have been influenced by the repetitive nature of the text. For example in the Afrikaans version of the story most of the sentences start with the word "daar" \ "there". Two of the sentences start with the word "hier" \ "here". Some of the learners ended up reading "there" where a "here" is suppose to be. A further level of analysis will seek to establish whether there was any discrepancy or more specifically a decrease in the number of word recognition errors that the learners have made during the post-test. Another will be to ascertain what the significance is of the remaining oral reading errors.

4.5 Presentation of results: story 2

As mentioned earlier in this chapter, the learners were engaged in 2 stories in the project. I will now present the results of the second story. Suffice to say that the groups have been divided in learner group 1 and 2 as in the first story. Learner group 1 consisted of 9 learners whilst learner group 2 of 13 learners. In keeping with the reflective nature of action research a second level of analysis, with the introduction of the visual discrimination category has been conducted. The aim of this category is to assess if the learner's results are a true reflection of word identification. The presentation will be made in the following categories:

- a) Words and Sentences read
- b) Errors in reading
- c) Re-tell
- d) Time utilized
- e) Visual discrimination

4.5.1 Words and sentences

The second story consisted of 44 (Afrikaans) and 34 (English) words, as well as 8 sentences. All the learners were scored in relation to the number of words read within the allotted 60 seconds. Most of the learners completed the story within this time period. I shall elaborate more on the time utilized by the learners in the specific category.

Table 4.10 Words and sentences: Learner group 1

Nr	Test	Name	Language	Total Words	Words Read	Sentences	Sentences read	Errors	Re-tell	Time (sec)	Actual Time
1	Pre-test	Manuel	E	34	34	8	8	0	28	60	30.16
	Post-test				34	8	8	0	28	60	30.5
2	Pre-test	Bradley	E	34	34	8	8	0	25	60	52.25
	Post-test				34	8	8	0	67	60	24
3	Pre-test	Leon	E	34	31	8	8	3	4	60	60
	Post-test				34	8	8	0	53	60	32.5
4	Pre-test	Quanita	E	34	24	8	5	10	7	60	58.84
	Post-test				32	8	8	2	16	60	49.03
5	Pre-test	Rhona	A	44	41	8	8	3	3	60	34.91
	Post-test				44	8	8	0	7	60	22.78
6	Pre-test	Simone	A	44	21	8	5	23	3	60	60
	Post-test				24	8	5	20	9	60	60
7	Pre-test	Bruno	A	44	8	8	3	36	0	60	60
	Post-test				33	8	7	11	21	60	54.25
8	Pre -test	Derill	A	44	5	8	1	39	3	60	60
	Post-test				33	8	6	11	51	60	60
9	Pre-test	Lincoln	A	44	1	8	0	43	0	60	60
	Post-test				33	8	6	11	58	60	37.06

The **pre-test** results for this story reflect that the 4 English speaking learners read between 24 and 34 words. The 5 Afrikaans speaking learners read between 1 and 41 words out of a total of 44 words. The **post-test** results, similar to the first story, indicate that the learners made quite a shift in their ability to recognize the words. Of the 9 learners in the group 7 have managed to improve their reading scores quite substantially, whilst 2 learners (Manuel and Bradley) have maintained the same reading performance of the pre-test. The most significant results were that of Lincoln and Derill. Their pre-test scores were between 1 and 5 respectively. Both have achieved a word count tally of 33 during their post-tests. Two learners' (Bradley's and Manuel's) word count scores were also interesting. They have managed to achieve a word count tally of

34 during their pre- and post-test. The number of words read appears to have a direct link with the number of sentences completed. A similar trend prevailed here as well. Some of the learners read between 1-8 words and have completed 0-3 sentences. The other 6 learners have completed between 5 and 8 sentences. All 9 learners have read 5 or more sentences during the **post-test**. These results are consistent with the words read by these learners.

4.5.2 Errors in reading

As it was explained earlier in the first story, the errors are directly deduced from the words read. Errors were categorized either as words omitted, misread, or incorrectly pronounced. The pre-test indicated that of the 9 learners 4 made between 23 & 43 mistakes. The rest (5) made between 0 and 10 errors. The post-test reflected a major improvement for most of the learners. Of the 9 learners in the group, 3 made no mistakes, compared to the previous 2 in the pre-test. The remainder of the group also made some strides, of which 2 learners made 2-3 and the other 4 between 11 & 20 mistakes.

4.5.3 Retell

The re-tell category has presented some rather interesting trends for this group. The discussion to follow will highlight these trends and for that reason will be dealt with accordingly.

Table 4.11 Re-tell trends

Unit	Nr	Test	Name	Language	Total Words	Words Read	Sentences	Sentences read	Errors	Re-tell	Time (sec)	Actual Time
1	1	Pre-test	Lincoln	A	44	1	8	0	43	0	60	60
	2	Pre-test	Derill	A	44	5	8	1	39	3	60	60
	3	Pre-test	Bruno	A	44	8	8	3	36	0	60	60
2		Post-test	Derill	A	44	33	8	6	11	51	60	60
		Post-test	Lincoln	A	44	33	8	6	11	58	60	37.06
	4	Post-test	Bradley	E	34	34	8	8	0	67	60	24
	5	Post-test	Leon	E	34	34	8	8	0	53	60	32.5
3	6	Pre-test	Simone	A	44	21	8	5	23	3	60	60
	7	Pre-test	Quanita	E	34	24	8	5	10	7	60	58.84
	8	Pre-test	Leon	E	34	31	8	8	3	4	60	60
	9	Pre-test	Rhona	A	44	41	8	8	3	3	60	34.91

a) Low reading count (pre-test) and Low retell word count (pre-test)

The 3 learners (Lincoln, Derill, Bruno) in unit 1 have read between 1 and 8 words during their pre-test. The single- word response during the feedback section has resulted in the recording of a 0-3 retell word count. They have not read enough content information to get a fuller picture of the story.

b) High reading word count (post-test) and High re-tell word count (post-test)

The 4 learners (Derill, Lincoln, Bradley, Leon) in unit 2 have managed to read quite well during the post -intervention test. They had a reading word count of 33-34 words. These learners have opted to respond in full sentences when requested to give feedback. Their respective re-tell word count tally was 51-67.

High reading word count (pre- and post-test) and Low re-tell word count

The learners in unit 3 have rather strange results. The 4 learners (Simone, Quanita, Leon and Rhona), have fairly high reading scores (21-44), yet there re-tell scores have not reflected the same trend. The responses were of a singular nature.

4.5.4 Time utilized

The results for this category will be presented in four (4) separate units.

a) Significantly fluent reading (pre-test)

Two learners (Manuel and Rhona) have read the story quite fluently. They have completed the story in 30.16 and 34.91 seconds respectively.

b) Under 60 seconds (pre-test)

Two learners (Bradley and Quanita) have managed to complete the story in less than 60 seconds.

c) Full time (60 seconds) (pre-test)

The remaining four learners i.e. Derill, Simone, Lincoln and Bruno utilized the full 60 seconds to complete the story.

d) Post-test changes during post-test

Of the 9 learners 4 managed to read the story during the post-test much more fluently. Their times were:

Table 4.12 Times achieved

Name	Pre-test	Post-test
Bradley	52.25 sec	24 sec
Lincoln	60 sec	37.06 sec
Leon	60 sec	32.5 sec
Rhona	34.91 sec	22.78 sec

The question however comes to mind whether there is a relationship between **words read, re-tell** and **time utilized** across the groups? Secondly, does reading a story more fluently influence the learner's ability to comprehend it better?

I will attempt to answer these two questions now. Their results have been presented in Table 4.13

Table 4.13 Time, words read and re-tell

No.	Name	Pre-test			Post-test		
		Words Read	Re-tell	Time	Words Read	Re-tell	Time
1	Manuel	34	28	30.16	34	28	30.5
2	Bradley	34		52.25	34	67	24
3	Lincoln	1	0	60	33	58	37.06
4	Bruno	8	0	60	33	21	54.25
5	Derill	5	3	60	33	51	60
6	Quanita	24	7	58.84	32	16	49.03
7	Rhona	41	3	34.91	44	7	22.78
8	Simone	21	3	60	24	9	60

There appears to be a **significant relationship** in performance across the units, *words read, re-tell* and the *time* utilized for the first three learners. They read the stories quite fluently, particularly so during the post-test. The learners recalled a significant number of words when asked to give feedback on the story.

Insofar as the **second group** of learners (Bruno & Derill) is concerned, there was a **positive relationship** between the **words read** within the required *time* (60 seconds or less) and the number of **words recalled**. Bruno's post-test results were more significant, because he read more words, used less time and recalled more information, compared to the pre-test. For Derill, the time utilized appears not to be a determining factor. The fact that he has read more content information during the post-test he was able to recall many more words as opposed to the pre-test.

The results of both Quanita and Rhona appear to be of a **borderline nature**. Both learners read quite well, improving from pre- to post-test. Both the time and the number of words read improved, yet the recalled word count did not change a lot. The type of feedback that was given, i.e. single words as opposed to full sentences had a major bearing on the re-tell word count.

Simone's results did not show significant changes. She made slight improvements across all areas, even though she has utilized the full 60 seconds allocated to her.

4.6 Assessment for visual discrimination

As was indicated in Chapter 3 it became necessary to add an additional assessment that is, of visual discrimination of words. The purpose was to show without a doubt that the achieved results were not by chance. Words were randomly selected to aid in this goal. Once the learners had finished reading the story and gave feedback of the story read, they were then requested to identify 9-10 words in the story read. Table 4.14 and 4.15 reflected the words identified and the learners' achievement levels. Learner group 1 was divided based on the type of story being read, i.e. Afrikaans & English and will be presented accordingly.

Table 4.14 Visual discrimination of words: Afrikaans group

NAMES	WORDS										
	kan	Jy	My	Help	Om	Vlieër	Bal	Stok	ag	Nee	mekaar
Lincoln	yes	Yes	yes	Yes	yes	No	yes	Yes	yes	Yes	yes
Bruno	yes	Yes	yes	Yes	yes	Yes	yes	Yes	no	Yes	no
Rhona	yes	Yes	yes	yes	yes	Yes	yes	Yes	yes	Yes	yes
Simone	yes	Yes	yes	yes	yes	Yes	yes	No	yes	Yes	no
Derill	yes	Yes	yes	yes	yes	Yes	yes	Yes	yes	Yes	yes

Table 4.15 Visual discrimination of words: English group

NAMES	WORDS									
	what	Help	kite	Ball	stick	Oh	No	we	Each	other
Bradley	yes	Yes	yes	Yes	yes	yes	yes	yes	Yes	yes
Quanita	no	Yes	yes	Yes	yes	yes	yes	no	Yes	yes
Manuel	yes	Yes	yes	Yes	yes	yes	yes	yes	Yes	yes
Leon	yes	Yes	yes	Yes	yes	yes	yes	yes	Yes	yes

The results across the Afrikaans and English groups were quite encouraging. Both groups have identified between 7-10 words out of a total of 10 words. Of interest in these two groups' results were the strategies employed to identify the words. Most of the learners (except Bradley and Leon) have re-read the story to identify the words. The two learners mentioned identified the words immediately.

The **errors** that these learners made were also interesting. Because the errors were not all the same it would be difficult to look for any commonality in the type of errors. Of interest to me is more **how the errors were made**. These were:

- Words not read during the post-test and thus not identified during visual discrimination exercise, for example, “stok” and “mekaar”
- Words changed during post-test for example “vlieër” for “kite”
- Words added and at the same time read as one word during post-test eg. “mekaar” read as “vir mekaar”.

Essentially learner group 1 made a lot of strides during this exercise. The words identified during the visual discrimination exercise have served to support their word count score during the post-test. I will now move to presenting the results of learner group 2.

4.7 Presentation of story 2 results: Learner Group 2

Similar to the discussions up to this point, the results of learner group 2 will be presented now. These results will be based on the learners' performances prior to and after the intervention of technology. This group has been divided into three clearly defined sub-groups and will be reflected in table 4.16. The first 4 learners have recorded a zero pre-test word count score but have a predominantly high post-test and re-tell score. The next two learners (Winston & Annie) have achieved a zero pre- and post-test word count score, but have a high re-tell score. The last 6 learners have an overall zero word count score.

4.7.1 Words, Sentences, Re-tell and Time

Table 4.16 Results of learner group 2

Number	Test	Name	Language	Total Words	Words	Sentences	Errors	Re-tell	Time (sec)
1	Pre-test	Chantal	A	44	2	1	42	0	60
	Post-test			44	16	5	28	48	60
2	Pre-test	Harry	A	44	0	0	44	0	60
	Post-test			44	5	1	39	0	60
3	Pre-test	Marie	A	44	0	0	44	0	60
	Post-test			44	32	6	12	35	60
4	Pre-test	Leo	A	44	0	0	44	0	60
	Post-test			44	8	1	36	55	60
5	Pre-test	Jack	A	44	0	0	44	0	60
	Post-test			44	30	6	14	27	60
6	Pre-test	Winston	A	44	0	0	44	0	60
	Post-test			44	0	0	44	22	60
7	Pre-test	Annie	A	44	0	0	44	0	60
	Post-test			44	0	0	44	53	45.81
8	Pre-test	Katy	E	34	0	0	34	0	60
	Post-test			34	1	0	33	0	60
9	Pre-test	Busi	E	34	0	0	34	0	60
	Post-test			34	0	0	34	0	60
10	Pre-test	Dino	E	34	0	0	34	0	60
	Post-test			34	0	0	34	0	60
11	Pre-test	Sherley	A	44	0	0	44	0	60
	Post-test			44	0	0	44	0	60
12	Pre-test	Candice	A	44	0	0	44	0	60
	Post-test			44	0	0	44	0	60
13	Pre-test	Shane	E	34	0	0	34	0	60
	Post-test			34	0	0	34	0	60

The results of the first 5 learners reflected a similar trend as those in Table 4.12 during the first story. The learners have achieved a low pre-test word count tally and a significant post-test word count tally. All 5 of these learners were not able to identify any words during the pre-test within the allocated time frame. Of interest is the fact that they were able to read quite a few words (5-32) during the post-test. Most of these learners, except Harry, read multiple words during their post-test. This also had a negative influence on Harry's ability to re-tell the story. The learners' re-tell feedback was consistent with the number of words read during the post-test. The only major contradiction in the words read and re-tell word count is that of Leo's. He had the second lowest word count score, but has shared the most words during the feedback session. In both instances, that is, pre and post-test the learners have made use of the full 60 seconds.

The results of Winston & Annie as reflected in Table 4.16 are in sharp contrast to the first 5 learners. Neither learner managed to read any words during the pre- and post-tests. By implication they also recorded a zero sentence score. For the sake of completeness the learners were still asked to give feedback during the post-test. Both learners were able to give appropriate feedback of the story. The question begs, how were they able to give feedback on a story that they were not able to read? Secondly, why is there a contrast in the ability of the learners to decode and remember the story? And lastly, the interventions have both visual and auditory properties, why has the latter been more significant for this group of learners?

The last set of learners' results (no. 8 – 13) is in contrast in all areas and has not presented any results of note. Both pre and post-test had a zero word count score. Of significance for me was the type of errors that this group of learners made.

Earlier in the chapter, I have made reference to the type of errors that the learners have made during their oral reading sessions. I have also indicated that I shall identify the type of errors as well as categorize them according to the guidelines provided. Table 4.17 & Table 4.18 provide an overview of the typical errors that learner group 1 & 2 made during the second story. Learner group 1 consisted of 9 learners and learner group 2 of 13 learners.

Table 4.17 Categorization of errors: Learner group 1

No.	Errors	Initial Interpretations	Pre-test	Post-test
1	Omission of part\all text	Word recognition or decoding challenges	138	35
2	Substituting words with own text	Difficulty recognizing words. Attempting to read similar text of previous sentence. Reads text from memory. Word form type replacements.	15	15
3	Identification of letters as opposed to whole words	Challenge to identify whole words. Identify mostly vocals.	0	0
4	Self-correcting misread words	Word recognition difficulties	1	0
5	Reversals	Challenges with left-to-right sequencing, Mirrors images of letters	0	0
6	Additions	Anticipation of context of text	4	4

As can be deduced from Table 4.17 the learners' challenges centred on word recognition. The errors category **omissions** has accrued the highest score (138) during the pre-test, followed by substituting the text with a total error count of 15 words. The post-test results show a sharp decline in omission type errors and dropped from 138 to only 35. The learners were able to identify more words during the post- intervention assessment. The error category of substituting words remained the same across the pre- and post-tests. The other reading errors have not presented significant shifts across the pre- and post-tests. Table 4.18 represents the error categorization of words for learner group 2 and will be presented now.

Table 4.18 Categorization of errors: Learner group 2

No.	Errors	Initial interpretations	Pre-test	Post-test
1	Omission of part/all text	Word recognition or decoding challenges	481	354
2	Substituting words with own text	Difficulty recognizing words. Attempting to read similar text of previous sentence. Reads text from memory. Word form type replacements.	49	85
3	Identification of letters as opposed to whole words	Challenge to identify whole words. Identify mostly vocals.	0	0
4	Self-correcting misread words	Word recognition difficulties	1	0
5	Reversals	Challenges with left-to-right sequencing, Mirrors images of letters	1	0
6	Additions	Anticipation of context of text	8	8

Word recognition errors as reflected in the first error category (omission of text) makes up the most significant part of the errors across the pre- and post-tests for learner group 2. During the pre-test the learners recorded a combined word recognition error count of 481 words. The post-test saw a decrease of 127 words, totalling now only 354 omission type errors. There has also been an upward shift towards the learners replacing more words during the post-test. It appears that the learners have made a concerted effort to read the words of the story. The remaining 4 error categories did not show any significant change from pre- to post- test.

4.8 Summary of results

4.8.1 Introduction

In order to make sense of the results presented above a summary of the most salient points will be made here of both story 1 and 2. The results have more or less followed a similar pattern across the two stories and will thus be summarized together. For the purposes of this summary the discussion will be made under the same headings that were used earlier in the chapter. These are **words and sentences, re-tell, time and errors** made by the learners. An additional assessment category was included during the second story for learner group 1, that of **visual discrimination** of words. The objective of this assessment was to ascertain whether the most accomplished group, learner group 1, made real or superficial strides in their reading. Because the stories were in some instances different from one another a direct comparison will not be made. Of greater significance is to establish whether there are any similarities in the learners'

reading results. Detailed explanations of the learners' results were given under each of these categories. In addition to the number of oral reading errors of the learners, a discussion of the type of errors has also been made for learner group 1 and 2. A discussion of the type of errors made was necessitated by the reflective nature of action research.

4.8.2 Words and sentences read

4.8.2.1 Introduction

Two stories were used in the study. The first story had 33 Afrikaans and 35 English words. The second story consisted of 44 Afrikaans and 34 English words. One of the primary aims of the learners was to read all the words in a given story and then to be able to recall the content. The learners, as explained earlier in the chapter, have been sub-divided according to their pre-test results within learner groups 1 & 2. The results of the learners have in many ways followed a certain pattern. The learners who have had high pre-test scores have for the most part also recorded high post-test scores.

4.8.2.2 Pre-test & Post-test Results

The reading scores of most of the learners across the two groups have fluctuated tremendously as has been highlighted in tables 4.3 & 4.7. Learner group 1 as referenced in table 4.3 within (story 1) and 4.10 (story 2) has better pre-test and post-test oral reading scores. Learner group 2 as has been reflected in tables 4.7 (story 1) & 4.16 (story 2) has significantly lower pre-test & post-test scores.

The error categorization has been discussed separately for the 2 learner groups. Essentially this differentiation was made to distinguish between the types of errors made. The learners have made different kinds of reading errors in both stories across the pre- and post-tests. During the pre-test most of the learners within groups 1 & 2 made omission type errors, which translates into them having difficulty to decode the words. The reading results for both learner groups 1 & 2 have improved significantly during the post-test. Learner group 1 made the most strides in their reading as opposed to the reading performance of learner group 2. The second group of errors that stood out the most was the substitution of words. Similar to omissions, substitutions also speak directly to the difficulty that the learners had to recognize a given word(s). The difference was that most of the replacements occur because the learners were influenced by the repetitive nature of the sentences. For example, when they read "here" at the beginning of the one

sentence then they replicate the same word in the next sentence. This phenomenon in the type of errors committed by the learners occurred in both stories.

4.8.2.3 Sentences

The amount of words read during both the pre- and post-tests had a direct bearing on the total **number of sentences** completed. The more words the learners have read translated into more sentences completed as well. Learner group 1 has completed the most sentences during both stories. Their ability to complete nearly all the sentences in a given story was particularly evident after the intervention sessions. Learner group 2 has had challenges to complete a significant number of sentences in both stories.

4.8.2.3.1 Summary of words and sentences

In summary, the oral reading scores have fluctuated across most of the learners. Although all the learners have been exposed to the same intervention the reading performances have been different. Learner group 1 has made the most significant strides in reading performance in both stories. A comparison of the learners across age groups was not necessarily made in this study. The study focused on the reading performances of learners in the intermediate phase of the school, notwithstanding the particular chronological or mental age of the learners in question.

4.8.3 Re-tell

As has been indicated earlier in the chapter there appears to be a direct link between the number of words that the learners have read and their ability to re-tell the story. A significant number of learners have recorded lower pre-test reading scores and have, in turn, also given minimal feedback during the re-tell session. The post-test results for most of the learners have increased which have also resulted in an increase in the re-tell scores. It also appeared that learner group 1 has benefited from both visual and auditory stimulation, whilst learner group 2 has leaned mostly on the auditory properties of the reading sessions. The latter group of learners has recorded a zero to low pre- and post-test oral reading score but was able to give feedback during the re-tell session.

4.8.4 Time

The allocated time that each learner received to complete both the pre-and-post test as indicated in chapter 3, has been set to 1 minute (60 seconds). Most of the learners across learner groups 1 & 2 have utilized the full 60 seconds across both the pre-and-post tests in story

1 and 2. During the first story only the learners reflected in table 4.6 and some in table 4.10 have reduced the amount of time that they utilized across the pre-and-post tests. This particular situation has also been prevalent during the second story. The learners' results in table 4.13 indicated a positive shift from pre- to post-test. Their level of reading fluency has increased which seems to have resulted in an increase in the number of words identified and recalled.

Apart from these isolated groups of learners a significant number of learners utilized the full 60 seconds (1 minute) across both pre- and post-tests. For these learners a reduction in the time utilized has not necessarily translated to an increased word identification tally. Of greater significance was the fact that they showed a constant upward move in their ability to identify the words of a given story.

4.9 Findings from interviews

4.9.1 Introduction

In order to answer the second research question that is, "What can educators of these ... learners learn from the change?" interviews were conducted with the four educators. Permission letters were issued to these educators and were returned timeously. The interviews were scheduled shortly after the story series were completed with the learners. The reasoning behind this was to allow the educators to engage with the stories and to observe how their learners performed during the reading sessions. The interviews were conducted at the research site as was indicated in Chapter 3. The dates for the interviews can be observed in Table 4.19 below.

Table 4.19 Dates of Interviews with educators

NR	NAME	DATE
1	EDUCATOR 1	14-Sep-10
2	EDUCATOR 4	14-Sep-10
3	EDUCATOR 2	20-Sep-10
4	EDUCATOR 3	21-Sep-10

4.9.2 Interview questions & thematic development

As indicated in chapter 3 the questions were designed from broad to more specific, with the aim of extracting information of the key concepts, reading and technology. The ultimate objective of the interviews was to get an account from the educators of their experiences with the learners in the class before and during the intervention sessions. The presentation of the results to follow

will be done according to the way the questions were categorized. The broad focus areas covered by questions 1-5 were to establish the educators' level of experience as well as the current state of literacy education at the school. The remaining 5 questions were aimed at the role of technology in literacy education as well as the educators learnt experiences during the interventions.

Question 1: How long have you been teaching at the current school?

The experience of the educators at the current school indicated that most of them have been teaching for more than 8 years. Only one of the 4 educators has been teaching for 3 years. Educator 1 responded "just over 10 years", whilst educator 3 said "third year".

Question 2: What in your view are the reasons for the placement of learners in your school and not in a "mainstream school"?

The views of the educators on the question of placement were in some respects similar and interconnected. According to them a diagnosis for cerebral palsy or of being intellectually challenged is in keeping with the school's admission policy. Infrastructural shortcomings on the part of "mainstream" schools were also furnished. Of interest was also the "inability to read and write" as a reason, as well as the fact that educators at special schools are specifically trained to meet the needs of the learners with challenges.

Question 3: What do you regard as important **knowledge and skills** that a learner with special educational needs should have on completion of their schooling?

In trying to assess what the focus area for teaching and learning at the school is, the educators were questioned on the skills and knowledge that they are trying to impart. All four of the educators agree that a basic literacy, numeracy and life skills programmes are being followed at the institution. As *educator 1* responded: "...each learner able to count to a certain level, able to identify primary colours, write their own name, remember own home address,... handle themselves well in society".

Another agreed with the type of skills that the school attempts to instil, but also highlights that one should also identify each learner's strengths and build on that. According to *educator 4*, one should not be content with teaching the learners these basic skills mentioned, but strive to teach

the learner(s) vocational skills. "... from the skills level one can teach the learner to become an artisan...one needs to find out what his/her strength is, and build on from there..." (direct translation from Afrikaans)

Question 4: What in your view as an educator is the importance of *reading/literacy instruction* for the mentally challenged learners at your school?

Similar to what has been reported in the *skills and knowledge* area, the educators highlighted that they primarily teach basic literacy to the learners. The focus appears to be on sight reading, recognition and identification of signs. As *educator 2* responded, "... for most of the learners at our school it is difficult, I would deal with sight reading, uhm being able to recognize various signs..."

All the educators indicated that reading and writing their names are important for the learners. One educator (*educator 1*) indicated that it is "an important value of society." In contrast to the other educators, *educator 4* did share that basic reading/literacy extends to all the learners, whilst intensive reading/literacy training is only for those who can. "... I don't think it is so important, more for those that you know can..." (direct translation from Afrikaans)

Question 5: How would you group your learners in terms of their ability to read?

The area of assessment and grading served an important purpose, i.e. to ascertain how the educators facilitate reading sessions in the class. All the educators do *whole class reading activities* at some point in time in a given day. Some (*educator 2 & 4*) will expose learners to picture reading or listening to audio stories. "...the rest you could split up further, those who could give you a story from pictures, which is a certain kind of reading...or from listening to a audio story"

They also shared that according to their assessments, it is on average 2 to 4 learners in the class that would show some competency to read. The processes that they have used were a bit different. *Educator 3* for example follows this pattern: a) whole class reading session, b) divide class in 3 separate groups, c) groups read by themselves (with support), d) individual reading, e) whole class reading session. *Educator 4*, in turn matches competent readers with those that have difficulty to read. As mentioned, the former learner(s) will "...sit with a group that cannot read and guiding them with the instructions..."

I will now shift my attention to discuss the last 5 questions asked as well as the ensuing theme(s) that have emerged from the interview data. The primary focus areas of this unit will be to establish, a) what the educators' view of technology is and b) what they have learnt from the experiences during the study. These focus areas will be presented under the primary heading: Role of technology and its influence on the educators' teaching and learning

The units/themes garnered from the first 5 questions, i.e. *placement of learners, skills and knowledge, literacy focus* as well as *assessment and grading* served to give an insight into the current state of affairs at the institution. The presentation to follow will build on this, but also serve to establish what the educators have learnt from being involved in the study. In particular, amongst others, whether the involvement in any way influenced the way they would approach reading and / or literacy in their classes.

The information shared by the educators for the latter part of the interview was in contrast to the initial part of the interview data. The initial part of the interview(s) indicated that the educators followed a basic programme for reading and literacy. Only one educator (educator 2) indicated the use of audio stories to a segment of the class. So, the question begs, against the current state of affairs, what are the *educators' perceptions of technology* particularly insofar as reading education is concerned?

Question 6: What in your view is the importance of technology, specifically computers, in the learning and teaching of mentally and physically challenged learners?

The educators' observations of their learners' use of technology were generally positive. According to educators 1 & 2, the learners are relatively excited when using the computer to perform tasks. "... *it's amazing how excited the learners get when its computer day...*" All the educators have shared that in some way or other the computer and / or technology does make the teaching task much easier. As educator 4 indicated: "... *learners learn faster with computers compared to when the same activities are performed in the class...*" (*translation from Afrikaans*). Some of the educators (educators 1 & 2) saw technology as a vehicle to facilitate independence and discipline. "... *teaching them a whole lot of discipline...*"

The next 4 questions are all interrelated because it encapsulates the engagements of the learners with the technology. As such the questions and the subsequent responses will be presented as one unit.

Question 7-10:

What, if any, have been the general achievements that your learners have made when using technology and / or computers as a learning tool?

Have you observed any change in your learners' reading abilities whilst being part of the reading sessions? What have you learnt from this change?

How would you describe your learners' reading competency (before and after intervention) in relation to the following units?

- a. The ability to decode text,
- b. Word recognition,
- c. Visual discrimination of words
- d. Reading fluency and lastly,
- e. Their understanding of the stories

The educators' learnt experiences during the study were also very interesting. Of interest according to all the educators, was the combined use of visual images and sound, particularly when engaged in stories, proved to be quite successful. Educator 3 highlighted this by saying that, "... stories it is giving them an interest... it is related to pictures, they can connect the phonics...". Educator 1 also adds "...a child views a story on the computer, hearing this voice coming from the computer... makes learning interesting and fun...".

Virtually all the educators indicated that they have learnt a lot with their engagements in the project. They have shifted the focus from a basic reading and literacy programme, for example, deduction of the story from pictures, to one that involves challenging the learners more. As educator 1 indicated, "... never to underestimate or limit a ... learner".

The process of allowing learners to read actual text, listening and visualizing text and then to identify it appear to be quite appealing to the educators. "... given me confidence to try a whole lot of new methods..." (educator 1). Educator 2 describe the change well by reiterating the previous speaker's sentiments: "...word recognition, ... sight reading... and now I see with some of them one could move beyond that; visual discrimination of words, ...showing me word for word,... using that method,... found that it works well for me... ."

Furthermore they have all seen a marked change in the learners' ability to recall information when their reading is supplemented with technology. Educator 4 shared that the learners are much more enthusiastic about reading now. All that needs to happen is to continue slowly with the reading sessions. "... I pick up a tremendous enthusiasm in the learners... they insist they want to read every day...they longed for what they have learnt...means a lot for them... great challenge in the mainstream school...I must just make it smaller... they must get the exercise everyday...when we go to the computer lab ...they want to go straight to the stories ... good thing..." (translated text from Afrikaans)

The questions asked during the interviews to the relevant educators elicited a range of themes which were directly drawn from information provided. In keeping with the primary objectives of the study the concepts that have been focused on were reading. The themes and / or key concepts to follow were highlighted in the earlier discussion and will be taken forward into the new chapter. These were:

1. The learners found reading and writing challenging tasks to master (Qn.2, 4, 5)
2. A basic reading / literacy programme is being followed for example reading names, signs, pictures (Qn.3, 4, 5)
3. Learner differentiation took place based on reading competency (Qn.4, 5,)
4. Teaching and learning methodologies are tailor-made for the learner (Qn. 3, 4, 5)
5. Teaching support for reading included different technologies inclusive of visual and sound properties (Qn. 5, 6, 7-10)
6. Shift from basic reading foci to intensive reading \ literacy programme (Qn. 7-10)

Beyond these concepts garnered from the interviews with the educators, new data also surfaced. These educators have not necessarily been asked to provide the information during the questioning phase. These new concepts\themes were:

1. Basic schooling serves to equip the learner to be functionally independent (Qn. 3, 4)
2. Reading literacy is an important value of society (Qn. 3, 4)
3. Technology facilitates independence and discipline (Qn. 6)

4.10 Chapter summary

The chapter has provided us with a clear indication of the learners' reading performance before and after the interventions. A differentiation of the sample group of learners was made based on their initial reading competency. The learners that recorded a significant pre-test score were grouped together and those that did not were placed in another. The results were captured

across the categories, words, sentences, re-tell and time during the first story. The second story was represented in the same way, except that an additional category, that of visual discrimination was added. An assessment for visual discrimination served to isolate the area of reading competency. Some of the common trends observed were:

4.10.1 Words and sentences

The pre-test word count of learner group 1 (table 4.3) in the first story ranged from 1-35, whilst learner group 2 (table 4.7) generally recorded a minimal to zero (0) word count score. A similar trend prevailed during the second story as has been reflected in table 4.10 (learner group 1) and table 4.16 (learner group 2). The post-test word count of learner group 1 showed a positive shift during stories 1 and 2. The word count scores for this group were between 6 and 35. Some (half) of the learners in learner group 2 made a positive shift by reading between 0 and 21 words. The remainder of the learners in the group did not manage to recognize any words even after the interventions. The sentences completed were directly linked with the number of words being read by the learners. That is, the more words being read translated into more sentences completed as well. Learner group 1 made the most significant improvements in the number of sentences completed across both stories. Learner group 2 has made the least number of shifts in the category, sentences completed.

4.10.2 Re-tell

Re-tell as has been discussed in the chapter as the ability of the learner to be able to understand and recollect parts or the entire story after reading it. The re-tell trends were in some way similar to the words being read. Learner group 1 has read more words during both stories 1 & 2 and has managed to re-tell more words during the pre- and post-test. The biggest shift in re-tell word count score occurred during the post-test. The learners in this group managed to identify the words correctly, understand them and recall them by creating their own sentences. Learner group 2 in turn have read fewer words during stories 1 & 2 and have recalled fewer words as well.

Beyond these obvious patterns new data has also surfaced and will also be discussed in the chapter to follow. These were:

- Some of the learners in learner group 1 have provided single word responses as opposed to whole sentences even when they have managed to read more words during the post-test

- Learners (learner group 1) (table 4.5 & 4.10) have significant pre-test word reading scores but had low to zero re-tell word count scores. The words identified were those that were at the start of the sentences for example “ek” (“I”).
- Learners that formed part of learner group 2 (table 4.7 & 4.16) were not able to read any words during the post-test, but were able to recall the story when asked to do so. These learners’ responses were based on what they had remembered of the story.

4.10.3 Time

The time allocation for the reading tasks was set to 60 seconds (1 minute) across both stories 1 and 2. Both learner groups were exposed to the same amount of time during their execution of the stories. For the most part the majority of the learners (learner groups 1 & 2) utilized the full 60 seconds to complete the story. Some of the learners (learner group 1) reflected in table 4.6 & 4.10 have reduced their amount of time, particularly during the post-test. The following trends were observed for these learners:

Learner group 1: (sourced from Tables 4.6 & 4.10)

- a) reduced time = high reading word count = high re-tell word count
- b) full time, high reading word count = reduced word errors = high re-tell

Learner group 2: (sourced from Tables 4.7 & 4.16)

- a) full time, high reading word count = high re-tell word count (table 4.7_13 learners)
- b) full time, zero word count, high re-tell
- c) full time, zero word count = zero re-tell

In summary, learner group 1 generally made positive shifts although not necessarily in the time category.

A graphic representation of the **reading errors** for learner group 1 & 2 was done. The initial errors were then analysed to isolate the area of difficulty for the learners. The next level of analysis involved categorizing the errors and providing an initial interpretation thereof. The most dominant errors in ranking order and its ensuing interpretations were:

- Omission of part \ all of the text - word recognition\decoding difficulties
- Substituting words with own text - word recognition challenges (reading text from memory – l1; start sentence in same manner – l2)
- Identification of letters – Difficulty to see word as complete whole
- Self-correcting misread words – word recognition challenges (l1) (analyse

misread word and correcting it)

- Reversals - challenges with left-to-right sequencing i.e. “saw” to “was”, word recognition challenges
- Additions – anticipate context of sentence and add own word

From these interpretations new data also became apparent and will be taken forward into chapter 5. These new categories of data that came about were:

Substituting words with own text – Reading text from memory as opposed to decoding and (word recognition challenges). Read similar word from previous sentence based on repetitive nature of story (word recognition challenges)

Self-correcting misread words – Analyse context of word\sentence and able to correct misread word

The chapter to follow will see a discussion of data referenced here as well as the new data that came to light.

4.11 Interview data

The educators' interview data have been isolated in the chapter. The key concepts/themes have been analysed and will be taken forward into chapter 5. These were:

- The learners found reading and writing challenging tasks to master
- A basic reading \ literacy programme is being followed by the educators
- Learner differentiation took place based on reading competency
- Teaching and learning methodologies are tailor-made for the learner
- Teaching support for reading included different technologies inclusive of visual and sound properties
- Shift from basic reading foci to intensive reading \ literacy programme

New data surfaced and were highlighted accordingly. These themes are not necessarily exclusive of the themes already discussed. Instead they are in many ways complimenting the current elicited themes. The themes were:

- Basic schooling serves to equip the learner to be functionally independent
- Reading literacy is an important value of society
- Technology facilitates independence and discipline

In the next chapter the main findings from both the learners and educators results are to be discussed in collaboration with the reviewed literature of chapter 2.

CHAPTER FIVE

DISCUSSION OF RESULTS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In the previous chapter the main findings of the study have been isolated in terms of the primary questions being asked. The questions were:

- 1 What direction for change does the reading of intellectually impaired learners take when a particular assistive technological device is used as a teaching-learning tool?
- 2 What can educators of these intellectually disabled learners learn from this change or lack thereof?

The chapter has arrived at conclusions insofar as the learners' reading achievements are concerned. The educators' interview data has been analysed and the central themes have been arrived at.

5.2 Discussion of results

The research topic had a dual purpose as has been indicated before, that is, to assess the learners reading competency before and after technological support. Secondly, the teachers were interviewed to establish what they have learnt from the learners' reading sessions. The main findings of the learners' data during their engagements with the two stories will be discussed under the following headings:

- 1 Words and sentences
- 2 Re-tell
- 3 Time

In turn the teachers' interviews elicited the following primary themes:

- The learners found reading and writing challenging tasks to master
- A basic reading \ literacy programme is being followed by the educators
- Learner differentiation took place based on reading competency
- Teaching and learning methodologies are tailor-made for the learner
- Teaching support for reading included different technologies inclusive of visual and sound properties
- Shift from basic reading foci to intensive reading \ literacy programme
- Basic schooling serves to equip the learner to be functionally independent
- Reading literacy is an important value of society
- Technology facilitates independence and discipline

By way of taking the discussion forward, I will now turn to the theories that informed the study. As we have learnt in Chapter 2, Vygotsky's **Zone of Proximal Development**, the concept of **scaffolding** and Feuersteins' **Mediated Learning Experience** were central to the study.

5.3 Zone of Proximal Development

Vygotsky refers to the **zone of proximal development** as "*...the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers*" (Vygotsky, 1978). Accordingly learning takes place on two levels, being the actual and potential development. Actual development is the level of a learner's cognitive functions that has already been established. The second level is of interest to us, and that is being achieved when the learner is assisted by others such as teachers, peers and computer technology. Vygotsky (1978) refers to the nature of support as "...imitating adults and through being instructed about how to act, children develop an entire repository of skills ...". The learner in this instance is not yet in a position to manage the required skills (reading) yet, but needs the support of adults (teachers) and or tools (assistive technology) to acquire it. Once the learner has acquired such skills, her/his developmental level grows to assimilate the new knowledge and the level of potential development thereby shifts. Accordingly the ZPD is a fluid system which involves the learner acquiring new knowledge to solve problems or master skills (Bransford, Brown & Cocking, 2000; Rogoff, 1990 in Mosito, 2005:21). The ZPD also implies that all learners (inclusive of intellectually impaired) have the potential to succeed given the appropriate conditions such as the quality of instruction, learning opportunities and a supportive environment (Rogoff, 1990 in Mosito, 2005:22). For the purpose of the study, the quality of instruction encompasses the types of instruction such as teaching with the support of technology. The teacher provides the learners with multiple learning opportunities to ensure that everyone experiences the story despite the variant levels of cognitive functioning. A supportive environment has been provided by the educator during the pre-test, intervention sessions and post-test by encouraging the learners to try even if they find the reading task challenging.

5.4 Scaffolding

Scaffolding, being the second theoretical concept has been defined as "tutorial interactions between an adult and child". More specifically the underlying notion is to make sense of the kind

of support that the adult (teacher) would provide to the child to perform a given task (Wood et al., 1976 in Hobsbaum et al., 1996:2). The role of the adult would be to fulfil the following functions:

1. capturing the interests of the learners in the (reading) task
2. highlighting important parts of the task the learner might overlook and
3. showing the learner how to achieve his\her objectives with the least amount of frustration (Wood et al., 1996:2).

5.5 Mediated Learning Experience

The mediated learning experience is a type of mediated engagement between the child and the environment. The quality of the interaction of MLE is achieved by the initiation and deliberate action of an adult (and / or teacher) between the “environmental stimuli” and the child (Kozulin et al., 1995:69). Feuerstein described MLE as “... the way in which stimuli emitted by the environment are transformed by a mediating agent, usually a parent, sibling or other caregiver. This mediated agent, guided by these intentions, culture and emotional investment selects and organizes the world of stimuli for the child...Through this process of mediation, the cognitive structure of the child is affected” (Feuerstein et al., 1980, p.15-16 in Kaufman & Burden, 2004).

To ensure that the interactions between the “teacher” and “learner” meet the prescriptions of MLE the universal criteria of intentionality and reciprocity, transcendence and meaning have to be present (Kozulin et al., 1995:69).

5.5.1 Intentionality/Reciprocity

Intentionality has been defined by Feuerstein as the “deliberate and non-accidental character of the mediated learning experience” (Kozulin et al., 1995). The focus of intentionality is the child and the object and how the characteristics of the object are being transformed. The aim is that the child experiences the object so that his\her thinking processes are influenced during the engagement (Kozulin & Presseisen, 1995:70). In this regard the teacher deliberately has to transform the experience of the reading task with the support of assistive technology in such a way that the learner gets more benefit out of it. The results described in Chapter 4 and to be discussed here give one some indications of the shifts from pre- to post- test.

5.5.2 Transcendence

The focus of transcendence is how the **learning experience** is extended to other situations as well (Kozulin & Falik, 1995). The objective is also to establish the underlying principles of the learning experience and to transfer it to other tasks in the child’s life (Kozulin et al., 1995:70).

Reading or the mastery thereof of the chosen research is not an isolated cognitive task devoid from other skills. The interview results of the educators highlighted the fact that one of the aims of reading is to provide the learner with a sense of independence beyond the obvious literacy competency. In this instance the learners have been exposed to the concepts of “helping” (as in “helping each other”) as well as the day-to-day activities that transpired in their “classrooms”, such as reading and writing. The reading activities and the discussions with the educators have reinforced these basic “skills” and “lessons”. In so doing the lessons learnt in the learners’ own classes have been reinforced to the computer classes.

5.5.3 Meaning

The mediation of meaning provides the learner with a reason for the interaction (Kozulin et al., 1995). The “mediated learning experiences become possible only when stimuli, events or information are infused with meaning by the mediator” (Kozulin et al., 1995:70). The learning experience can thus not be devoid of a clearly defined purpose for the learner. The mediator (teacher) therefore, has a responsibility to make the mediational interaction as meaningful as possible for the learner. In the case of the sample group of learners the learning experience has been carefully “mediated” and commenced at the choice of stories chosen. The first story “**In our classroom**” has been chosen because it ties in with a known concept/theme of the first term at the school. The second story “**Can you help me**” is a common theme that runs through all other themes and or concepts being taught.

At the second level, given the challenges that the learners have, assistive technologies were utilized to provide the learners with a media enriched experience. The technology utilized made the learners excited to read, which is in contrast to the observations of the learners during the pre-tests. Some of the learners were hesitant to read based on the fact that they found the task to be too challenging. As educator 4 stated during the interview, “...I pick up a lot of enthusiasm, ... he insists to read everyday... I must now take other stories as well... they long for what they have learnt ...mean the world to them ... because it has been a great challenge for them in the mainstream school...they have the opportunity to can...” [translated from Afrikaans]. Lastly, during the intervention sessions the stories were made meaningful when the teachers related the story with the learners’ current experiences.

In this study as has already been stated and to follow, the teachers in collaboration with the assistive technology have scaffolded and mediated the reading for the learners. In turn the

learners' potential development has for the most part been shifted. I will move to the discussion of the learners' data as has been mentioned earlier.

5.5.4 Words and Sentences

According to Lessing and De Witt (2002) reading is a single aspect or learning outcome in literacy competence which can be described as the construction of meaning for which the learner must attain a necessary level of decoding proficiency. Kartal (2006) indicated that children learn to read by progressing through a number of developmental processes. These are "letter and word recognition", "decoding", "comprehension" as well as how fluent the learner engages with the text.

In this study word recognition and the completion of sentences served as a first indicator of reading competence. The ability to master a mentally refined skill such as reading depends to a large extent on the intellectual functioning of the learner. The learners in the study are from a heterogeneous⁵ group of learners that fall within the band of intellectual impairment. Intellectual impairment has been defined as "the presence of a significantly reduced ability to understand new or complex information, to learn new skills..." (Louw & Edwards, 1997; Papalia, Olds & Feldman, 2002).

The analysis thus far has brought me to the conclusion that two clearly defined groups have evolved insofar as the learners' reading competency is concerned. These groups have been separated based on the fact that their pre-test results have been very different from one another.

The initial assumption was that, if the learners' pre-test results are different then the post-test results will reflect the same result. Another assumption was that the amount and level of change will be different as well. The conclusions reached were exactly just that, learner group 1 & 2 presented different results. Learner group 1 made the most significant shifts in their ability to recognize the words in the story, whilst learner group 2 made marginal to no shifts.

The disparity in word recognition skills by the two learner groups can be supported by literature. Accordingly learners with an intellectual impairment have general challenges of word identification (Forgave, 2002; Higgins & Raskind, 2000; Manset-Williamson & Nelson, 2005 in Elder-Hinshaw, Manset-Williamson, Nelson, & Dunn, 2006: 7).

⁵ heterogeneous insofar as different levels of intellectual impairments i.e. mild, moderate, profound and severe is concerned

The interview data of the educators also suggested that the focus on a basic literacy programme at the research site indicates that the target group of learners have difficulty managing “real” reading. As *educator 2* responded, “... *most of our learners at our school are difficult; I would deal with sight reading...*”. In asking the educators how they would group the learners in the class, *educator 2 & 4* mentioned that they will expose learners to picture reading or listening to audio stories “ *the rest you could split up further, those that could give you a story from pictures, which is a certain kind of reading ... or they listen to an audio story*”. *Educator 4* also stated that reading extends to all the learners, whilst intensive reading is only for those that can “... *I don't think it is so important, more for those that you know would be able ...*” (*translated from Afrikaans*). In assessing the errors made by the learner groups, word recognition errors have been the biggest category of errors committed. These, of course, have had a significant bearing on the amount of words being read as well as sentences completed.

5.5.4.1 Error categorization of words (& sentences)

The understanding is that word recognition errors are when a learner deviates in any way from the written text. The definitions as provided by Spache and Ekwall (1981) and Goodman, (1995) & Goodman et al. (1987) in Girgin (2006) in this study under the headings *omissions*, *substitutions*, *self correcting of words* and *reversals* are types of word recognition errors. All of these error groups indicate that the learner has amended the original text.

Theorists such as Piaget have indicated that the type of errors that learners make during a reading engagement give one the necessary insight into the area that has not yet been mastered (Mosito, 2005:122). Similarly, the underpinnings of miscue analysis indicate that the reading errors of learners provide one with insight into the strategies that they utilize (Goodman, 1973 in Hall, 2003:6). It is also the conceptualization of the errors that would enable one to design the intervention programme to the needs of the learners.

It is against this background of information that one wishes to isolate the word recognition errors committed by the learners. As has been pointed out earlier word recognition errors were the biggest type of errors committed by the learners. The question begs how exactly have the reading errors been reflected in the learners' reading engagements?

Word recognition errors took place on different levels. The dominant error groups were the omission of all or parts of the text, substituting the original words with their own words and self-

correcting initially, erroneously read words (Spache, 1981; Ekwall, 1981 & Goodman, 1995; Goodman et al., 1987 in Girgin, 2006). Since the former error types were in the absolute majority the discussion to follow will only focus on these groups. These error types give the best indication of where the reading challenges and/or word recognition errors were located for the learners in the study.

Another type of word recognition error that also surfaced particularly with learner group 2 was that they read from memory as opposed to decoding the text.

5.5.4.2 Omission type errors: Learner Group 1

In learner group 1 & 2 omission type errors were reflected during the pre- and post-test by the learner omitting parts or all of the text in the story.

Illustrative Text 5.1: Pre-Test

Story 1

“*There are two pieces of chalk*” being read by the learner as “*There are two ...*”

“*Here are five rulers*” being read as “*... five ...*”

Story 2

“*We can help each other!*” read as “*We can help ...*”

In all of these examples the learner omits to complete the sentences, either at the beginning or at the end of the sentence.

Illustrative Text 5.2: Post-Test

Story 1

“*There are two pieces of chalk*” now being read as “*There are two pieces of chalk*”

“*Here are five rulers*” as “*Here are five rulers*”

Story 2

“*We can help each other!*” read as “*We can help each other*”

During the post-test following the intervention the learner was able to read both sentences correctly.

5.5.4.3 Omission type errors: Learner Group 2

Illustrative text 5.3: Pre-test

Story 1

“*Daar is een onderwyseres*” (There is one teacher). No reading took place.

In this instance all the words in the story have been omitted from the text. The learner made no attempt to read any parts of the story.

Story 2

"Can you help me get my ball?" No reading took place on the part of the learner.

Illustrative Text 5.4: Post-test

Story 1

"Daar is een onderwyseres" (There is one teacher) read as "... is een onderwyseres"

The learner has made significant progress from pre- to post-test, but has still left the first part of the sentence out.

Story 2

"Can you help me get my ball?" No reading took place on the part of the learner.

As has been mentioned earlier learner group 1 made the most significant shifts during the post-test for both stories compared to learner group 2. Of interest is the illustration in IT 5.1 points to the fact that the learner might have been influenced by the number names that s\he could have encountered already in a mathematics lesson(s). In this instance prior knowledge could have ensured that s\he was able to master some parts of the text.

Insofar as learner group 2 is concerned the learners presented general difficulty with the text as reflected in IT 5.3 & 5.4. In the second story as described in IT 5.4 the learner made no progress. The learner referenced here represents the group of learners that the intervention programme had no impact on insofar as word recognition is concerned.

The next sub-group of errors that form part of word recognition errors was when the learners substituted words with their own text. By way of reflection, substitutions according to Spache (1981) and Ekwall (1981) occurs when one word or more words in the text are substituted for another. We have observed in this study that in both pre- and post-tests learner group 1 & 2 substituted the original text with their own words. Learner group 1 has either kept the status quo (pre:15 & post:15) or marginally increased their errors during the post-test, whilst learner group 2 has substantially increased this type of error as reflected in tables 4.9 & 4.18. Logically one would expect that the focus should be on reducing an error rather than increasing it. The questions to be asked are why and how these omission type errors took place to ascertain the relevance and efficacy of the intervention strategy employed by the educator(s).

5.5.4.4 Substitution type errors: Learner Group 1

In learner group 1 & 2 substitution type errors were reflected during the pre- and post-test as the learner altering some of the text in the story.

Illustrative Text 5.5: Pre-Test

Story 1

“Here are four rulers” [roo-lers] read as “Here are four rules” [rools]

“Here are seven pictures” [pik-chers] read by the learner as “Here are seven pencils” [pen-suhls]

Story 2

“Kan jy vir my help om my vlieër te kry?” [Can you help me get my kite?] read as “Kan jy vir my help om my eer te kry?”

Illustrative Text 5.6: Post-Test

Story 1

“Here are four rulers” [roo-lers] read now as “Here are four rulers” [roo-lers]

“Here are seven pictures” read now as “Here are seven pencils” then self-correct to “pictures”

Story 2

“Kan jy vir my help om my vlieër te kry?” now read as “Kan jy vir my help om my vlieër te kry?”

5.5.4.5 Substitution type errors: Learner Group 2

Illustrative Text 5.7: Pre-Test

Story 1

“Daar is een onderwyseres” (There is one teacher). The learner omits all or part of the text

Story 2

“Kan jy vir my help om my vlieër te kry?” [Can you help me get my kite?] No reading took place on the part of the learner

Illustrative Text 5.8: Post Test

Story 1

“Daar is een onderwyseres” read as “Hier is een onderwyseres” (Here is one teacher)

Story 2

“Kan jy vir my help om my vlieër te kry?” read by the learner as “Kan jy my help om vlieër af te haal?”

As can be deduced from the discussion learner group 1 and 2 both made substitution type errors. The type and way in which the errors were made by the learner groups were however different. Learner group 1 made errors that were very close to the way the actual word is suppose to be or has attempted to read the word, but failed to read the whole word as can be seen in IT 5.5. The expectation then would be that with the necessary intervention that these types of errors can be amended.

The type of errors that learner group 2 made were in many ways far removed from the real word or were just nonsensical. These types of errors were based on the fact that the learner could not decode the requested word. On other occasions, as can be seen in IT 5.8, the learner has substituted the starting words of the sentences in the first story. These words formed part of the story, but were incorrectly used. In this instance the learner appeared to have been influenced by the repetitive start of the sentences. Out of the 8 sentences the first two sentences start with “daar” [there], the third sentence with “hier” [here] then three sentences start again with “daar” [there], then “hier” again. The learner has erroneously started all the sentences with the word “hier” [here] as opposed to alternating it with the correct word(s) where necessary.

In other respects the learner has replaced the original word with another word. When asked to read the words the learner identified different words as opposed to what was actually written. The sentence in the second story might be contextually correct, but the correct words were not identified when requested to do so. The learner has read from memory, meaning what s\he could remember from the interventions as opposed to visually analysing and decoding the words. The strategies employed by the two learner groups were very different from one another, which, by implication, also mean that a different intervention strategy has to be utilized by the educator.

One can perhaps speculate about some of the other strategies that the learners have employed to master the text, but this is not within the scope of this study. At this stage one merely seeks to present the findings of the study which includes isolating the primary errors of the learners and to establish whether any changes took place following the intervention programme. Suffice to say the learners’ results are aligned with the literature which points to the variant reading abilities of the learners as discussed earlier. The results are also consistent with a study conducted with 5-6 year old boys to improve their phonological awareness following a talking book intervention programme (Adams, 1990; Goswami & Bryant, 1990; Blachman, 2000; & Snowling, 2000 in Littleton et al., 2006). Another focus was to assess the children’s attainment levels as well as

whether their reading strategies (as highlighted by the errors made) had in any way been influenced (Littleton et al., 2006). The results indicated that the two groups of boys with different phonological pre-test scores presented with different achievement scores following the intervention. Although the results were somewhat different from the present study, the learners in this study with higher pre-test scores eventually showed higher post-test scores on word recognition. The author also highlighted that besides the different achievement levels of the groups, it was quite significant that talking books have the potential to support learners on their particular reading developmental level (Littleton et al., 2006).

Although the intention in this study is not to make a comparison between the two learner groups, based on their own unique abilities it is worth noting that learner group 1 fared much better compared to learner group 2 insofar as word recognition is concerned. Be that as it may, it is these very reading abilities that present us with different outcomes even when the same intervention strategy is employed for both learner groups.

It is (also) perhaps worth going back full circle to the intervention stage as discussed in Chapter 3 to provide one with a lens into the role of the educator and (assistive) technology and how it has or, in some cases, has not brought about any change. The assistive technology referred to here and being used in the study is what has been described by the United States Public Law as "... any ... piece of equipment ... used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Hobbs et al., 2009). The assistive technology in the study is a type of (recorded) text-to-speech technology that Thompson (2005) refers to as a software application that converts computer text to digitized speech. Zhao (2007) also states that speech technology refers to "technology that enables machines (recorder & computer) to receive ...human oral language (read story) as input and respond with human or human-like oral language (read story with visual and sound properties) as output".

More specifically the assistive technology utilized in the study is a type of E-book where a printed paper-based storybook has been "re-created" into a digital book. E-books have additional intrinsic elements such as sound animation and interactive activities that can scaffold the learning of the learner to master the task at hand (Rhodes et al., 2007). The e-book used in the study had sound (human-like voices), brightly coloured text identifiers as well as interactive activities that supported the learners' reading. These interactive activities could be used to aid the learners' understanding of the story.

All intervention sessions has been preceded with a pre-test to assess the learners reading ability on the level of words, sentences, re-tell and time used. The teacher has allocated a computer, where the electronic story has already been opened, to each learner. The stories have been dealt with as a combination of group and individualized sessions. All sessions have been started with a short introduction of the story which includes the following: *“We will do a story today... we will read the story through a few times and ask some questions about it ...I want you to follow the story on the screen and also listen carefully to it ... the words of the story will be highlighted which would make it much easier for you to follow... after reading the story as a whole class, we shall give each of you a chance to read a word, then a sentence and then eventually the whole story... the words will be replayed as much as possible until such time as you can read the words... enjoy... here we go... .”* Through the process mentioned here, the whole class of learners was exposed to the story first on a group then on an individual level.

The teacher has served as the mediator using the assistive technological device appropriately between the learner and the story. She has done this by “reading” (clicking on the next page button) the story to the learners and has provided them with contextual information about the story. The context of the story has been provided by way of telling the learners that the story has to do with learners in a school (“In our classroom”) and a group of children (“Can you help me”). The teacher has also performed the functions as stated earlier by Wood et al. (1996:2) that is, to capture the interest of the learners in the story, highlighting the salient points in the stories with the aim of ultimately understanding the text.

The learner`s role was to actively listen, follow the highlighted story on the computer monitor and respond to the teacher`s questions when asked to do so. The learner would have acquired and assimilated the new knowledge into his\her current knowledge base. The results described in chapter 4 and discussed here have explicated the nature of the learners reading performance.

The teachers asked the learners some content specific questions after reading the whole story a few times such as; *“what was the story about”, “who was involved in the story”, “can you tell me how many pencils were there”* and *“how many children were in the story”*. These types of questions were then followed with word specific questions which were along the following lines; *“can you show me the words daar\there, onderwyseres\teacher, penne, kan\can, vlieër\kite, help, nee\no”*. The next level of engagement was to ask the learners what they have learnt from the story (ies), thus assessing the learners` understanding of the values underlying the story.

The medium of transmission of the story was via the computer screen and the audio devices attached to the system case. The learner has been exposed to the story on different levels, that is, firstly by way of the teacher setting the stage and systematically taking the learner through the sessions as has just been highlighted. The computer has stimulated the learner's reading in different ways, by visually highlighting whole words as well as allowing him/her to listen to the story. In this regard Larson (2010) states that the learner can be exposed to chunks of the reading task, for example, to read one paragraph a few times then asking the learner to re-tell that part. This process can be repeated until such time as the learner knows the content of the story well enough.

Beyond these the learners also got to follow their peers' reading responses and follow suit when it was their turn. One can perhaps infer as to the possible influence that the peers' reading might have had on the learners' post-test (word reading, retell and time) scores following the intervention sessions. This is particularly relevant in the light that the nature of the intervention session included the assistive technology providing sound to the story. However the parameters of the study do not include this potentially valuable resource into the general analysis.

5.6 Re-tell

As has been stated previously in this chapter, re-tell or comprehension forms part of the developmental stages of reading (Kartal, 2006). In short, reading without understanding would not unlock the meaning of the written code. This particular notion has been shared by Lessing and De Witt (2002) who state that reading is an important aspect of literacy which involves the construction of meaning. The learning outcome, "reading and viewing" that forms part of the foundation phase (Grades R – 3) also underscores the importance of comprehension. Part of this outcome is the ability of the learners to be able to make meaning of written text (DoE, 2002 in Long et al., 2009). Re-tell as used in the study, is the ability of the learner to reflect on the text being read during the pre-test, intervention sessions and post-test. On all these levels the understanding of the written texts (stories) was assessed in order to track if any change occurred as per the first research question.

To restate the information shared at the end of chapter 4, the re-tell trends have in many ways followed a similar trend as the words and sentences read section. Learner group 1 read more words across story 1 & 2 and recorded a higher re-tell score compared to learner group 2 who had low to zero word recognition scores. The amount of content words read has in many instances, had a direct bearing on the re-tell word scores of learner group 1.

However in other cases the learners have had significant word reading scores, but these scores have not translated into higher retell scores due to the singular word responses. As stated in chapter 2, learners with an intellectual impairment have challenges to memorize and rehearse text that they have read. Furthermore they also do find it difficult to organize or instinctively elaborate on the text that they have read which would help them to learn (Belmont et al., 1971; Turner et al., 1994 in Alfassi et al., 2009).

For the most part group 2 have read less words, with not enough content information of the story that might have improved their re-tell word scores. Another rather interesting trend for this group of learners as reflected in tables 4.7 & 4.16 in chapter 4, was the fact that they have read a limited amount of words but when asked to re-tell the story they were able to respond positively. This trend has also been supported by the observations of the educators after the intervention sessions. As educator 1 responded to the question of the learners' level of understanding following the interventions: *"...when it comes to remembering and when it comes to re-telling and even if its not the way it is meant to be, they are just unique in their way of responding and in remembering..."* *"...it was amazing to see that the weaker learner has remembered something about a story that was read with them ..."* The educator in this case has made reference to learner group 2, with their own unique abilities and being able to recall the story following the reading session.

This brings me now to some of the instances of the learners' recalled data. The focus of this part of the discussion is to report on the learners' understanding of the stories more concretely. The illustrations will provide one with different levels of analysis, that is, a synopsis of the learners' word recognition, nature and amount of recalled words during the pre- and post-tests. The most salient points have been discussed, with particular reference to the possible change following the intervention sessions. I will distinguish between the two learner groups as has been done throughout the study.

Learner group 1 read more words across story 1 & 2 and has recorded a higher re-tell score

5.6.1 Re-tell Illustration 5.1: Learner group 1

Story 1: Pre-Test (Synopsis of reading)

"There is one teacher"

"There are two pieces of chalk"

Re-tell: *“There are one teacher. There are 2 pieces of chalk. There are four books. Here three pens”.*

The learner’s word reading scores for the pre-test was 35 out of 35. The re-tell word count score in turn amounted to 30. The learner’s read scores have provided him\her with sufficient content that have reflected well in the re-tell section. However what is lacking in the re-tell responses is the learner’s ability to creatively develop his\her own sentences. The learner has for the most part retold the sentences verbatim which could have, as stated previously, a bearing on the ability to learn.

Story 1: Post-Test (Synopsis of reading)

“There is one teacher”

“There are two pieces of chalk”

Re-tell: *“A story in our classroom. There are three pens. There are two pieces of chalk. There is one teacher. Here are four books.”*

The learner’s post-test word count have remained the same, whilst the re-tell word count, although word for word, have improved slightly from 30 – 32. To a degree the learner’s result is consistent with the literature that states that a person with an intellectual impairment lacks the knowledge of reading strategies including elaborating on the text, as well as the ability to monitor their own understanding thereof (Belmont et al., 1971; Turner et al., 1994 in Alfassi et al., 2009). The learner has challenges in that s/he does not have the ability to decode the text and transform it into a creative reflection of the whole story (ies).

One can deduce that beyond the similar type of responses as the pre-test the learner made a positive shift by starting to create his\her own sentences with “A story in...” as opposed to “In our classroom”, which was different to the pre-test.

Learner group 2 who had low to zero word recognition scores

5.6.2 Re-tell Illustration 5.2: Learner group 2

Story 1: Pre-Test (Translated from Afrikaans synopsis of reading)

“Daar is een onderwyseres” [“There is one teacher”] No reading took place

Re-tell: The learner was not asked to re-tell based on the negative word recognition scores during the pre-test.

The learner's word reading scores were negative with no content information.

Post Test: (Translated from Afrikaans)

"Hier is drie penne." [Here are three pens] read as "Daar is drie penne" [There are three pens]

"Daar is vier boeke." [There are four books] read as "Daar is vier liniale" [There are four rulers]

Re-tell: "Hoe ons in die klas is [How we are in class]; Een onderwyseres [One teacher]; Twee bordkryte [two chalks], Drie penne [three pens]; En daar is vier liniale [And there are four rulers]; En daar is vyf|ses vetkryte [And there are five|six crayons]; Daar is 'n klomp van ons [There are a lot of us]"

During the pre-test the learner could not decode any of the text and therefore was not in a position to share any information when requested to do so. The post-test word recognition scores were significant with a total score of 14 words and a re-tell word count of 21 words. The learner's recalled set of words can be divided into three separate units. The first section "How we are..." is the learner's own summary of the story. The second section, "One teacher" to "three pens" is a reproduction of the words being read. The last part, "And there are four rulers" to "There ...lots of us" has not been read during the post-test. One can thus infer that the latter part of the learner's recollected words came from the intervention sessions since no words were read during the post-test.

5.6.3 Re-tell Illustration 5.3: Learner group 1

Story 1: Pre-Test (Translated from Afrikaans synopsis of reading)

"There is one teacher"

"Here are seven pictures"

Re-tell: "Storie gaan oor boeke, penne" [translated as] "Story is about books and pens"

The learner's word reading scores for the pre-test was 31 out of 33 words. The re-tell word count score only amounted to 5 words. The reading scores however did not translate into expected higher re-tell scores.

Post-Test: (Translated from Afrikaans)

"There is one teacher"

"Here are seven pictures" read as "Here are seven pens"

Re-tell: penne [pens], prente [pictures], een onderwyseres [one teacher], daar is baie van ons [there are lots of us], bordkryte - twee [chalk - two], boeke – vier [books – four]

The learner's word reading was less than the pre-test score, which were 28 out of 33 words. The re-tell word count score of 13 words was three times more than the pre-test score, but still not

completely in line with the amount of words being read. The learner's responses were similar in nature as the pre-test, that is, singular type words as opposed to full sentences. Beyond these inconsistencies the learner's re-tell segment now included much more content information.

5.6.4 Re-tell Illustration 5.4: Learner group 2

Story 2: Pre-Test (Synopsis of reading)

"*Kan jy vir my help om my vlieër te kry?*" [Can you help me get my kite?] The learner did not read any words during the pre-test. The learner was not requested to re-tell based on a zero word recognition score.

Post Test: (Translated from Afrikaans)

"*Kan jy vir my help om my vlieër te kry?*" [Can you help me get my kite?] read as "**Kan jy vir my help om vlieër af te haal?**"

Re-tell: "*Die kite was op die dak gewaai.*" [The kite was blown onto the roof] "*En toe is die bal ook op die dak.*" [And then the ball is also on the roof] "*Dit is die stok ook op die dak.*" [The stick is also on the roof]

During the pre-test the learner did not manage to read any words and by implication also recorded a zero re-tell word count score. The post-test saw a change in the learner making a concerted attempt at decoding the words, although for the most part not appropriately placed. The learner has essentially scanned over the text and read it out aloud to the assessor. She was not credited for the read text based on the fact that the word(s) pointed to and actually been read was different. The recalled word count was significant, because the learner was able to accumulate a word count score of 53 words in the absence of a significant post-test score. The learner, as can be seen from the re-tell synopsis, was able to create her/his own sentences and have a reasonable understanding of the story.

One can deduce from the change that during the post-test that the learner is now making a mental shift to really "read" the words of the story as opposed to the pre-test where no reading took place. To a degree it is this very real attempt and understanding of the story that provided the learner with a significant re-tell word count score. This type of "reading" has also been observed by educator 3 where the learner was "reading" from memory as opposed to decoding the text. According to the aforementioned educator "...they can read from sentence one up to the last ...if you ask them to read in the middle of the sentence ...impossible for them ... they can memorize the story..." Forgrave (2002) in Zhao (2007) states that the technology provides the learner with repetitive visual and auditory cues that aids the understanding of the text. In this

instance the educator has managed to facilitate these repetitive cues through manipulating the story (ies) on the computer, and as a result the learner's comprehension improved. As stated earlier the learner was also able to create her\his own sentences as opposed to reporting on the story word for word.

The learners' performance in the re-tell section across the two stories was in many ways similar to the words read section. The two representative learner groups as can be seen in RI 5.1 – 5.3 have presented interesting performances in their reporting of the words being read following the pre- and post-tests. Learners group 1's word reading and recalled information followed a more or less consistent pattern. The learner generally read more words, was able to get to grasp the content of the story and was able to give a reasonably fair reflection thereof. These results were echoed by educator 2 saying "...able to re-tell the story up to uhm 80% spot on,... but now I can see there are a few of them that can actually...".

However Learner group 2 as reflected in RI 5.2 & 5.4 employed different strategies to recall the information following the intervention sessions. At some level they were either not in a position to recall any information from the stories as stated in most of the pre-tests or have provided a verbatim type response. For the most part, the words being read have not been translated into recalled words. It appears that the interventions have at this stage had a more significant bearing on some of the learners in group 2's understanding of the stories.

5.7 Time

Time or as it has been understood in the study is the ability of the learner to decode the text as fluently as possible. The unit has been assessed on all levels, that is, pre- and post-tests across both stories. Stated earlier in the chapter by Kartal (2006) the ability of the learner to fluently master the text is one of the cornerstones of reading. Given the reading challenges such as reading fluency that learners with an intellectual impairment have (Forgrave, 2002) the focus of this part of the discussion is to examine the salient points from the results insofar as time is concerned. One also wishes to assess whether the intervention sessions have any influence on the learner's ability to read the stories much more fluently and potentially improve the understanding and learning for the learner.

The results encapsulated in Chapter 4 indicate that most of the learners in learner group 1 & 2 made use of the full 60 seconds to complete the stories during the post-test. In some cases learner group 1 has managed to reduce their reading time during the post-test. By way of

restating the trends highlighted at the end of chapter 4 the learners' post-test performances can be categorized in the following manner:

Learner group 1: (sourced from table 4.6 & 4.10)

- a) reduced time = high reading word count = high re-tell word count
- b) full time, high reading word count = reduced word errors = high re-tell

Learner group 2: (sourced from table 4.7 & 4.16)

- a) full time, high reading word count = high re-tell word count
- b) full time, zero word count, high re-tell
- c) full time, zero word count = zero re-tell

The order of discussion will be the trends highlighted of learner group 1, followed by learner group 2. Illustrations of a learner's performance under each of the units will be made to explain the pattern more concretely.

Learner group 1: Reduced time = high reading word count = high re-tell word count

Insofar as the sequence explained above 4 out of 10 learners (table 4.6) and 7 out of 10 learners (table 4.10) recorded similar kind of results. These learners reduced the time used during the post-test, have read a significant amount of words and were able to recall a fair amount of words. For explanatory purposes one of the learner's result sets will be restated here.

Table 5.1 Extract from table 4.10, Learner group 1, Story 2

Number	Test	Name	Language	Total Words	Words Read	Sentences	Errors	Re-tell	Time (sec.)
1	Pre-test	Leon	E	34	31	8	4	4	60
	Post-test			34	34	8	0	53	24.21

One can deduce from the learner's results in table 5.1 that he had read the story fluently during the post-test, completing it in 24.21 seconds. The reading word count has increased from 31 to 34 and the recalled words have also increased substantially. The learner was only able to recall 4 words during the pre-test, "die bal" [the ball], die kat [the cat]" compared to the post-test that included the whole story. We can thus assume from the learner's result set that reading the story

more fluently has contributed to his word recognition and general comprehension. As educator 2 explained, “*fluency came in that they use their own words*”. The learner was able to read the story more fluently, and at the same time create his own sentences. Adams (1995) in Kartal (2006) stated that the speed, accuracy and effortlessness with which the reader responds to text have a significant influence on the understanding thereof. The representative learner referenced here was able to read the story effortlessly and has henceforth improved his understanding of the story. One can also assume that the intervention session, that is, the assistive technology as manipulated by the educator(s) has had a bearing on the learner’s results. As stated earlier, electronic books help to develop the learner’s vocabulary, understanding of the text while at the same time show them how to read fluently (Horney et al., 1999; Lefever-Davis et al., 2005 in Rhodes et al., 2007).

Learner group 1: Full time, high reading word count = reduced word errors = high re-tell

As per the pattern stated above 6 out of 10 learners (table 4.6) and 2 out of 10 learners (table 4.10) recorded similar kind of results. These learners have improved on all other levels, that is, of words read, recalled information except on time. Table 5.2 reflects the results set of one of the learners from learner group 1.

Table 5.2 Extract from table 4.6, Learner group 1, Story 1

Number	Test	Name	Language	Total Words	Words Read	Sentences	Errors	Re-tell	Time (sec.)
1	Pre-test	Quanita	E	35	13	5	22	17	60
	Post-test			35	32	8	3	27	60

The learner’s results indicate that she has used the full 60 seconds during the pre- and post-test. Her post-tests results, that is, words read (13 to 32), sentences completed (5 to 8) and re-tell (17 to 27) have all shown a marked improvement. It appears that in both tests she used the 60 seconds differently. During the pre-test she processed the words much slower, hence the limited words (13) being read and the high error word count score of 22. The learner was not able to identify any of the first words (*there, here*) and did not complete the story within the allocated time. When asked to re-tell the story she responded very slowly and not completely in order. Her pre-test recalled responses were “*there is one teacher [uhh]*”, “*there are 5 rulers – [uhh]*” which supports the previous statement. Most of the challenges that she had during the

pre-test was corrected during the post-test. She read more confidently, identifying more words, and provided a more sequentially correct recollection of the story, for example, “*there are two pieces of chalk*” and “*there are three pens*”.

The results stated here of Quanita is somewhat in contrast to the earlier discussion where the learner made improvements in all areas, although they are from the same learner group. Beyond this the statement made earlier by educator 2 insofar as the ability of the learner to create his/her own sentences, is also relevant for Quanita. However, the position held by Adams (1995) in Kartal (2006) still holds true, that is, when the speed and accuracy of the reading task is compromised then the word recognition and understanding of the text suffers. The pre-test results are indicative of this position. The post-test results although not executed at a faster pace, is consistent with the advantages of electronic books, that is, accelerating vocabulary and comprehension (Horney et al. 1999; Lefever-Davis et al., 2005 in Rhodes et al., 2007) by allowing the learner to experience the stories on a visual (see words) and auditory (hear correct pronunciation) level (Forgrave, 2002 in Zhao (2007).

Learner group 2: Full time, high reading word count = high re-tell

As per the pattern stated above 13 out of 26 learners (table 4.7) and 4 out of 13 learners (table 4.16) recorded similar kind of results. These learners have shown improvement after the interventions, in the areas of word recognition, sentence completion and recalled information except on time. Table 5.3 reflects the results set of one of the learners from learner group 2.

Table 5.3 Extract from table 4.7, Learner group 2, Story 1

Number	Test	Name	Language	Total Words	Words Read	Sentences	Errors	Re-tell	Time (sec.)
1	Pre-test	Steve	A	33	0	0	33	0	60
	Post-test			33	16	5	20	23	60

The representative learner, Steve reflected in table 5.3 has shown improvements in most of the assessed areas, words read (0 to16), sentences (0 to 5), recalled words (0 – 23) except on time.

Once the learner was able to recognize the words in the story, the errors dropped also and the amount of sentences completed increased. Although the words were for the most part scanned over it was correctly pointed at by the learner and thus credited for. The recalled words shared by the learner were word for word from the original story for example, “*daar was een onderwyseres*” [there is one teacher], “*daar is vier boeke*” [there are four books]. At one level the understanding of the learner is commendable particularly since he have not read any words during the pre test. On another level one of the sentences “*daar is baie van ons*” [there are lots of us] was not read during the post-test, but reported on during the re-tell section. One can deduce that the learner remembered parts of the story from the intervention sessions as opposed to reporting directly from the read story.

Learner group 2: Full time, zero word count, high re-tell

As per the pattern stated above 8 out of 26 learners (table 4.7) and 2 out of 13 learners (table 4.16) recorded similar kind of results. Table 5.4 reflects the results set of one of the learners within learner group 2.

Table 5.4 Extract from table 4.16, Learner group 2, Story 2

Number	Test	Name	Language	Total Words	Words Read	Sentences	Errors	Re-tell	Time (sec.)
1	Pre-test	Winston	A	44	0	0	44	0	60
	Post-test			44	0	0	44	22	60

The learner reflected in Table 5.4 has not managed to read any words during both the pre- and post-tests within the allocated time of 60 seconds. He has also not been able to recall any information during the pre-test. During the pre-test the learner was observed to be nervous in his responses. When asked to read the words in the text the learner was relaying the text of the first story, and has thus not been credited for it. As stated earlier the learner was also not able to read any words of the story or complete any sentences within the 60 seconds. Interestingly he has managed to provide the assessor with information about the story for example “*kite*”, “*ball*”, “*bal kom afhaal*” [come to take ball off]. For the most part the learner gives singular word or short phrased responses. Essentially the learner has not reached the decoding stage of word recognition yet, but has been able to slowly remember some parts of the story. Insofar as the change in understanding from pre- to post-test is concerned educator 2 stated “*now I can see*

there is a few of them that can actually...". His singular word responses speak of the fact that he is not yet able to creatively develop his own sentences yet which is in line with the literacy challenges of the sample group of learners (Belmont et al. 1971; Turner et al. 1994 in Alfassi et al. 2009). These results are consistent with the observations shared by educator 2 who indicates that *"fluency came in that they use there own words"*. To a degree the information shared by the previous authors as well as the educator is somewhat similar yet contradictory as well. On one level the learner was not able to share full sentences which are consistent with what the authors shared, but on another level, the learner was at least able to share some content during the post-test. This is in sharp contrast to the pre-test results.

Learner group 2: Full time, zero word count = zero retell

As per the pattern stated above 2 out of 26 learners (table 4.7) and 6 out of 13 learners (table 4.16) recorded similar kind of results. Table 5.5 reflects the results set of one of the learners within learner group 2.

Table 5.5 Extract from table 4.16, Learner group 2, Story 2

Number	Test	Name	Language	Total Words	Words Read	Sentences	Errors	Re-tell	Time (sec.)
1	Pre test	Sherley	A	44	0	0	44	0	60
	Post test			44	0	0	44	0	60

The learner reflected in table 5.5 has not managed to recognize any words, complete sentences, or recall information from the text for both pre- and post-test. She tried to decode the text in the story, but essentially substituted the words with her own text for example, *"Wat doen ons nou?"* [What now?] read as *"Ek kan doen"* [I can do]. The learner was not credited for the words being "read", but rather marked as word recognition errors as discussed earlier in the chapter. It also appeared the she did not derive any benefit from the intervention sessions.

5.8 Conclusion

In this section concluding remarks are arrived at insofar as the research questions in chapter 1 is concerned:

- What direction for change does the reading of intellectually and physically impaired learners take when a particular assistive technological device is used as a teaching-learning tool?
- What can educators of these intellectually disabled learners learn from this change?

The action research study conducted has highlighted the need for additional support for learners with reading challenges and at the same time underscored the potential benefits of using such support measures, for example, technology. The role of the educator in mediating support is critical to the learners' coding and decoding strategies during the reading process.

The results presented have been consistent with the performance levels of the learner with an intellectual impairment. That is, that all learners function cognitively on different levels and as such the interventions will almost certainly present variant results. It is thus important for any researcher (and teacher) to account for the variant cognitive levels of functioning of the learners. The intervention strategy for the targeted group of learners will have to make provision for all groups of learners within the band of intellectual impairment. The study only but "scratched the surface" into the possibilities of the teacher making use of recorded speech technology to influence the reading ability and support of learners with intellectual impairments. It is my belief that based on the positive performance of a segment of the learners during the study, that the "reading code" can truly be unlocked for this targeted group of learners.

5.9 Limitations of the study

The following were identified as limitations of the study: Intervention sessions took place over a short period due to the institution's own logistical arrangements. Despite, the study yielded useful lessons on the direction for change that can occur when intellectually impaired learners' reading is mediated through assistive technology. In this regard, it became clear that despite the intellectual impairment learners are as excited about interaction with computers. This interest in computers is enough motivation to yield very positive results in learners reading abilities.

The second limitation is that the school only has one computer room, which allows a given class to utilize the facilities once a week. This challenge coupled with the educator's own programme made it difficult to secure more computer sessions with those respective classes. The positive side to this though is that teachers are forced to find interesting ways that can enable reading. As a result learners are exposed to a repertoire of teaching strategies over and above assistive technology which further strengthen the gains made through assistive technology.

The rather small sample group of learners located in the intermediate phase of the school can not necessarily be generalized to all learners with an intellectual impairment in the school. The study can thus not be generalized to all learners with an intellectual impairment. Ethically and educationally the small number was an advantage for the learners participating in the study as it allowed individual attention from the teachers and the researcher.

The intervention strategy utilized during the intervention sessions was similar in nature for all the learners. The learners in the sample group fall within a band of intellectual impairment that is, mild, moderate or severe and needed to have been exposed to different teaching methods. The results have highlighted the fact that the learners have generally responded differently to the pre- tests, intervention sessions and post-tests hence the reference to learner group 1 and 2.

5.10 Recommendations for further research

The learners in the study have been grouped according to their initial reading competency, yet the results of the learners within the groups showed some variance. I would recommend research that assesses the learners' reading ability within a homogenous group across a larger sample group.

Most of the educators in the study indicated that they are not following an intensive literacy programme that would challenge the learner's reading competency. The same educator group has seen a great deal of value in using assistive technologies to complement their current teaching. In addition educator 4 expressed concern of what will happen after the completion of the study. I would recommend an intensive research project that would assess the efficacy of a literacy programme with homogenous groups of learners that would be both teacher and technology driven. The purpose could be multi-faceted, such as:

- a) to provide the educator with the necessary tools to facilitate a systematic learner centred literacy programme, and
- b) to provide the learners with the necessary literacy skills.

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APPENDICES

APPENDIX A: PERMISSION FROM WCED

Navrae
Enquiries
Imibuzo
Telefoon
Telephone
Ifoni
Faks
Fax
Ifeksi
Verwysing
Reference
Isalathiso

**Dr RS
Cornelissen**

**(021) 467-
2286**

**(021) 425-
7445**

**20091016-
0015**



**Wes-Kaap
Onderwysdepartement
Western Cape Education
Department
ISebe leMfundo leNtshona
Koloni**

Mr Albert Warnick
153 Third Avenue
GRASSY PARK
7941

Dear Mr A. Warnick

**RESEARCH PROPOSAL: A STUDY OF THE INFLUENCES OF COMPUTERS
TECHNOLOGY ON THE READING OF INTELLECTUALLY AND PHYSICALLY
CHALLENGED LEARNERS.**

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.

3. You make all the arrangements concerning your investigation.
4. The programmes of Educators are not to be interrupted.
5. The Study is to be conducted from **20th January 2010 to 30th June 2010**.
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr R. Cornelissen at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as submitted to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

We wish you success in your research.

Kind regards.

Signed: Ronald S. Cornelissen

for: **ACTING HEAD: EDUCATION**

DATE: 19th October 2009

**MELD ASSEBLIEF VERWYSINGSNOMMERS IN ALLE KORRESPONDENSIE / PLEASE QUOTE
REFERENCE NUMBERS IN ALL CORRESPONDENCE / NCEDA UBHALE IINOMBOLO
ZESALATHISO KUYO YONKE IMBALELWANO**

**GRAND CENTRAL TOWERS, LAER-PARLEMENTSTRAAT, PRIVAATSAK X9114, KAAPSTAD
8000**

**GRAND CENTRAL TOWERS, LOWER PARLIAMENT STREET, PRIVATE BAG X9114, CAPE
TOWN 8000**

WEB: <http://wced.wcape.gov.za>

APPENDIX B: PERMISSION FROM WCED (EXTENSION)

Navrae
Enquiries
IMibuzo
Telefoon
Telephone
Ifoni
Faks
Fax
IFeksi
Verwysing
Reference
ISalathiso

**Dr RS
Cornelissen**

**(021) 467-
2286**

**(021) 425-
7445**

**20091016-
0015**



**Wes-Kaap
Onderwysdepartement
Western Cape Education
Department
ISebe leMfundo leNtshona
Koloni**

Mr Albert Warnick
153 Third Avenue
GRASSY PARK
7941

Dear Mr A. Warnick

**RESEARCH PROPOSAL: A STUDY OF THE INFLUENCES OF COMPUTERS
TECHNOLOGY ON THE READING OF INTELLECTUALLY AND PHYSICALLY
CHALLENGED LEARNERS.**

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

12. Principals, educators and learners are under no obligation to assist you in your investigation.
13. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
14. You make all the arrangements concerning your investigation.

15. The programmes of Educators are not to be interrupted.
16. The Study is to be conducted from **20th January 2010 to 30th September 2010**.
17. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
18. Should you wish to extend the period of your survey, please contact Dr R. Cornelissen at the contact numbers above quoting the reference number.
19. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
20. Your research will be limited to the list of schools as submitted to the Western Cape Education Department.
21. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
22. The Department receives a copy of the completed report/dissertation/thesis addressed to:

**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

We wish you success in your research.

Kind regards.

Signed: Ronald S. Cornelissen

for: **ACTING HEAD: EDUCATION**

DATE: 19th October 2009

APPENDIX C: PERMISSION LETTER TO THE SCHOOL

Date: 25 January 2010

Attention: The Principal

As you are aware that I am currently busy with my masters studies at the Cape Peninsula University of Technology. I am conducting research that is primarily of a qualitative nature. For this purpose I will be conducting classroom observations and interviews within the Intermediate phase.

The purpose of the study is to assess the influence of a particular form of assistive technology on the reading ability of mentally and physically impaired learners.

I would like to ask permission to do classroom observations within the 5 Intermediate Phase classes. I will also need to conduct interviews with these respective educators and learners (**1 learner per class**).

Further to this, I would also like to make you aware of the fact that all gathered information will be treated with the strictest confidentiality. The name of the school, the respective educators and learners will be changed to ensure anonymity in all publications.

The Western Cape Education Department has already granted me permission to do the research from the 21 January 2010 until the 30 June 2010. Please find attached a copy indicating this.

My data collection will essentially be done during the period 1 February 2010 until 3 June 2010. The final programme i.e. days and times of data collection will be communicated to you as soon as possible.

I trust that my request will meet with your approval.

Thanking you

.....

Mr Albert Warnick

APPENDIX D: PERMISSION LETTER TO EDUCATORS

Date: 25 January 2010

Dear Teacher

I am currently busy with my masters studies at the Cape Peninsula University of Technology.

I am conducting research that is primarily of a qualitative nature. For this purpose I will be conducting classroom observations and interviews within the Intermediate phase.

The purpose of the study is to assess the influence of a particular form of assistive technology on the reading ability of mentally and physically impaired learners.

I would like to ask permission to do a series of classroom observations within your class.

I will also need to conduct interviews with you from time to time.

Please also be aware that I will also be interviewing a learner(s) from your class. I am also in the process of requesting permission from the said learner(s).

Further to this, I would also like to make you aware of the fact that all gathered information will be treated with the strictest confidentiality. My request at this stage is also that all engagements with yourself and the said learner in your class be kept confidential.

Your name will also be changed to ensure anonymity in all publications.

The Western Cape Education Department has already granted me permission to do the research from the 21 January 2010 until the 30 June 2010. Please find attached a copy indicating this.

My data collection will essentially be done during the period 1 February 2010 until 3 June 2010. The final programme i.e. days and times of data collection will be communicated to you as soon as possible.

I trust that my request will meet with your approval.

Thanking you

.....

Albert Warnick

APPENDIX E: PERMISSION LETTER TO PARENTS

Date: 25 January 2010

Dear Parent/Guardian

I am currently busy with my masters studies at the Cape Peninsula University of Technology.

I am conducting research that is primarily of a qualitative nature. For this purpose I will be conducting classroom observations and interviews within the Intermediate phase of your child's school.

The purpose of the study is to assess the influence of a particular form of assistive technology on the reading ability of mentally and physically impaired learners.

I would like to ask permission to do a series of observations of you're your child, whilst being busy with school work in his\her class. I will also need to conduct interviews with him\her from time to time.

Further to this, I would also like to make you aware of the fact that all gathered information will be treated with the strictest confidentiality.

Your child's personal details i.e. name and surname will also be changed to ensure complete anonymity in all publications.

The Western Cape Education Department has already granted me permission to do the research from the 20 January 2010 until the 30 June 2010. Please find attached a copy indicating this.

My data collection will essentially be done during the period 1 February 2010 until 3 June 2010. The final programme i.e. days and times of data collection will be communicated to you as soon as possible.

I trust that my request will meet with your approval. ***Please sign the attached slip to indicate whether your child can be part of the research.***

Thanking you

.....

Albert Warnick

-----**Complete, cut here & return to school immediately**-----

Research

I,parent/guardian of
(parent's / guardian's name)

.....

(child's name and surname)

/___/ give my permission

/___/ do not give permission

.....

Signature (parent/guardian)

.....

Date

APPENDIX G: STORIE 1 – IN ONS KLASKAMER

TEL KAART									
MONDELING LEES									
NAAM:									
DATUM & TYD:									
STORIE					TOTAAL WOORDE		NOTAS		
In ons klaskamer									
Margaret Koopedi									
Daar	is	een	onderwyseres.			4			
Daar	is	twee	bordkryte.			4			
Hier	is	drie	penne.			4			
Daar	is	vier	boeke.			4			
Daar	is	vyf	liniale.			4			
Daar	is	ses	vetkryte.			4			
Hier	is	sewe	prente.			4			
Daar	is	baie	van	ons.		5			
TOTAAL WOORDE:						33			
MINUS FOUTE:									
KORREKTE WOORDE:									
TYD:									
HERTEL WOORDE:									
HERTEL:									
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27									
28 29 30 31 32 33									

HERTEL:									

APPENDIX H: STORY 2 – CAN YOU HELP ME?

TALLY CHART									
ORAL READING									
NAME:									
DATE & TIME:									
STORY							TOTAL WORDS		NOTES
Can you help me?									
Margaret Koopedi									
Can	you	help	me	get	my	kite?		7	
Oh	no!							2	
Can	you	help	me	get	my	ball?		7	
Oh	no!							2	
Can	you	help	me	get	my	stick?		7	
Oh	no!							2	
What	now?							2	
We	can	help	each	other!				5	
TOTAL WORDS:								34	
MINUS ERRORS:									
WORDS CORRECT:									
TIME:									
RETELL WORDS:									
RETELL:									
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25									
26 27 28 29 30 31 32 33 34									

RETELL:

APPENDIX J: INTERVIEW SCHEDULE FOR EDUCATORS

GROUP: EDUCATORS

SETTING THE STAGE

1. The purpose of the discussion is being clarified
2. The process of the study are once again being explained
3. An opportunity for educators to ask questions of clarity is provided

QUESTIONS:

1. How long have you been teaching at the current school?
2. What in your view are the reasons for the placement of learners in your school and not in a “mainstream school”?
3. What do you regard as important **knowledge and skills** that a learner with special educational needs should have on completion of their schooling?
4. **What** in your view as an educator is the importance of **reading literacy instruction** for the mentally and physically challenged learners at your school?
5. **How** would you group your learners in terms of their ability to read?
6. **What** in your view is the importance of **technology**, specifically computers, in the learning and teaching of mentally and physically challenged learners?
7. **What**, if any, has been the **general achievements** that your learners had made when using **technology & / or computers** as a learning tool?
8. **Have** you observed any change in your learners’ reading ability whilst being part of the reading sessions? What have you learnt from this change?
9. **How** would you describe your learner’s reading competency (before and after intervention) in relation to the following units:
 - a. The ability to decode text,
 - b. Word recognition,
 - c. Visual discrimination of words
 - d. Reading fluency and lastly,
 - e. Their understanding of the stories
10. **Do** you have any last comments or observations?

APPENDIX K: EDUCATOR RESPONSE SHEET

GROUP: EDUCATORS

NAME/CLASS:

How long have you been teaching at the current school?
What in your view are the reasons for the placement of learners in your school and not in a “mainstream school”?
What do you regard as important knowledge and skills that a learner with special educational needs should have on completion of their schooling?
What in your view as an educator is the importance of reading literacy instruction for the mentally and physically challenged learners at your school?
How would you group your learners in terms of their ability to read?
What in your view is the importance of technology , specifically computers, in the learning and teaching of mentally and physically challenged learners?
What , if any, has been the general achievements that your learners had made when using technology & /

or computers as a learning tool?

Have you observed any change in your learners' reading ability whilst being part of the reading sessions?
What have you learnt from this change?

How would you describe your learner's reading competency (before and after intervention) in relation to the following units:

- a. The ability to decode text,
- b. Word recognition,
- c. Visual discrimination of words
- d. Reading fluency and lastly,
- e. Their understanding of the stories

Do you have any last comments or observations?

