A TEACHING AND LEARNING PROGRAMME TO ENHANCE THE TEACHING AND LEARNING NEEDS OF VISUALLY IMPAIRED LEARNERS IN AN INCLUSIVE NATURAL SCIENCES CLASSROOM

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DECLARATION

I, MOSES MOJAKI MALOKA, solemnly declare that this work is original and the result of my own labour. It has never, on any previous occasion, been presented in part or whole to any institution or Board for the award of any Degree.

I further declare that all information used and quoted has been duly acknowledged by complete reference.

Signature: _____

Date: _____

DEDICATION

This thesis is dedicated to my late parents, Mathejana Mahadiyou and Thokolosi Esau Maloka. It is also dedicated to my brothers, Mahlasenyana, Baaki, Mahoete, Pule Sello and my only sister Hadiyo. I also dedicate this thesis to my late friend, Gift Sekolanyane.

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SUMMARY

The purpose of this study was to investigate perceptions of visually impaired learners and their teachers regarding the extent to which the teaching and learning needs of learners with visual impairment are addressed in inclusive classrooms.

The first phase of the study was characterized by a literature review. A literature review was undertaken to elucidate the concept visual impairment and to highlight the magnitude of visual impairment in South Africa. Attention was also paid to the place of visual impairment in the context of an inclusive education and training system. Furthermore, the literature study explored the characteristics and causes of visual impairment, provided insight into the curricular considerations that underpin the teaching, learning and assessment of visually impaired learners and highlighted the problematic nature of language development, cognitive development, social development and self-esteem development among learners with visual impairment.

The second phase of the study comprised empirical research. Within a positivist framework, quantitative research by means of non-experimental descriptive survey research was undertaken to collect data in order to determine to what extent the teaching and learning needs of visually impaired learners are accommodated in inclusive classrooms. This was achieved by administering a closed questionnaire to a purposively selected sample of teachers (n = 80) and learners (n = 92) from the Fezile Dabi District in the Free State Department of Education to determine their perceptions regarding the characteristics of classroom teaching, learning and assessment for visually impaired learners. In addition to this, the questionnaire administered to the teachers also set out to determine whether the teachers possess adequate knowledge to identify learners with visual impairments in their classrooms.

The data analysis revealed that general teaching and learning needs of visually impaired learners are addressed to a certain extent, but

developmental needs related to language, cognitive, social and self-esteem development, appear to be underemphasized. In this regard, the benefits of a mediated learning approach in the context of teaching visually impaired learners was investigated and utilized in the design of learning activity examples that could be included in a curriculum-based teaching and learning programme for Grade 7 Natural Sciences classrooms. In the absence of curriculum-based teaching and learning programmes that address the language, cognitive, social and self-esteem development of visually impaired learners in inclusive classrooms, this research makes a distinct contribution.

Key words: visual impairment, teaching and learning needs, mediation, inclusive education.

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CHAPTER ONE

ORIENTATION AND MOTIVATION

1.1 INTRODUCTION AND STATEMENT OF THE PROBLEM

At any given point in time, there are learners in the mainstream school population whose behaviour and academic performance indicate that they have significant difficulties in coping with the teaching and learning demands at school (Fourie, 2005:35). Learners who experience these difficulties challenge the expertise and the training of their teachers to the full. The policy on inclusive education, Education White Paper 6, also places growing pressure on ordinary schools to provide appropriate teaching and provision for many learners with moderate to severe barriers to learning (Department of Education, 2001:18, 19). The Education White Paper 6 outlines how the education and training system must transform to accommodate the full range of learning needs.

With a blurring of the boundaries between mainstream and special education, it is more apparent than ever that teachers need to be aware of recent developments in the way in which school problems are being construed and in current thinking about addressing learner needs during teaching (Dunbar-Krige & Van der Merwe, 2010:161). The teacher in the ordinary school is thus being considered as a key professional resource in the prevention of school-based difficulties and in the planning and carrying out of ameliorative interventions.

The achievement of basic teacher adequacy has always been accepted as one of the explicit aims of the schooling (Fourie, 2005:79). Associated with this, teachers in the mainstream of education have gradually acknowledged that there is a need for the development of teaching techniques and the production of special teaching programmes for helping learners who experience barriers to learning (Fourie, 2005:79).

According to Hugo (2006:46), a teacher who works within an inclusive educational paradigm will encounter various internal (medical) and external (social-economic) barriers that prevent learners from learning and developing adequately. Internal barriers are difficulties that originate inside the individual's own self and affect learning and development. External barriers exist outside the individual's own self and affect learning and development.

Teachers are primarily responsible for the early identification of barriers to learning and development (Goodyear, 2006:55). The National Department of Education (2004:39) identifies the following barriers to learning:

- Pedagogical barriers that call for sufficient teacher support to all learners, fair assessment procedures, flexible curricula and linking teaching to the preferred learning style of the learner.

- Medical barriers that call for attention to sensory disabilities that could be either visual or auditory, physical disabilities and cognitive disabilities in the classroom.

- Societal barriers that call for support to learners coming from backgrounds characterized by severe poverty, abuse, crime and violence.

- Systemic barriers that call for adequate facilities at school, the availability of appropriate teaching and learning support material and proper attention to each learner.

Learners with visual impairments include the bland and weak-sighted, experience medical barriers to learning and development (Hugo, 2006:49). Visual impairment may be the result of various factors such as prenatal defects, retinal infections, cataracts, malnutrition, diabetes and physical accidents (Barraga & Erin, 2001:22-27). Learners who are partially sighted or have poor vision show a range of difficulties related to eye functioning. There may be difficulties with eye movement (ocular motility), with the two eyes working together (binocularity), with eye-hand co-ordination and with

focusing problems (Hugo, 2006:49). Since partial vision is often first identified when the learner enters formal schooling, the teacher needs to be able to recognize a learner with visual impairment (Goodyear, 2006:55). Teachers need to take special note of trachoma (ocular mobility), nystagmys (involuntary movement of the eyes), strabismus (crossed-eyes, cannot align eyes simultaneously), myopia (near-sightedness), hyperopia (far-sightedness) and albinism (sensitivity to light and refraction faults such as hyperopia and myopia) which occur frequently (Hugo, 2006:49).

Visual impairment has far-reaching implications for teaching and learning in the inclusive classroom. Among others, Hugo, (2006:50), Lewis and Doorlag (2006:337) and Gearheart (1997:24) mention the following:

- Learners have difficulty in copying work from the chalk board.
- Eye strain often leads to headaches, which can affect concentration and reduce the time available for studying.
- Learners read slowly and with difficulty.
- They have difficulty in comprehending what is read.
- They have trouble with physical activities, which require eye-hand co-ordination.
- They need additional time to complete tasks.
- They have difficulties in trying to follow facial expressions and gestures during conversation and often feel reluctant to participate because they cannot judge when it is a good time to join the conversation.

Furthermore, the motor development, cognitive development, social development, language development and self-esteem development of visually impaired learners appear to be problematic and need special attention during teaching and learning (Bishop, 2004:66-71) (*cf.* 2.4).

The policy on inclusive education (Department of Education, 2001:7) increasingly expects of teachers to fulfil the needs of learners. In addition to this, the Norms and Standards for Teachers (SA., 2000:A47) specifies that teachers should, among others, fulfil a community and pastoral role: "*Within the school, the teacher will demonstrate an ability to develop a supportive and empowering environment for the learner and respond to the educational and the other needs of learners and fellow teachers*." Hay, Smith and Paulsen (2001:213-218) indicate that empowering the teacher to implement the policy on inclusion is neglected and teachers do not possess adequate knowledge and skills to address learner needs. In the context of this study, the aim was to place an instrument in the hand of the teachers who teach in an inclusive context that will assist them in enhancing the teaching and learning needs of visually impaired learners. In addition to the pastoral role, teachers should also act as mediators of learning (Fraser, 2006:2; SA., 2000:A48). A mediated learning approach is regarded as an approach that expects of teachers to help learners to bridge the gap between what they cannot do on their own at a given time, to what they can do with a little help from someone else (Fraser, 2006:1). A mediator of learning remains sensitive to the diverse needs of learners and the barriers to learning that they might experience. In addition to this, a mediator adapts his/her teaching and assessment strategies to the needs and shortcomings of the learners and creates a learning environment that is learner-friendly (Fraser, 2006:1). Based on the aforementioned arguments, the researcher was of the opinion that a mediated learning approach could be regarded as a possible teaching approach to accommodate the needs of the visually impaired learner. Furthermore, a mediated learning approach has been cited in research conducted by Maghuve (2005) as an approach that could assist visually impaired learners in Biology classrooms.

Other research studies conducted nationally and internationally on learners with visual impairments revealed the following: the feelings of parents and teachers regarding the inclusion of visually impaired learners in mainstream

schools have been explored (Ngxata, 2005); the academic and educational needs of the visually impaired learner have been researched in studies by Naidoo (2006), Shunmugan (2003), Matanga (2000), Gumede (1996), Brockmeier (1992) and Nielsen (1992). These studies *inter alia* cited independence and affective development as two key aspects that need to be addressed during the teaching and learning of the visually impaired learner. A number of studies highlighted the needs of teachers who require new competencies to teach the visually impaired learner (Nielsen, 1992; Stratton, 1991). The researcher could also locate two studies that focused on a curriculum and a school management model for visually impaired learners in South Africa (Schoeman, 1996; Schoeman, 1991). Not one of the identified studies investigated the merits of a mediated learning approach for teaching visually impaired learners, and no evidence could be found of teaching and learning programmes based on the principles of mediaton to support the teaching and learning of visually impaired learners in an inclusive classroom. Furthermore, the Department of Education (2005b:11, 22, 34, 99) and the literature provide general guidelines and strategies for modifying the learning environment for learners with visual impairment, and suggest that teaching and learning strategies must be adapted for learners with visual impairments (*cf.* 3.2; 3.3). However, no guidance is provided to teachers, or suggestions made regarding the adaptation of the learning processes that should underpin teaching and learning to accommodate the motor, language, cognitive, social and self-esteem needs of learners with visual impairments in inclusive classrooms. This study wishes to contribute to the existing body of research, and extend the research conducted by Maghuve (2005) in which a mediated learning approach is suggested as a possible teaching approach to accommodate the needs of the visually impaired learner in an inclusive classroom.

Based on the aforementioned this research attempted to answer the following central problem question: **to what extent do teachers accommodate the teaching and learning needs of the visually impaired learner in an**

inclusive classroom, and if not, how can the principles and processes of a mediated learning approach be applied to accommodate the teaching and learning needs of visually impaired learners?

The following problem questions arose within this central question:

- What are the teaching and learning needs of the visually impaired learner in an inclusive classroom?
- To what extent do teachers possess adequate knowledge to identify visually impaired learners in an inclusive classroom?
- What are teachers' attitudes towards learners with visual impairments in inclusive classrooms?
- How do teachers presently handle the teaching and learning needs of the visually impaired learner in an inclusive classroom?
- To what extent can the principles of a mediated learning approach address the teaching and learning needs of the visually impaired learner in an inclusive classroom?
- To what extent is there a difference between the teacher and learner responses regarding the addressing of teaching and learning needs of visually impaired learners in an inclusive classroom?
- How can the principles and processes of mediated learning be utilized in the design of learning activities for a curriculum-based teaching and learning programme to assist teachers to accommodate the teaching and learning needs of the visually impaired learner in an inclusive classroom?

Linked to objective six, the researcher formulated the following null and alternative hypotheses:

H_0 = There will be no statistically significant difference between the learner and teacher responses regarding the extent to which the teaching and

learning needs of visually impaired learners in inclusive classrooms are addressed.

H_1 = There will be a statistically significant difference between the learner and teacher responses regarding the extent to which the teaching and learning needs of visually impaired learners in inclusive classrooms are addressed.

1.2 AIM AND OBJECTIVES OF THE STUDY

The overall aim of this study was to determine to what extent teachers accommodate the teaching and learning needs of visually impaired learners in an inclusive classroom and if not, to apply the principles and processes of a mediated learning approach to the design of learning activities to accommodate the teaching and learning needs of visually impaired learners.

The overall aim was operationalized as follows:

- by establishing what the teaching and learning needs of the visually impaired learner in an inclusive classroom are through a literature review and an empirical study;
- by examining whether teachers possess adequate knowledge to identify visually impaired learners in an inclusive classroom;
- by investigating teachers' attitudes towards learners with visual impairments in inclusive classrooms;
- by determining how teachers presently handle the teaching and learning needs of the visually impaired learner in an inclusive classroom, by means of an empirical study;
- by evaluating to what extent the principles and processes of mediated learning can address the teaching and learning needs of the visually impaired learner in an inclusive classroom;

- by establishing the extent to which there is a difference between the teacher and learner responses regarding the addressing of teaching and learning needs of visually impaired learners in an inclusive classroom; and

- by designing learning activities for a curriculum-based teaching and learning programme based on the principles and processes of mediated learning to assist teachers to accommodate the teaching and learning needs of the visually impaired learner in an inclusive classroom.

1.3 EMPIRICAL RESEARCH

The empirical research comprised two phases, namely a literature study and quantitative, descriptive survey research.

1.3.1 Literature study

A thorough study was made of available primary and secondary literature sources to determine the needs of the visually impaired learner during teaching and learning in an inclusive classroom, as well as of the existing measures and practices to assist and accommodate the visually impaired learner during teaching and learning. The following key words and phrases were used to locate relevant literature: *inclusive teaching, visual impairment, teaching and learning needs of visually impaired learners, mediation* and *mediated learning.*

The following themes were identified in the literature and informed the way in which the literature review in Chapter Two, as well as the questionnaires were structured.

Table 1.1: Overview of literature consulted and the themes extracted

Themes	**Journals** **Books** **Internet articles**
The visually impaired learner in the South African school context	World Health Organisation, 2008, 2002 Hugo, 2006 Bishop, 2004 Government of New Foundland and Labrador, 2001 Huebner, 2000
The magnitude of visual impairment	World Health Organisation, 2008, 2002 Resnikoff *et al.,* 2008 Naidoo *et al.,* 2003
An inclusive education and training system	Dunbar-Krige & Van der Merwe, 2010 Department of Education, 2009, 2001 Landsberg *et al*., 2005 Swart *et al.,* 2005 Davis, 2003 Engelbrecht *et al.,* 2001 Green, 2001 Engelbrecht *et al.,* 1998
Barriers to learning	Donald *et al.,* 2010 Dunbar-Krige & Van der Merwe, 2010

	Engelbrecht & Green, 2007 Hugo, 2006 Corey *et al.,* 2004 Department of Education, 2003 Manson *et al.*, 2003 Peterson & Hittie, 2003 Williams & Cersch, 2003 Jones & Bender, 2002 Rivera & Smith, 2000
Visual impairment: a concept clarification Structure and function of the eye	Bishop, 2004 Government of New Foundland and Labrador, 2002 Farrell, 2006
Definition of visual impairment	Hugo, 2006 Davis, 2003 World Health Organisation, 2008, 2002
Causes of visual impairment	World Health Organisation, 2008 Farrell, 2006 Barraga & Erin, 2001
Characteristics of visually impaired learners	Ormrod, 2008 Besnoy *et al.,* 2006 Hugo, 2006

	Lewis & Doorlag, 2006 Donald *et al.,* 2005 Gray, 2005 Bishop, 2004 Eggen & Kauchak, 2004 McGaha & Farran, 2001 Kay, 200
Categories of visual impairment	Gray, 2005 Bishop, 2004 Cox & Dykes, 2001
The effects of visual impairment of development	Hugo, 2006 Gray, 2005 Bishop, 2004 Davis, 2003 Barraga & Erin, 2001 Webster & Roe, 1998 Crocker & Orr, 1996 Kekelis & Sacks, 1993 Preisler, 1993 Erin *et al.,*1991 Freeman, 1989 Parsons, 1988 Putullaz & Gottman, 1981
Teaching and learning for the visually impaired learner	Arends, 2009

	Mitchell, 2008 Gawe, 2007 Farrell, 2006 Ferreira, 2006 Hugo, 2006 Johnson & Lawson, 2006 Lerner & Kline, 2006 Monayi, 2006 Anon., 2005 Hay & Winn, 2005 Keller, 2005 Bishop, 2004 Chaiklin, 2004 Barraga & Erin, 2001 Cox & Dykes, 2001 Felder, 2001 Felder & Brent, 2001 Gadbow, 2001 Heward, 2000 Johnson, 2000 Johnson *et al.,* 2000 Koenig & Holbrook, 2000 Klatzy & Lederman, 1988
Assessment and the visually impaired learner	Davies, 2003 Department of Education, 2002b Heward, 2000

Mediated learning	Switlick, 1997 Feuerstein *et al*., 2010 Feuerstein, 2007 Fraser, 2006 Kozulin, 2004 Mahn, 2004 Deutsch, 2003 Falik, 2001a & b Felder & Brent, 2001 Feuerstein *et al.,* 2001 Hay & Beyers, 2000 Feuerstein & Feuerstein, 1991 Feuerstein *et al.,* 1991 Feuerstein *et al.,* 1985

1.3.2 Research design

This section only provides an overview of the research design that was employed in the study. A comprehensive discussion and motivation of the choice of research design is provided in Chapter Three.

Against a positivist research framework, a quantitative research design was chosen to gather information about the teaching and learning needs of the visually impaired learners during teaching and learning, as well as on the existing practices of teachers to assist the visually impaired learner during teaching and learning. Flowing from the above, examples of learning activities that could form part of a curriculum-based teaching and learning programme for Grade 7 Natural Sciences was designed to provide guidance to teachers to accommodate the teaching and learning needs of the visually impaired learner in an inclusive classroom setting.

1.3.2.1 Research paradigm

The proposed study focused on a positivist paradigm, as it was the researcher's intention to act as an objective observer during the research in order to understand classroom reality from an external point of view (Maree & Van der Westhuizen, 2007:33).

1.3.2.2 Research design

A quantitative study was chosen because the researcher wanted to objectively establish the characteristics of a given situation, namely the teaching, learning and assessment practices of teachers in inclusive classrooms. In the context of this study, the researcher wanted to quantify the extent to which teachers accommodate the teaching and learning needs of visually impaired learners in inclusive classrooms objectively, and no manipulation of variables was envisaged (Ivankova, Creswell & Plano Clark, 2007:255; McMillan & Schumacher, 2006:23-24; Leedy & Ormrod, 2005:95).

1.3.2.3 Research strategy

As part of the quantitative research, a non-experimental, descriptive survey strategy was utilized in this research. A descriptive survey research strategy was suitable for this research as no intervention took place, and this study entailed a first investigation in order to provide a summary of the characteristics and nature of existing teaching and learning practices for visual impaired learners in inclusive classrooms by examining the perceptions of teachers and learners (McMillan & Schumacher, 2006:24, 215).

1.3.2.4 Population and sample

The population for the study involved all visually impaired learners and their teachers. As it was not possible to conduct research with the entire population, a study population was chosen. All the schools in the Fezile Dabi District formed part of the research population. Due to time and logical constraints a ten percent sample was selected by means of systematic random sampling (McMillan & Schumacher, 2006:128). From the 200 primary and secondary schools in the Fezile Dabi District, ten primary and ten secondary schools were randomly selected. All the teachers in the 20 schools were invited to take part in the research. In total 80 willing teachers took part in the research (n = 80). In each of the identified schools learners who were visually impaired were selected purposively (McMillan & Schumacher, 2006:128) with the assistance of the school principal and teachers and invited to take part in the research. In total, 92 learners agreed to become involved in the research (n = 92). The sample comprised a heterogeneous group of learners and teachers *(cf.* 5.2.1; 5.3.1).

1.3.2.5 Data collection instrument

As the researcher wanted to examine the characteristics of classroom teaching and learning by obtaining the perceptions, opinions and experiences of a large population, a questionnaire was a suitable instrument to survey a sample of the population (Leedy & Ormrod, 2005:183).

Information gathered from the literature study was used to develop and design two structured questionnaires with closed questions, for teachers and learners respectively, to gather information regarding the teachers' knowledge about visual impairment and to establish the frequency with which certain teaching and assessment methods and strategies were utilized during teaching. Group administration of the questionnaires was applied. The questionnaires were administered by the researcher personally to a whole group of respondents (Maree & Pietersen, 2007a:157). The perceptions and views of the respondents were measured by using a Likert scale. This provided an ordinal measure of a respondent's viewpoints (for example: *"almost always", "often", "sometimes", "almost never"* and *"strongly agree", "agree", "disagree", "strongly disagree"*) (Maree & Pietersen, 2007c:148).

Pilot study

A pilot study was conducted with a group of teachers (n =50) and learners (n = 50) of the population who were not part of the sample in order to determine the reliability of the questionnaire. Cronbach Alpha coefficients (*a*) and inter-item correlations were calculated to determine the reliability of the various items in the sections of the questionnaire. Validity of the questionnaire was determined by considering criteria for **face**, **content** and **construct validity** (Leedy & Ormrod, 2005:92). A comprehensive account of how the researcher complied with reliability and validity criteria is provided in Chapter Four (*cf.* 4.6.2.5).

Feedback from the pilot study was used to improve on the formulation of the questionnaire statements.

1.3.2.6 Data analysis

An independent statistician from the Statistical Consultation Services of the North-West University, Vaal Triangle Faculty, was approached to assist with the analysis and interpretation of data. By means of descriptive statistics (Pietersen & Maree, 2007a:183), the data analysis for the teacher and learner responses to the questionnaires were summarized with frequency counts,

percentages and means from which preliminary conclusions were drawn. The data obtained for the teachers and learners respectively, were compared and similarities highlighted. By means of inferential statistics (Pietersen & Maree, 2007b:198), the statistical significance of the differences between teacher and learner responses were calculated by means of t-tests. Cohen's *d* was utilized to determine the effect of the statistical significant differences in practice (*cf.* 4.8). To determine the reliability of the actual study, a Cronbach Alpha coefficient was calculated again for the various sections of the questionnaire.

1.3.2.7 A teaching and learning programme based on the principles of mediation

The research that was conducted did not set out to focus on a specific subject or Learning Area, but wanted to determine what the teaching and learning needs of visually impaired learners in general are, establish whether these needs are accommodated, and if not, how these could be accommodated in an inclusive classroom. As the researcher works in the field of the Natural Sciences, he decided to apply the principles of mediated learning to the Learning Outcomes of the Natural Sciences in order to provide teachers with examples of learning activities that could be included in a curriculum-based teaching and learning programme for Grade 7 Natural Sciences. The principles of mediated learning are however generic in nature, and the teaching and learning principles and processes utilized in the designed programme can be applied to any other subject fields or Learning Areas. The motivation for designing the programme according to the principles of mediation is provided in Chapter Six.

1.4 ETHICAL ASPECTS

The following ethical aspects, as indicated by Creswell (2009:89-92) and Leedy & Ormrod (2005:102) were adhered to:

- The prescribed research request to the Free State Department of Education was completed and submitted to the Department for approval in

order to administer the research questionnaire and to conduct the focus group interviews (*cf.* Appendix A).

- After permission was granted, school principals, teachers, learners and their parents were consulted to obtain permission for the research. Respondents were provided with a description of what their participation involved, as well as a statement indicating that their participation was voluntary and that they had the freedom to withdraw at any time if they wished to do so.

- Questionnaires were completed anonymously. All respondents were assured that information and responses pertaining to the research would be kept private and confidential. Furthermore, the researcher gave the respondents the assurance that the results would be presented in an anonymous manner to protect the identities of the respondents.

- During the completion of the questionnaire, the researcher was present, and invited respondents to ask for explanations if they did not understand the questionnaire, as the questionnaire was not constructed in the Home Language of the respondents.

- During an information session, the respondents were informed about how and why they were selected, and what the benefits of taking part in the research would hold.

- All the research respondents signed an informed consent form before the research commenced.

- The research was not conducted during school hours so as not to interfere with teaching time and the questionnaires were completed during school break time.

- During the study, the researcher strove to be honest, respectful and sympathetic to all respondents.

- As soon as the examination process of the thesis has been completed, the research results will be shared with all the respondents.

1.5 DEFINITION OF KEY CONCEPTS IN THE STUDY

Chapter Two will provide a comprehensive elucidation of the concepts central to the study. In this section, the researcher will only provide a concise definition to set the scene for the discussion in Chapter Two.

- Inclusive education: Inclusive education is education that ensures that the full variety of education needs is optimally accommodated and included in a single education system (Department of Education, 2001:17).

- Mainstreaming: Mainstreaming includes accommodations designed to facilitate the participation of learners with disabilities in all aspects of existing public education systems (Department of Education, 2001:17).

- Barrier to learning: A barrier to learning is any factor, either internal or external to the learner, which causes a hindrance or barrier to that person's ability to benefit from schooling (Department of Education, 2004:39).

- Mediated learning: Mediated learning refers to intentional interaction by a teacher during the teaching and learning process to direct learners but not tell them what to think (Fraser, 2006:5).

- Visual impairment: Visual impairment refers to learners with low vision of partial loss of sight to total blindness (Gray, 2005:180). In the context of this study, the researcher focused on learners with low vision who have difficulty in reading and copying from the board.

- Teaching and learning needs of visually impaired learners: In the context of this study, teaching and learning needs will refer to **general teaching and learning needs** (*cf*.2.3.5; 3.3) such as adapting the learning environment, allowing extra time to complete tasks, enlarged print, verbal explanations and providing active and tactile learning (Mitchell, 2008:33; Farrell, 2006:20; Hugo, 2006:50; Cox & Dykes, 2001:72). In addition to this, teaching and learning needs will also refer to the accommodation of **developmental teaching and learning needs** (*cf.* 2.4) which in the context of this study will refer to cognitive, language, social and self-esteem/self-concept needs which are important for prerequisites for effective teaching and learning (Bishop, 2004:66-71).

1.6 CHAPTER DIVISION

Chapter 1: Introduction and orientation

Chapter 2: Visual impairment: a concept clarification

Chapter 3: Accommodating the teaching and learning needs of the visually impaired learner in an inclusive classroom

Chapter 4: Empirical research design

Chapter 5: Data analysis and interpretation

Chapter 6: A teaching and learning programme to accommodate the teaching and learning needs of the visually impaired learner in an inclusive Natural Sciences classroom

Chapter 7: Summary, findings and recommendation

1.7 CHAPTER SUMMARY

In this chapter, the importance of accommodating the teaching and learning needs of visually impaired learners was highlighted, as well as the fact that teachers who teach visually impaired learners might be in need of assistance to adapt their instructional practices in order to accommodate the teaching and learning needs of these learners. By means of quantitative, descriptive survey research, this study set out to determine to what extent the teaching and learning needs of visually impaired learners are presently met. In the absence of research that documents the accommodation of the teaching and learning needs of visually impaired learners, this research set out to fulfil this gap.

The next chapter focuses on a detailed explanation of what visual impairment entails.

CHAPTER TWO

VISUAL IMPAIRMENT: A CONCEPT CLARIFICATION

2.1 INTRODUCTION

Research studies have shown consistently the benefits of increasing access to opportunities for social interaction and learning for children with visual impairment. Teaching children in mainstream schools carries inherent benefits of participation and learning within an environment of non-segregation, thus promoting the child's educational and social inclusion (McGaha & Farran, 2001:80; Gray, 2005:179). However, children with visual impairment also require additional support in mobility or tactile awareness as well as regarding their language, cognitive, social and self-esteem development in addition to accessing the main curriculum (Bishop, 2004:66-71; Cox & Dykes, 2001:68). Providing for children who are blind or who have low vision in mainstream schools, increases the diversity of needs in the classroom and presents challenges for schools to become educationally inclusive.

Some of the major issues addressed in this chapter are:

- The visually impaired learner in the South African school context.
- The visually impaired learner: a concept clarification of visual impairment.
- The effects of visual impairment on learner development.

2.2 THE VISUALLY IMPAIRED LEARNER IN THE SOUTH AFRICAN SCHOOL CONTEXT

2.2.1 Introduction

According to the World Health Organisation (WHO), visual impairments are related to refractive errors which occur when the eye is not able to focus images correctly on the retina (WHO, 2002). The result is blurred vision,

which is sometimes so severe that it creates functional blindness (having sufficient vision to move around but may require accommodations in the classroom) for affected individuals (WHO, 2002).

According to Hugo (2006:49), Bishop (2004:23), WHO (2008), the Government of Newfoundland and Labrador (2001:1.4-1.5) and Huebner (2000:55-76), the most common refractive errors are:

- **Myopia** (nearsightedness): difficulty in seeing distant objects clearly.
- **Hyperopia**: also known as hypermetropia (farsightedness), refers to difficulty in seeing close objects clearly.
- **Astigmatism**: distorted vision resulting from an irregularly curved cornea.
- **Exotropia**: one or both eyes turn outwards to the ears.
- **Hypertropia**: eyes that turn downward.
- **Nystagmus**: jerkey movement of the eyes. A child with nystagmus will have considerable difficulty fixing the eyes on a specified point, although some children can be helped to find an eye in which involuntary movement is reduced. Line markers for reading and the use of reading materials with bold, well-contracted print are helpful.
- **Estropia:** one or both eyes turn inward to the nose.
- **Strabismus**: muscle imbalances of the eye, causing eyes not to be simultaneously directed to the same object.

2.2.2 The magnitude of visual impairment

In this discussion, the researcher focuses on the latest statistics that could be obtained.

The WHO (2008) indicates that globally, in 2002 more than 161 million people were visually impaired, of whom 124 million people had low vision and 37

million were blind. However, refractive error as a cause of visual impairment was not included, which implies that the actual global magnitude of visual impairment is greater. Worldwide for each blind person, an average of 3,4 people have low vision, with country and regional variation ranging from 1,4 to 5,5 (WHO, 2008).

These figures, the first global estimates since the early 1990s, are the best achievable scientific estimates of the global burden of visual impairment and are the result of new studies carried out in nearly all WHO regions, which have substantially updated the epidemiological data according to age, gender and geographical region (WHO, 2008).

Visual impairment is unequally distributed across age groups. More than 82% of all people who are blind are 50 years of age and older, although they represent only 19% of the world's population. The WHO (2008) indicates that, due to the expected number of years lived in blindness (blind years), childhood blindness remains a significant problem, with an estimated 1,4 million blind children below age 15, and that in every region of the world, and at all ages, females have a significantly higher risk of being visually impaired than males. Visual impairment is not distributed uniformly throughout the world. More than 90% of the world's visually impaired live in developing countries (WHO, 2008). In Table 2.1, the global estimates of visual impairment are indicated.

Table 2.1: Global estimates of visual impairment (WHO, 2002)

	African Region	Region of the Americas	Eastern Mediterranean Region	European Region	South-East Asia Region	Western Pacific Region	Total
Population	672,2	852,6	502,8	877,9	1 590,80	1 717,50	6 213,90
Blind people	6,8	2,4	4	2,7	11,6	9,3	36,9
% of total blind	18%	7%	11%	7%	32%	25%	100%
% with low vision	20	13,1	12,4	12,8	33,5	32,5	124,3
% with visual impairment	26,8	15,5	16,5	15,5	45,1	41,8	161,2

The WHO (2002) estimated that globally in 2002, 161 million people were visually impaired because of eye diseases such as cataract, glaucoma and macular degeneration. It is estimated that an additional 153 million people are visually impaired globally because of uncorrected refractive errors. The estimates confirm that uncorrected refractive errors are a leading cause of visual impairment worldwide, despite the fact that correction of refractive errors is a simple and cost-effective intervention in eye care (Resnikoff, Pascolini, Mariotti & Pokharel, 2008:63; Naidoo, Rakhunandan, Mashige, Govender, Holden, Pokharel & Ellwein, 2003:3764-3770).

The most recent statistics that the researcher could retrieve for the three most common refractive errors, namely myopia, hyperopia and astigmatism, that are prevalent among male and female learners from different age groups in South Africa, are reflected in Tables 2.2, 2.3 and 2.4 below.

Table 2.2: Prevalence of myopia (nearsightedness) in South Africa (WHO, 2002)

Age group	Sample size (n)	Prevalence %
5	339	1.9
6	458	1.6
7	469	0.6
8	471	2.4
9	469	2.1
10	551	2.5
11	483	2.8
12	476	2.5
13	420	3.4
14	428	4.6
15	326	0.0
5-15	**4.890**	**2.9**

Table 2.3: Prevalence of hyperopia (farsightedness) in South Africa (WHO, 2002)

Age group	Sample size (n)	Prevalence %
5	339	1.4
6	458	3.98
7	469	1.7
8	471	1.3
9	469	1.6
10	551	1.9
11	483	2.1
12	476	1.5
13	420	2.1
14	428	1.6
15	326	0.4
5-15	**4.890**	**1.8**

Table 2.4: Prevalence of astigmatism (distorted vision) in South Africa (WHO, 2002)

Age group	Sample size (n)	Prevalence %
5-15	**3,957**	**1.1**

The statistics reported in the previous tables indicate that myopia (nearsightedness) affects the majority of learners between the ages of 13 and 14, and that hyperopia (farsightedness) is mainly prevalent among six year olds.

As learners with visual impairments need to be accommodated in inclusive teaching and learning situations (Department of Education, 2001:18-19), it is important to highlight the nature of an inclusive education and training system to determine the implications that an inclusive education and training system hold for the instructional practices of teachers.

2.2.3 An inclusive education and training system

Inclusive education means education that is non-discriminatory in terms of disability, culture, gender or other aspects of learners or staff that are assigned significance by a society (Department of Education, 2001:16, 17). It involves all learners in a community, with no exceptions and irrespective of their intellectual, physical, sensory or other differences (age, ability, socio-economic background, talent, gender, language and cultural origin) and provides equal access to the mainstream curriculum and classroom for all learners. Inclusion emphasizes diversity over assimilation, and is based on the notion of human rights, equity, equality, social justice, respect, tolerance and care (Dunbar-Krige & Van der Merwe, 2010:163, 170; Landsberg, Kruger & Nel, 2005:4; Department of Education, 2001:16-19; Ballard, 1997:244-245). Inclusion also deals with transformation, redressing past imbalances and the progressive development of the quality of education and training (Dunbar-Krige & Van der Merwe, 2010:163).

The traditional medical approach and the social rights approaches have had the greatest impact on schools and education in South Africa (Dunbar-Krige & Van der Merwe, 2010:165). The traditional medical approach isolated learners and focused on their weaknesses instead of their abilities (Engelbrecht, Oswald, Swart & Eloff, 2001:293-308). During the apartheid era, mainly White learners benefited from the provision of educational needs, and Black learners were deprived of special education services (Engelbrecht *et al.,* 2001:293). This implied that schools that accommodated White disabled learners were well resourced, while the few schools for black disabled learners were systematically under-resourced. Furthermore, the provision of special education was fragmented, and the segregation of learners on the basis of race was extended to incorporate segregation on the basis of disability (Green, 2001:12; Engelbrecht, Green, Naicker & Englebrecht, 1998:3-11). Learners who did not have special needs were separated from learners with special needs, which prevented them from

interacting with a wide spectrum of learners from different abilities and needs (Green, 2001:5-12).

In addition to the traditional medical approach, the social rights or inclusive approach towards learners imply a shift of emphasis on the deficits and special needs of the learners to the untapped potential and value of each learner (Dunbar-Krige & Van der Merwe, 2010:166). Dunbar-Krige and Van der Merwe (2010:166) argue that the disability or special need is only a portion of the learner and does not limit education, but rather creates challenging opportunities for both learner and teachers.

Davis (2003:12) and Swart, Engelbrecht, Eloff, Pettipher and Oswald (2005:80) indicate that inclusive education is a means of establishing a caring, humane and egalitarian society. According to Education White Paper 6 (Department of Education, 2001:16), the characteristics of inclusive education and training are:

- Acknowledging that all children and youth can learn and that all children and youth need support.
- Accepting and respecting the fact that all learners are different in some way and have different learning needs which are equally valued and an ordinary part of our human experience.
- Enabling education structures, systems and learning methodologies to meet the needs of all learners.
- Acknowledging and respecting differences in learners, whether due to age, gender, ethnicity, language, class and disability or HIV status.
- Broader than formal schooling and acknowledge that learning also occurs in the home and community, and within formal and informal modes and structures.

- About maximizing the participation of all learners in the culture and the curricula of educational institutions and uncovering and minimizing barriers to learning.

- About empowering learners by developing their individual strengths and enabling them to participate critically in the process of learning.

Meeting the above mentioned, requires support, which should focus on:

- involving the home and community environment in teaching and learning;

- strategies for screening, identifying, assessing and supporting learners;

- addressing barriers to learning by building the capacity for individual support of learners and teachers; and

- adjusting the teaching and assessment techniques in the learning environment (Department of Education, 2009).

It is clear that some learners may require more intensive and specialized forms of support to be able to develop to their full potential. Inclusive education and training acknowledge that there are barriers that can obstruct effective learning in the classroom. The next section will provide an overview of these barriers.

2.2.4 Barriers to learning at school

Teachers need to address barriers that learners may experience. Education will only succeed if teachers are fully aware of the social, emotional, physical and other barriers experienced by their learners (Williams & Cersch, 2003:157-162).

Anything that may stand in the way or prevent the learner to participate fully and learn effectively can thus be seen as a barrier to learning. It is important to remember that barriers do not necessarily exist all the time, but can

sometimes arise suddenly, due to change in circumstances, emotional trauma and a variety of other factors (Hugo, 2006:47).

According to Hugo (2006:60) and the Department of Education (2004:39), barriers to learning can broadly be divided into five groups namely:

- Socio-economic barriers
- Pedagogical barriers
- Medical barriers
- Cognitive barriers
- Systemic barriers

In the context of this study, the focus was on medical barriers, with specific reference to learners who are visually impaired.

In order to determine the place of visual impairment among the different groupings of barriers, the researcher will briefly clarify each of the barriers. All five groups mentioned above are equally important and deserve equal attention from the teachers. It is also important to keep in mind that a learner rarely has only one specific barrier to learning and can sometimes experience a combination of two or more, which need to be identified and addressed (Hugo, 2006:45,46). The researcher therefore briefly discusses each of the barriers.

2.2.4.1 Socio-economic barriers

According to Hugo (2006:46-47), socio-economic barriers can differ from community to community. Although poverty is one of the issues discussed in more detail in this chapter, the neglect of learner in wealthier households can also cause barriers to learning and development. These issues discussed below, are instrumental to a larger variety of societal barriers experienced by many learners (Corey, Corey, Callahan & Russell, 2004:34).

Learners, their learning processes and the education system are severely affected by sustained poverty (Dunbar-Krige & Van der Merwe, 2010:179; Corey *et al.,* 2004:34). Their unemployed parents cannot meet their most basic needs such as nutrition and shelter. Under-nourished learners cannot concentrate. Their emotional stress increases and they lose their ability to take part in the learning process effectively.

Corey *et al.* (2004:34) argue that a lack of basic amenities such as water, electricity and toilets contributes to the creation of an unhealthy environment, which is not conducive to learning and place learners at risk.

Lack of access to basic services

Donald, Lazarus and Lolwana (2010:157) also indicate that some learners experience problems to access basic medical treatment in clinics near their homes. Learners with chronic illnesses may be hospitalized in institutions where no attention can be given to academic matters, with the results that they miss long periods of school, and often drop out of school (Donald et al., 2010:157).

Nature disasters and epidemics

At the same time, nature disasters, like floods, fire or epidemics also impact negatively on learners (Peterson & Hittie, 2003:67). The HIV-Aids epidemic has left many households without adult caregivers, leaving learners to deal with the chronic illnesses resulting from disease and caring for other siblings. Without community support, these learners will become part of the *"drop-out statistic"*, not fulfilling their potential and perpetuate the poverty (Peterson & Hittie, 2003:67).

Abuse, crime and teenage pregnancy

When a learner is physically, emotionally or sexually abused, the emotional and physical damage could cause frequent absences from school and eventually *"drop-out"* (Peterson & Hittie, 2003:73). Substance abuse by

learners, parents or other members of the immediate family, might lead to family breakdown and increased levels of stress. Some learners dealing with problems or abuse in their families may leave their homes and become street children. Similarly, pregnant teenagers may decide to leave school to try to earn an income in order to support their babies. Their associated stigmatization and lack of supportive structures in the community make it impossible for these girls to continue with their schooling (Peterson & Hittie, 2003:101).

In the wider community, risk factors such as high levels of violence and crime disrupt learning. The lack of safety in a learning environment then becomes a barrier to learning and development (Peterson & Hittie, 2003:101).

Attitudes

Manson, McCalls, Arter, McLinden and Stone (2000:31) is of the opinion that harmful and negative attitudes towards learners with differences at school lead to labelling, like "*drop outs",* "*slow learners*" and many others that can have a negative influence on self-esteem. Learners with low self-esteem seldom fully participate in the education activities.

Learners who experience barriers to learning are often met with much resistance when enrolling at a school (Mason *et al.*, 2000:37) due to negative assumptions and a lack of knowledge on how to deal with the barriers to learning experienced by learners.

In the same way, learners with exceptional abilities are often misunderstood and regarded as a threat (Rivera & Smith, 2000:72). This leads to denial of their considerable abilities because of negative attitudes and low expectations. Gifted learners from poverty-stricken communities are often not recognized and given opportunities to reach their full potential (Rivera & Smith, 2000:72).

2.2.4.2 Pedagogical barriers

Jones and Bender (2002:83) highlight the following as pedagogical barriers to learning:

- Insufficient support from teachers.
- Inappropriate and unfair assessment procedures.
- Inflexible curricula.
- Learners who study through the medium of a language other than their home language.

The following key components, according to Jones and Bender (2002:83), can be instrumental in the exclusion of certain learners from teaching and learning in the classroom.

- Learning styles: teachers must ensure that all learning styles (visual, auditory, kinaesthetic) are accommodated in the classroom.
- Tempo of teaching: learners should be allowed to work at their own pace. In this way, no one will feel left out and quick workers will not feel frustrated.
- What is taught: decisions made by school management teams and governing bodies regarding subject choices should reflect a balance of vocational subjects with life skills in order to develop intellectual and emotional capacities fully. Learners should not be excluded from certain subjects based on gender, religion or physical disabilities.
- Management and organization of the classroom: teachers should come to class well prepared with a clear vision of what should be achieved on each specific day. A neat classroom with well-planned and defined areas will lay the groundwork for a successful day, where both learners and learners know the routine and expectations.

In the context of this study, the researcher wishes to emphasise it that learners with visual impairment experience a medical barrier to teaching and learning, and if teachers do not adapt their teaching and learning practices to accommodate these learners, these learners will ultimately experience pedagogical barriers in addition to the medical barrier.

2.2.4.3 Medical barriers

According to Hugo (2006:48), medical barriers can refer to sensory barriers such as hearing loss and visual impairment, neurological disabilities such as cerebral palsy, learning barriers that are exhibited in academic learning difficulties, communication disorders, attention problems and memory problems. Furthermore, medical barriers refer to perceptual and motor disorders, as well as health impairment and chronically sick learners. Finally, cognitive and intellectual disabilities also form part of the group of medical barriers that can impact negatively on teaching and learning (Department of Education, 2004:39). For the purpose of the study, the focus was on visual impairment as a sensory barrier.

Visual impairment

A wide range of visual problems ranging from temporary to permanent can cause visual impairment in learners, which will adversely affect their performance at school. Visual impairment is discussed in detail in Section 2.3. According to Peterson and Hittie (2003:247), problems with visual impairment include the following:

- Visual acuity, which is a measure of clarity of vision.
- Visual field, which implies how well individuals can see, using peripheral or side vision.

Peterson and Hittie (2003:139-153) distinguish between the following three categories of visual impairment:

- **Low vision**: A learner with low vision can see objects when they are within a few centimetres away, but has severe limitations with distance vision, even when wearing spectacles.

- **Visually limited/partially sighted:** A learner with limited vision has poor visual acuity. Therefore, adaptations to educational programmes are required to accommodate these learners during teaching and learning.

- **Blindness:** this term is used for individuals who have no vision at all, only light, or shape perception.

2.2.4.4 Cognitive barriers

Impaired cognitive development can result in some learners experiencing learning problems (Hugo, 2006:60) and manifest as thinking, learning and adaptive behaviour (Engelbrecht & Green, 2007:198). Learners who experience learning problems due to impaired cognitive development experience problems with verbal abilities such as reading, spelling, basic literacy and mathematics (Hugo, 2006:60). These learners are also slower than their peers to acquire social skills and in using memory effectively, associating and classifying information, reasoning and making judgments (Engelbrecht & Green, 2007:198). In addition to the mentioned problems, behavioural problems such as hyperactivity or attention deficiency also contribute to learning problems, and learners who achieve below their levels of ability are regarded as learners with learning problems (Hugo, 2006:64). As highlighted by the literature, learners with visual impairment experience problems with the acquisition of cognitive skills *(cf.* 2.4.2), which implies that in addition to a medical barrier they may also experience cognitive barriers which need to be accommodated during teaching and learning.

2.2.4.5 Systemic barriers

Systemic barriers refer to problems in the education system that can contribute to conditions that may cause barriers to learners. According to the

Department of Education (2004:39), the following can be classified as systemic barriers:

- Lack of basic and appropriate learning support material.
- Lack of assistive devices.
- Inadequate facilities at school.
- Overcrowded classrooms.
- Lack of mother tongue teachers.

The availability of educational resource plays a role in effective learning in any society. An inadequate number of schools and available classrooms restrict the effort to supply in the need for education. These inadequate resources are sometimes indicative of urban/rural disparities or discrimination on the grounds of gender, race and disability, which exist within a community (Department of Education, 2004:40).

The researcher concludes that systemic barriers can also be caused for learners with visual impairment, if the teaching and learning environment lacks appropriate learning support material and assistive devices.

In the context of this study the focus was on elucidating visual impairment as a sensory disability, and establishing how the teaching and learning environment accommodates visually impaired learners to avoid pedagogical, cognitive and systemic barriers occurring in addition to the medical barrier.

The next section focuses on an in-depth explanation of visual impairment.

2.3 THE VISUALLY IMPAIRED LEARNER: A CONCEPT CLARIFICATION

In order to understand the nature of visual impairment, it is necessary to explore the structure and function of the eye.

2.3.1 Structure and function of the eye

In the following section the researcher devotes a discussion to the parts of the eye and how they work together to enable the visual process to occur, based on information obtained from Bishop (2004:22-29 and the Government of Newfoundland and Labrador (2001:1.2-1.2):

The eyeball has three layers, namely an outer layer, a middle layer and an inner layer. The **outer layer** consists of the tough, fibrous white part of the eye called the sclera and the transparent cornea. The **middle layer** of the eyeball is called the uveal tract and consists of the choroid, the iris, and the ciliary body. The choroid supplies nutrients to the retina. The ciliary body helps control the thickness of the lens by contracting and relaxing the fibres that regulate its tension. The iris, which is the coloured part of the eye, lies behind the cornea and controls the amount of light going through the centre of the eye (pupil). The transparent lens is responsible for the fine-tuning of light rays so that they form clear images where they strike the retina, which forms the **inner layer** of the eyeball.

In a normal and healthy eye, light rays enter the eye and move to the cornea where they are bent (process of refraction). Then the light rays travel to the iris, which ensures that the right amount of light passes through to the interior of the eye. The rays are then refracted again and pass through to the retina where they come together and are focused. The retina then changes the information into electrical impulses, which travel to the brain for interpretation, and the brain makes the connection with what we see. If, during this process, one or more parts of the eye are not working properly, the visual process may be affected (Bishop, 2004:22-29).

2.3.2 Definition of visual impairment

According to Corn (1989:26-28), the following terms are frequently used by professionals who work with learners who have visual impairments.

- **Visual acuity**: this term indicates how well a person sees from specified distances.

- **Visual impairment**: visual impairment refers to conditions of the eye or visual system that result in less than normal vision, which could include reduced visual acuity, obstructed or narrowed field vision, or failure of visual stimuli to be sent to the brain.

- **Visual perception**: implies the ability to gain meaning from visual stimuli.

- **Visual functioning**: this links to the extent to which vision is used.

The term visual impairment refers to children who are classified as blind or who have low vision (Farrell, 2006:13; Hugo, 2006:49; Davis, 2003:2). The WHO (2002) bases their definition of visual impairment on visual acuity (clarity of vision) scores that are widely accepted. These scores are based on the sight perception of people with perfect vision and are written as a fraction. For example, a person with a score of 6/18 implies that he can see at 6 metres from an object what a person with perfect sight would see at 18 metres. Alternatively, a score of 3/60 means that an object at a distance of 3 metres appears in its detail as it would to a person with perfect sight if it were 60 meters away. According to this conception:

- a person scoring between 6/6 and 6/18 is classified as having normal vision;

- a person scoring between 6/18 and 3/60 is classified as having low vision; and

- a person scoring less than 3/60 is classified as being blind (WHO, 2008; Davis, 2003:2).

According to Davis (2003:2), it is important to mention that the vast majority of people who are classified as blind have some sight, i.e. usually the term blind does not mean a person is unable to see anything at all. Sometimes a person with no sight facility is referred to as being totally blind. While this definition is

useful in making a distinction between those with more severe and those with more moderate loss of sight, there are dangers associated with any forms of classification of people, as the very act of placing someone in a group serves to mask diversity.

There are many different eye conditions and sight can be affected in many different ways (Davis, 2003:4). For example, people who are classified as blind might have peripheral vision; some might have tunnel vision, while others might find that their ability to see depends on the level of light available. For some people, too much light might lead to blindness, for others too little light may result in reduced vision (Davis, 2003:4).

For educational purposes, individuals who are blind must learn to read Braille or use aural methods (audiotapes and records). Teachers often refer to those individuals with visual impairment or low vision as those who can read print, even if they need magnifying devices or large-print books (Davis, 2003:4).

2.3.3 Causes of visual impairment

Causes of visual impairment may involve factors that are genetic; that arise during foetal development or during the birth process; or that occur in childhood (Farrell, 2006:15). According to Farrell (2006:15), factors affecting the development of the foetus or affecting the baby during the process of birth can cause visual impairment. For example, maternal rubella can lead to a baby having visual impairment such as cataracts where the lens of the eye is cloudy or opalescent, resulting in a loss of vision for detail. A baby can also be born prematurely which can lead to microphthalmia (underdeveloped eyes and high quantities of oxygen are needed to keep the baby alive (Farrell, 2006:15).

Neurological disorders can lead to visual pathway damage and cortical visual impairment. This is a visual loss, which may be temporary or permanent, caused by a disturbance of the posterior visual pathways and/or the occipital lobes. The damage to the brain that causes this may occur before, during or after birth, or may be the result of disease or injury. While the eyes may seem

normal, visual messages to the brain are not correctly interpreted or acted upon. In childhood, causes of visual impairment include viral infections, brain tumours and injury (Farrell, 2006:15). According to the WHO (2008), except for the most developed countries, cataracts remain the leading cause of blindness in all regions of the world, with glaucoma as the second leading cause of blindness globally**.** The WHO (2008) estimates that, globally, up to 75% of all blindness is avoidable. However, the proportion of the specific causes of blindness varies considerably from region to region, depending on local circumstances. Only about half the cases of childhood blindness are avoidable.

According to Barraga and Erin (2001:22-27), visual impairments can also be caused by the following:

- **Albinism**: albinism is a hereditary condition in which there is a lack of pigment throughout the body, including the eyes. It is usually accompanied by a nystagmus (jerky eye movement) condition. People with albinism are very sensitive to light and sometimes wear tinted glasses.

- **Retrolental fibroplasias** (RLF): visual impairment is caused by oxygen given to incubated premature babies.

- **Glaucoma:** glaucoma is a condition in which pressure of the fluid inside the eye is too high. Depending upon the type of glaucoma, visual loss may be gradual, sudden, or present at birth. When visual loss is gradual, it begins with decreasing peripheral vision.

- **Faulty muscle control**: this can cause squinting; fast, jerking movements of the eye, which cannot be controlled; or laziness in one eye which causes double vision.

- **Trachoma**: this is an infectious disease which is carried by flies. If it is not treated, it can lead to blindness.

- **Conjunctivitis (or pink eyes):** this is infectious but usually clears up within three days, but can damage the cornea if left untreated.

It is possible to diagnose, measure and correct refractive errors with spectacles. However if they are left uncorrected, they are the cause of low vision and even blindness.

2.3.4 Categories of visual impairment

The term visual impairment encompasses a broad spectrum of eye conditions and visual acuity levels or clarity of vision (Gray, 2005:180). Typically, terms such as *"partially sighted", "low vision", "legally blind"* and *"totally blind"* are used in education contexts (Gray, 2005:180).

Categories of visual impairment reflect visual acuity, the ability to use vision and how much the other senses are used for learning (Bishop, 2004:23, 24; Cox & Dykes, 2001:68).

- Low vision: These learners are able to learn using their visual sense. However, they may require magnified print, special seating arrangements and the use of enhanced font size. These learners tend to work more slowly and have trouble when working with detail (Bishop, 2004:24; Cox & Dykes, 2001:68). Other characteristics are highlighted in 2.3.5.

- Functional blindness: These learners read and write using Braille. Some of them have sufficient vision to move around a classroom safely, but may also require accommodation to do so (Bishop, 2004:23; Cox & Dykes, 2001:68).

- Blindness: For these learners, visual acuity is reduced to such an extent that learning takes place from other senses most of the time (Bishop, 2004:24; Cox & Dykes, 2001:68).

A quick screening test in the context of a normal classroom would have the learner covering one eye at a time and counting fingers from 6 metres. The responses should be correct and consistent using separate eyes and both

eyes together without blinking, rubbing the eyes or leaning forward (Bishop, 2004:25).

In the context of this study, the researcher specifically focused on the support provided to learners in inclusive classrooms with low vision.

2.3.5 Characteristics of visually impaired learners

In the context of this study, the focus was on learners, who in particular, were partially sighted or had low vision and were able to use their visual sense in learning to some extent. Where the condition is moderate or mild and where the learners are able to function with appropriate aids (such as prescription glasses, magnifiers and large print), they may be accommodated in an inclusive educational environment (Gray, 2005:180).

According to Gray (2005:180), visual impairment impacts on the development of the learner, because visually impaired learners cannot rely on their vision to provide information. The information they obtain through their senses is often fragmented and inconsistent. Consequently, the physical development lags behind that of their sighted peers. They also have problems in making friends and interpreting facial cues and body language (Gray, 2005:180), thus implying that their social development will be problematic (*cf.* 2.4.6).

Since partial vision is often first identified when the learners enter formal schooling, the teachers need to be able to recognize a learner with visual impairment. Lewis and Doorlag (2006:337), Ormrod (2008:179-180), Donald, Lazarus and Lolwana (2005:237-241) and Eggen and Kauchak (2004:174) identify the following characteristics that teachers should take note of:

2.3.5.1 Desk work of learners

When learners are busy with desk work, the following could provide an indication to the teacher that the learner might be experiencing vision problems:

- The head is held very close to the paper when writing or drawing.

- The pencil is held very tightly when writing or drawing lines.
- Lines may also be drawn very boldly and emphatically.
- Writing may be uphill or downhill on the paper.
- Reverse letters or words in writing and copying.
- Difficulty copying from the blackboard or books.
- Drawings are poorly oriented on the page.
- When looking at the board, the learner frowns or squints.
- The learner complains of difficulty in copying from the board.
- Difficulty working from the board to the desk.
- The head is tilted to one side rather than held upright.
- Consistent postural difficulties shown at the desk.
- Excessive use of a hand or finger to keep the place while writing and reading.
- Writes crookedly, poor spacing, does not stay on the lines.
- Leaves out letters, numbers or words in writing.

2.3.5.2 Physical activities

According to Lewis and Doorlag (2006:337), Ormrod (2008:179-180), Donald *et al.* (2005:237-241) and Eggen and Kauchak (2004:174), when a learner takes part in physical activities, teachers need to be on the look-out for the following signs that could be an indication of visual impairments:

- Looks carefully at where he is walking.
- Places footsteps very deliberately.

- Often falls accidentally while running.
- Has difficulty catching, hitting or kicking a ball.
- Avoids physical activities and sport.
- Experiences difficulties with eye-hand coordination.
- Has difficulty with handwriting and cutting.

2.3.5.3 Reading

When reading, a visually impaired learner, according to Lewis and Doorlag (2006:337), may exhibit the following characteristics:

- Holds the book very close or too far away from the eyes when reading.
- Says that the words are blurring, or skips words.
- Complains that the words swim or float.
- Asks to sit closer to the chalkboard.
- Often loses the place while reading.
- Loses place on the line or page.
- Whispers the words silently while reading for auditory reinforcement.
- Tilts the head to one side when reading.

The physical appearance of the visually impaired learner might indicate that the learner may suffer from one or more of the following: blinking the eyes more than usual, watery and inflamed eyes, squinting eyes, rubbing of eyes, covering one eye, swollen or infected eyelids or jerky and darting eye movements. It could also be that the learner complains of headaches, eye pain or seeing double (Lewis & Doorlag, 2006:337; Ormrod, 2008:179-180; Donald *et al.,* 2005:237-241; Eggen & Kauchak, 2004:174)

2.3.5.4 General characteristics

According to Ormrod (1995:179), learners with visual impairments frequently have many or all of the under-mentioned characteristics:

- Normal functioning of the other senses.
- General learning ability is similar to that of non-disabled learners.
- They have fewer opportunities to experience and interact with the outside world.
- Reduced capability to imitate the behaviours of others.
- Occasional confusion, particularly in chaotic situations such as the playground.

2.3.5.5 Social functioning

The social functioning of learners with visual impairment, according to Lewis & Doorlag (2006:337), Ormrod (2008:179-180), Donald *et al.* (2005:237-241) and Eggen and Kauchak (2004:174), exhibit the following characteristics:

- Difficulty when trying to follow speakers' facial expressions and gestures.
- Difficulty when trying to start and follow conversations.
- Difficulty when trying to organize classroom materials.
- Difficulty finding books and stationery in the schoolbag.

In line with the views of McGaha and Farran (2001:80) the researcher argues that to be effective in social interaction, visually impaired learners need to acquire certain skills, including the ability to read and interpret the social signals of others and to act appropriately in response to those signals.

2.3.5.6 Gifted learners and visual impairment

Having knowledge of the characteristics that gifted learners with visual impairments exhibit can build awareness and increase sensitivity to the presence of intellectual giftedness among these learners (Besnoy, Manning & Karnes, 2006:134). A basic trait among these learners is the ability to learn and remember facts quickly, but the absence of visual experience may cause them to be slower in understanding abstract concepts (Besnoy *et al.,* 2006:134). Furthermore, they often produce work that is above grade level in comparison to their sighted peers (Salek in Besnoy *et al.,* 2006:134), and they may possess superior concentration skills (Besnoy *et al.,* 2006:134). According to Besnoy *et al*. (2006:134), these learners may be curious and perceptive, often seek independence of expression, and develop individual learning strategies to help them achieve outcomes.

According to Bishop (2004:174-175), there are two important issues to bear in mind when dealing with visually impaired learners who are gifted, namely *"growing the potential"* of preschool learners and "*realizing the potential"* of school-age children. This implies paying attention to characteristics of the child that may be early indicators of giftedness and providing stimulating opportunities and experiences that will allow those characteristics to develop whatever potential there is for giftedness. These children could be called *"at promise"* as opposed to the negative *"at risk"* (Kay, 2000:293).

Bishop (2004:174-175) offers the following guidelines to provide direction for intervention planning when working with visually impaired learners who are gifted:

- The senses need to be stimulated as early as possible by using high contrast colours and a variety of textures and shapes.
- Teachers should provide interactive experiences and toys so that the learner can participate and initiate activity.

- Encourage safe and sustained independent exploration. Teachers should provide opportunities and then get out of the learners' way, as gifted learners with visual impairments have their own speed and style of learning.

- Allow for and accept individual likes and dislikes. Most gifted learners with visual impairments do not do things like everyone else, which assists towards developing a healthy sense of self-esteem.

- The gifted learner who is visually impaired must build a repertoire of tactual and auditory cognitive memories to draw upon when structured learning begins.

2.4 THE EFFECTS OF VISUAL IMPAIRMENT ON LEARNER DEVELOPMENT

Apart from the aforementioned general teaching and learning needs (*cf.* 2.3), learners with visual impairment may also experience a number of developmental teaching and learning needs.

When vision is reduced or absent, nearly all aspects of early learning and development can be affected: motor, cognitive, language, self-help, self-esteem and social (Bishop, 2004:62). It is therefore essential that teachers pay attention to the needs created by ineffective motor, cognitive, language, self-help, self-esteem and social development.

2.4.1 Motor development

According to Bishop (2004:66), the eyes are used to explore the world. The visually impaired child has the *physical* ability to activate and strengthen muscles, but he/she often lacks the motivation to move, causing the first delay in head control, which is a critical postural achievement. The second common area of delay in motor development seems to be the ability to reach (Bishop, 2004:66). Having no vision or limited vision limits the opportunities for exploring the world. Bishop (2004:66) argues that without vision, the progress

from total body contact with the environment (lying on the floor) to sitting (*less* body contact with the environment) to standing (only the soles of the feet in contact with the floor) is hampered.

According to Bishop (2004:74-75), a visual impairment may thus prohibit or discourage the voluntary movement that begins cognitive data collection. Unless caregivers stimulate and encourage body movement in the young child with a visual impairment, sensory stimulation is hampered. Early exploration of space is essential to the internalization of what is out there and where it is. Bishop (2004:74) furthermore argues that movement is critical, not only for the maturation of the motor system, but also for the opportunity to interact with the environment. Cognitive growth depends on sensory input during the exploration of objects, people and space. Concept development and the child's construction of reality also depend on interaction with the environment. In addition to this, meaningful language acquisition relies on first-hand contact with a variety of things and actions. The more experience a visually impaired child has with his/her environment, the more data will be stored in the brain for future reference and recall (Bishop, 2004:75).

2.4.2 Cognitive development

It is well known that vision plays a large role in cognitive development (Bishop, 2004:68). Bishop (2004:68) is of the opinion that the cognitive capacity of blind and visually impaired learners may develop in a different ways, along different routes, but it does develop. Bishop (2004:68; 74-75) highlights the following characteristics as evident in the cognitive development of learners with visual impairment:

- People permanence may develop before object permanence, because people are more present during the first months in a child's life.
- Cause-and-effect relationships are harder to understand when the cause or its effect cannot be seen.

- The properties of matter are observed by sighted children, but must be taught specifically to visually impaired children. It is impossible to compare and categorize until basic concepts and their properties are learned.

- Visual memory is the basis of play, self-help skills and social skills (gestures, manners, acceptable behaviours). Specifically blind children must be taught each action or behaviour physically, since they will not have visual memory.

- All the perceptual abilities learned spontaneously by sighted children must be systematically taught to visually impaired children, such as distinguishing between similarities and differences, identifying missing parts of a whole, spatial orientation/position in space (both for the self and other objects), and figure-ground perception (selecting main properties or ideas from a distracting background, whether auditory or tactual).

- Visual impairments are known to interfere with age appropriate acquisition of cognitive skills for classification, conservation and spatial imagery, the acquisition of reasoning skills and problem-solving skills. Many visually impaired learners have difficulty getting past the concrete stage of learning into the abstract stage.

2.4.3 Language development

According to Bishop (2004:69), at the preverbal stage of language *("babbling"),* visually impaired children are at no disadvantage, since most of this language is auditory exploration or auditory imitation. However, when labelling begins, delays occur because the child has difficulty in visualising relationships that lead to the labelling of objects. Many visually impaired learners learn to use words without having a clear understanding of their meanings. Other areas of language difficulty are in adjectives and adverbs, which are often visual concepts. Furthermore, the applied use of language

such as asking questions, initiating, continuing or ending conversations and creative writing appear to be problematic (Bishop, 2004:69).

2.4.4 Self-help skills

According to Bishop (2004:70), imitation is used by preschool sighted children learn to learn how to feed, dress and care for themselves. However, children who have vision problems do not have spontaneous models to watch and imitate, and must be specifically taught the motor skills necessary for self-feeding, dressing, grooming and toileting (Bishop, 2004:70). Lack of opportunities for incidental learning may make it necessary for learners with visual impairments to receive specific instruction in daily living skills (Barraga & Erin, 2001:174).

2.4.5 Self-esteem/self-concept

In contrast to the sighted child who looks in a mirror and sees the image of him/her looking back, the child with a visual impairment experiences difficulty to see a reflection and know what he/she looks like (Bishop, 2004:70). It is therefore clear that their self-concept will largely be based on how they are treated by others and the extent to which they can exercise control over the self or the environment. Children with visual impairment are often dependent on others and passive because they are often deprived of opportunities to make choices, take decisions, act independently and execute behaviours that are socially acceptable (Bishop, 2004:70). Teachers need to acknowledge that learners with visual impairments also need to develop positive self-images and feel accepted, worthwhile and valued (Mitchell, 2008:53). Learners with visual impairments often lack self-confidence, and often have emotional baggage resulting from previous disappointments and problems arising from their impairment. This can have a long-term effect on their self-confidence (Hugo, 2006:50). Learners with visual impairments are unable to see the body language and interactions of other learners and often feel reluctant to participate during teaching and learning because they cannot

judge when it is a good time to join the conversation, interrupt someone or to indicate that it is their turn (Noble & Mullins in Hugo, 2006:50).

2.4.6 Social skills

Research has indicated that learners with visual impairments are behind their sighted peers in social skills development (Erin, Dignan & Brown, 1991:58-61). Without the benefit of certain visual cues, some learners may not have learned behaviour appropriate in social situations. Learners with visual impairments may need to be taught how to extend their hand to shake hands or how to use their hands to gesture appropriately when talking. Barraga and Erin (2001:181) argue that conversational skills, such as making or simulating eye contact or spatial orientation skills such as orienting oneself to others are important for successfully integrating learners with visual impairments into general education settings. Bishop (2004:71) explains that social skills are often learned through visual observations, and learners with visual impairments often have limited opportunities to observe how others behave and interact with each other, and what behaviours are socially acceptable. Since success in inclusive classrooms depends a great deal on social acceptance, this area of learning is important in the early years (Bishop, 2004:74). Therefore, the development of social skills during teaching and learning is very important for learners who experience visual impairments.

Previous research has demonstrated that learners with visual impairments face many challenges in social situations (Gray, 2005:180). A primary arena for social interaction is play, but this behaviour may be different in learners with visual impairments. Learners with visual impairments typically engage in repetitive and stereotyped play (Freeman, 1989:7) and they frequently do not explore their environments or objects and direct their play towards their own bodies (Webster & Roe, 1998:291).

Manipulative play and the functional use of toys are observed less in children with visual impairments (Parsons, 1988:50-53), and visually impaired children have been found to engage less in symbolic and role-play to a limited extent,

and do so less successfully than sighted children. This directly affects their development of social competence. Moreover, children with visual impairments tend to direct their play more towards adults than towards their peers (Crocker & Orr, 1996:148). Taken together, all of the above-mentioned characteristics could be expected to interfere with the ability to interact socially in the classroom.

Research that focused on the social interactions of children with visual impairments in classrooms has suggested that these children do indeed have difficulty interacting with their peers (Ormrod, 1995:179; Preisler, 1993:79; Putullaz & Gottman (1981:1-10). The limited visual feedback that these children receive from their environments affects their attainment of social skills, such as learning to read non-verbal communication cues, initiating and maintaining interactions, and using eye gaze to regulate interactions (Ormrod, 1995:179). Without these skills, children with visual impairment often missed out on opportunities for interaction and became isolated.

Indoor and outdoor settings are critical in the case of children with visual impairments (Preisler, 1993:112). Preisler (1993:112) noted that children with visual impairments appear to be more uncomfortable outdoors than indoors. He also found that the children avoided wide, open areas such as playgrounds, especially those that did not have landmarks as a reference point.

Another important factor in the world of the learner with visual impairment is the number of children in a given area (Kekelis & Sacks, 1993:202). The more children there are, the more opportunities there are for social interaction; even when they find it difficult to make contact. Kekelis and Sacks (1993:202) reported that sighted children are initially interested in children with visual impairments, but over time gave up on interacting with them when their efforts to establish contact were not returned.

An impediment to the interaction of visually impaired learners with their peers is their preference for interaction with adults (Crocker & Orr, 1996:148).

Children with visual impairments may choose to interact with adults because these interactions may be more meaningful and stimulating than are interactions with peers, and adults are able to compensate for children with visual impairments who have not developed appropriate social skills (Crocker & Orr, 1996:148). Crocker and Orr (1996:148) report that children with visual impairments are more likely than sighted children to be near their teachers, whereas the sighted children were more likely to be near their peers. Crocker and Orr (1996:158) found that sighted children initiated interactions with peers at a rate that was three times the rate of initiations of interactions by children with visual impairments.

According to McGaha and Farran (2001:90), both visually impaired and sighted learners spend more time with sighted learners and the sighted learners initiate interactions at a higher rate than learners do with visual impairment. Simply placing both groups of learners together will not lead to interaction; therefore, visually impaired learners need support in developing skills for greater success in interaction (McGaha & Farran, 2001:92).

It is clear from the preceding discussion that visual impairment creates a number of teaching and learning needs related to motor, language, social, self-esteem and cognitive development. Strategies for and approaches to classroom teaching and learning are therefore necessary to minimize the effect of visual impairment on the learning potential of the visually impaired learners.

2.5 CHAPTER SUMMARY

In this chapter the researcher provided a detailed explanation of the concept visual impairment and the place of the visually impaired learner in an inclusive South African school context (*cf.* 2.2). The causes of visual impairment are manifold and can involve factors that are genetic that arise during foetal development or during the birth process; or that occur in childhood, for example viral infections, brain tumours and injury (c*f.* 2.3.3).

In the South African context, visual impairments mostly manifest as myopia (near-sightedness), hyperopia (far-sightedness) and astigmatism (distorted vision) among male and female learners of all age groups (*cf.* 2.2.2). Seen within the context of the implementation of inclusive education in South Africa, which is guided by White Paper 6, learners who experience visual impairment are regarded as learners who can learn, but need support to do so. Although their learning needs differ from those of their peers who do not experience visual impairment, they are equally valued, accepted and respected within a mainstream classroom (*cf.* 2.2.3).

Learners with visual impairments experience a medical barrier that can affect their academic learning and success at school (*cf.* 2.2.4.3). These are learners who experience conditions of the eye or visual system that result in less than normal vision, which could include reduced visual acuity, obstructed or narrowed field vision, or failure of visual stimuli to be sent to the brain (*cf.* 2.3.1; 2.3.2). A visual impairment can affect the motor, cognitive, language and social development of the learner, as well as the development of self-help skills and self-concept (*cf.* 2.4).

In the context of teaching and learning, teachers need to adapt their teaching and assessment strategies and provide special devices in order to accommodate the general teaching and learning needs of the visually impaired learner, as neglecting to do so, could lead to these learners, in addition to their medical barrier, also experiencing pedagogical and systemic barriers (*cf.* 2.2.4.2; 2.2.4.5). In addition to the general teaching and learning needs, learners with visual impairments also experience needs related to motor, language, cognitive, social and self-concept/self-esteem development (*cf.* 2.4).

In order to achieve their full potential at school and in adult life, visually impaired learners need to see and value themselves as potential learners and potential achievers in life. The negative impact that visual impairment can have on teaching and learning is manifested in various ways. Literature highlights difficulties related to writing, working from the chalkboard, hand-eye

coordination, reading and social functioning. In order for learners who are visually impaired to benefit optimally from teaching and learning, teachers need to be able to identify learners who experience visual impairments in order to create supportive learning environments across a wide spectrum of activities that take place in the classroom (*cf.* 2.3.5).

Learners with visual impairments should be helped to move beyond their own often-negative views of themselves. Schools have the opportunity to create the conditions for all learners to succeed. This can be achieved *inter alia* by organizing teaching and learning in such a way that all learners can attain the outcomes through identifying and understanding barriers to learning and assessment, creating safe and supportive environments, adapting teaching and assessment practices and ensuring a flexible curriculum (*cf*. 2.2.3; 2.3.5).

The next chapter, Chapter Three, highlights aspects that need to be considered for accommodating the teaching and learning needs of the visually impaired learner in an inclusive classroom.

CHAPTER THREE

ACCOMMODATING THE TEACHING AND LEARNING NEEDS OF THE VISUALLY IMPAIRED LEARNER IN AN INCLUSIVE CLASSROOM

3.1 INTRODUCTION

According to Fraser (2006:1), the traditional role of the teacher has changed a great deal in recent years. In the teacher-oriented and content-based teaching approach of the past, the teacher was regarded as the person who communicated information. The teacher's most important task was to convey certain information, usually from textbooks to passive learners and to establish whether learners were able to reproduce it, unchanged, in test and examinations. Teaching mainly entailed one-way communication and what the teacher and textbook said was seldom challenged (Fraser, 2006:1).

Fraser (2006:1) continues to say that the above-mentioned the traditional role of the teacher has long since served its purpose and as the Outcomes-Based teaching approach that is currently followed in South Africa, expects of learners to take responsibility for their own learning and to be independent. The researcher is of the opinion that the teachers of today have to balance the traditional teaching role with that of a mediator of learning. The role of mediator expects the teacher to help learners to bridge the gap between what they cannot do on their own at a given time to what they can do with a little help from someone else, which links well with the Zone of Proximal Development (ZPD) of Vygotsky (in Chaiklin, 2004:41). This process is referred to as mediation, which implies that the teacher should internationally intervene and direct learners in the learning process, but should not tell them what to think (Pettigrew & Akhurst, *in* Fraser, 2006:1). Mediating learning implies that teachers should be sensitive to the diverse needs of the learners, adapt their teaching strategies to learners' needs and shortcomings, which

could be a suitable approach when dealing with visually impaired learners in an inclusive classroom.

According to Hay and Winn (2005:140-154), new legislation makes provision for learners with special needs in education, or as it is now aptly defined: learners who experience barriers to learning, to be included in mainstream education. Therefore, there will be more and more learners with barriers to learning in mainstream classrooms. Accommodating these learners in mainstream classrooms means that a teacher as a mediator of learning should know all the various forms of intrinsic barriers to learning, such as sensory and physical impairments, as well as the forms of extrinsic barriers to learning, such as socio-economic problems (Goodyear, 2006:55). The teacher will also be expected to mediate the teaching situation and learning process in such a way that each learner can be accommodated in an ordinary classroom situation (Department of Education, 2001:16). A comprehensive exploration of the merits of mediated learning in the context of visual impairment is provided in Chapter Six.

This chapter addresses the following issues:

- Visual impairment: implications for teaching and learning in inclusive classrooms.
- Enhancing teaching and learning for the visually impaired learner.
- Assessment and the visually impaired learner.

3.2 VISUAL IMPAIRMENT: IMPLICATIONS FOR TEACHING AND LEARNING IN INCLUSIVE CLASSROOMS

According to Bishop (2004:81), it should be emphasized that when visually impaired learners are included in regular classes with their sighted peers, it is still the responsibility of regular classroom teachers to provide instruction in academic areas, and they should make classroom instruction more effective for the visually impaired learner.

During the first three years of structured education (Grades 1-3), the greatest emphasis is on language arts (reading, writing, spelling), and for those who have difficulty seeing primary-size print, some enlargement may be necessary (Bishop, 2004:93).

Bishop (2004:93) suggests some general guidelines for working with visually impaired learners. The guidelines are reflected in Table 3.1.

Table 3.1: Guidelines for working with visually impaired learners (Bishop, 2004:93-94)

DO'S	DONT'S
feel comfortable using vision words, such as "look", "see", and "watch". … use the learner's name when calling on him/her. … read out loud what you are writing on the board. … encourage independence; the visually impaired learner needs to learn to do as much as possible for him/herself. … include the visually impaired learner in as many class activities as possible. … fill in experiential gaps when you discover them. … allow extra time when needed, for tactual exploration, when appropriate, slower visual/Braille reading, etc. … provide extra storage space for special equipment/materials.	… be afraid to touch the visually impaired learner, but tell him/her you are about to touch him/her; respect the learner's personal preferences about touching. … overprotect; let the learner try as many things as possible for him/herself. … worry about your initial feelings of awkwardness; remember that you are teaching a learner who happens to experience a barrier to learning … be afraid to require a learner's best work. … be afraid to require good behaviour; administer the same discipline, if needed, as you would for a sighted child; rules *do* count. … hesitate to ask the learner what something looks like to him/her, it may help you understand the quality of the

… encourage the use of aids/devices (*not* aides).	learner's vision; … feel you must tolerate unacceptable behaviour in the visually impaired learner any more than you would in a normally sighted learner.

Since much of the learning in the primary years is concrete and interactive, the visually impaired learner can participate in most of the activities (Bishop, 2004:94). The more *"hands on"* learning there is, the easier it is for the visually impaired child to build the necessary concepts that form the foundations for later learning. Bishop (2004:95) argues that it is when the instructional programme begins to shift from an interactive process to an abstract level (using language to mediate learning via textbooks) that visually impaired learners must rely on whatever concepts and/or prior experiences are stored in their memories. This transition usually begins in the late primary grades and continues into the upper elementary grades.

It is also during this time that teachers must be most alert to deficits in conceptual foundations and gaps in experiences (Bishop, 2004:101). The visually impaired learner is not aware of these missing bits of information, and will often *say* he/she understands a new concept when he/she really does not, and questioning is often helpful in uncovering deficits.

Characteristics of the visual impairment itself may determine the degree of impact on early development and learning. Total blindness forces other sensory channels to provide initial sensory input data to the brain, although this information does not have the same motivational power as visual information has. The use of other senses to take over the area of the brain reserved for vision is called *"plasticity"* which does not happen spontaneously or automatically; intervention must take place to provide the experiences that encourage brain use. Plasticity links well with the notion of a human being adaptive, which is a central assumption in the theory of mediated learning (Feuerstein, Feuerstein & Falik, 2010:14) (*cf*. 6.2).

The following section pays attention to practical ways in which the teaching and learning environment can be adapted to accommodate the needs of visually impaired learners (*cf.* 2.3.5; 2.4).

3.3 ENHANCING TEACHING AND LEARNING FOR THE VISUALLY IMPAIRED LEARNER

Teachers should be able to identify visual impairment early and effective remedial intervention should take place (*cf.* 2.3.5). Teachers should develop and modify teaching strategies for learners with visual impairment and make adaptations to the learning environment related to teaching, learning and assessment strategies (Mitchell, 2008:30,31; Farrell, 2006:20; Hugo, 2006:50-51; Johnson & Lawson, 2006:595-696; Heward, 2000:18).

3.3.1 Adapting the learning environment

The limited nature of visual association for learners with visual impairments has classroom implications (Cox & Dykes, 2001:68-74). Farrell (2006:20), asserts that the following factors need to be considered when adapting environments: it is always desirable that the visually impaired learner assumes as much responsibility for his/her unique needs as possible, given the level of maturity and ability. Teachers need to explain to the other learners in the class why changes are made, for example seating the learner with a visual impairment in the front of the classroom. According to Farrell (2006:20), most environmental modifications such as adjusting seating of lighting do not cost a lot, but if an extra electrical outlet is needed to support the visually impaired learner's use of electrical equipment, there may be additional cost involved. Farrell (2006:20) argues that ambient lighting is important around the school for learners with visual impairment in particular, and glare-free lighting should be ensured. In addition to this, Cox and Dykes (2001:68) argue that free movement in the classroom is an essential part of successful school experiences that have to be guaranteed for learners who experience visual impairments.

3.3.2 Teaching strategies for visually impaired learners

Learners having low vision usually require large print as well as special equipment and materials (Keller, 2005). The major challenge facing visually impaired learners in the educational environment is the overwhelming mass of visual material to which they are continually exposed, e.g. textbooks, course outlines, class schedules, chalkboard writing, etc. (Keller, 2005). In addition, the increase in the use of films, videotapes, computers, lasers disks and television adds to the volume of visual material to which they have only limited access. To assist in overcoming a learner's visual limitation requires unique and individual strategies based on each learner's particular visual impairment and his/her skill of communication (e.g. Braille, speed listening, etc.) (Keller, 2005).

3.3.3 Strategies to use in group learning situations

Teaching or facilitating groups can be done so that a mix of strategies used will meet the learning needs of most of the learners (Gadbow, 2001:19-20). The foundation of such teaching is setting a climate for learning that encourages respondents to be co-learners and to join the ongoing refinements in the learning programme actively (Gadbow, 2001:19-20). A focus on the processes of learning must be considered along with the content to be learned.

A fear that many teachers still have is that flexibility and alternative approaches to teaching and learning will "*water down"* the curriculum and lower the standards (Felder, 2001). However, repeated research studies have shown that teacher-centred instructional methods have been found to be inferior to approaches that involve active and cooperative learning (Felder, 2001).

According to Felder and Brent (2001:69-75), cooperative learning techniques where learners work together with others to achieve a common goal, can be developed and introduced slowly and methodically. The use of well-developed approaches to cooperation has shown to be very effective for

learners. Learners with differing learning styles, abilities and special needs can work together in cooperative learning settings with positive results for all (Monyai, 2006:128). The use of cooperative and other group learning approaches with a wide range of learners, including those with visual impairments, may entail consideration of additional factors, such as use of various assistive technologies and other accommodations (Ferreira, 2006:139).

According to Gawe (2007:223-226), cooperative learning promotes active learning as well as the development of critical and creative cognitive abilities. Working with others, expose learners to situations where questions and problems arise that require learners to think together and come up with possible answers and solutions. Furthermore, cognitive development is enhanced due to the cognitive conflict that arises when learners have to defend and/or motivate their viewpoints and opinions to their peers. According to Arends (2009:354-355), cooperative learning promotes the establishment of social relationships among learners as learners are given opportunities to develop social skills such as listening to one another, praising one another, learning to respect and accept one another irrespective of ability or background. Language development is also enhanced through cooperative learning, as learners are given opportunities to talk to one another, which enrich vocabulary acquisition and promote expression and pronunciation ability (Johnson, Johnson & Stanne, 2000). It is clear that cooperative learning possesses the potential to assist teachers to accommodate the language, cognitive, social and self-esteem needs that learners with visual impairments experience (*cf.* 2.4.2-2.4.6).

3.3.4 General courtesy

According to (Keller, 2005), the following principles of general courtesy should be applied during teaching and learning in classrooms when working with learners who are visually impaired:

- Speak to the class upon entering and leaving the room or site, and call the learners with vision impairment by name to attract their attention.

- The learners should be seated away from glaring lights (e.g. by the window) and preferably in front of the class.

- Descriptive words such as straight, forward, left, etc., in relation to the learner's body orientation, should be used and the use of vague terms with unusable information, such as *"over there", "here", "this",* etc., should be avoided.

- Teachers should provide detail descriptions of visual occurrences during learning activities, and by means of tactile learning familiarize the learner to the classroom, laboratory, equipment, supplies, materials and field sites.

- Verbal notice of room changes, special meetings or assignments should be provided and when appropriate, written information should be read to a learner with a visual impairment.

- Identify yourself by name; don't assume that the learner who is visually impaired will recognize you by your voice, even though you have met before. If you are asked to guide a learner with a visual impairment, identify yourself, offer your services and, if accepted, offer your arm to the learner's hand. Tell them if they have to step up or step down, let them know if the door is to their left or right and warn them of possible hazards.

- Orally let the learners know if you need to move, leave, or need to end a conversation, and routinely check the instructional environment to be sure it is adequate and ready for use.

3.3.5 General strategies during teaching presentations

The various strategies indicated below will work for most learners with visual impairment (Keller, 2005).

Accessible descriptions will be necessary for pictures, graphics, displays or field sites. A wide selection of magnifying devices are available that can be used by visually impaired learners to assist in reading or working with objects that need to be observed. All visual material needs to be accompanied by a verbal description. If demonstrations are done, verbal presentations should always accompany the demonstration. When overhead projectors are used, the content of the transparencies should be described aloud, and large print should be used on the transparencies (Keller, 2005).

Keller (2005) indicates that if there are multiple speakers (such as a panel) in a classroom, each speaker should introduce himself or herself to the audience so that their voices can be identified. Presentations must be clearly heard by everyone in the room and all questions from the audience should be repeated, prior to answering them.

If handouts are given, they should be available in large print, audiotape, computer disk, and/or Braille formats. Printing should be done on white paper with sharp, black ink in large print, 16-18, with an enlargement setting of 160-175% (Hugo, 2006:50; Keller, 2005).

Teachers should take cognizance of the following, as suggested by Lerner and Kline (2006:115) and Keller (2005) during lesson presentations:

- Coloured objects should be used for identification of aspects related to a lesson or an experiment, or otherwise they should be tacitly coded. All chalkboard writing should be described in detail and whenever possible, actual objects for three-dimensional representations should be used. Learners should be allowed to use a tape recorder for recording classroom presentations or the text.

3.3.6 The use of laboratories

When learners who experience visual impairment are involved in laboratory work, teachers should observe the following, to optimize the teaching and

learning environment for the learners (Hugo, 2006:51; Anon., 2005; Keller, 2005):

- Teachers should describe and spatially familiarize the learner with the laboratory and all equipment to be used.

- Alternative, less difficult activities/exercises can be utilized but should have the same or similar learning objectives as for the sighted learners.

- Enlarged activity scripts, directions or readings should be utilised.

- Assistance may also be needed for converting certain laboratory materials from a visual to a tactile format. It is good to have the learner with vision impairment do a trial run on the equipment before the activity and allow more time for the laboratory activities.

- Always try to keep materials, supplies and equipment in the same places and place the learner and/or tape recorder in an appropriate distance from the activity to secure proper hearing and/or the recording of results or observations.

- Use an overhead projector to show systematic instructions as well as layout boards with colourful markers for showing relationships when doing comparisons.

- Label material, supplies and equipment with large print and consider pairing the learner with vision impairment with a sighted leaner. Then have the non-impaired learner describe the activities and outcomes to the learner with vision impairment

3.3.7 Active, tactile and kinaesthetic learning

According to Mitchell (2008:33) and Johnson (2000:584-594), learners with visual impairments should be allowed opportunities to explore and construct their own meaning during interaction with the learning environment, their peers and the teacher. Learners with visual impairment use tactile and

kinaesthetic input to learn and remember things about their environments (Barraga & Erin, 2001:63, 65; Cox & Dykes, 2001:72).

Cox and Dykes (2001:72) and Klatzy and Lederman (1988:120) indicate that any visual materials used in classrooms need to be adapted for use by learners who do not have the visual skills required for the tasks. Charts, models, maps and graphs will have greater educational value for learners with visual impairments if they can be "read" using the sense of touch. For example, outlining map boundaries with string enables learners with visual impairments to use their sense of touch (Cox & Dykes, 2001:72; Klatzy & Lederman, 1988:120).

Whenever teachers use objects to manipulate such as models or other equipment, learners with visual impairments need the opportunity to use their tactile and kinaesthetic senses to become familiar with the objects to benefit from their use in lessons (Cox & Dykes, 2001:72; Klatzy & Lederman, 1988:125). Teachers should introduce learners with visual impairments to materials and equipment used in activities such as science experiments before the activity. If learners have the opportunity to learn about the materials or equipment before the activity begins, they will be more able to concentrate on the concept being taught, rather than on what equipment they are using (Cox & Dykes, 2001:72; Klatzy & Lederman, 1988:128).

According to Lerner and Kline (2006:115) and Anon. (2005), when utilizing group interaction, peer tutoring and discussion in the classroom, teachers should describe and spatially familiarize the learner to the classroom. Place the learner and/or recorder in an appropriate distance from the activity to permit recording of material. If the learner is partially sighted, be sure he/she is seated where lighting is appropriate.

3.3.8 Field experiences

The use of field experiences with learners who have visual impairments, require the making of handouts, safety information and assignments in an appropriate form (e.g. regular print, large print, tactile Braille or cassette)

(Anon., 2005; Keller, 2005). Consider alternative activities/exercises that can be utilized with less difficulty for the learner, but have the same or similar learning objectives. A detailed description and narration of objects seen in science centres, museums and/or field activities should be provided, accompanied by an enlarged activity script, directions or readings for descriptions of a field activity to use with field observations (Anon., 2005).

3.3.9 Auditory learning and accommodations

Teachers should ensure that teaching is mostly verbal, because learners with visual impairments rely largely on hearing (Hugo, 2006:50). Auditory input provides another way in which learners can gain information. Teachers should however not assume that learners with visual impairments will understand verbal input in the same way and at the same depth as other learners understand visual input (Barraga & Erin, 2001:119). Auditory language triggers the creation of mental images that correspond with words, and these images are recalled to assist learners in comprehending verbal language (Barraga & Erin, 2001:119). A learner with visual impairment is likely to have fewer and less detailed mental images to correspond with verbal language, and such images may differ according to a learner's individual experiences and verbal input he or she has received from others (Whitmore & Maker in Cox & Dykes, 2001:72).

According to Cox and Dykes (2001:72) and Heward (2000:29), teachers should observe and interact with learners with visual impairments in an effort to determine whether individual learners understand verbal input. According to Heward (2000:72), the teacher must check for comprehension during class discussions and when giving directions. If learners are having difficulty understanding what the teacher says, the teacher may need to clarify or expand on their background knowledge or vocabulary. Organizations providing services for people with visual impairments offer audio-taped textbooks. Classmates can be designated as note-takers for learners with visual impairments. Class notes can then be audio-taped or transcribed using an enlarged font (Cox & Dykes, 2001:72; Heward, 2000:29)

Cox and Dykes (2001:72) and Heward (2000:29) further indicate that teachers may also develop verbal or other auditory cues as signals for attending to important information or particular events, as teaching listening skills is also important. Efficient listening is crucial to classroom success for learners with visual impairments. Improved listening skills help learners with visual impairments increase their spoken and written communication and reading skills (Cox & Dykes, 2001:72; Heward, 2000:35-40).

3.3.10 Visual learning

According to Cox and Dykes (2001:72) and Heward (2000:81), most learners with low vision have some usable vision and their visual learning can become more efficient if they can enhance their skill to use their vision through training for the use of assistive devices. Teachers should observe learners to determine that they have visual skills sufficient for locating and tracking visual materials. Vision specialists can offer assistance in developing learners' visual skills and in making accommodations necessary for helping learners use their vision in productive ways. Such services including make maps, adapting reading materials and assisting in general accommodations (Heward, 2000:81).

Printed materials should be clear and be printed using an easily readable font, whilst providing an easel to hold reading materials can help learners with visual impairments to do close-up work more easily (Barraga & Erin, 2001:127). Black felt-tip pens and soft lead pencils are useful writing utensils for learners with visual impairments because of the increased amount of contrast they create against white writing paper (Koenig & Holbrook, 2000:290).

Some simple strategies for using printed materials can help learners with visual impairments to learn visually without requiring huge adjustments to the classroom environment. Simply holding books or other materials closer is enough to help some learners with visual impairments (Heward, 2000:101-107). Using magnifying devices or large-print materials are two

accommodations that are often implemented in the classroom (Barraga & Erin, 2001:141).

The learner's position in the classroom in relation to visual presentations should allow for an unobstructed view. If necessary, allow the learner to move to a position with a better vantage point when visual materials are being used (Cox & Dykes, 2001:73). Barraga and Erin (2001:157) and Cox and Dykes (2001:73) indicate that information written on the chalkboard should be large, and dry erase boards are good alternatives to regular chalkboards as their bright backgrounds strongly contrast with the colours (especially black) used on them. All visual aids should have clear, sharp images and materials with high contrast are easier for learners with visual impairments. For example, handouts should have very dark black or navy blue print on bright, white paper (Barraga & Erin, 2001:158-159; Cox & Dykes, 2001:73).

3.3.11 Technological adaptations

Technological advances have created many products that hold advantages for learners with visual impairments, for both input and output of information (Cox & Dykes, 2001:73). According to Ferreira (2006:139), laboratory work, experiments and expeditions should be made more accessible by supplementing them with verbal recordings of everything that occurs visually. Visually impaired learners should be told in advance if visual material such as videos, maps or posters will be used during teaching, and discuss with them alternative ways of accessing the information (Ferreira, 2006:139). It is also possible to make the learners "see" by making use of models that they can feel and touch (Ferreira, 2006:139). It is therefore important to use media during teaching to gain and keep attention, to enhance retention and transfer, and to ensure involvement.

3.3.12 The role of the District-Based Support Team and the Institutional/School-Based Support Team

In order to assist teachers to accommodate diverse learner needs in their classrooms, the District-Based Support Teams and School-Based Support

Teams play important roles. According to the Department of Education (2005a:14-16), the District-Based Support Team is required to provide curriculum, assessment and instructional support in the form of illustrative learning programmes, learner support material and equipment, assessment instruments and professional support for teachers at school to deal with the challenges of teaching in inclusive classrooms.

School-Based Support Teams are required to provide resource centres that will have the responsibility of providing professional support in curriculum adaptations for assessment and instruction (Department of Education, 2005a:35).

3.4 ASSESSMENT AND THE VISUALLY IMPAIRED LEARNER

Heward (2000:6) indicates that visual problems can affect learners in many ways, for example, eyestrain often leads to headaches, which can affect concentration and reduce the time available for studying. In addition to this, learners with visual problems usually have reading problems. They read slowly and with difficulty (Heward, 2000:6). If they can read only large print, for instance, they will have great difficulty reading examination papers, textbooks, worksheets and even the teacher's handwriting on the board (Heward, 2000:6). They need extra time for tasks like looking up words or answering an examination paper (Heward, 2000:9-10).

To be fair to all learners and consistent with the principles of Outcomes-Based Education special arrangements may be needed when it comes to assessment of visually impaired learners (Department of Education, 2002b:8-10). Teachers can adapt the routine way in which activities and assessment are planned, structured and conducted in many practical ways. The purpose of alternative or adaptive methods of assessment is therefore to minimize the impact or arrange of intrinsic and extrinsic barriers upon the assessment performance of the learner (Department of Education, 2002b:8-10).

- Multiple assessment opportunities also need to be provided to improve work and to achieve optimally (Switlick, 1997:225).

- Switlick (1997:225) asserts that learners can have the test or examination instructions read to them and they can dictate their answers to a teacher/leaner/other person who writes down what is to be marked.

- Learners can also dictate their answers on a cassette, which can assist learners with reading and writing barriers, severe visual barriers and those with physical barriers that affect their hand movements (Switlick, 1997:230).

- Design activities which allow learners to demonstrate a level of competence and to achieve an outcome, are ideal to use with learners who experience visual impairments (Switlick, 1997:239).

The Department of Education (2002b:8-10) suggests the following guidelines to accommodate differences among learners during assessment.

3.4.1 Specific adaptive methods of assessment for visual impairment

Visual impairment refers to a situation where certain eye conditions become a significant barrier to scholastic progress. In these cases, ordinary print is problematic, even with the help of spectacles or contact lenses (Bishop, 2004, 2004:24. Davies (2003:205-206) and the Department of Education (2002b:8-10) recommend the following as alternative methods of assessment:

- Assessment tasks should be available in Braille, and learners can respond in Braille or typing. Furthermore, assessment tasks can be prepared manually or electronically and preferably on egg yellow paper by using enlarged and/or bolded text. When visually impaired learners cannot read Braille or if schools do not have Braille, they should provide learners with the test or assessment task on cassette. Learners should receive the printed assessment task as well as the audio-cassette recording.

- Care should be taken that the reading tempo is suitable for the age of the learner when assessment tasks are read aloud, and that mark allocations and questions number are read out clearly.

- Extension cables and adaptors must be provided in the assessment room, headphones should be permissible in order not to create a disturbance, and learners should have a set of batteries in case of a power failure.

- If the assessment task is read to the learner or he/she listens to a tape recorder and records the answers on a dictaphone. The use of computers with voice synthesizers can permit learners to respond by typing.

- All learners with visual impairment should receive sufficient time to complete the task in accordance with the learning area requirements to demonstrate competency.

- Learners with visual impairment may require adult support for practical activities, using equipment, locating material, drawing and measuring.

- It is essential to limit illustrations, especially fine detail in illustrations, such as diagrams in Natural Sciences.

3.5 CHAPTER SUMMARY

In this chapter, the researcher explored the importance of adapting the curriculum to accommodate the needs of visually impaired learners in inclusive classrooms. Some of these adaptations refer to the following: seating, lighting, enlarging visual material and including technological adaptations (*cf.* 3.3.1-3.3.11), utilizing cooperative learning and discussion to enhance social skills development (*cf.* 3.3.3), making use of teacher presentations (*cf*. 3.3.5), and providing visual, auditory, active, tactile and interactive learning opportunities (*cf.* 3.3.7; 3.3.8; 3.3.9; 3.3.10). During the assessment of visually impaired learners, alternative methods of assessment

should be employed. These refer *inter alia* to the availability of assessment tasks in Braille, reading assessment tasks to learners, providing tape recorders to learners to record their answers, limiting illustrations and providing sufficient time to complete the assessment task (*cf.* 3.4.1).

The next chapter focuses on the empirical research design that was employed to obtain data in order to determine teachers' knowledge and attitudes regarding accommodating learners with visual impairments in inclusive classroom, as well as to establish the extent to which teachers accommodate the teaching and learning needs of visually impaired learners.

CHAPTER FOUR

EMPIRICAL RESEARCH DESIGN

4.1 INTRODUCTION

The previous chapter highlighted the various ways in which the teaching and learning needs of visually impaired learners could be accommodated. This chapter focuses on the empirical design, which was utilized to determine whether the teaching and learning practices of teachers embrace the teaching and learning needs of visually impaired learners.

The main purpose of this chapter is to give a comprehensive explanation of the following:

- Aim and objectives of the research.
- Research paradigm.
- Research design.
- Research strategy.
- Data collection instruments.
- Population and sample selection.
- Data analysis.
- Ethical principles.

4.2 AIM AND OBJECTIVES OF THE RESEARCH

The overall aim of this study was to determine to what extent teachers accommodate the teaching and learning needs of visually impaired learners in an inclusive classroom and if not, to apply the principles and processes of a mediated learning approach to the design of learning activities to accommodate the teaching and learning needs of visually impaired learners.

Flowing from the above, examples of how a curriculum-based teaching and learning programme could accommodate the needs of visually impaired learners in an inclusive classroom were designed by utilizing Learning Outcomes and Assessment Standards of Natural Sciences Grade 7. Natural Sciences was chosen, as the researcher is knowledgeable in this field and also teaches Natural Sciences. However, the principles applied in the designing of the programme are generic and could be utilized as a guideline for designing similar programmes in any subject field or Learning Area.

The overall aim of this study was to determine to what extent do teachers accommodate the teaching and learning needs of the visually impaired learner in an inclusive classroom and if not, how can the principles and processes of a mediated learning approach be applied to accommodate the teaching and learning needs of visually impaired learners.

The overall aim was operationalized as follows:

- by establishing what the teaching and learning needs of the visually impaired learner in an inclusive classroom are through a literature review and an empirical study;
- by examining to what extent teachers possess adequate knowledge to identify visually impaired learners in inclusive classrooms;
- by investigating teachers' attitudes towards learners with visual impairments in inclusive classrooms.
- by determining how teachers presently handle the teaching and learning needs of the visually impaired learner in an inclusive classroom, by means of an empirical study;
- by evaluating to what extent the principles and processes of mediated learning can address the teaching and learning needs of the visually impaired learner in an inclusive classroom;

- by establishing the extent to which there is a difference between the teacher and learner responses regarding the addressing of teaching and learning needs of visually impaired learners in an inclusive classroom; and

- by designing learning activity examples for a curriculum-based teaching and learning programme incorporating the principles and processes of mediated learning to assist teachers to accommodate the teaching and learning needs of the visually impaired learner in an inclusive classroom.

4.3 RESEARCH PARADIGM

According to Cohen, Manion and Morrison (*in* Maree & Van der Westhuizen, 2007:31), research is about understanding the world, and your understanding is informed by how you see the world, what you view understanding to be and what you see as the purpose of understanding. This implies that a researcher should:

- determine whether reality in the context of the research should be understood from an external, objective view (realist view), or through the words created by individuals (nominalist view) (Cohen *et al*. *in* Maree & Van der Westhuizen, 2007:31);

- determine whether knowledge can be viewed as objective (positivist stance) or interpretive (anti-positivist stance); and

- adopt a stance regarding human nature, i.e. decide whether the respondents that will take part in the research should respond mechanically to their environment, initiate their own actions or fall somewhere between the two mentioned extremes.

Once decisions regarding a research paradigm have been made, research methods, designs and data collection instruments are chosen in line with the chosen research paradigm. The decisions made regarding the above, impact

on the choice of research methods, research designs, data collection instruments and sampling techniques.

In the context of this study, a positivist stance was adopted, as the researcher regarded it as the most suitable stance for objectively collecting information regarding the characteristics of classroom teaching and learning for visually impaired learners. The researcher acknowledges that this paradigm neglects critical and creative forms of data collection and reduces human behaviour to technicism (Cohen, Manion & Morrison, 2007:18).

4.4 RESEARCH DESIGN

To answer the question of the choice of the research design, the researcher had to establish what kind of data he wanted to gather. Data can either be quantitative (in the form of numbers), or qualitative (perceptions or opinions) or a combination of quantitative and a qualitative approaches) (Creswell, 2009:4).

Another important aspect that needed consideration was the role of the researcher. Would the researcher be an external observer of the research phenomenon or would the researcher be looking subjectively through a lens at the research phenomenon from the inside out? Examining the role of the researcher would define interest in the objective (quantitative) or subjective (qualitative) style of research.

Linked to the positivist paradigm where the researcher decided to be an external observer whose intent it was to establish and confirm a given situation in the classroom and to develop generalizations that contribute to theory, a quantitative approach was chosen (Leedy & Ormrod, 2005:95).

4.4.1 Quantitative research

In general, quantitative research is used to answer questions about relationships among measured variables with the purpose of explaining, predicting and controlling phenomena (McMillan & Schumacher, 2006:23;

Leedy & Ormrod, 2005:94). This approach is sometimes called the traditional, experimental or positivist approach. In contrast, qualitative research is typically used to answer questions about the complex nature of phenomena, often with the purpose of describing and understanding the phenomena from the respondents' point of view (Leedy & Ormrod, 2005:94). The qualitative approach is also referred to as the interpretative, constructivist or postpositivist approach.

Quantitative researchers seek explanations and predictions that will generalize to other persons and places (Leedy & Ormrod, 2005:94). In the context of this study, the researcher wished to explore the teaching and learning situation by examining the perceptions of teachers and learners in order to determine how the teaching and learning needs of the visually impaired are accommodated.

4.4.1.1 Validity of quantitative research for this study

To ensure the **internal validity** of the research study, data from both teachers and learners were analyzed to answer the research question (McMillan & Schumacher, 2006:134; Leedy & Ormrod, 2005:99). In this regard Maree and Van der Westhuizen (2007:40) refer to crystallization. Lincoln and Guba (in Maree & Van der Westhuizen, 2007:40) refer to crystallization as *"attending to voices that differ from your own to enable you to study multiple constructed realities"*. In the context of this study the classroom reality for teaching the visually impaired as viewed from the perceptions of teachers and learners were taken into consideration before final conclusions were made.

The **external validity** of the study was important as it determined to what extent the results would be applicable to the situations beyond the study itself – in other words, the extent to which conclusions drawn could be generalized to other contexts (McMillan & Schumacher, 2006:141). The following strategies enhanced the external validity of the research. The research was conducted in a real-life setting and yielded results that could have broader applicability to other real-world contexts with similar characteristics as the

sample that was utilized (McMillan & Schumacher, 2006:141; Leedy & Ormrod, 2005:99).

The researcher argues that **construct validity** was guaranteed as the use of a questionnaire could be regarded as a suitable data collection instrument to obtain information about the characteristics of the teaching and learning situations in the classrooms that were involved in the research (McMillan & Schumacher, 2006:140). Furthermore, the nature of the construct *"teaching and learning needs of visually impaired learners"* was adequately explained in the literature review, which allowed for making accurate inferences during the interpretation of the data (McMillan & Schumacher, 2006:141).

The use of appropriate statistical tests to analyse the data and draw inferences, enhanced the statistical conclusion validity of the research (McMillan & Schumacher, 2006:134).

4.5 RESEARCH STRATEGY

Mouton (in Fouché & De Vos, 2002:137) defines a research strategy as a blueprint of how one intends to conduct research. It involves a plan or programme according to which data are collected. As this research was characterized by a positivist paradigm, a quantitative research strategy was utilized.

4.5.1 Quantitative research strategy

In line with the viewpoint of McMillan and Schumacher (2006:24) and Leedy and Ormrod (2005:179), a descriptive survey research strategy was chosen for this study as this research involved examining and characterizing a situation/phenomenon as it is. It did not involve modifying or changing a situation under investigation, nor was it intended to determine the cause-effect relationships (Leedy & Ormrod, 2005:170).

Survey research refers to almost any form of descriptive, quantitative research (Gay & Arasian *in* Leedy & Ormrod, 2005:183). According to

McMillan and Schumacher (2006:25, 233) and Leedy and Ormrod (2005:183), survey research involves acquiring information about one or more groups of people about their characteristics, feelings, beliefs, attitudes, opinions or previous experiences. The ultimate goal is to learn about a large population by surveying a sample of the population. Inferences about a particular population are drawn from the responses of the sample. As it was the intention of the researcher to explore the opinions, attitudes and experiences of the research respondents with regard to teaching and learning practices for accommodating the teaching and learning needs of visually impaired learners, survey research was deemed suitable.

4.6 DATA COLLECTION INSTRUMENTS

Although there are a myriad of data-gathering instruments for conducting quantitative and qualitative research, the researcher opted for questionnaires, as they would enable the researcher to collect the necessary data to address the research problem from a positivistic stance (Delport, 2002:165).

4.6.1 Questionnaires

Questionnaires are relatively economical to use, have the same questions for respondents and can ensure anonymity (McMillan & Schumacher, 2006:194). They are frequently used to provide the main source of data in primary research, and are concerned with description and measurement (Cohen *et al*., 2007:318).

There are different types of questionnaires, namely the self-administered, the investigator-administered, postal surveys and telephone surveys (Maree & Pietersen, 2007a:157; Mitchell & Jolley, 2001:472). In the context of this study self-administered questionnaires and investigator-administered questionnaires were used.

4.6.1.1 Self-administered questionnaires

This option was chosen for conducting the pilot study as questionnaires were delivered to school principals who in turn appointed responsible staff members to oversee the completion and return of the questionnaires. Respondents filled in the questionnaires individually in the absence of the researcher (Mitchell & Jolley, 2001:478). According to Mitchell and Jolley (2001:478), self-administered questionnaires have the following advantages and disadvantages.

4.6.1.1.1 Advantages and disadvantages of self-administered questionnaires

Advantages:

- They are easily distributed to a large number of people.
- They allow for anonymity.
- They are relatively a cheaper way to collect data.

Disadvantages:

- There is usually a low return-rate from respondents.
- Problems such as ambiguity cannot be resolved because researcher and respondent do not interact.

In the context of this study 50 questionnaires were distributed to teachers and 50 questionnaires were distributed to learners. The respondents returned all questionnaires.

4.6.1.2 Investigator-administered questionnaires

This option was chosen for the actual research and the respondents completed the questionnaires in the presence of the researcher. The researcher presented and administrated the questionnaires and immediately

collected them after completion (Mitchell & Jolley, 2001:478). According to Mitchell and Jolley (2001:478), this type of questionnaire has the following advantages and disadvantages:

4.6.1.2.1 Advantages and disadvantages of investigator-administered questionnaires

Advantages

- The researcher can clarify questions for respondents.
- The researcher's presence stimulates respondents to respond, yielding higher responses.

Disadvantages

- The researcher's presence reduces anonymity.
- Because of the reduced anonymity, respondents might not be honest in their responses.

The researcher managed to avoid the above-mentioned disadvantages as the researcher and the participants were not known to each other. Participants could respond to the questionnaire items without feeling threatened to respond in ways that would impress the researcher.

In the context of this study 80 questionnaires were distributed to teachers and 92 questionnaires were distributed to learners. All the questionnaires were duly completed and no low response rate was experienced.

According to Maree and Pietersen (2007a:159), a researcher has to pay careful attention to the design of the questionnaire to enhance reliability of the research results. How the researcher dealt with the design of the questionnaires in the context of this study, is explained in the following section.

4.6.2 Questionnaire design

Questionnaire design is a very important part of the research process, and the design should not compromise the generation of reliable data (Maree & Pietersen, 2007a:158). Attention has to be paid to the following aspects: appearance of the questionnaire, question sequence, wording of questions and response categories (Maree & Pietersen, 2007a:159).

4.6.2.1 Appearance of the questionnaire

The researcher incorporated the following aspects as suggested by Maree and Pietersen (2007a:159) to make the questionnaire user-friendly, namely printing was neat, the font not too small, clear instructions were given and the purpose for completing the questionnaire was indicated (*cf.* Appendix B & C).

4.6.2.2 Completion time of the questionnaire

According to Maree and Pietersen (2007a:159), learners should preferably be able to complete a questionnaire in less than 30 minutes and adults in less than 20 minutes. The questionnaire should not have more than 100 to 120 items. In the context of the research, learners took 30 minutes and teachers 20 minutes to complete the questionnaire and the questionnaires did not comprise more than 120 items.

4.6.2.3 Question sequence

Questions were ordered into sections so as not to confuse the respondents. In each section, the questions were linked to a specific aspect of teaching and learning of visually impaired learners (Maree & Pietersen, 2007a:160). Special attention was paid to the wording of the questions. The following guidelines suggested by Maree and Pietersen (2007a:160) were applied:

- clear, unambiguous language;
- double-barrelled questions were avoided;
- hypothetical questions were avoided;

- items were formulated as statements and not as questions;
- leading questions that guide respondents in a certain way were avoided; and
- double-negative questions were avoided.

4.6.2.4 Types of questions

Questions can be divided into open (unstructured) or closed (structured) questions (Bell *in* Maree & Pietersen, 2007a:160). Open-ended questions do not suggest any responses to the set questions. They are open questions that do not force the respondents to choose rigidly between limited responses; instead they permit respondents to answer in their own frame of reference. As data obtained from the closed questions are easier to analyse than data obtained from open questions, the researcher opted for closed questions. The closed questions provided a set of responses from which respondents have to choose one or sometimes more than one response (Maree & Pietersen, 2007a:161). Bell (*in* Maree & Pietersen, 2007a:161) distinguishes six types of closed questions: list, ranking, category, quantity, grid and scale.

For the purpose of the research Likert scale questions were used (Maree & Pietersen, 2007a:167). According to Bell (*in* Maree & Pietersen, 2007a:167), scale questions help researchers to discover strength of feeling or attitude. The response options are set up so that the variables measured can be expressed as a numerical score that is of either an ordinal, interval or ratio type (Maree & Pietersen, 2007a:167). In the context of the research, nominal scales that consist of two or more classes (e.g. male/female) were utilized in the section of the questionnaire that focused on biographic information. Ordinal scales were used to determine attitudes and perceptions regarding the teaching and learning of visually impaired learners (for example *“strongly agree", "agree", "disagree", "strongly disagree"*) (Maree & Pietersen, 2007a:167).

Based on the literature review, the questionnaires were developed to firstly determine teachers' knowledge regarding identifying learners with visual impairments as well as their attitudes related to having these learners in mainstream classrooms. Secondly, the questionnaires set out to establish how well teachers address the teaching and learning needs encountered by the visually impaired learners in an inclusive classroom. The researcher developed two questionnaires. For two of the sections in the questionnaire the same questions developed for the teachers were modified to suit the learners. This was done to counter-check teacher and learner responses for accuracy and credibility.

The questionnaires to teachers and learners were grouped into different sections (*cf.* Appendix B & C). The teacher questionnaire comprised the following sections and the questionnaire items linked with the various sections in the literature.

- Section A called for biographical information from both learners and teachers.

- Section B determined teachers' knowledge and attitude regarding visual impairment (*cf.* 2.3.2; 2.3.5; 2.4). It was important to include these items as the researcher argues that teachers will only be able to accommodate the teaching and learning needs of visually impaired learners if they are able to identify these learners, and are positive that the inclusion of these learners in mainstream classroom will not hamper the teaching and learning process.

  Section B contained 39 randomly placed items, which were clustered for the purpose of the data analysis and interpretation into the following constructs: knowledge regarding personal characteristics, knowledge regarding physical characteristics, knowledge regarding behavioural characteristics, knowledge regarding learning characteristics and general characteristics (*cf*. 5.2.2.1 - 5.2.2.5)

As the literature review did not specifically provide information on the teaching and learning processes that should be utilised to address the teaching and learning needs related to language, cognitive, social and self-esteem development, no specific questions in this regard were formulated. Furthermore, the researcher did not want to ask any leading questions that would guide teachers to responses that the researcher was looking for. The researcher could however derive at conclusions regarding the extent to which these areas were addressed during teaching and learning through the responses obtained for the entire questionnaire.

- Section C determined challenges related to classroom teaching, learning and assessment of visually impaired learners. In this section, the teachers' attitudes towards learners with visual impairment were also determined (*cf.* 2.3.2; 2.3.3; 2.3.4; 2.3.5; 2.4).

- Section D determined the application of principles related to classroom teaching, learning and assessment for visually impaired learners *(cf.* 3.2; 3.3; 3.4).

- Section E determined the use of teaching and assessment strategies for visually impaired learners (*cf.* 3.3; 3.4).

The learner questionnaire comprised the following sections:

- Section A called for biographical information from both learners and teachers.

- Section B determined the application of principles related to classroom teaching, learning and assessment for visually impaired learners (*cf.* 3.2; 3.3; 3.4).

- Section C determined the use of teaching and assessment strategies for visually impaired learners (*cf.* 3.3; 3.4).

Sections B and C corresponded with sections D and E in the teacher questionnaire, and the responses to these two sections were compared (*cf.* 5.4).

4.6.2.5 Reliability and validity of the questionnaire

Before the actual research commenced, a pilot study was conducted with visually impaired learners (n = 50) and their teachers (n = 50) from schools which were not part of the sample, to determine the reliability of the questionnaire items for both the teacher and the learner questionnaire. A Cronbach Alpha coefficient was calculated for the pilot study and the actual study and inter-item correlations were calculated to determine whether the questionnaire statements addressed the constructs in question for the pilot study and the actual study. The following results reported in Table 4.1 and 4.2 were revealed for the various sections of the teacher and learner questionnaires.

Table 4.1: Reliability of teacher questionnaire items: pilot study and actual study

	Teachers Cronbach alpha *α*		**Teachers Inter-item correlations**	
	Pilot	**Actual**	**Pilot**	**Actual**
Section B	0,68	0,77	0,08	0,30
Section C	0,75	0,72	0,05	0,57
Section D	0,82	0,76	0,15	0,33
Section E	0,89	0,66	0,46	0,65

Table 4.2: Reliability of learner questionnaire items: pilot study and actual study

	Learners Cronbach alpha *α*		Learners Inter-item correlations	
	Pilot	**Actual**	**Pilot**	**Actual**
Section C	0,75	0,88	0,37	0,57
Section D	0,72	0,84	0,29	0,51

A Cronbach Alpha coefficient was calculated to determine the internal consistency of the questionnaire items and to establish whether the items were correlated positively to one another (Akbaba, 2006:183). Sekaran (2000) points out that the internal consistency reliability becomes higher as the Cronbach Alpha moves closer to 1. In most Social Sciences, a Cronbach alpha coefficient between 0,7 and 0,8, is yielded as acceptable when working with a set of items to be considered on a scale, but some use 0,75 or 0,80 while others are lenient and accept 0,60 (Simon, 2008). According to Simon (2008) and Garson (2008), 0,60 could be seen as in order for an exploratory study. Tables 4.1 and 4.2 indicate that the questionnaire for learners and teachers complied with reliability criteria.

An inter-item correlation was also determined for the various items listed in the various sections of the questionnaire. An inter-item correlation is used to judge the reliability of the instrument by estimating how well the items that reflect the same construct, yield similar results (Trochim, 2006.) According to Trochim (2006), an inter-item correlation of between 0,15 and 0,5 yields an acceptable value. Both questionnaires complied with these criteria.

Validity of the questionnaire was determined by considering face, content and constructs validity (Pietersen & Maree, 2007c:215; Leedy & Ormrod, 2005:92).

Face validity: The questionnaire measured the construct in question, namely teaching and learning practices that accommodate the teaching and learning for visually impaired learners. The promoter of the study scrutinized the questionnaire items to ensure face validity (Pietersen & Maree, 2007c:215).

Content validity: The questionnaire reflected the various parts of the content domain, namely the nature of visual impairment and the teaching and learning needs of visually impaired learners, in appropriate and complete proportions (Pietersen & Maree, 2007c:217). Furthermore, the questionnaire items focused on the behaviours and skills that are central to the accommodation of teaching and learning for the visually impaired as identified by the literature review.

Construct validity: The questionnaire items were verified by the study leader, the independent statistician who was responsible for the capturing of the data and a few experts in the field of enhancing teaching and learning for the visually impaired, to ensure that they measured the construct in question. The researcher did not perform a factor analysis to examine the construct validity statistically (Pietersen & Maree, 2007c:218), which could be regarded as a limitation in the study.

The researcher was of the opinion that the instrument's validity and reliability were beyond reproach and could be implemented with confidence and with full knowledge that the outcome of the findings would provide insight into the practices of the teachers at issue. In the context of this study the researcher made use of methodological triangulation (Cohen *et al.,* 2007:142) as the same data collection method was used on different occasions with two different groups of respondents.

4.7 POPULATION AND SAMPLE

Sampling is defined as taking a portion of a population or universe and considering it as representative of the population or universe (Strydom, 2005:193). The universe refers to all potential subjects who possess the attributes in which the researcher is interested. Population refers to individuals in the universe who possess specific characteristics of interest to the researcher (Strydom, 2005:193).

Time and cost are the two major reasons for not including an entire population in a study (Maree & Pietersen, 2007b:172). Since the good of a survey is to use the sample to learn about the population, the sample should be drawn to be valid to generalize its results to the population (Maree & Pietersen, 2007b:172).

Two major classes of sampling can be distinguished, namely probability sampling and non-probability sampling (Maree & Pietersen, 2007b:172-180). Probability sampling is based on principles of randomness and non-probability sampling is not. Consequently, probability samples satisfy the requirements to generalize to the population, while this is not the case with non-probability sampling (Maree & Pietersen, 2007b:176-177).

As this research focused on a special situation (visual impaired learners in inclusive classrooms), the sampling was done with a specific purpose in mind. As this type of sampling is not based on the principles of randomness results cannot be accurately generalized to the population (Maree & Pietersen, 2007b:172; McMillan & Schumacher, 2006:128). Purposive samples are based entirely on the judgment of the researcher, in that a sample is composed of elements that contain most of the characteristics of the population (Singleton, Straits, Straits & Mc Allister *in* Strydom, 2005:202). Purposive sampling holds a greater likelihood of error due to subject bias (McMillan & Schumacher, 2006:128). However, the small standard errors revealed in Table 5.19 could imply that the sampled respondents likely were accurate reflections of the population (Field, 2005:17).

The population for this study involved all visually impaired learners and all teachers working in inclusive classroom settings where they might come across learners who are visually impaired. The study population, however, was identified as visually impaired learners and their teachers in the Fezile Dabi District in the Free State Province, which constitutes 200 primary and secondary schools. The Fezile Dabi District was conveniently selected, as the researcher works in this district and had easy access to the schools. Due to time and logistical constraints, 10 primary and 10 secondary schools were selected by means of systematic random sampling. This implied that each member of the population stood an equal chance of being involved in the study (Maree & Pietersen, 2007b:174). Primary and secondary school names were placed randomly on separate lists. The schools were selected according to a particular interval until 10 names were available on each list. As a 10% sample was drawn, a number between 1 and 10 was randomly selected as a starting point. The researcher randomly selected number 2 as the starting point and from there on every 10^{th} school name was subsequently selected as follows: number 2, 12, 22, 32 etc. until 20 schools were identified (McMillan & Schumacher, 2006:128). This type of sampling is free of subject classification error but has the weakness of a larger sampling error than in stratified random sampling as well as periodicity in the list of population elements (McMillan & Schumacher, 2006:128).

Seaberg, Grinnell and Williams (in Strydom, 2005:195) indicate that a 10% sample should be sufficient to control for sampling errors. In each of the identified schools, only willing teachers who taught visually impaired learners were invited to take part in the research in order to not violate ethical principles. In total, 80 teachers comprised the final sample. Learners who were visually impaired were identified in each of the schools with the assistance of school principals and teachers. In order to comply with the principles of conducting ethical research, the learners were invited to willingly take part in the research. In total, 92 learners ultimately took part in the research. Both the teacher and learner samples comprised heterogeneous

groups of respondents, as indicated in the biographic information (*cf.* 5.2.1; 5.3.1).

4.8 DATA ANALYSIS

4.8.1 Data analysis of the questionnaire responses

After the data had been collected by means of the questionnaires they were captured and firstly analysed by means of descriptive statistics. Descriptive statistics are used to organize and summarize data meaningfully in order to promote an understanding of the data characteristics (Pietersen & Maree, 2007b:198). Frequencies, means, percentages and standard deviations were calculated for the responses received for the various questionnaire items. According to the independent statistician, the data did not reveal any skewed distribution, was not abnormally peaked or flat and indicated homogeneity of variance within the groups (McMillan & Schumacher, 2006:167, 308; Pietersen & Maree, 2007a:190). Therefore, the researcher utilized parametric statistical procedures for the analysis of the data.

Frequency tables were used to explore teacher and learner responses for the various questionnaire items simultaneously. This provides an immediate comparison of the teacher and learner responses (Pietersen & Maree, 2007a:185).

As the researcher wanted to go beyond summarizing and describing data, inferential statistics were also utilized (Pietersen & Maree, 2007b:198). Inferential statistics were utilized to interpret statistically significant differences between the teacher and learner responses for two of the questionnaire sections and to determine the magnitude of significant differences (Pietersen & Maree, 2007b:211). T-tests and Cohen's d were utilized for these purposes. P-values smaller than the 0.5 were regarded as significant and values larger than 0.5 as non-significant (Pietersen & Maree, 2007b:207-212). The following interpretations were allocated to Cohen's *d*:

- 0.2: small effect in practice

- 0.5: medium effect in practice
- 0.8: large effect in practice (Pietersen & Maree, 2007b:211).

4.9 CHAPTER SUMMARY

In this chapter, the approach followed to explore and describe the research problem was elucidated. A positivist paradigm informed the choice of the research design. In line with this paradigm, a quantitative research design and a descriptive survey research strategy were utilized to collect data by means of questionnaires from the research respondents. Chapter Five provides an analysis and interpretation of the data obtained for the questionnaires.

CHAPTER FIVE

DATA ANALYSIS AND INTERPRETATION

5.1 INTRODUCTION

In this chapter, the results of the study are presented and discussed according to the various sections in the questionnaires. The main aim of the questionnaires was to determine to what extent teachers possess adequate knowledge to identify learners with visual impairments in their classrooms, and to establish the types of teaching and assessment practices utilized by the teachers to accommodate the teaching and learning needs of learners with visual impairments in inclusive classrooms. The responses to the questionnaires are presented as follows:

- Biographic information: teachers.
- Knowledge and attitude regarding visual impairment: teacher responses.
- Challenges related to the teaching of visually impaired learners: teacher responses.
- Classroom teaching, learning and assessment principles: teacher responses.
- Teaching and assessment strategies for the visually impaired: teacher responses.
- Biographic information: learners.
- Classroom teaching, learning and assessment principles: learner responses.
- Teaching and assessment strategies for the visually impaired: learner responses.
- A comparison of teacher and learner data.

5.2 DATA ANALYSIS OF THE TEACHER RESPONSES

Data are reported in tabular and graphical form. For the purpose of the graphical representations, data are rounded off to the nearest integer.

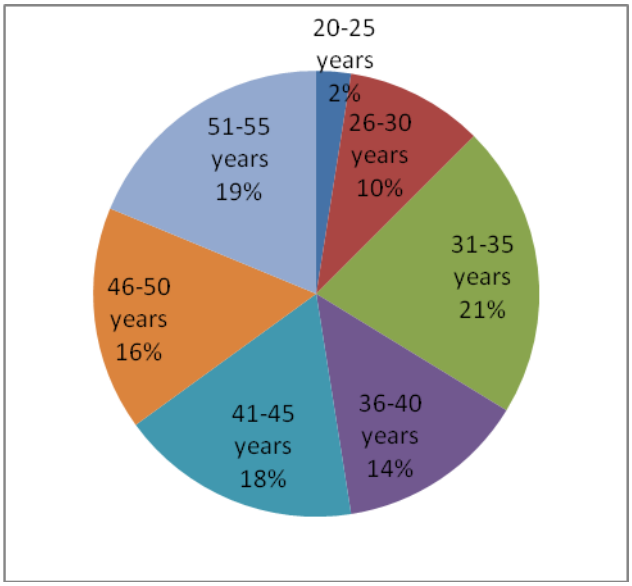
5.2.1 Biographic information

In this section, the data obtained for the various biographic variables related to the teachers who took part in the study are reported.

Table 5.1 indicates the data obtained for the biographic variable age.

Table 5.1: Age of teachers

1	f	%
20-25 years	2	2,50
26-30 years	8	10
31-35 years	17	21,25
36-40 years	11	13,75
41-45 years	14	17,50
46-50 years	13	16,25
51-55 years	15	18,75
56-60 years	0	0
61+ years	0	0



According to the data in Table 5.1, the majority of the teachers were aged between 31 and 35 years.

Table 5.2 indicates the data obtained for the biographic variable type of school. Of the 80 respondents 74 (92,5%) taught at public schools and 6 (7,5%) taught at private schools, which implies that the research findings will mainly apply to learners and teachers in public schools in the Fezile Dabi District.

Table 5.2: Type of school

1		2	
Public		Private	
f	%	f	%
74	92,5	6	7,5

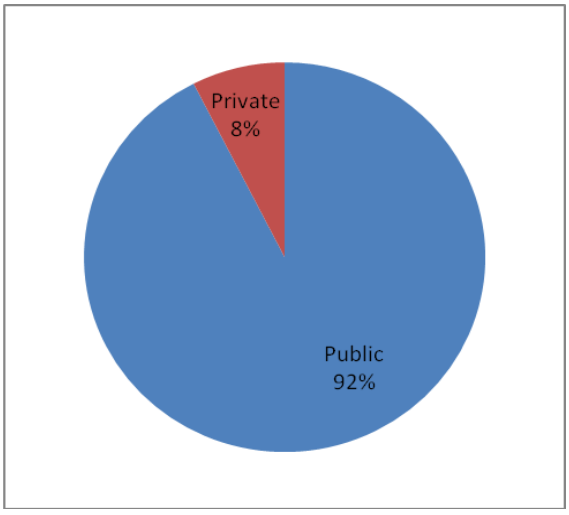
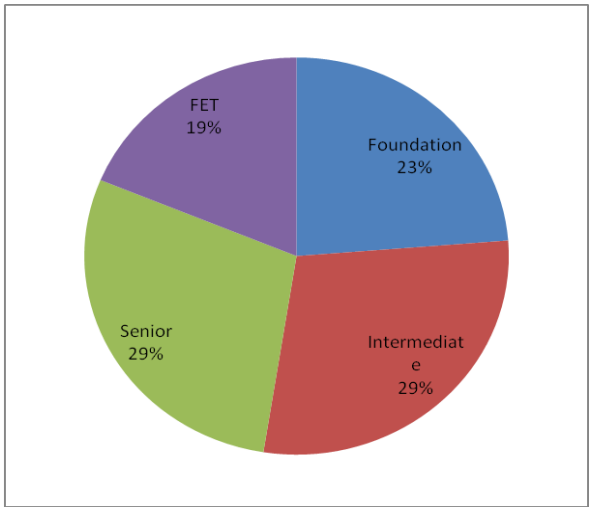


Table 5.3 indicates the data obtained for the biographic variable phase of teaching.

Table 5.3: Phase of teaching

1		2		3		4	
Foundation		Intermediate		Senior		FET	
f	%	f	%	f	%	f	%
19	23,75	23	28,75	23	28,75	15	18,75



Of the 80 respondents, 19 taught in the Foundation Phase, 18 in the Intermediate Phase, 23 in the Senior Phase and 20 in the Further Educating

and Training Phase. All the teaching phases were thus represented in the research.

Table 5.4 indicates the data obtained for the biographic variable related to the number of visually impaired learners whom the teachers teach presently in their classrooms.

Table 5.4: Number of visually impaired learners taught by the teachers

1		**2**		**3**		**4**	
1-5		6-10		11-15		16-20	
f	%	f	%	f	%	f	%
80	100	0	0	0	0	0	0

All the respondents indicated that they presently teach between 1-5 visually impaired learners in their classrooms.

Table 5.5 indicates the data obtained for the question that requested teachers to indicate how they became aware of the visually impaired learners in their classrooms. This was an open question, and the researcher grouped similar responses together after quantifying the number of times a certain response was given. Teachers were allowed to indicate more that one source that created their awareness to the visually impaired learners in their classrooms.

Table 5.5: Becoming aware of learners with visual impairments

Number of respondents	**Source of awareness**
13	From the learners' portfolios
2	From the learner himself
4	Sitting too close to the chalkboard/book
4	Red and painful eyes
8	Frowning

6	Administration clerk
10	Parents
5	Squinting
3	Dusty or rust colour eyes
2	Wearing cap in class
8	Colleagues
4	Wearing very thick glasses
2	Albinism
8	Copying incorrectly from the chalkboard
3	Blinking too much
3	Holding a book far away from the eyes when reading

It is clear from the responses in Table 5.5, that the majority of the respondents became aware of learners with visual impairment through the learners' work compiled in their portfolios. Other important sources that directed the teachers' awareness to learners with visual problems were other colleagues and the parents of the learners. Furthermore, certain physical characteristics such as learners frowning and copying incorrectly from the chalkboard also created awareness among the teachers that certain learners experience visual problems.

In the next section, the results obtained for the teacher responses to the various questionnaire sections are reported. For the purpose of the discussion of the results, only the data for the obtained responses were taken into consideration and are reflected in the tables.

5.2.2 Knowledge regarding visual impairment

This section reports the results obtained for the teacher responses that aimed to determine the extent to which teachers possess adequate knowledge to identify learners with visual impairments in their classrooms. This section

comprised 39 randomly structured statements, which described the following characteristics of learners with visual impairments, namely **personal characteristics, physical characteristics, behavioural characteristics, learning characteristics** and **general characteristics**. The researcher included this section, as it was important to determine whether teachers could identify learners with visual impairments and what their attitude toward these learners were. According to the researcher, teachers can only effectively address the teaching and learning needs of visually impaired learners if they are able to identify these learners, know who they are and are willing and positive to accommodate the teaching and learning needs of these learners.

The teachers had to indicate to what extent they agree or disagree with a number of statements related to the characteristics of visually impaired learners. For the purpose of the data analysis and discussion, the 39 questionnaire items are structured according the characteristics that they present.

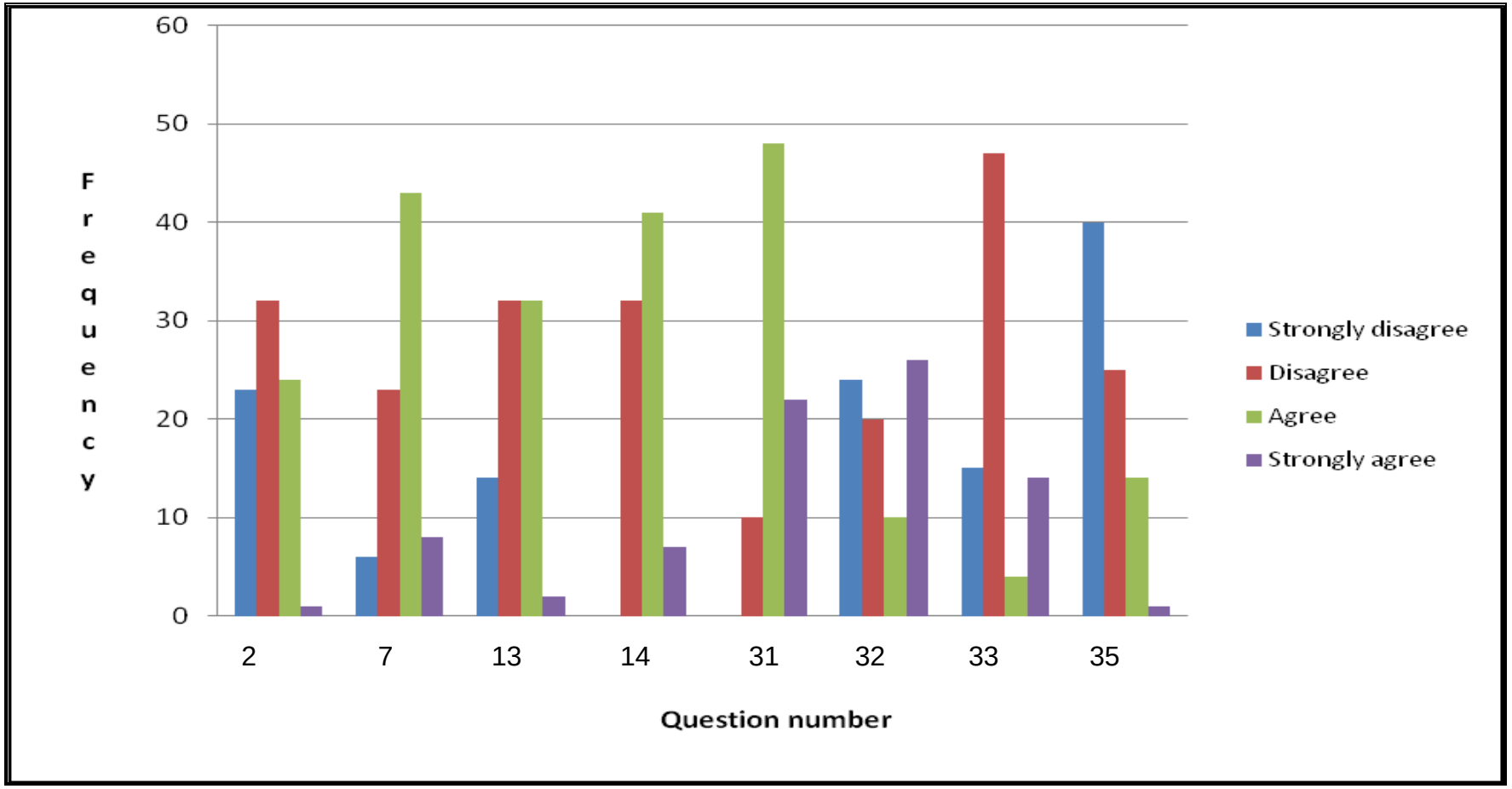
5.2.2.1 Personal characteristics

Table 5.6 and Figure 5.1 indicate the results obtained for the teacher responses in relation to the identification of personal characteristics of visually impaired learners.

Table 5.6: Personal characteristics of visually impaired learners

Learners with visual impairment.....	1		2		3		4		
	Strongly disagree		Disagree		Agree		Strongly agree		Mean
	f	%	f	%	f	%	f	%	
2 are not intelligent	23	28,75	32	40,00	24	30,00	1	1,25	2,04
7 are inattentive	6	7,50	23	28,75	43	53,75	8	10,00	2,66
13 are restless	14	17,50	32	40,00	32	40,00	2	2,50	2,28
14 are impulsive	0	0,00	32	40,00	41	51,25	7	8,75	2,69
31 often lack self-confidence	0	0,00	10	12,50	48	60,00	22	27,50	3,15
32 are lazy	24	30,00	20	25,00	10	12,50	26	32,50	2,48
33 are intellectually impaired	15	18,75	47	58,75	4	5,00	14	17,50	2,21
35 are uneducable	40	50,00	25	31,25	14	17,50	1	1,25	1,70
Section mean	2,40								

Figure 5.1: Graphical representation: Personal characteristics of visually impaired learners



Although the majority of the respondents disagreed (40%) and strongly disagreed (28,75%) that learners with visual impairments are not intelligent, there are still a number of teachers who agreed (30%) that learners with visual impairments are not intelligent. These responses are not in line with the literature, where it is indicated that general learning ability of learners with visual impairments are similar to the learning ability of non-disabled learners (Ormrod, 1995:179) (*cf.* 2.3.5.4). It is apparent that there are teachers who have a wrong impression about the intellectual abilities of learners with visual impairments.

The majority of the respondents also agreed (53,75%) that learners with visual impairments are inattentive, impulsive (51.25%), restless (40%) and lack self-confidence (60%). According to Lewis and Doorlag (2006:337), Ormrod (2008:179-180) and Donald *et al.* (2005:237-241) (*cf*. 2.3.5.2), learners with a visual impairment are rather more careful than impulsive. Deduced from the literature, it rather seems that learners with visual impairments will not be inattentive, restless or impulsive as their lack of vision impedes their physical ability (Bishop, 2004:66) (*cf*. 2.4.1). It is true that learners with visual impairments could have problems with self-confidence and self-concept, as this is based on how others treat them (Mitchell, 2008:53; Bishop, 2004:70) (*cf*. 2.4.5). However, they are able to develop self-confidence and a positive self-image. Again, it appears that the teachers who took part in the study have a wrong perception of learners of the personal characteristics of learners with visual impairments.

More or less an equal number of respondents strongly disagreed (30%) and strongly agreed (32,5%) that learners with visual impairments are lazy. It appears that teachers are divided in their opinion regarding this aspect.

What is encouraging form the responses, is that a number of teachers appear to regard learners with visual impairments as not being intellectually impaired (58,75%) and uneducable (50%). These responses are in line with Bishop (2004:68) (*cf.* 2.4.2), who argues that the intelligence of learners with visual

impairments does develop, but in different ways, which implies that they are educable and need to learn (Bishop, 2004:70) (*cf*. 2.4.2). The researcher is concerned that a number of teachers (17,50%) strongly agreed that learners with visual impairments are intellectually impaired, and 17,50% agreed to visually impaired learners being uneducable. These responses clearly indicate a lack of knowledge among some of the teachers regarding the personal characteristics of visually impaired learners, which could imply that their teaching and learning needs might not be addressed in the classroom.

In summary, it appears that not all the teachers who took part in the study have complete knowledge to identify certain personal characteristics of learners with visual impairments. Misperceptions were detected among some of the respondents as they *"strongly agreed"* and *"agreed*" to visually impaired learners being not intelligent, lazy, impulsive, inattentive and intellectually impaired. In this section, the researcher expected that all the teachers had to disagree or strongly disagree with the questionnaire statements. Based on the responses obtained, the researcher is concerned that some of the visually impaired learners who took part in the study might go unnoticed in the classroom because the teachers apparently do not possess adequate knowledge to identify them. This in turn could imply that teaching is not adapted to the needs of these learners.

In the following discussion, the responses obtained for recognising the physical characteristics of visually impaired learners are reported.

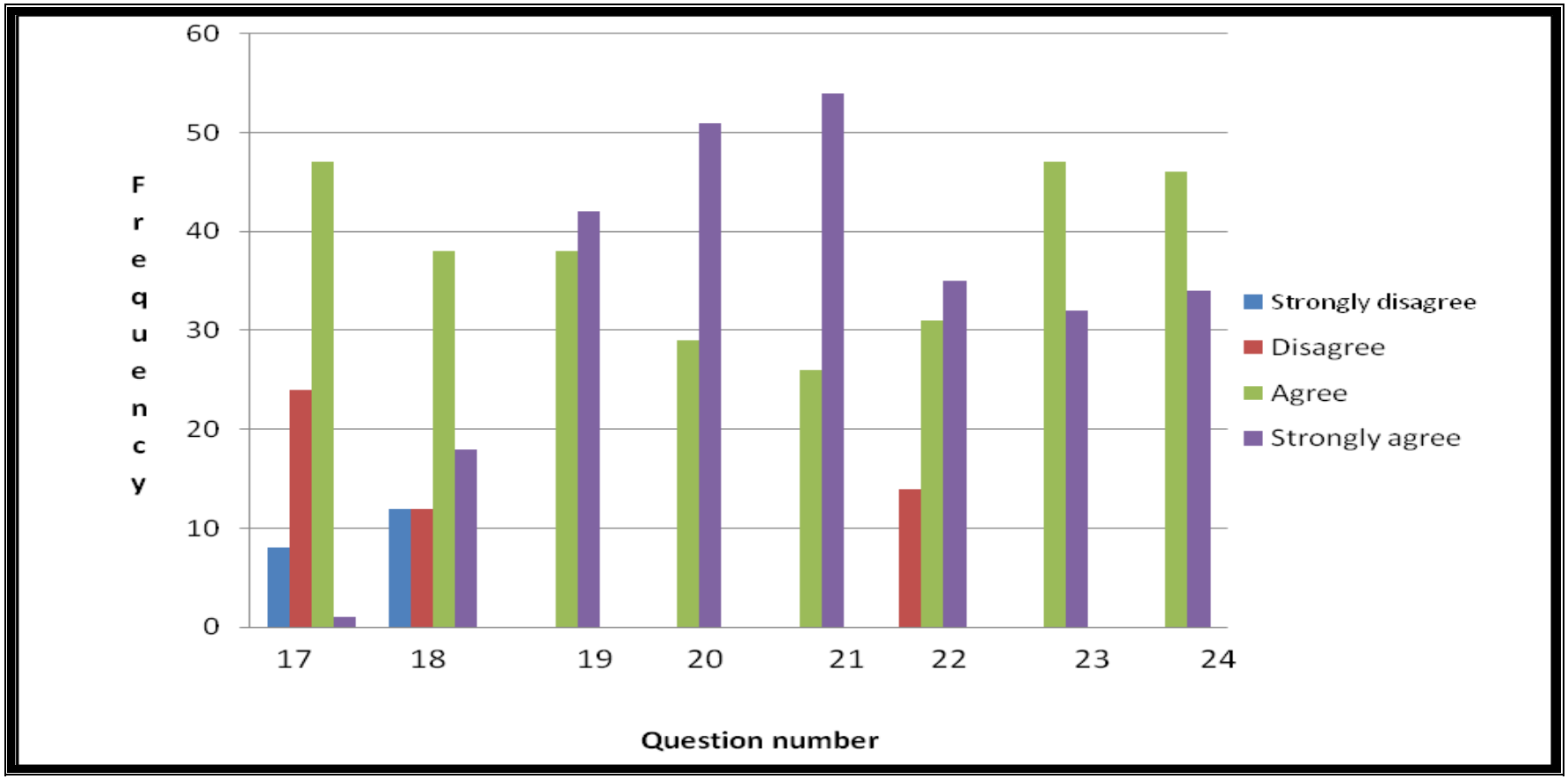
5.2.2.2 Physical characteristics

Table 5.7 and Figure 5.2 indicate the results obtained for the teacher responses in relation to the identification of the physical characteristics of visually impaired learners.

Table 5.7: Physical characteristics of visually impaired learners

Learners with visual impairment.....	1		2		3		4		
	Strongly disagree		Disagree		Agree		Strongly agree		
	f	%	f	%	f	%	f	%	Mean
17 can be detected by looking at the eyes of the learner	8	10,00	24	30,00	47	58,75	1	1,25	2,51
18 blink their eyes more than usual	12	15,00	12	15,00	38	47,50	18	22,50	2,78
19 rub their eyes frequently	0	0,00	0	0,00	38	47,50	42	52,50	3,53
20 narrow their eyes	0	0,00	0	0,00	29	36,25	51	63,75	3,64
21 frown a lot	0	0,00	0	0,00	26	32,50	54	67,50	3,68
22 cannot focus their eyes on what they read	0	0,00	14	17,50	31	38,75	35	43,75	3,26
23 may hold text close to their eyes	0	0,00	0	0,00	47	58,75	32	41,25	3,41
24 may hold text far from their eyes	0	0,00	0	0,00	46	57,50	34	42,50	3,43
Section mean	3,28								

Figure 5.2: Graphical representation: Physical characteristics of visually impaired learners



All the items in this section of the questionnaire pointed to physical observable characteristics of learners with visual impairments, as identified in the literature by Lewis and Doorlag (2006:337), Ormord (2008:179-180) and Donald *et al.* (2005:237-241) (*cf*. 2.3.5.1) and the researcher expected the respondents to agree or strongly agree with the statements. The majority of the respondents strongly agreed and agreed respectively, that learners with visual impairments:

- narrow their eyes (63,75%; 36,25%);
- frown a lot (67,50%; 32,50%);
- rub their eyes frequently (52,50%; 47,50%); and
- cannot focus their eyes on what they read (43,75%; 38,75%)

In addition to this, many of the respondents agreed that learners with visual impairments:

- blink their eyes more than usual (47,50%);
- can be detected by looking at the eyes (58,75%);
- may hold a text close to their eyes (58,75%); and
- hold a text far from the eyes (57,50%).

In summary, the responses obtained were encouraging, as it appears that the teachers who took part in the study are knowledgeable about identifying the physical signs of learners with visual impairments. This implies that teachers will be able to become aware of these learners for whom curriculum adaptations are required. A number of teachers however need to be made aware that blinking of eyes and by looking at the eyes of learners can provide an indication of a possible visual impairment.

In the following discussion, the responses obtained for recognising the behavioural characteristics of visually impaired learners will be reported.

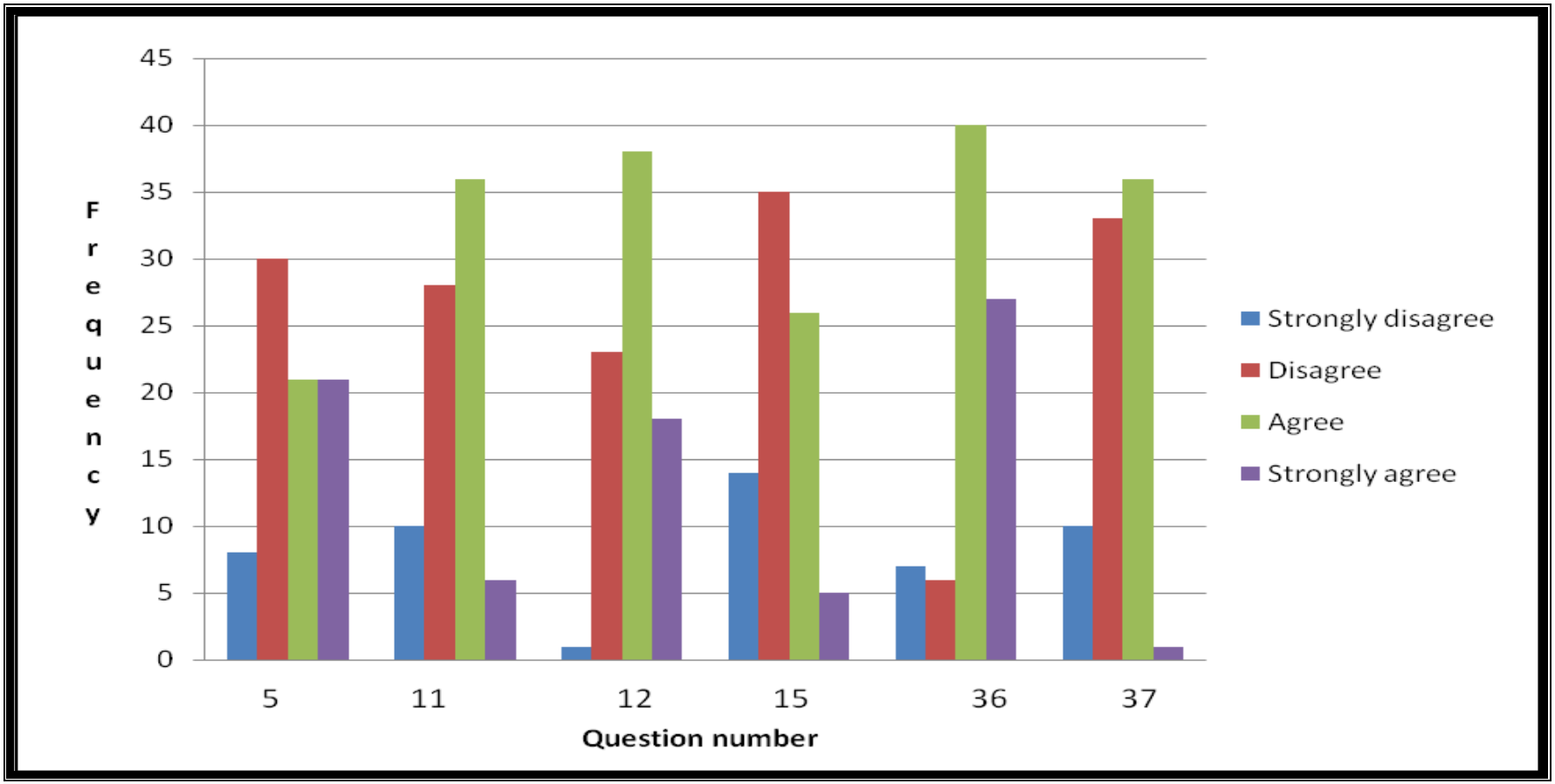
5.2.2.3 Behavioural characteristics

Table 5.8 and Figure 5.3 indicate the results obtained for the teacher responses in relation to the identification of the behavioural characteristics of visually impaired learners.

Table 5.8: Behavioural characteristics of visually impaired learners

	1		2		3		4		
Learners with visual impairment.....	**Strongly disagree**		**Disagree**		**Agree**		**Strongly agree**		**Mean**
	f	%	f	%	f	%	f	%	
5 rely heavily on teachers	8	10,00	30	37,50	21	26,25	21	26,25	2,69
11 do not respondent in group work	10	12,50	28	35,00	36	45,00	6	7.50	2,48
12 do not take part in conversations in class	1	1,25	23	28,75	38	47,50	18	22,50	2,89
15 rely heavily on their peers	14	17,50	35	43,75	26	32,50	5	6,25	2,28
36 are stressful to mainstream teachers	7	8,75	6	7,50	40	50,00	27	33,75	3,09
37 hamper the learning progress in a classroom	10	12,50	33	41,25	36	45,00	1	1,25	2,35
Section mean	2,63								

Figure 5.3: Graphical representation: Behavioural characteristics of visually impaired learners



Although the majority of the respondents disagreed (37,50%) that learners with visual impairments rely heavily on their teachers, more than half of the respondents agreed (26,75%) and strongly agreed (26,25%) that these learners do rely heavily on their teachers. The literature indicates that learners with visual impairments prefer to be near adults and their teachers (Crocker & Orr, 1996:148) (*cf.* 2.4.6) and that their interactions with their peers are not so successful. The responses of the teachers indicate that there are a number of teachers who took part in the study, who are not knowledgeable regarding the fact that learners with visual impairment have a strong dependence on their teachers. Linked to the previous responses, are the responses related to the fact that learners with visual impairments do not eagerly participate in group work. A large number of teachers agreed (45%) and strongly agree (7,50%) that these learners are not eager to participate in group work. Crocker and Orr (1996:148) (*cf.* 2.4.6) argue that adults compensate for the underdeveloped social skills of the learners with visual impairments, which peers do not do, therefore the inclination of visually impaired learners is to rely more on their teachers. Furthermore, the fact that sighted children often give up on interacting with learners who have visual impairments because their bids are not returned (Kekelis & Sacks, 1993:202) (*cf.* 2.4.6), supports the favouring of contact with adults by visually impaired learners. The responses of the majority of the respondents are therefore in line with the literature, as 43,75% disagreed and strongly disagreed (17,50%) that learners with visual impairments rely on their peers.

According to Lewis and Doorlag (2006:337), Ormrod (2008:179-180) and Donald *et al*. (2005:237-241) (*cf.* 2.3.5.5) learners with visual impairments find it difficult to start and follow conversations in class. The responses of the teachers are in line with the literature, as the majority of the them (47, 50%) agreed and strongly agreed (22,50%) that visually impaired learners do not take part in conversations in class. It is, however, disturbing, that 28,75% disagreed to this statement, which indicates that some of the teachers who took part in the study lack knowledge regarding visually impaired learners' behaviour in the classroom related to taking part in conversations.

Half of the respondents (50%) agreed and some strongly agreed (33.75%) that learners with visual impairments are stressful to mainstream teachers, while 45% agreed and 41,25% disagreed that learners with visual impairments hamper the learning process in the classroom. It is true that learners with visual impairments challenge teachers to adapt the curriculum and learning environment which imply an additional workload (Farrell, 2006:20; Lerner & Kline, 2006:115; Keller, 2005; Barraga & Erin, 2001:119; Cox & Dykes, 2001:72; Gadbow, 2001:19-21) (*cf.* 3.3.1-3.3.11). However, it is expected of teachers in inclusive classrooms, to accommodate all learners so that the learning progress of learners is not hampered (Dunbar-Krige & Van der Merwe, 2010:166; Department of Education, 2001:16) (*cf.* 2.2.3).

With regard to the latter responses, the teachers who took part in the study appear to be divided in their opinion regarding the fact that visual impairment poses a barrier to learning that can hamper the learning progress in the classroom. It could be that some of the teachers still need support in how to successfully deal with teaching and learning in a classroom where different learner needs have to be accommodated, therefore their agreement with the statement.

In summary, the responses to the items in this section of the questionnaire do not convincingly indicate that the teachers who took part in the study are knowledgeable about the relationships learners with visual impairments form with their teachers and peers, and why these learners appear to be reluctant to become involved during conversations in the classroom. Furthermore, some of the teachers appear to be dubious as to whether learning progress can be guaranteed in a classroom where the needs of visually impaired learners have to be accommodated. It could be that the teachers are not yet ready to respond to a multisensory approach (auditory, tactile and kinaesthetic) to teaching to enable visually impaired learners to succeed (Mitchell, 2008:33; Barraga & Erin, 2001:63-65; Cox & Dykes, 2001:72; Johnson, 2000:584-594) (*cf.* 3.3.7).

In the following discussion, the responses obtained for identifying the learning characteristics of visually impaired learners are reported.

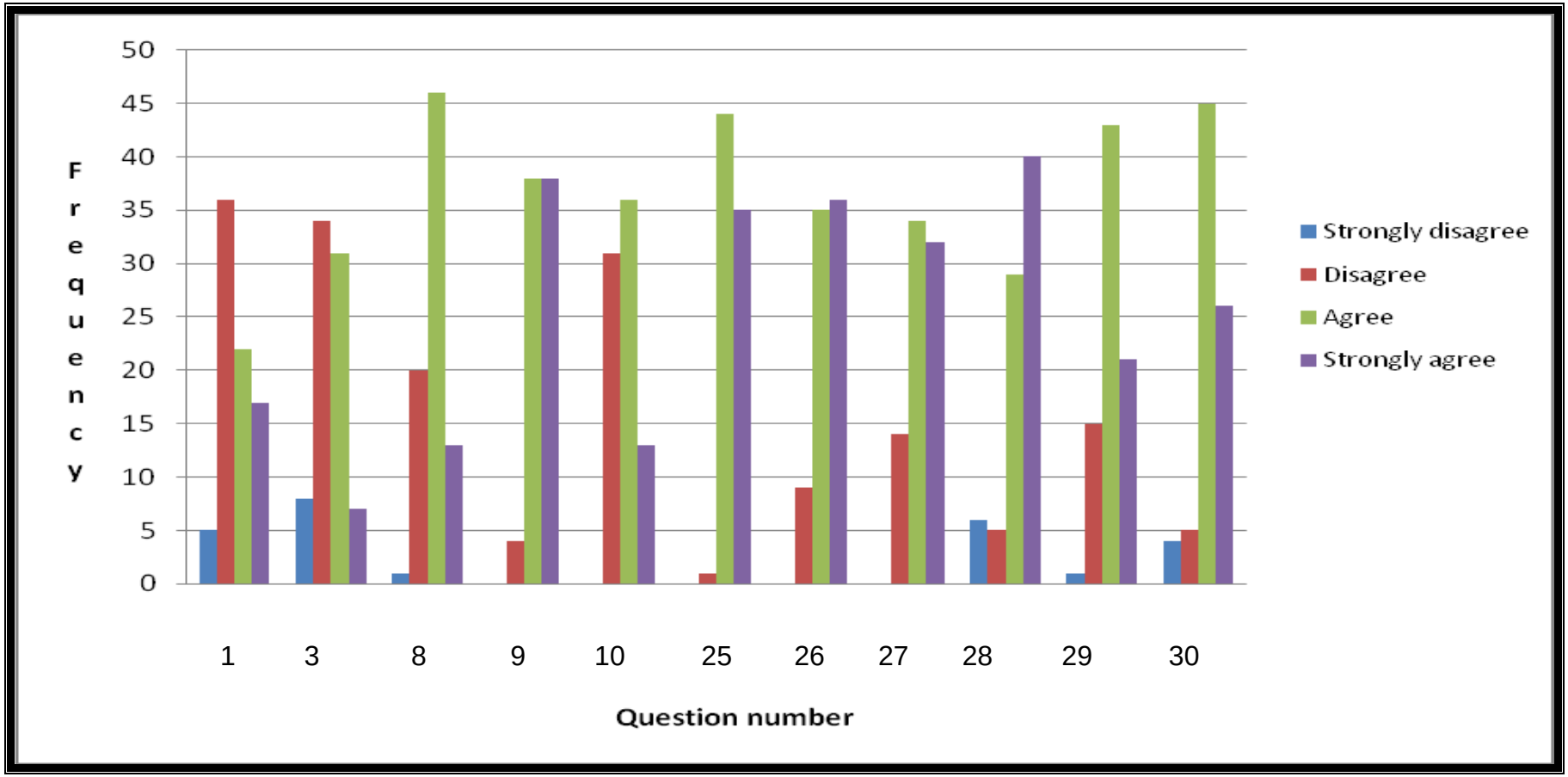
5.2.2.4 Learning characteristics

Table 5.9 and Figure 5.4 indicate the results obtained for the teacher responses in relation to the identification of the learning characteristics of visually impaired learners.

Table 5.9: Learning characteristics of visually impaired learners

	1		2		3		4		
Learners with visual impairment...	**Strongly disagree**		**Disagree**		**Agree**		**Strongly agree**		**Mean**
	f	%	f	%	f	%	f	%	
1 have poor academic achievement	5	6,25	36	45,00	22	27,50	17	21,25	2,64
3 have a disorganized approach to learning	8	10,00	34	42,50	31	38,75	7	8,75	2,46
8 struggle to remember what they have learned	1	1,25	20	25,00	46	57,50	13	16,25	2,89
9 have good listening skills	0	0,00	4	5,00	38	47,50	38	47,50	3,43
10 have poor communication skills	0	0,00	31	38,75	36	45,00	13	16,25	2,78
25 confuse letters with more or less the same shape (P,D,B,R)	0	0,00	1	1,25	44	55,00	35	43,75	3,43
26 cannot space their writing properly	0	0,00	9	11,25	35	43,75	36	45,00	3,34
27 continually write down incorrectly from the chalk board	0	0,00	14	17,50	34	42,50	32	40,00	3,23
28 have concentration problems	6	7,50	5	6,25	29	36,25	40	50,00	3,29
29 have reading problems	1	1,25	15	18,75	43	53,75	21	26,25	3,05
30 need extra time for tasks	4	5,00	5	6,25	45	56,25	26	32,50	3,16
Section mean	3,06								

Figure 5.4: Graphical representation: Learning characteristics of visually impaired learners



The majority of the respondents (45%) disagreed and strongly disagreed (6,26%) that learners with visual impairments have poor academic achievement. This is in line with Ormrod (1995:179) (*cf.* 2.3.5.4) who argues that learners with visual impairments have a general learning ability similar to non-disabled learners, which implies that learners with visual impairments do not necessarily perform academically poorer that their non-disabled peers. However, a large number of the teachers did not share this view, as 27,50% agreed and 21,25% strongly agreed that learners with visual impairments have poor academic achievement. In addition to this, many of the respondents (57,50%), agreed that learners with visual impairments struggle to remember what they have learned.

A large number of respondents (43,50%) disagreed that learners with visual impairments have a disorganised approach to learning, whereas 38,75% agreed to the statement. A disorganised approach **will** occur if visual material or activities in the classroom are not adapted for learners with visual impairments (Mitchell, 2008:33; Farrell, 2006:20; Ferreira, 2006:139; Keller, 2005; Barraga & Erin, 2001:119; Cox & Dykes, 2001:73; Heward, 2000:18, 81; Koenig & Holbrook, 2000:290) *(cf*. 3.3.1-3.3.10). In this regard, the respondents who disagreed to the statement appear to be in line with the literature. On the other hand, Gray (2005:180) (*cf*. 2.3.5) indicates that information obtained by learners who are visually impaired through their other senses, are often fragmented and inconsistent, which could lead to a disorganized approach to learning.

The majority of the respondents (57,5%) agreed that learners with visual impairments struggle to remember what they have learned. This will only be true in the case of learning not providing opportunities to explore, investigate and participate (Mitchell, 2008:33; Cox & Dykes, 2001:72) (*cf.* 3.3.7).

An equal number of respondents strongly agreed and agreed (47,5%) that learners with visual impairments have good listening skills which support a stronger focus on the use of verbal presentations during teaching and learning

for the visually impaired learner (Hugo, 2006:50; Barraga & Erin, 2001:119) (*cf.* 2.3.5).

It is clear from the responses, that the majority of the respondents will be able to identify problems that visually impaired learners could experience when they are busy with deskwork, namely spacing their writing, writing down incorrectly from the chalk board and confusing letters with more or less the same shape. The literature indicates that the above-mentioned aspects are indeed problematic to visually impaired learners (Lewis & Doorlag, 2006:337; Ormrod, 2008:179-180; Donald *et al.,* 2005:237-241; Eggen & Kauchak, 2004:174) (*cf.* 2.3.5.1).

Learners with visual impairments (Lewis & Doorlag, 2006:337; Donald *et al.,* 2005:237-241) also experience reading problems (*cf*. 2.3.5.3). The majority of the teachers rightfully agreed (53,75%) and strongly agreed (26,25%) that learners with visual impairments experience reading problems.

Poor communication skills among learners with visual impairments can be attributed *inter alia* to problems they experience in making friends (Gray, 2005:180; McGaha & Farran, 2001:90-92; Crocker & Orr, 1996:148) (*cf.* 2.4.6), and avoiding opportunities for interaction (Ormrod, 1995:179) (*cf.* 2.4.6). The majority of the respondents (45%) indicated that poor communication skills hold true for learners with visual impairments. A number of the respondents (38,75%) disagreed that learners with visual impairments have communication problems. These responses are disturbing, as they imply that problems related to the language development of learners with visual impairments (Bishop, 2004:69) (*cf.* 2.4.3) might be overlooked during teaching and learning.

Literature highlights the fact that learners with visual impairments may possess superior concentration skills (Besnoy *et al.,* 2006:134) (*cf.* 2.3.5.6). The responses of the majority of the respondents were not in line with the literature, as they strongly agreed (50%) and agreed (36,25%) that learners with visual impairments have concentration problems.

The majority of the respondents rightfully agreed (56,25%) and strongly agreed (32,50%) that learners with visual impairments need extra time for tasks. This is in line with the suggestions made by the Department of Education (2002b:8-10), Davies (2003:205-205), Heward (2000:6-10) and Switlick (1997:225-230) that providing extra time should be provided for the completion of all learning and assessment tasks (*cf.*3.4.1).

In summary, it appears that teachers possess adequate knowledge to recognize learners with visual impairment when doing deskwork, they are aware that visually impaired learners have good listening skills and poor reading skills, and need extra time for task completion. However, a number of the respondents appear to be under the wrong impression that learners with visual impairments have poor academic achievement, experience concentration problems and are disorganized. With regard to the latter, the literature clearly indicates that the learning environment needs to be structured in such away to enhance the success and progress of the learners with visual impairments. This will include *inter alia* the provision of tactile learning, a strong focus on auditory learning and adapting printed material using an easily readable font (Barraga & Erin, 2001:153; Heward, 2000:18, 29, 81) (*cf.* 3.3.1). The responses also revealed that a stronger focus on the language development of learners with visual impairments is required in some of the classrooms where the research was conducted.

In the following discussion, the responses obtained for recognising certain general characteristics of visually impaired learners are reported.

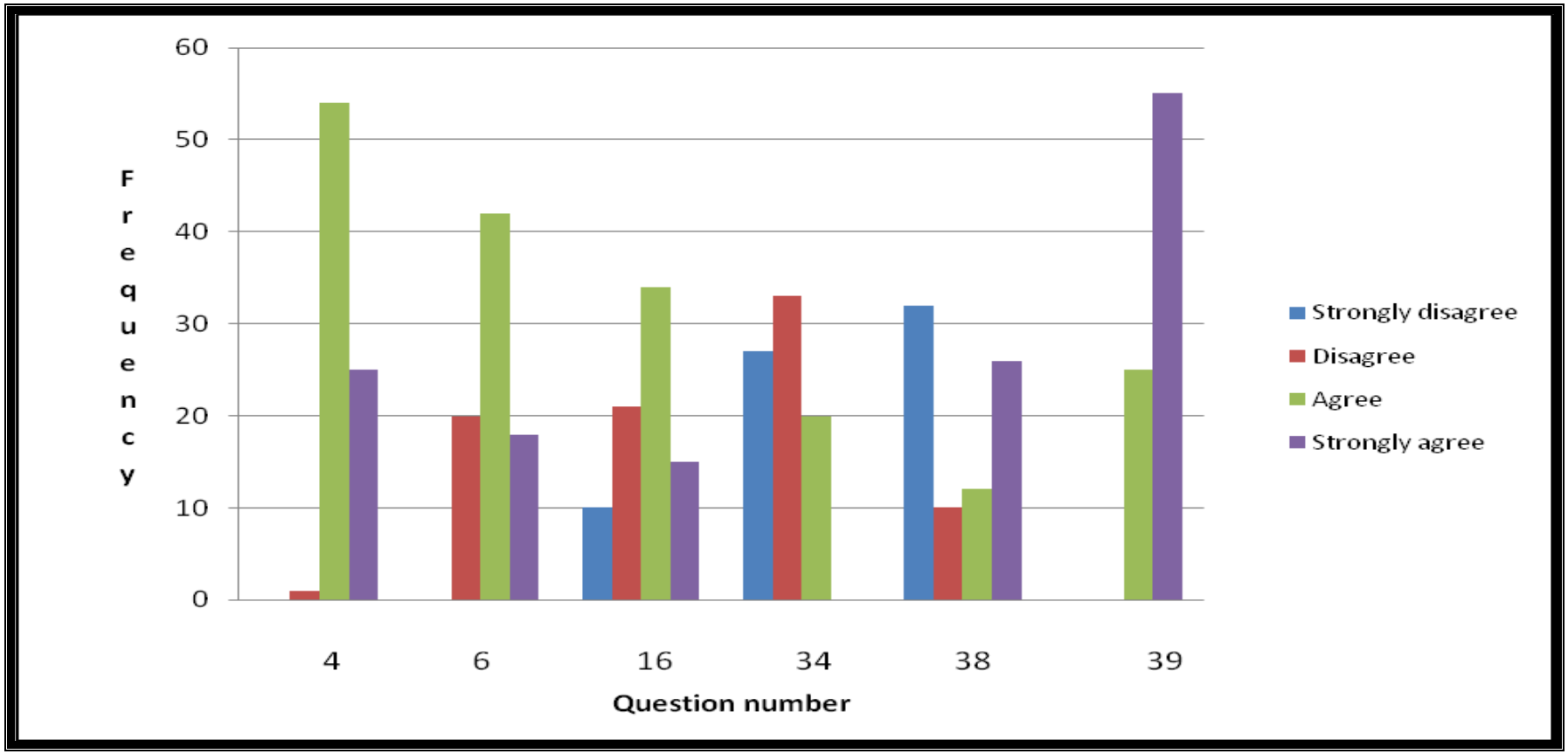
5.2.2.5 General characteristics

Table 5.10 and Figure 5.5 indicate the results obtained for the teacher responses in relation to the identification of general characteristics of visually impaired learners.

Table 5.10: General characteristics of visually impaired learners

	1		2		3		4		
Learners with visual impairment.	**Strongly disagree**		**Disagree**		**Agree**		**Strongly agree**		**Mean**
	f	%	f	%	f	%	f	%	Mean
4 can be assisted if identified early	0	0,00	1	1,25	54	67,50	25	31,25	3,30
6 impact negatively on learning in the classroom	0	0,00	20	25,00	42	52,50	18	22,50	2,98
16 can be assisted through remedial intervention	10	12,50	21	26,25	34	42,50	15	18,75	2,68
34 do not belong in mainstream classrooms	27	33,75	33	41,25	20	25,00	0	0,00	1,91
38 should be taught separately in the mainstream	32	40,00	10	12,50	12	15,00	26	32,50	2,40
39 requires that teachers pay careful attention to the learning environment (design, light, sound, seating arrangement)	0	0,00	0	0,00	25	31,25	55	68,75	3,69
Section mean	2,66								

Figure 5.5: Graphical representation: General characteristics of visually impaired learners



In this section, the researcher mainly wanted to establish whether the teachers who took part in the study are of the opinion that learners with visual impairments can be taught within mainstream schools and whether the learners could be assisted through intervention. The responses would provide an indication of the teachers' attitudes towards visually impaired learners in mainstream classrooms.

The majority of the respondents (67,50%) agreed to the fact that learners with visual impairments can be assisted through intervention (42,50%) when identified early. It is disconcerting that a large number of the respondents disagreed (26,25%) and strongly disagree (12,50%) that remedial intervention will not assist these learners. In addition to this, 52,50% agreed and 22,50% strongly agreed that including learners with visual impairments in the classroom will impact negatively on learning in the classroom. The responses are not in line with what the Department of Education (2001:16,19) envisages for all learners, namely that all learners can learn when curriculum barriers to learning are met when teachers include a greater flexibility in the selection of their teaching and assessment strategies (*cf*. 3.3; 3.4).

The teachers who took part in the study had divided opinions regarding whether learners with visual impairments should be taught in mainstream classrooms or separately in the mainstream. A large number of the respondents strongly disagreed (33,75%) and disagreed (41,25%) that learners with visual impairments do not belong in mainstream classrooms. Many of the respondents strongly disagreed (40%) and disagreed (12,50%) that learners with visual impairments should be taught in separate classes in mainstream schools. Because a large number of the respondents strongly agree (68,75%) and agreed (31,25%) that the teaching environment requires adaptations, the researcher concludes that teachers are aware of the challenges that come along when teaching visually impaired learners in inclusive classrooms.

In summary, it is clear that some of the respondents find the presence of learners with visual impairments in a mainstream classroom problematic. Maybe this perception also contributed to the majority of the respondents (68,75%) strongly agreeing that learners with visual impairments require that the teacher pays a lot of attention to the structuring and planning of the learning environment.

The discussion linked to each of the sections in the questionnaire that focussed on the characteristics of learners who are visually impaired, indicated that not all the teachers who took part in the study possess adequate knowledge to identify these learners. Although a large number of the teachers indicated adequate knowledge regarding the identification of visually impaired learners in their classrooms, the data also revealed that the respondents had misperceptions or divided perceptions regarding the following: visually impaired learners not being intelligent, impulsive, inattentive, lazy, intellectually impaired, having poor academic achievement, concentration problems and a disorganized approach to learning.

Furthermore, it was clear that many of the respondents do not understand the social relationships that visually impaired learners establish with their teachers and peers. The responses indicated that the learners were apparently reluctant to become involved in conversations and social activities. It also became clear that the teachers who took part in the study might not be aware of the fact that although the cognitive development of visually impaired learners might take place differently to that of their sighted peers (Bishop, 2004:68-75) (*cf.* 2.4.2; 2.4.3; 2.4.6). These misperceptions could imply that visually impaired learners might go unnoticed, and their needs related to language, social and cognitive development ultimately not addressed during teaching and learning. Furthermore, if the social development of the visually impaired learner is under-emphasized, the development of self-concept and self-esteem might also be affected (Mitchell, 2008:53; Hugo, 2006:50; Bishop, 2004:70) (*cf.*2.4.5). It was encouraging that the respondents indicated that they had adequate knowledge to identify visual problems by looking at the

physical appearance and observing the behaviours of learners during teaching and learning.

The respondents indicated that having learners with visual impairments in their classrooms is stressful, and that these learners do not belong in the mainstream. This could imply a negative attitude towards the learners with visual impairments that could *inter alia* be linked to the fact that curriculum adaptations, which bring along an additional workload, are required, or maybe the teachers do not have enough knowledge and support form district-level to plan for the curriculum adaptations required.

In the following section, the teacher responses to the questionnaire items that related to the challenges faced by teachers when teaching visually impaired learners are reported.

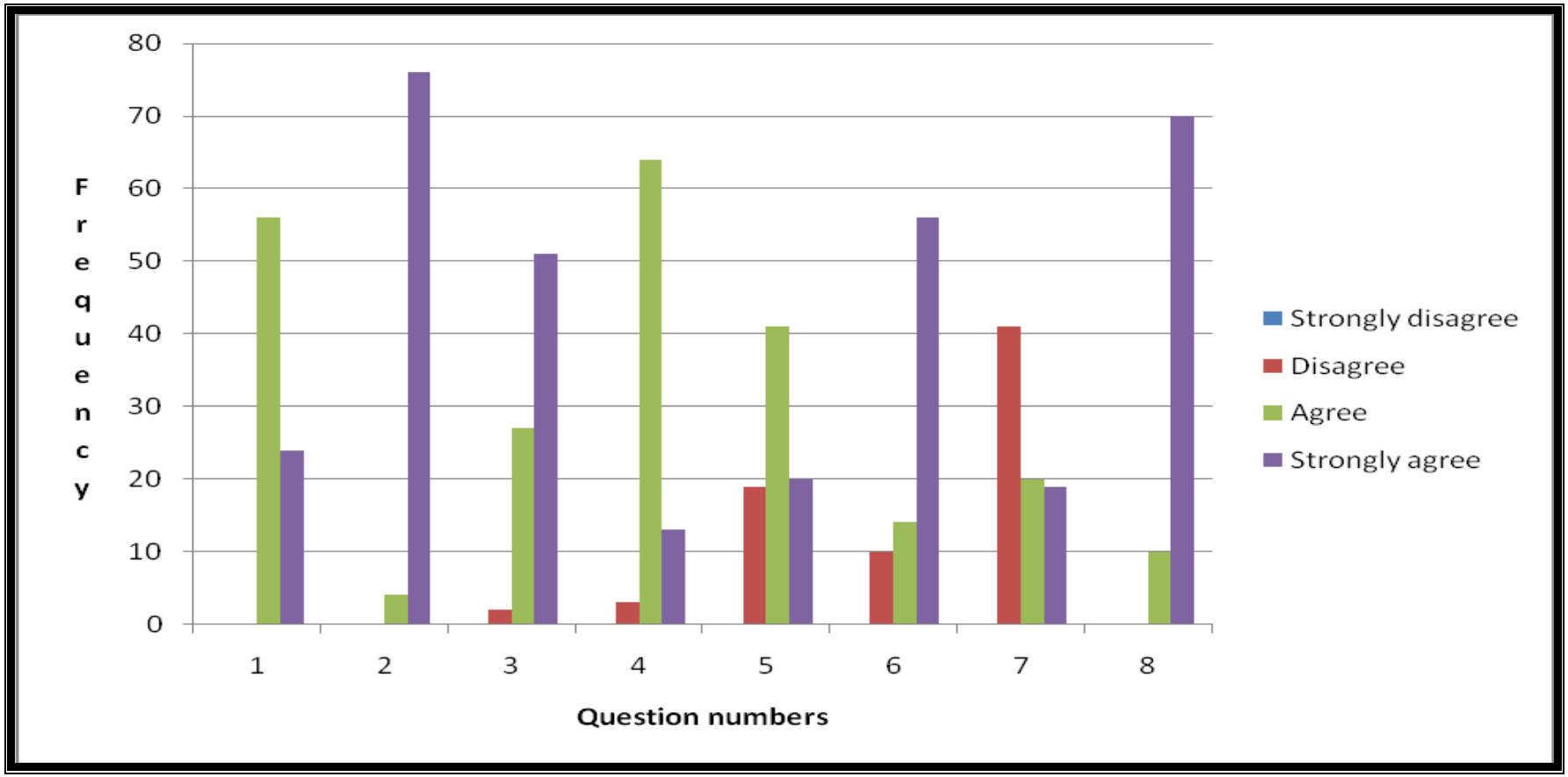
5.2.3 Challenges related to the teaching of visually impaired learners

Table 5.11 and Figure 5.6 indicate the results obtained for the items in this section of the questionnaire. Teachers had to indicate the extent to which they agree with the statements as being challenges related to the teaching of visually impaired learners.

Table 5.11: Challenges related to the teaching of visually impaired learners

	1		2		3		4		
Teaching visually impaired learners is challenging because.....	**Strongly disagree**		**Disagree**		**Agree**		**Strongly agree**		**Mean**
	f	%	f	%	f	%	f	%	Mean
1 it is time consuming	0	0,00	0,00	00,0	56	70,00	24	30,00	3,30
2 teachers need to adapt the curriculum	0	0,00	0,00	00,0	4	5,00	76	95,00	3,95
3 they require a lot of attention	0	0,00	2	2,50	27	33,75	51	63,75	3,61
4 teachers do not possess adequate knowledge to teach learners with visual impairments	0		3	3,75	64	80,00	13	16,25	3,13
5 teachers do not get support from district offices	0	0,00	19	23,75	41	51,25	20	25,00	3,01
6 teachers need to collaborate with teachers who teach learners with special needs	0	0,00	10	12,50	14	17,50	56	70,00	3,58
7 it can obstruct the progress of learners who do not have impairments	0	0,00	41	51,25	20	25,00	19	23,75	2,73
8 a number of factors in relation to the classroom environment have to be considered (design, light, seating arrangement, sound)	0	0,00	0	0,00	10	12,50	70	87,50	3,88
Section mean	2,78								

Figure 5.6: Graphical representation: Challenges related to the teaching of visually impaired learners



From the responses obtained, it appears that the teachers who took part in the study are aware of the challenges linked to the teaching of visually impaired learners in an inclusive classroom. The majority of the teachers agreed (70%) and strongly agree (30%) that it is time-consuming, that teachers do not get support from district offices (51,255) and that teachers do not possess adequate knowledge (80%) to teach learners with visual impairment. Furthermore, the majority of the respondents strongly agreed that teaching visually impaired learners implies adapting the curriculum (95%), that the visually impaired learners require a lot of attention (63,75%), that they need to collaborate with other teachers (70%) and take a number of factors into consideration (87,5%) when planning the learning environment for teaching learners with visual impairments. What is noteworthy, is that 51,25% disagreed that learners with visual impairment can obstruct the progress of learners without visual impairment. When compared to questionnaire item 37 (*cf*. Table 5.8) that addresses a similar issue, namely whether learners with visual impairment will hamper the learning progress in the classroom, 45% of the teachers agreed to it's being possible. It appears that half of the respondents who took part in the study are of the opinion that learners with visual impairment will not necessarily hamper learning progress. The other half of the respondents were of the opinion that this would happen.

The responses of the teachers who took part in the study augur well with the findings in the literature, where it is indicated that teaching learners with visual impairments in inclusive classrooms comes along with challenges. These challenges refer to: management and organization, tempo of teaching (Jones & Bender, 2002:83) (*cf.* 2.2.4.2), paying special attention to teaching and assessment strategies to accommodate these learners (Mitchell, 2008:83; Hugo, 2006:50; Lerner & Kline, 2006:15; Jones & Bender, 2002:83; Cox & Dykes, 2001:72) (*cf.* 2.2.4.2; 3.3.5; 3.3.2; 3.3.3; 3.3.7; 3.4) and making adaptations to the learning environment (Farrell, 2006:20) (*cf.* 3.3.1).

Although it is indicated by the Department of Education (2005a:16-23) that support from district offices in relation to curriculum, teaching, assessment

and the provision of resources should be provided to teachers who have to accommodate the teaching and learning needs of all learners, the responses obtained indicated that this is not the case. The lack of support could contribute to teachers' negative attitudes towards having learners with visual impairments in their classrooms.

In the following section, the teacher responses to the questionnaire items that related to the application of teaching, learning and assessment principles are reported.

5.2.4 Classroom teaching, learning and assessment principles

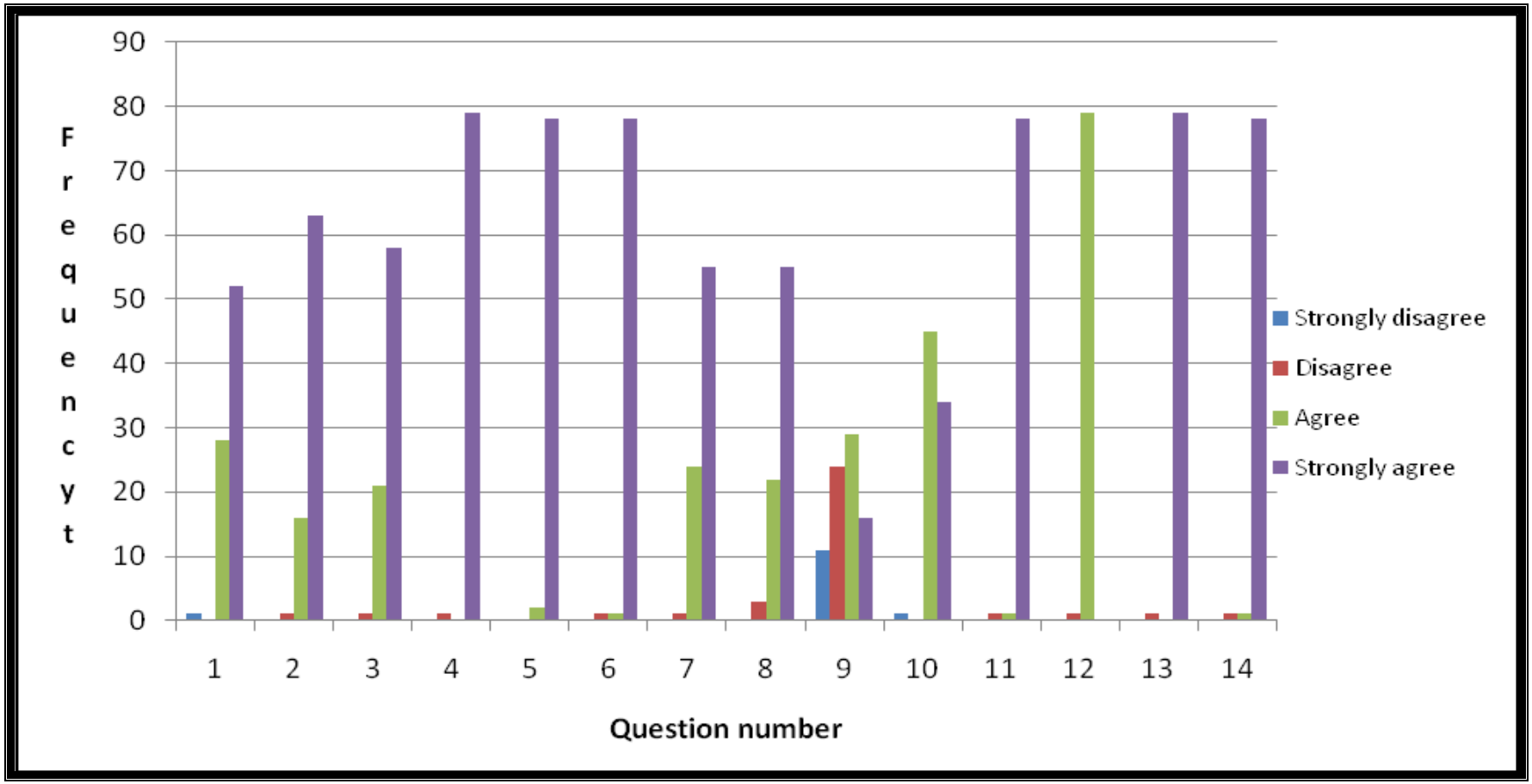
Table 5.12 and Figure 5.7 indicate the results obtained for the items in this section of the questionnaire. The teachers had to indicate the extent to which they agree with the statements as being important principles for classroom teaching, learning and assessment when dealing with visually impaired learners.

Table 5.12: Classroom teaching, learning and assessment for the visually impaired learner

Teachers should	1		2		3		4		
	Strongly disagree		Disagree		Agee		Strongly agree		
	f	%	f	%	f	%	f	%	Mean
1 modify teaching strategies	1	0,00	0	0,00	28	35,00	52	65,00	3,65
2 modify assessment strategies	0	0,00	1	1,25	16	20	63	78,75	3,78
3 accommodate learners with visual impairments in mainstream classrooms	0	0,00	1	1,25	21	26,25	58	72,50	3,71
4 motivate all learners to accept each other the way they are	0	0,00	1	1,25	0	0,00	79	98,75	3,98
5 involve parents in teaching and learning	0	0,00	0	0,00	2	2,50	78	97,50	3,98
6 participate in planning and implementing specific learning support programmes	0	0,00	1	1,25	1	1,25	78	97,50	3,96
7 involve visually impaired learners in extra-curricular activities	0	0,00	1	1,25	24	30	55	68,75	3,68
8 give learners with visual impairments extra time for tasks	0	0,00	3	3,75	22	27,50	55	68,75	3,65
9 teach learners with visual impairments mostly verbal	11	13,75	24	30,00	29	36,25	16	20,00	3,63
10 make use of audio tapes when teaching	1	1,25	0	0,00	45	56,25	34	42,50	2,40
11 enlarge reading material	0	0,00	1	1,25	1	1,25	78	97,50	3,96
12 make use of special equipment during teaching	0	0,00	1	1,25	79	98,75	0	0,00	3,98

13 supply learners with a verbal reading of everything that occurs visually	0	0,00	1	1,25	0	0,00	79	98,75	3,98
14 utilize models during teaching in order for learners to feel and touch	0	0,00	1	1,25	1	1,25	78	97,50	3,96
Section mean	3,73								

Figure 5.7: Graphical representation: Classroom teaching and assessment for the visually impaired learner



The responses obtained from the questionnaire items in this section clearly indicate that the teachers who took part in the study are knowledgeable about what the policy on inclusive education entails (Dunbar-Krige & Van der Merwe, 2010:163; Landsberg *et al.,* 2005:4; Department of Education, 2002b:16-19) (*cf.* 2.2.3). The majority of the teachers strongly agreed and agreed respectively to many of the following questionnaire items:

- teachers should modify teaching strategies (65%; 35%);
- teachers should modify assessment strategies (78,75%; 20%);
- learners with visual impairments should be accommodated in a mainstream classroom (72,50%; 26,25%);
- learners should be motivated to accept each other the way they are (98,75%);
- parents should be involved in the teaching and learning of learners (97,50%);
- teachers should participate in collaborative planning and implementing of specific learning support programmes (97,50%);
- involve learners with visual impairments in extracurricular activities (68,75%; 30%);
- learners with visual impairment should be given extra time for the completion of tasks (68,75%; 27,50%);
- learning material for visually impaired learners should be enlarged (97,50%);
- supply learners with verbal readings of everything that occurs visually (98,75%); and
- utilize models during teaching (97,50%).

Furthermore, 98,75% agreed that special equipment should be used during the teaching of visually impaired learners. The majority of the respondents also agreed (56,25%) and strongly agreed (42,50%) that audio tapes be used during teaching. These responses support the argumentation in the literature that equipment such as Braille, tape recorders and dictaphones should be utilized during the teaching of visually impaired learners (Davies, 2003:205-206; Department of Education, 2003:8-10) (*cf.* 3.4.1).

What appears to be problematic, is that a number of the respondents who strongly disagreed (13,75%) and disagreed (30%) that learners with visual impairments should not be taught mainly verbally. According to the literature, teachers should always provide detailed verbal descriptions and narratives of the activities in the classroom (Keller, 2005) (*cf.* 3.3.5), and Hugo (2006:50) (*cf*.3.3.9) argue for teaching to be mainly verbal as learners with visual impairments rely largely on hearing.

In the following section, the teacher responses to the questionnaire items that related to the frequency with which certain teaching and assessment strategies are utilized in the classroom for visually impaired learners, are reported.

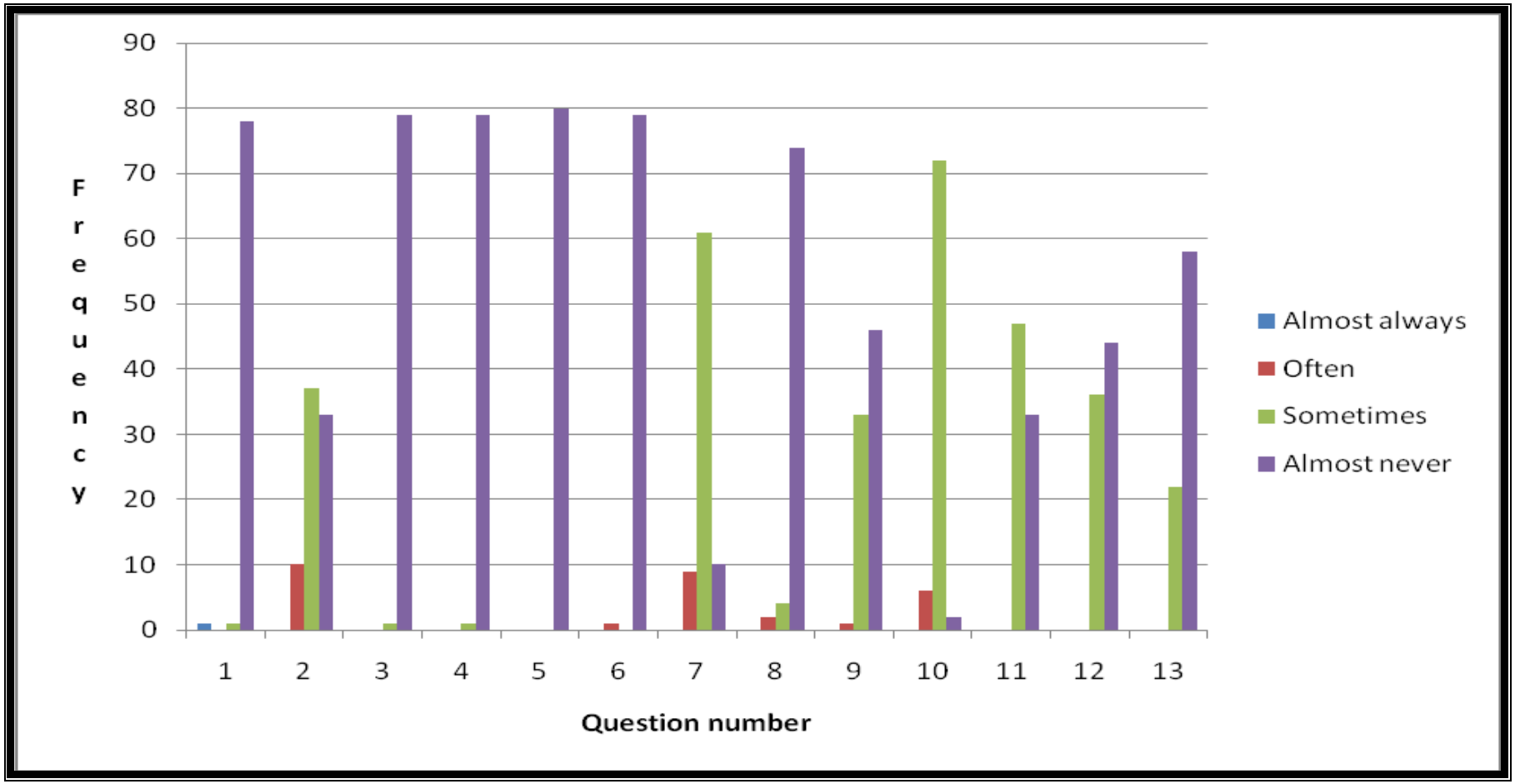
5.2.5 Teaching and assessment strategies for the visually impaired

Table 5.13 and Figure 5.8 indicate the results obtained for the items in this section of the questionnaire. The teachers had to indicate the frequency with which they utilize certain teaching and assessment strategies in the classroom.

Table 5.13: Teaching and assessment strategies for the visually impaired learner

Teaching and assessment strategies	Almost Always		Often		Sometimes		Almost Never		
	f	%	f	%	f	%	f	%	Mean
1 Braille	1	1,25	0	0,00	1	1,25	78	97,50	3,95
2 Enlarged or bolded text	0	0,00	10	12,50	37	46,25	33	41,25	3,29
3 Audio cassettes	0	0,00	0	0,00	1	1,25	79	98,75	3.29
4 Dictaphones	0	0,00	0	0,00	1	1,25	79	98,75	3,99
5 Permitting learners to respond by typing	0	0,00	0	0,00	0	0,00	80	100,00	4,00
6 Allowing additional time to complete tasks	0	0,00	1	1,25	0	0,00	79	98,75	3,98
7 Allowing learners to respond through descriptions instead of drawings	0	0,00	9	11,25	61	76,25	10	12,50	3,01
8 Reading assessment tasks to learners before requesting them to complete them	0	0,00	2	2,50	4	5,00	74	92,50	3,90
9 Verbal explanations and lectures	0	0,00	1	1,25	33	41,25	46	57,50	3,56
10 Demonstrations	0	0,00	6	7,50	72	90,00	2	2,50	2,95
11 Group work and cooperative learning	0	0,00	0	0,00	47	58,75	33	41,25	3,41
12Supplying verbal readings when demonstrations are done	0	0,00	0	0,00	36	45,00	44	55,00	3,55
13 Utilizing models to feel and touch	0	0,00	0	0,00	22	27,50	58	72,50	3,73
Section mean	3,63								

Figure 5.8: Graphical representation: Teaching and assessment strategies for the visually impaired learner



Although the responses obtained in the previous section indicated that the teachers who took part in the study acknowledge that the teaching and learning environment needs to be adapted for learners with visual impairments, the responses to the questionnaire items in this section of the questionnaire revealed the opposite. The majority of the respondents indicated that they almost never use the following:

- Braille (97,50%);
- audio cassettes (98,75%);
- dictaphones (98,75%);
- permitting learners to respond by typing (100%);
- allowing additional time to complete tasks (98,75%);
- reading assessment tasks to learners before they complete them (92,50); and
- using models to feel and touch (72,50),

Enlarged or bolded texts are only used sometimes (46,25%) or almost never (41,25%), and learners are only allowed to sometimes respond through verbal descriptions (76,25%) instead of drawings. The majority of the respondents indicated that demonstrations (90%) and group work and cooperative learning (58,75%) are sometimes used, and verbal readings are supplied sometimes (45%) when demonstrations are done. A number of teachers indicated that they almost never use group work and cooperative learning (41,25%) and supply verbal readings when demonstrations are done (55%). In addition to this, verbal explanations and lectures are supplied sometimes (41,25%) and almost never (57,50%).

The literature on the teaching and learning of the visually impaired learner highlights the importance of adapting instruction through Braille, enlarged and bolded texts and audio cassettes (Ferreira, 2006:139; Keller, 2005; Bishop,

2004:93; Barraga & Erin, 2001:141; Heward, 2000:21) *(cf.* 3.2; 3.2.4; 3.3.9; 3.3.10; 3.3.11; 3.4). In addition to this, the Department of Education (2003:8-10) (*cf*. 3.5.1) highlights the importance of giving additional time to complete tasks and limiting the use of illustrations and drawings. Teachers should make use of cooperative learning techniques, as these techniques motivate interaction and social acceptance (Felder & Brent, 2001:69-75) (*cf.* 3.3.3). Keller (2005) (*cf*. 3.3.4) argues for the use of verbal explanations during teaching and assessment, and Hugo (2006:51) and Keller (2005) (*cf.* 3.3.5; 3.3.6) support the use of enlarged print. The use of models and equipment to manipulate during teaching and learning is supported by Keller (2005) and Cox & Dykes (2001:72) (*cf.* 3.3.7) while Keller (2005) suggests the use of demonstrations during teaching.

The responses obtained could be an indication that the schools where the teachers teach do not possess adequate resources to facilitate the teaching and learning of visually impaired learners. Furthermore, teachers might not yet understand the importance of verbal explanation during teaching, and also do not take cognizance of the merits of cooperative learning for establishing social relationships than can promote language development, cognitive development and self-esteem among learners with visual impairments (*cf.* 3.3.3).

In the following section, the data analysis and interpretation for the responses obtained from the learner questionnaire are reported.

5.3 DATA ANALYSIS AND INTERPRETATION: LEARNER QUESTIONNAIRE

In the next section, the biographic information for the learners who took part in the study is presented. In the tables that present the data, responses obtained for the various questionnaire items as well as items that were not answered (missing responses) are reported. For the purpose of the graphical representations, data are rounded off to the nearest integer, and missing

responses refer to the learners who did not indicate any response to certain questionnaire items.

5.3.1 Biographic information: learners

Table 5.14 indicates the spread of learner respondents according to the grade they are presently completing.

Table 5.14: Grade of learners

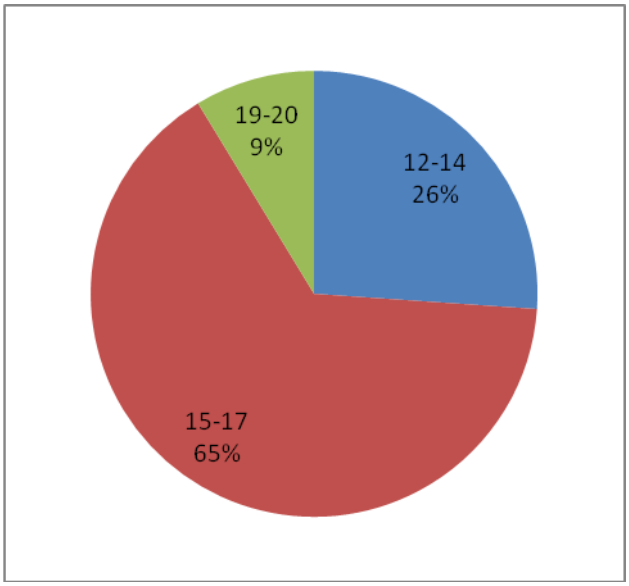
	1	2	3	4	5	6	7	8	9	10	11	12
F	0	0	0	0	0	12	24	32	0	17	7	0
%	0	0	0	0	0	13,0	26,1	34,8	0	18,5	7,6	0

The data in the table revealed that the majority of the learners who took part in the study were in Grade 8.

Table 5.15 indicates the different age groups represented by the learner respondents.

Table 5.15: Age groups of learners

	6-8	9-11	12-14	15-17	19-20	20+
F	0	0	24	60	8	0
%	0	0	26,1	65,2	8,7	0

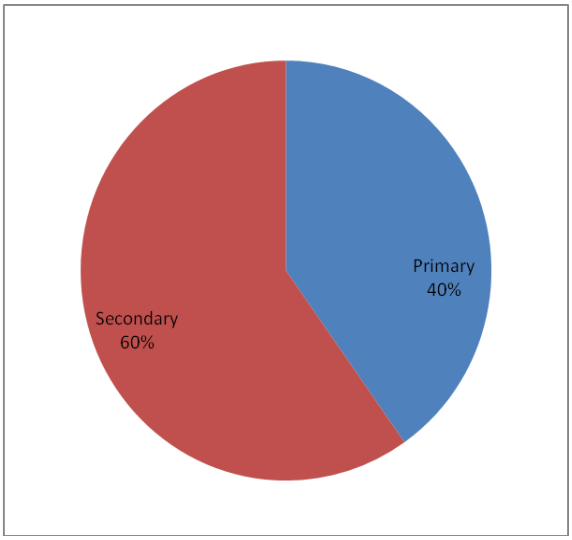


Sixty of the 92 respondents were between the ages of 15 and 17 years.

Table 5.16 indicates the number of learner respondents who were at primary and secondary school level.

Table 5.16: School level

Primary		Secondary	
f	**%**	**f**	**%**
37	40,21	55	59,78



The majority of the learners who took part in the study were secondary school learners.

In the following section, the data analysis and interpretation for the responses obtained from the learner questionnaire for the items related to classroom teaching, learning and assessment are reported. The learners had to indicate the extent to which they agree with the statements as being important principles when teaching and assessing learners who are visually impaired.

5.3.2 Classroom teaching, learning and assessment principles

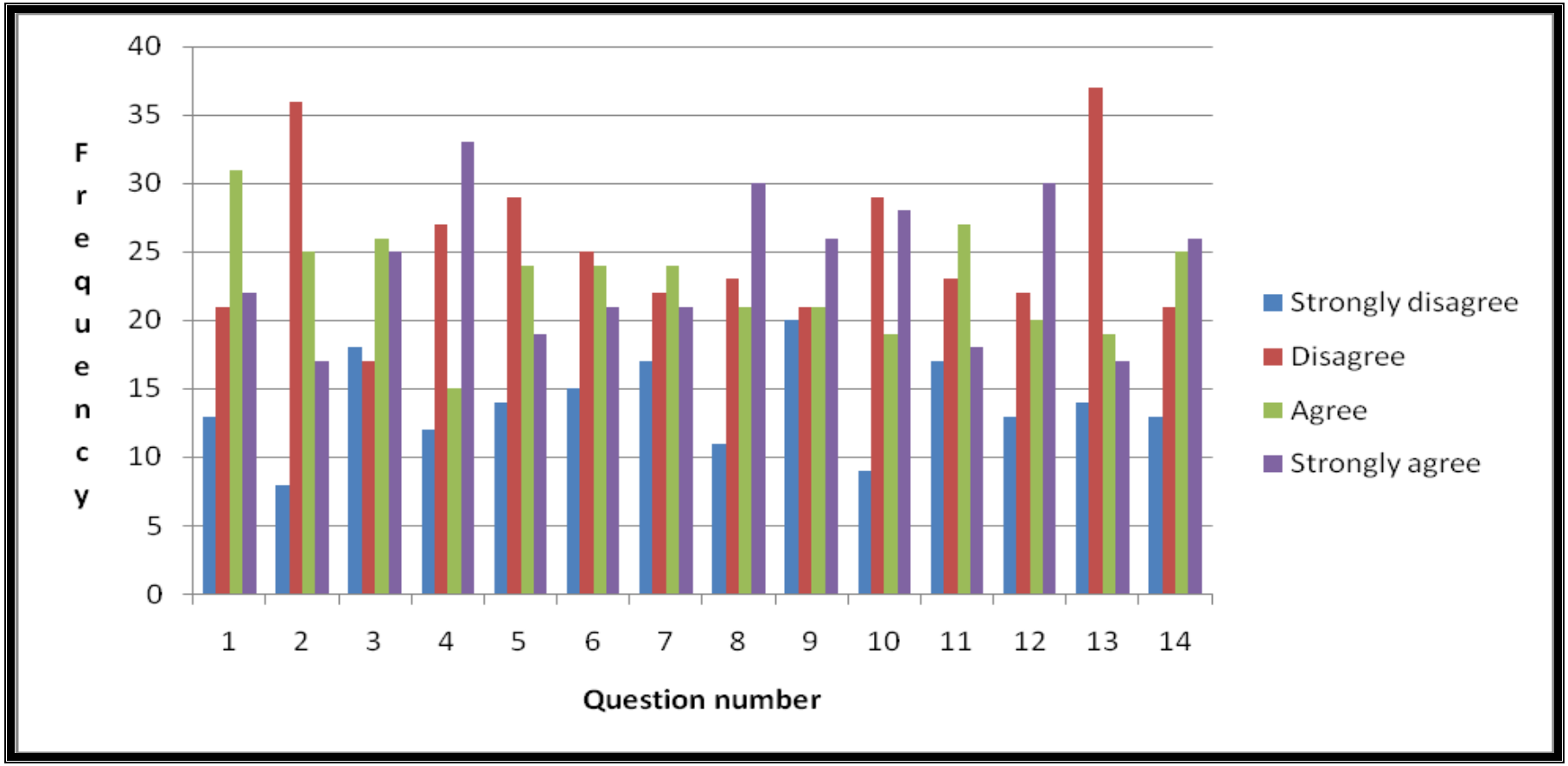
Table 5.17 and Figure 5.9 indicate the results obtained from the learner responses.

Table 5.17: Classroom teaching and assessment principles for the visually impaired learner: learner responses

		Strongly disagree		Disagree		Agree		Strongly agree		Missing responses	
		f	%	f	%	f	%	f	%	f	%
1.	Teachers should develop and modify teaching strategies for learners with visual impairment	13	14,13	21	22.83	31	33.70	22	23.91	5	5.43
2.	Teachers should modify assessment strategies or learners with visual impairment	8	8,70	36	39,13	25	27,17	17	18,48	6	6,52
3.	Teachers should plan and manage the learning environment to accommodate learners with visual impairment in mainstream classrooms	18	19,57	17	18,48	26	28,26	25	27,17	6	6,52
4.	Teachers should motivate all learners to accept each other the way they are	12	13.04	27	29,35	15	16,30	33	35,87	5	5,43
5.	Teachers should involve parents of the visually impaired learners in the teaching and learning of these learners	14	15,22	29	31,52	24	26,09	19	20.65	6	6,52
6.	Teachers should participate in planning and implementing specific learning support programmes for the visually impaired learner	15	16,30	25	27,17	24	26,09	21	22,83	7	7,61

		Strongly disagree		Disagree		Agree		Strongly agree		Missing responses	
		f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
7.	Teachers should involve visually impaired learners in extra-curricular activities	17	18,47	22	23,91	24	26,09	21	22,83	8	8,70
8.	Learners with visual impairment need extra time for tasks	11	11,95	23	25,00	21	22,83	30	32,61	7	7,61
9.	Teaching learners with visual impairment should be mostly verbal	20	21,73	21	22,83	21	22,83	26	28,26	4	4,35
10.	Teachers should make use of audio tapes when teaching visually impaired learners	9	9,79	29	31,52	19	20,65	28	30,43	7	7,61
11.	Teachers should enlarge reading material for the visually impaired learner	17	18,48	23	25,00	27	29,35	18	19,56	7	7,61
12.	Teachers should make use of special books and equipment when teaching the visually impaired learner	13	14,13	22	23,91	20	21,74	30	32,6	7	7,61
13.	Teacher should supply learners with a verbal reading of everything that occurs visually	14	15,22	37	40,22	19	20,65	17	18,48	5	5,43
14.	Teachers should utilize models during teaching and learning in order for learners with visual impairment to feel and touch	13	14,13	21	22,83	25	27,17	26	28,26	7	7,61
Section mean: 2,56											

Figure 5.9: Graphical representation: Classroom teaching and assessment for the visually impaired learner: learner responses



In contrast to the teacher responses that indicated strong agreement with most of the questionnaire items in this section, a small number of learners strongly agreed to the following principles being important during the teaching and assessment of learners with visual impairment:

- to motivate all learners to accept one another the way they are (35,87%);
- to provide extra time for tasks (32,61%);
- that learning should be mostly verbal (28,26%);
- to make use of audio tapes (30,43%);
- that special equipment should be used during teaching (32,6%); and
- that models should be used during teaching for learners to feel and touch (28,26%).

The above-mentioned responses indicate that the learners had different opinions. They were not all of the opinion that learners should be motivated to: accept one another the way they are, need extra time for tasks, that there should be a strong focus on verbal learning, and that special equipment and models be used during teaching.

In addition to the above, 22,83% disagreed and 14,13% strongly disagreed that teaching strategies for visually impaired learners should be modified. Similar responses were obtained for the modification of assessment strategies, where 8,70% strongly disagreed and 39,13% disagreed that assessment strategies be modified for visually impaired learners. The implementation of special support programmes for visually impaired learners was however supported, as 48,92% of the respondents strongly agreed and agreed to this being done. However, 43,47% of the respondents strongly disagreed and agreed to the implementation of special support programmes.

Only 28,26% of the respondents agreed and 27,17% strongly agreed that teachers should accommodate learners with visual impairments in

mainstream classrooms. A number of the learners, namely 38,05% did not share this view.

The learner respondents also did not have similar views regarding the involvement of their parents in their teaching and learning either. Disagreement with the involvement of parents in teaching and learning was indicated by 46,74% of the respondents, and agreement by 46,74 of the respondents.

The involvement of visually impaired learners in extra-curricular activities was also disagreed to by a number of respondents (42,38%) and on the other hand agreed to by 48,92% of the respondents.

Only 29,35% and 19,56% of the respondents agreed and strongly agreed respectively that teachers should enlarge learning material, whereas 25% and 18,48% agreed and strongly agreed that teachers should supply them with a verbal reading of everything that occurs visually in the classroom. It is surprising that a large number of the learner respondents disagreed to enlarging learning material and supplying them with verbal readings as explanation of visual activities that take place in the classroom. The researcher cautiously concludes form the responses of the learners to the different learning needs that they apparently do not want to receive special attention during teaching and learning, as this might expose them to being labelled and regarded as different from the other learners. This conclusion does not augur well with the policy on inclusive education where it is indicated that teachers need to accommodate the different learning need of learners (Department of Education, 2001:16-17).

In the following section, the data analysis and interpretation for the responses obtained from the learner questionnaire for the items related to teaching and assessment strategies for the visually impaired are reported. The learners had to indicate the frequency with which their teachers applied the indicated teaching and assessment strategies.

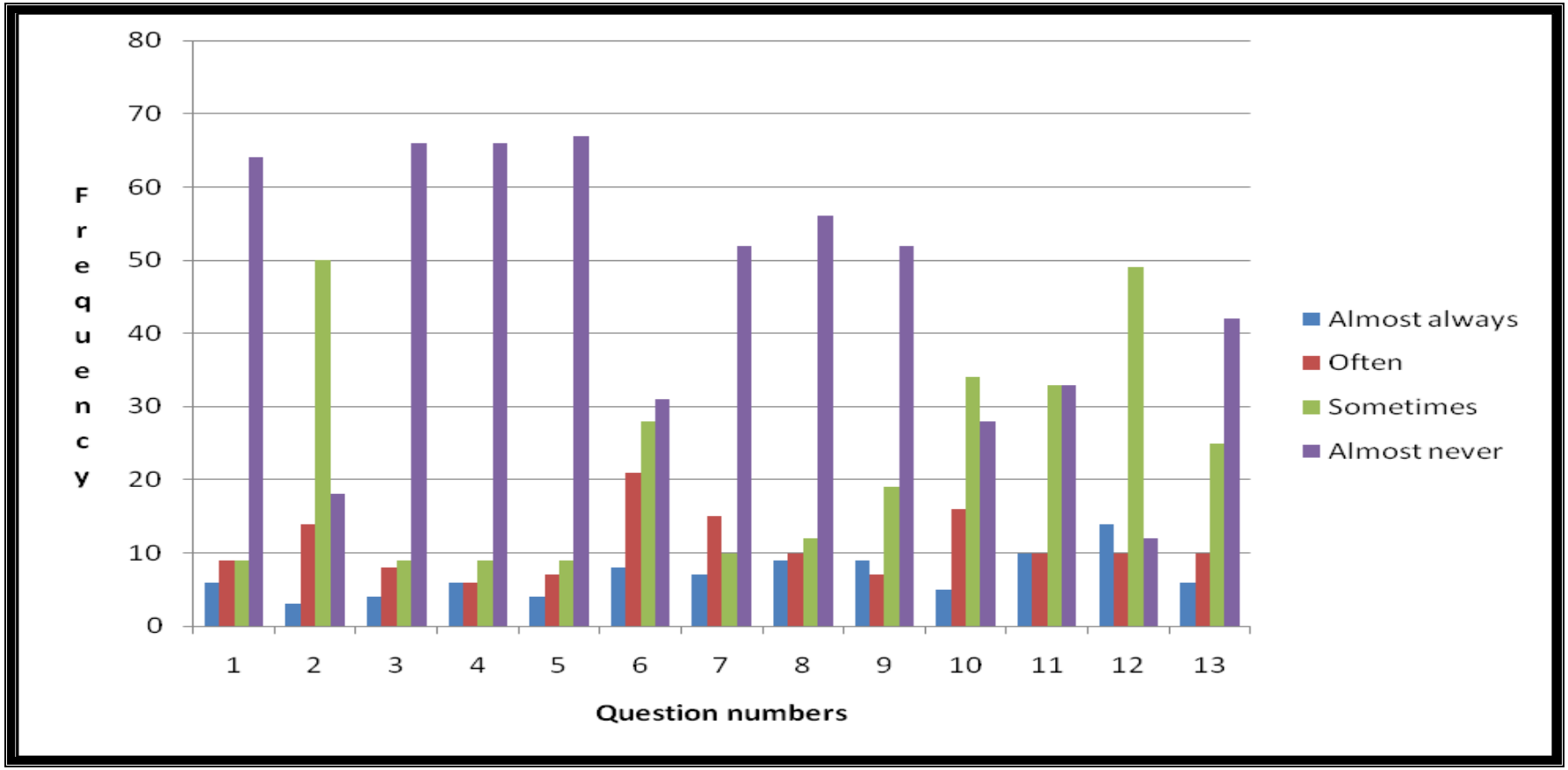
5.3.3 Teaching and assessment strategies for the visually impaired

In Table 5.18 and Figure 5.10 the results obtained for the learner responses related to the teaching and assessment strategies applied by their teachers, are reported.

Table 5.18: Teaching and assessment strategies for the visually impaired learner: learner responses.

		Almost Always		Often		Sometimes		Almost Never		Missing responses	
		f	%	f	%	f	%	f	%	f	%
1.	Braille	6	6,52	9	9,78	9	9,78	64	69,57	4	4,35
2.	Enlarged or bolded text	3	3,26	14	15,21	50	54,35	18	19,57	7	7,61
3.	Audio cassettes	4	4,35	8	8,70	9	9,78	66	71,74	5	5,43
4.	Dictaphones	6	6,52	6	6,52	9	9,78	66	71,74	5	5,43
5.	Permit learners to respond by typing	4	4,35	7	7,61	9	9,78	67	72,83	5	5,43
6.	Allowing additional time to complete tasks	8	8,70	21	22,82	28	30,43	31	33,70	4	4,35
7.	Allowing learners to respond through descriptions instead of drawings	7	7,61	15	16,30	10	10,87	52	56,52	8	8,70
8.	Reading assessment tasks to the visually impaired learners before requesting them to complete them	9	9,78	10	10,87	12	13,04	56	60,87	5	5,43
9.	Verbal explanations and lectures	9	9,78	7	7,61	19	20,65	52	56,52	5	5,43
10.	Demonstrations	5	5,43	16	17,39	34	36,06	28	30,43	9	9,78
11.	Group work and co-operative learning	10	10,87	10	10,87	33	35,87	33	35,87	6	6,52
12.	Supplying verbal readings when demonstrations are done	14	15,22	10	10,87	49	53,26	12	13,04	7	7,61
13.	Utilizing models to feel and touch	6	6,52	10	10,87	25	27,17	42	45,65	9	9,78
Section mean: 3,21											

Figure 5.10: **Graphical representation: Teaching and assessment strategies for the visually impaired learner: learner responses**



The responses of the learners indicated a strong correspondence with the responses obtained from the teachers to this section of the questionnaire. The majority of the learners indicated that their teachers almost never:

- use Braille (69,57%);
- use audio cassettes (71,74%);
- use dictaphones (71,74%);
- permit learners to respond by typing (72,83%);
- allow learners additional time to complete tasks (33,70%);
- allow learners to respond through descriptions instead of drawings (56,52%);
- read assessment tasks before learners have to complete them (60,87%);
- provide verbal explanations and lectures (56,52%); and
- utilize models to be felt and touched during teaching (46,65%).

The responses indicated above also indicate that there are apparently a number of learners whose teachers do make use of the mentioned teaching and assessment strategies during teaching, as there were a few responses that indicated that the mentioned strategies are almost always and often used. These responses support the suggestions made by Farrell (2006:20) (*cf.* 3.3.1), Keller (2005) (*cf*. 3.3.2; 3.3.5; 3,3,8), Davies (2003:205-206) (*cf.* 3.4.1), Gadbow (2001:19-20) (*cf.* 3.3.3) and Heward (2000:9-10) (*cf.* 3.4) that the teaching and learning environment should be adapted for learners with visual impairments.

The teacher and learner responses augur well with regard to the use of enlarged or bolded text, as the majority of the teachers and learners responded that this is sometimes used with 46,25% (*cf*. Table 5.13) and

54,35% respectively. With regard to the use of demonstrations, the learner responses were more varied than the teacher responses. A number of the respondents, 17,39%, indicated that demonstrations are often used, 36,06% indicated that demonstrations are sometimes used, and 30,43% responded that demonstrations are never used. In contrast to this, 90% of the teachers indicated that they sometimes use demonstrations (*cf.* Table 5.13).

The teachers were more of the opinion than the learners that they utilize group work and cooperative learning, as the majority of the teachers, 58,75%, indicated that they sometimes use it (*cf.* Table 5.13), and 41,25% indicated that they never use it. An equal number of learners indicated that their teachers sometimes (35,87%) and almost never (35,87%) use cooperative learning. It appears that the use of social learning is not realized in the classrooms of the teachers who took part in the study. Although some of the teachers indicated that they supply verbal readings with verbal instructions with demonstrations on a frequent basis, a number of the learners were of the opinion that their teachers almost always (15,22%) and often (10,87%) provide verbal readings when demonstrations are done.

In the following section, the teacher and learner responses for two of the sections of the questionnaires are compared.

5.4 COMPARISON: TEACHER AND LEARNER RESPONSES

Two of the sections in the learner and teacher questionnaire were phrased similarly in order to make comparisons between the teacher and learner responses. The data obtained for the following sections were compared and triangulated:

- Section B (Learners) and section D (teachers): Principles of classroom teaching, learning and assessment
- Section C (Learners) and section E (teachers):Teaching and assessment strategies for the visually impaired

Table 5.19 indicates the results obtained for the comparison between the teacher and learner responses. In order to determine whether there were any statistically significant differences between the teacher and the learner responses, the responses were compared on the mean scores for each of the questionnaire sections. T-tests were utilized to determine whether differences that occurred were statistically significant (Pietersen & Maree, 2007d:230). To determine the effect size of the statistical significant difference, Cohen's *d* was calculated to highlight the magnitude and importance of observed effects (Pietersen & Maree, 2007b:211) and the effect sizes were interpreted as follows:

- 0.2: small effect size
- 0.5: medium effect size
- 0.8: large effect size (Pietersen & Maree, 2007b:211)

Table 5.19 reports the means, standard deviations, standard errors and the statistical significance of the differences between the means, as well as the effect of the statistically significant differences in practice between the learner and teacher responses for the two sections in the questionnaire. Following the data in the table, Figure 5.11 provides a visual representation of the means obtained for the responses from the teachers and the learners for the two sections of the questionnaire.

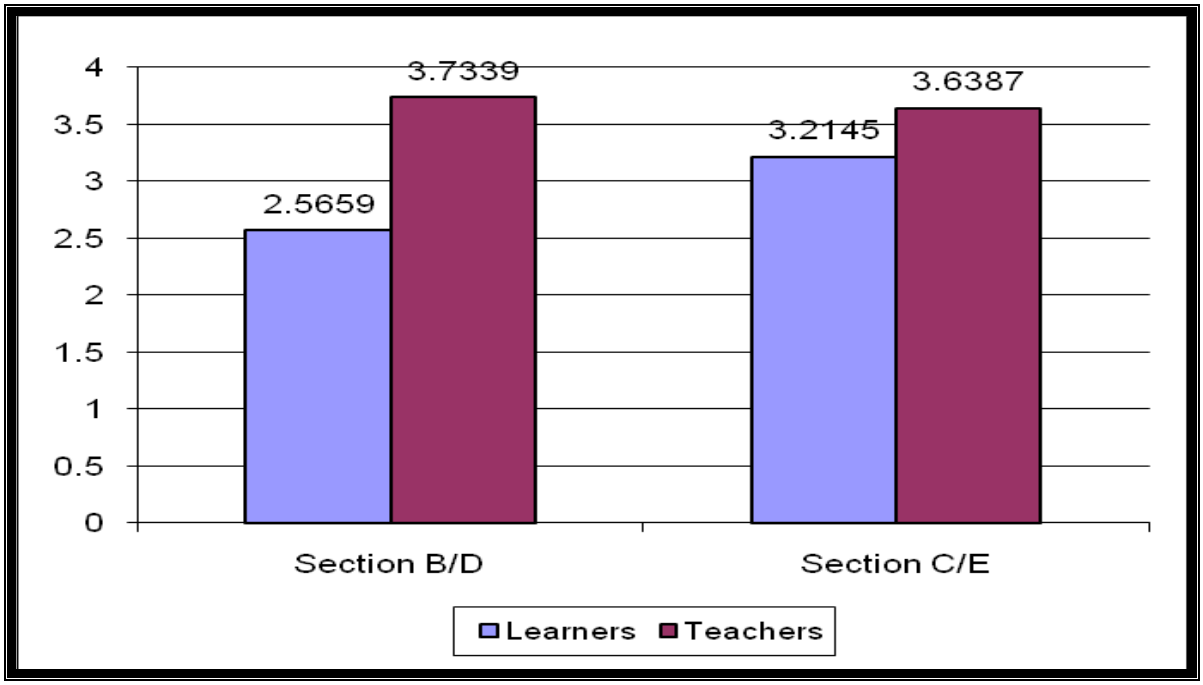
Means for the various sections in the questionnaire were calculated according to the ordinal scales utilized for classifying the questionnaire responses (1= *"almost always"/"strongly agree"*, 2 = *"often"/"agree"*, 3 = *"sometimes"/ "disagree",* 4 = *"very seldom"/ "strongly disagree")*. In the context of this study, it is important to note that the lower the mean, the more favourable the response, as it is closer to 1.

Table 5.19: Comparison – teacher and learner responses

Group	N	Mean	Std Dev *s*	Std Error	Mean diff	Sig *p*	Cohen *d*	Effect in practice
B & D 1	92 (B)	2,56	0,30	0,033	-1,16	0,043*	0,567	Medium
2	80 (D)	3,73	0,22	0,025				
C & E 1	92 (C)	3,21	0,54	0,060	-0,42	0,000*	0,778	Large
2	80 (E)	3,63	0,17	0,019				

* Statistical significance: $p < 0,05$

Figure 5.11: Graphical representation – comparison of teacher and learner responses



The learners were more convinced than their teachers that the teaching and assessment principles identified in the questionnaire should be applied to accommodate learners with visual impairment. A statistically significant difference, $p < 0,05 = 0,043$ with a medium effect in practice ($d = 0,0567$) was noted between the responses of the teachers and the learners. A statistical

significant difference, $p < 0,05 = 0,000$ with a large effect in practice ($d = 0,778$) was also noted between the teacher and learner responses for the application of teaching and assessment strategies to accommodate learners with visual impairment. Once again, the learner responses indicated a more frequent application of teaching and assessment strategies to accommodate visually impaired learners than the responses of the teachers. The standard deviations reported for the learner and teacher responses to the various sections of the questionnaire were also very small, which indicated that the responses in both groups did not indicate a very wide dispersion and variation of responses around the mean, and that the mean was representative of the observed data (Field, 2005:14,15).

The standard error is a measure of how representative the sample is likely to be of the population. A large standard error implies a lot of variability and a sample that might not be representative of the population. A small standard error, as observed in the table above, implies that the sample is likely to be an accurate reflection of the population (Field, 2005:17).

Based on the results obtained for the comparison, the researcher rejects the null hypothesis that was formulated at the onset of the study. According to the null hypothesis, there will be no statistical significant difference between the teacher and learner responses. However, the data in Table 5.19 indicate a statistically significant difference between the teacher and learner responses for two of the sections in the questionnaire ($p < 0,05 = 0,567$; $p < 0,05 = 0,000$). The researcher concludes that the teachers lack comprehensive knowledge on the principles of teaching and assessment that should guide teaching and learning in the context of visual impairment. Furthermore, the learner responses for the application of teaching and assessment strategies to accommodate visually impairment reflected a more frequent utilization of the strategies, than what the responses of the teachers did. The conclusion is made that teachers who took part in the study need to apply teaching and assessment strategies to accommodate the teaching and learning needs of visually impaired learners on a more frequent basis than what they presently

do. Based on the aforementioned discussion, the alternative hypothesis is therefore accepted, as there was a statistically significant difference between the perceptions of the teachers and the learners regarding the extent to which the teaching and learning needs of visually impaired learners are accommodated.

5.5 CHAPTER SUMMARY

In this chapter, the responses of the teachers who took part in the study regarding their knowledge and attitudes regarding learners with visual impairment in inclusive classrooms were reported. Teacher and learner responses regarding the application of teaching, learning and assessment principles and strategies to accommodate visually impaired learners were also discussed.

It appears that not all of the teachers who took part in the study have complete knowledge to identify the personal characteristics of learners with visual impairments. Misperceptions were detected regarding visually impaired learners being not intelligent, lazy, impulsive, inattentive and intellectually impaired (*cf*. 5.2.2.1). Furthermore, it seems that the teachers who took part in the study are knowledgeable on identifying the physical and behavioural characteristic of learners with visual impairments. This implies that teachers will be able to become aware of learners for whom curriculum adaptations are required (*cf.* 5.2.2.2; 5.2.2.3). The responses obtained from the teachers do not convincingly indicate that they are knowledgeable on the relationships learners with visual impairments form with their teachers and peers, and their involvement during conversations in the classroom. The teachers appear to be not convinced that learning progress can be guaranteed in a classroom where the needs of visually impaired learners have to be accommodated (*cf.* 5.2.2.3). Teachers possess adequate knowledge to recognize learners with visual impairment when doing deskwork, that they have good listening skills and poor reading skills, and need extra time for task completion. However, a number of the respondents appear to be under the wrong impression that

learners with visual impairments have poor academic achievement, experience concentration problems and are disorganized (*cf.* 5.2.2.4). Many of the teachers also seem to find the presence of learners with visual impairments problematic in a mainstream classroom (*cf.* 5.2.2.3) and are of the opinion that they should be taught separately in the mainstream (*cf.* 5.2.2.5)

The use of verbal explanations and lectures, as well as the use of cooperative learning for language, cognitive, social and self-esteem development appears to be under-estimated (*cf.* 5.2.4; 5.3.3). Based on the data obtained, the researcher argues that although the most important teaching and learning needs related to the general adaptations to teaching, learning and assessment (*cf.* 3.3.1-3.3.11) are adhered to by many of the teachers, some of them require additional support in accommodating visually impaired learners in their classrooms. Furthermore, needs related to the effects that visual impairment can have on learning as identified by the literature review, namely language development, cognitive development, social development and the development of self-esteem (*cf.* 2.4.2-2.4.6), appear to be inadequately addressed in the classrooms that were involved in the research.

The researcher did not explicitly formulate questionnaire statements that would guide teachers in indicating language, cognitive, social and self-esteem problems as developmental needs of visually impaired learners and did not explicitly request from the teachers to indicate how they deal with these. In the absence of information in the literature on how to accommodate the developmental needs of visually impaired learners that could guide the formulation of questionnaire items in this regard, the researcher aimed to deduce whether these critical areas are addressed during the teaching and learning of the visually impaired learner based on the responses obtained.

Based on the data obtained, the researcher argued that the teachers who took part in the study are in need of a teaching and learning approach that

could address the above-mentioned developmental needs. The researcher motivates this conclusion as follows:

In line with the literature, many teachers indicated the following:

- Visually impaired learners lack self-confidence (*cf.* Table 5.6), which corresponded well with problematic self-esteem development as being characteristic of visually impaired learners (Mitchell, 2008:53; Bishop, 2004:70) (*cf*.2.4.5).

- Visually impaired learners do not often participate in group work (*cf.* Table 5.8), and in addition to this, it was reported by learners and teachers that cooperative learning and group work are underutilized (*cf.* Table 5.13; Table 5.18). This implies that social learning and social development might not be realized optimally (Gray, 2005:180) (*cf.* 2.4.6), and the merits of cooperative learning for language development, cognitive development and self-esteem development (Arends, 2009:324-355; Gawe, 2007:223-226; Johnson *et al.,* 2000) (*cf.* 3.3.3) not acknowledged.

- Visually impaired learners do not readily take part in conversations (*cf.* Table 5.8) and have poor communication skills (*cf.* Table 5.9). These responses could point to problems related to language development (Bishop, 2004:69) (*cf.* 2.4.3).

- Visually impaired learners struggle to remember what they have learned (*cf.* Table 5.9). These responses could highlight the fact that learners experience problems with cognitive development (Bishop, 2004:68, 74-75) (*cf.* 2.4.2) as they might not have adequately developed cognitive skills and strategies such as analysing, comparing, evaluating and synthesising information to cope with learning (Feuerstein *et al.,* 2010:71-81).

In short, the researcher is of the opinion that the teachers who took part in the study appear to be able to identify some of the physical and behavioural characteristics of visually impaired learners, and will be in a position to accommodate some of the general teaching and learning needs experienced by the visually impaired learners (*cf.*1.5). The researcher is however concerned that the accommodation of the developmental teaching and learning needs appears to be problematic (*cf.*1.5).

In Chapter Six, the researcher proposes a teaching and learning approach based on the principles and processes of mediated learning that could address the aforementioned needs.

CHAPTER SIX

A TEACHING AND LEARNING PROGRAMME TO ENHANCE TEACHING AND LEARNING OF VISUALLY IMPAIRED LEARNERS IN AN INCLUSIVE CLASSROOM

6.1 INTRODUCTION

Based on the findings reported in the previous chapter, it is evident that teachers are not yet knowledgeable and skilled to address all the challenges related to the teaching of the visually impaired learners. Linked to the findings, the teachers also expressed their concerns related to additional workload and a lack of support from education district offices (*cf.* Table 5.11). Two issues were clear to the researcher after the data analysis had been completed, firstly the teachers who took part in the study were in need of an approach that could firstly, accommodate a wide variety of learner needs, including those of the visually impaired learner. Secondly, teachers were in need of an approach that would not require major restructuring to the curriculum, as the teachers expressed their concern about time-related issues in adapting the curriculum for visually impaired learners. This decision is made because the researcher cautiously concluded form the responses of the learners (*cf.* Table 5.17) that they apparently do not want to receive special attention during teaching and learning, as this could, according to the researcher, expose them to being labelled and regarded as different from the other learners. Therefore, a teaching and learning approach that could accommodate as many learners as possible, without focussing explicitly on visually impaired learners, would avoid the aforementioned.

The researcher argues that making adaptations to the learning environment might not be as problematic for teachers as making adaptations to the curriculum in terms of teaching and learning processes that would accommodate the developmental needs (language, cognitive, social and self-esteem) of visually impaired learners during teaching and learning. The latter

requires that teachers be acquainted with knowledge regarding learning theories that underpin teaching and learning, for which teachers might require additional training. In order to find a suitable approach on which to base teaching and learning of the visually impaired learners, the researcher firstly examined a number of learning and developmental theories.

6.2 LEARNING THEORIES AND THE VISUALLY IMPAIRED LEARNER

According to Bishop (2004:50-52), theories on human development and learning can be grouped as follows:

- psychoanalytical theorists base their philosophy on human interactions;
- behaviourists place their emphasis on human behaviour and its shaping through the environment;
- cognitivists believe intellectual development to be the most important facet of human growth;
- constructivists are concerned with the social construction of knowledge
- humanists are people and feelings-oriented.

In addition to the above, human development can also be linked to the hierarchy of needs gratification as indicated by Maslow (in Arends, 2009:142, 143; in Bishop, 2004:49). The needs-hierarchy is structured according to different levels, which range from the lowest physiological level (hunger, thirst, elimination), to safety-security (order, routine, lack of danger), to love and belongingness (friends, spouses), to self -esteem (self-respect, self-esteem); and to an even higher level, seldom reached in reality by many people, namely self-actualization (the realization of full potential). The infant's needs are at the lowest level, the toddler and preschool child cross the next two levels, and the school-age child can usually achieve the fourth level.

Another way of looking at human developmental theory is through the nature versus nurture approach. Naturists describe human development from a

physical and maturational viewpoint, and nurturists see the environment and the development of the cognitive system as more important in shaping development (Bishop, 2004:50). The latter corresponds well with the theory of Reuven Feuerstein on mediated learning where the mediator creates conditions in the teaching and learning environment to enable successful learning and development (Feuerstein *et al.,* 2010:38).

The researcher argues that it is important to recognize the heterogeneity of learners, and that one theory may be better for some learners than other. This researcher's own philosophy of education leans heavily on the socio-cognitive and constructivist approaches of Piaget and Vygotsky (Mahn, 2004:119-137) for a number of reasons:

- it is sensory-based and process oriented which implies that the focus is not so much on what learners learn, but how they learn;
- it respects individual maturation and readiness levels;
- it encourages independence on the part of the child;
- it allows the teacher to be a facilitator instead of a director;
- socio-cognitive, active and interactive learning are promoted;
- it is easily adapted to learners with special needs; and
- it has the potential to make learning a pleasant experience (Feuerstein *et al.,* 2010:38-40; Mahn, 2004:119-137)

A close examination of the above-mentioned reasons indicates that a socio-cognitive approach could be regarded as suitable in the context of visual impairment. A socio-cognitive approach augurs well with a number of principles that are regarded as important during the teaching and learning of visually impaired learners, namely to encourage active, interactive and independent learning (Mitchell, 2008:33; Cox & Dykes, 2001:72) (*cf.* 3.3.7), to encourage social learning (Felder & Brent, 2001:69-75; Gadbow, 2001:19-20)

(*cf.* 3.3.3) and to encourage cognitive development (Bishop, 2004:68, 74-75) (*cf.* 2.4.2).

In addition to the above, the researcher is of the opinion that the socio-cognitive approach to teaching and learning could be regarded as conducive to address a number of negative effects that visual impairment can have on a learner, namely effects on cognitive development, language development, self-concept and social skills (*cf.* 2.4). Furthermore, this approach also holds teaching and learning benefits for all the other learners in the classroom as well. The researcher motivates his argument as follows:

Firstly, the literature revealed that learners with visual impairment require focused attention regarding their cognitive development, as this may develop in ways different from learners without a visual impairment (Bishop, 2004:68) (*cf*. 2.4.2). The researcher therefore argues that a teaching and learning approach with a strong cognitive focus should benefit learners with visual impairment. Furthermore, a strong cognitive focus on teaching and learning is also required for learners without visual impairment. This strong cognitive focus is evident in the critical and developmental outcomes that should underpin all teaching and learning according to the National Curriculum Statement (NCS) (Department of Education, 2002a:11).

Secondly, language development poses difficulties to learners with visual impairments (Bishop, 2004:69) (*cf.* 2.4.3). In this regard, a socio-cognitive and interactive approach to teaching and learning can provide opportunities for the applied use of language, which could motivate learners to take part in discussions, ask questions and initiate, continue and end conversations. The importance of nurturing language acquisition and good communication skills are also important for learners without visual impairment. In this regard, the National Curriculum Statement envisages that all learners need to be able to communicate effectively (Department of Education, 2002a:11).

Thirdly, a socio-cognitive approach to teaching and learning can support the development of a positive self-concept, which is highlighted by Bishop

(2004:70) as a problematic issue among learners with visual impairment (*cf.* 2.4.5). Interactive learning can promote the acceptance of learners with visual impairment as individuals who are worthwhile and valued, enhance their social skills of learning how to interact with others (*cf.* 2.4.6), and they will be able to observe what behaviours are socially acceptable. Bishop (2004:71) (*cf. 2*.4.4) indicates that the development of social skills is problematic among learners with visual impairment, as they have limited opportunity to observe how others behave and interact (*cf.* 2.4.6). The importance of social learning for all learners is highlighted as a Critical Outcome in the NCS (Department of Education, 2002a:11).

In this regard, the researcher proposes a mediated learning approach that focuses on the active and interactive nature of the teaching and learning process as an effective way of accommodating the teaching and learning needs of the visually impaired learner, as well as learners without visual impairments, in an inclusive classroom.

In the next section, the role of mediation and the merits of mediated learning for visual impairment are explored.

6.3 THE ROLE OF MEDIATION IN TEACHING THE VISUALLY IMPAIRED LEARNERS

The word *"mediator"* is derived from the Greek *"mesites"* which means to intervene between two parties (Fraser, 2006:5). A mediational teaching style is a derivative of Reuven Feuerstein's theory of cognitive modifiability, which regards mediated learning as essential for cognitive development of children (Feuerstein, 2007:8).

An important characteristic of a mediated learning is its social and cognitive approach to teaching and learning. The mediator intentionally equips the learner with cognitive skills and provides a learning environment that promotes social, interactive and independent learning (Feuerstein *et al.,* 2010:38; Falik, 2001a). According to Feuerstein, Klein and Tannenbaum

(1991:7), the main difference between a teacher and a mediator is that the mediator, in contrast to the traditional teacher, intentionally intervenes and assists the learner by directing the learning process in order to obtain the desired response. The mediator helps learners to bridge the gap between what learners cannot do on their own at a given point in time, to what they can do with assistance. This corresponds with Vygotsky's theory of the Zone of Proximal Development, which supports the notion of scaffolded learning (in Kozulin, 2004:19). According to Lerner and Kline (2006:113), scaffolded learning is neither too easy nor too difficult, and a learner is guided through the learning process by means of mediation. A mediator selects and organizes the world of stimuli for learners and equips them with means to learn (tools to acquire knowledge and skills). In this regard, Kozulin (2004:18) refers to guided participation by the mediator and joint activity between mediator and learner, which emphasizes the importance of experience during mediated learning. Through **experience** learners develop their learning potential and integration into society and the learning propensity is enhanced (Feuerstein in Falik, 2001b).

Mediated learning is a universal phenomenon, which is not dependent on language, culture, learning barrier or any other variable, and enables humans to adapt to change or transitions in life experiences (Feuerstein *et al.,* 2010:48).

According to Feuerstein, classroom teaching and learning which is based on mediated learning should be characterized by the following principles: **universal criteria, situational phase specific criteria and integrative orienting belief system** principles (in Falik, 2001b, Feuerstein, 2001; Feuerstein & Feuerstein, 1991:15-49).

The universal principles (Feuerstein *et al.,* 2010:41-48; Fraser, 2006:10; Deutsch, 2003:32-35; Feuerstein, Mintzker & Feuerstein, 2001) that should be present in all learning refer to the following processes:

- **Intentionality and reciprocity**: all interactions with learners should be purposefully focused and directed. Learning stimuli should be more powerful and imposing, in order to breathe new spirit into the teaching and learning interaction (Feuerstein *et al*., 2010:43).

- **Transcendence:** learning in the classroom should be linked to the world outside the classroom.

- **Mediation of meaning**: learners should see the relevance and value of learning activities and their energetic capacity to learn should be enhanced (Feuerstein *et al.,* 2010:46).

The situational or phase-specific principles (Feuerstein *et al.,* 2010:50-57; Falik, 2001b; Feuerstein, Hoffman, Jensen & Rand, 1985:40) refer to the following processes:

- **Mediation of regulation and control of behaviour**: learner need to monitor their own learning progress and make adjustments to improve their learning. Furthermore, it aims to encourage the postponement of impulsive and socially unacceptable behaviour by purposefully imposing thinking on activities (Feuerstein *et al.,* 2010:52). The researcher argues that including this principle during teaching and learning could enhance the social development of the visually impaired learner.

- **Mediation of feelings of competence**: learners need to develop an optimistic belief in success, feel good about their learning efforts, and capable and confident to complete a task. This principle aims to increase courage to investigate and to perform novel tasks that, according to the researcher, would benefit the development of the self-esteem of the visually impaired learner.

- **Mediation of goal seeking, goal planning and goal achieving**: learners should be encouraged to set their own realistic goals, identify ways to achieve these goals and evaluate the successfulness of their goal

achievement. This principle is important for structuring higher-order cognitive processes and abstract thinking (Feuerstein *et al.,* 2010:55). The researcher argues that inclusion of this principle during teaching and learning would benefit the cognitive development of the visually impaired learner.

- **Mediation of sharing behaviour**: during teaching and learning learners should be involved in activities where they cooperate with their peers, and share and discuss experiences with one another. The researcher asserts that sharing behaviour involves making contact with peers and to adjust their own behaviour to the behaviour of others. Cooperation is also valuable for learners to gain insight and support from others, and to provide opportunities for establishing harmony among learners. In addition to this, the sharing of experiences with others can enhance cognitive development and language development, which are important Critical Outcomes that have to be achieved during teaching and learning (Department of Education, 2002a:11).

- **Mediation of individuation and psychological differentiation**: it is important to emphasize the uniqueness of each learner, and accept differences among learners. Independence and diversity should thus be valued during teaching. The right to think and express oneself in ways that are distinct from those of others avoid feelings of rejection and abandonment and could enhance self-esteem and self-confidence (Feuerstein *et al.,* 2010:54).

- **Mediation of challenge, novelty and complexity**: learners should be challenged with novel and complex experiences. When confronted with challenging activities, learners should also receive support to succeed; otherwise, the challenge will defeat the notion of mediating feelings of competence that are necessary for self-esteem and self-confidence.

The integrative orienting belief-system principles (Feuerstein *et al*., 2010:57-60; Falik, 2001b) are necessary for sustained behavioural change in a learner (Falik, 2001b). They refer to the following processes:

- **Mediation of awareness of the human being as a changing entity**: self-reflection, self-change and growth among learners should be encouraged. Self-esteem could be enhanced through the inclusion of this principle during teaching and learning, as the potential to adapt in spite of barriers is enhanced.

- **Mediation of the search for optimistic alternatives**: creating an awareness among learners to select useful experiences from their past that could be regarded as influential for growth, and to be on the lookout for new experiences to change present potential. This principle enhances learner self-confidence and readiness to face challenges as well as promotes the development of cognitive strategies to deal with situations encountered.

- **Mediation of a feeling of belonging**: this refers to establishing connections at social and emotional levels between individuals in order to create a learner-friendly classroom.

It is clear from the principles of mediated learning that it is an approach that primarily is concerned with the **how** of teaching and not so much with the content to be taught. The principles that were highlighted above provided the foundation for the teaching and learning examples that the researcher developed. It is clear from the aforementioned discussion, that the developmental needs of visually impaired learners could be addressed by incorporating each of these principles during teaching and learning.

In summary, based on the theory of Feuerstein (2007:5, 8, 16) the researcher motivates the appropriateness of a mediated learning approach in the context of visual impairment as follows:

- Teaching and learning in the context of visual impairment implies a restructuring of the learning environment and adaptations to the curriculum (*cf.* 3.3.1). In this regard, mediated learning is a systematic approach which suggests that the total learning environment, its physical parameters, scheduling of activities, instructional groupings and the interaction in the classroom between learners and learners and teacher should function as a source of modifiability and change (Feuerstein, 2007:5).

- Specific emphasis is placed on the cognitive, language, social and self-esteem development of learners. Adequate cognitive development cannot take place without mediated learning (Feuerstein, 2007:8). Through mediated learning, adequate cognitive development can take place in spite of learning barriers (Feuerstein, 2007:8). Feuerstein (2007:17-18) list the following expected changes as a result of mediated learning:

    - Spontaneous use of cognitive functions and operations
    - An increase in self-pride, enthusiasm and involvement in learning
    - An increase in the feeling of competence and improved self-image
    - Divergent thinking and looking for alternative anwers
    - Increased social sensitivity
    - Increased readiness to take part in discussions
    - An increase in spontaneous use of vocabulary and concepts
    - Willingness to assist others and to accept help
    - Improved interpersonal relations
    - Increased self-monitoring (metacognitive skills)

- Increased tolerance – readiness to hear others out and understand their point of view

- The principles of mediation provide an approach to teaching that can respond to diverse learners' needs (Feuerstein, 2007:16).

Further support for the advantages of mediation with visually impaired learners was found in the research conducted by Maghuve (2005) (*cf.* 1.1) as well as in the argumentation of Bishop (2004:93, 94) (*cf.* 3.2), according to which a mediated learning approach appear to be effective for teaching visually impaired learners. The researcher is not aware of any existing curriculum-based teaching and learning programmes based on the principles of mediation to address the teaching and learning needs of visually impaired learners. Furthermore, no clear guidelines are provided to teachers by the Department of Education (2005b:52-53) regarding the teaching principles and processes that should underpin the teaching and learning of visually impaired learners (*cf*. 1.1). The researcher therefore presents four examples of learning activities based on the principles of mediation that could become part of a curriculum-based teaching and learning programme to be utilized with learners who experience visual impairment. The present guidelines for inclusive learning programmes merely provide general "tips" and strategies for accommodating visually impaired learners in an inclusive classroom (Department of Education, 2005b:52-53).

In summary, a mediator is sensitive to the differences and needs among learners, understands how learning takes place and is concerned that learners acquire cognitive skills, social skills, communication skills and self-esteem skills. Furthermore, a mediator actively involves learners during teaching and learning, fosters an inquiring attitude, builds on learners' prior knowledge, motivates learners, creates opportunities for learning through social interaction and creates opportunities so that learners can apply what they have learned outside the classroom. The next section focuses on the

application of a mediated learning approach to the Learning Area Natural Sciences Grade 7.

6.4 THE PRACTICAL APPLICATION OF MEDIATED LEARNING

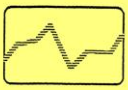
"Mediated learning is not only designed for the handicapped, it is designed for all of us, since it is what makes us human" Reuven Feuerstein (2010:37)

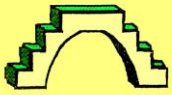
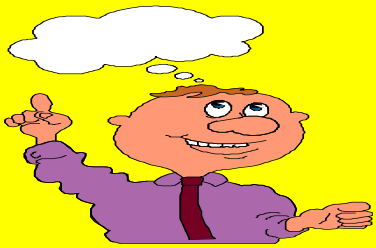
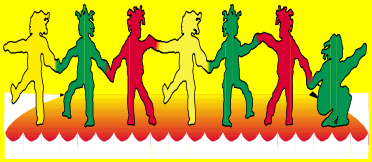
It was not the intention of the researcher to focus on the teaching of visually impaired learners in a specific subject field or Learning Area. However, in order to make the application of a mediated learning approach practical, the researcher decided to utilize the Learning Area with which he is the most familiar with, namely Natural Sciences Grade 7, to demonstrate how the principles of mediated learning can be applied to teaching and learning. The principles of mediation are generic in nature, and are applicable to any Learning Area or subject field (Feuerstein *et al.,* 2010:38-48).

In Table 6.1, an overview of the principles that underpinned the design of the examples that could form part of a teaching and learning programme in Natural Sciences, and their links with the developmental needs experienced by visually impaired learners are provided.

Table 6.1: Overview of the principles for mediated learning and the needs of the visually impaired learner (Adapted from Feuerstein, 2007)

Principles of mediated learning		
Symbol	**Principles**	**Application (processes)**
 SELF-REGULATION AND CONTROL OF BEHAVIOUR	**Self regulation and control of behaviour** **Needs addressed: cognitive development (meta-cognition, self-reflection)**	• Involve learners in self-regulating activities • Avoid impulsiveness • Self-questioning: Am I doing what is required of me?
 COMPETENCE	**Feelings of competence** **Needs addressed: self-esteem**	• Create a feeling of mastery and success to motivate learners • Optimistic: I can be competent • Feelings of satisfaction
 SHARING BEHAVIOUR	**Sharing behaviour** **Needs addressed: social skills development, language development, cognitive development**	• Create co-operative environments: learners learn and share with one another • Sensitivity towards others • Comparing and sharing ideas and opinions
 INDIVIDUATION	**Individuation** **Needs addressed: self-esteem**	• Apply different teaching and assessment strategies • Appreciation of uniqueness and independence – voicing own opinions • Promote development of own personality • Allow different

		approaches to solving problems
 GOAL PLANNING	**Goal planning** **Needs addressed: higher cognitive skills development**	• Mediator should encourage learner to: plan, set, achieve and evaluate the achievement of goals
 NOVELTY AND CHALLENGE	**Novelty and challenge** **Needs addressed: self-esteem**	• Challenging tasks should be presented • Tasks should not be so difficult that learners become demotivated
 SELF-CHANGE	**Self-change** **Needs addressed: cognitive development (self-reflection)**	• Learners should become aware of their potential for change • Learners should assess themselves • Learn to reflect on their own learning progress
 MEANING	**Meaning** **Needs addressed: cognitive development**	• Meaning, analysis of practical value and relevance of what is being done
 INTENTIONALITY AND RECIPROCITY	**Intentionality and reciprocity**	Mediator should: • Create an awareness of the learning process • Arouse interest and curiosity • Focus the attention of the learner

 TRANSCENDENCE	**Transcendence** **Transferring/bridging** **Needs addressed: cognitive development**	• Linking past, present and future events • Learning applied in other situations
 OPTIMISTIC ALTERNATIVES	**Search for optimistic alternatives** **Needs addressed: self-esteem, cognitive development**	• Creating an awareness among learners to select useful experiences from their past that could be regarded as influential for growth, and to be on the lookout for new experiences to change present potential
 BELONGING	**Feeling of belonging** **Needs addressed: self-esteem**	• Establishing connections at social and emotional levels between individuals

As Learning Programmes are structured and systematic arrangements of activities that promote the attainment of Learning Outcomes and Assessment Standards (Department of Education, 2002:11) the four examples that the researcher designed are activities based on the principles of mediated learning through which certain Learning Outcomes and Assessment Standards should be achieved.

The researcher wishes to emphasize that in addition to the mediated learning approach, the general strategies for accommodating learners with visual impairments in inclusive classrooms as highlighted in the literature review (*cf*.

3.2; 3.3, 3.4) should at all times be adhered to during the implementation of the activities.

The principles of intentionality and reciprocity and meaning are always included at the onset of the teaching and learning experienced to set the scene and to clarify concepts central to the understanding of the teaching and learning experience and for the execution of learning activities.

The four examples of learning activities based on the principles of mediated learning are now presented.

Activity 1: Properties of material

INFORMATION TO TEACHER

OUTCOME ADDRESSED:	**LO 1: Scientific investigations**
ASSESSMENT STANDARD:	**Systematically tests two or more items in order to compare them on the same properties**
RESOURCES NEEDED:	**Textbooks, different objects**
PROCESS SKILLS ADDRESSED:	**Identify phenomena/problems/issues. Observe.**

Learners do the activity on their own.

INFORMATION

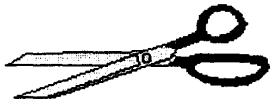
Answer all the questions on your own.

1. Explain in your own words:

1.1 What is meant by a ***flexible*** material?

1.2 The difference between ***hardness*** and ***brittleness.*** You may use examples to clarify your answer.

2. Complete the table.

OBJECT/USE	PROPERTIES (relevant and essential properties)	WHICH PROPERTY OR PROPERTIES MAKE(S) THE OBJECT FUNCTIONAL OR MORE EFFECTIVE? WHY?
		
SCISSORS 		
POT 	- .	
ELECTRICAL WIRE 		

MEMORANDUM

1.1 The material can be bent and/or twisted and/or stretched and it will return to its original shape.

1.2 Hardness: *A* material is hard when it is solid and cannot be separated easily.

Brittleness: *A* material is brittle when it can easily break into many pieces.

Example: Wood and steel are hard but not brittle; Glass is hard but also brittle.

2.

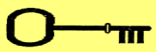
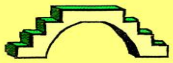
OBJECT	PROPERTIES	WHICH PROPERTY OR PROPERTIES MAKE(S) THE OBJECT FUNCTIONAL OR MORE EFFECTIVE?
SHOE	Flexible to a degree Strong: must be able to withstand pulling and pushing forces.	Example: Flexibility: if a shoe is not flexible, it would be impossible to walk, as the shoe changes shape constantly
SCISSORS	Hard Strong Rustproof	Example: Hardness: it allows the scissors to be sharpened
POT	Hard Strong Rustproof Can conduct thermal energy, etc.	Example: Any 4 with appropriate reasons. To withstand high temperatures, because exposed to water frequently, to conduct heat for cooking purposes.
ELECTRICAL WIRE	Can conduct electricity Flexibility	Example: Conductibility: provides electricity at various points in a home or other building, etc.

ASSESSMENT

Checklist

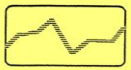
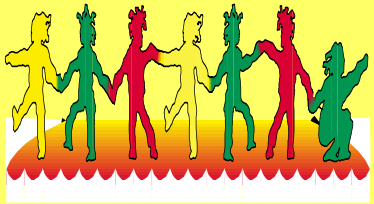
CRITERIA	YES	NO
1.1 Can explain the concept of *flexibility* correctly.		
1.2 Can explain the concept of *hardness* correctly.		
1.3 Can explain the concept of *brittleness* correctly.		
1.2 + 1.3 Understands the difference between *hardness* and *brittleness.*		
2.1 Identifies **relevant** properties of the objects.		
2.2 Identifies **relevant** essential properties of the objects.		
2.3 Gives **relevant** reasons for 2 or more of the choices made.		

In the following section, the researcher links the principles of mediation to the execution of the learning activity.

Principles of mediation	Application (processes)
 INTENTIONALITY AND RECIPROCITY	• Learners to bring along objects made from different material, which are displayed in the front of the classroom. • The teacher makes use of careful questioning: let us take a closer look at the objects – what are they made of? Is the material that they are made of important, why? Let learners touch and feel the objects and report what they find. • Content and knowledge central to the execution of the activity are clarified.
 MEANING	• Careful questioning by the teacher: Why do you think it is necessary that we study and compare the different material objects are made of? Is it important to know this?
 TRANSCENDENCE	• Ask learners to search for and bring along other objects that represent the categories *flexible, hard* and *brittle.* Let the learners discuss the suitability of the material linked to the functionality of the object. • Ask learners to share their experiences that they have had with objects made from material, which did not suit the functionality of the object.

 SELF-REGULATION AND CONTROL OF BEHAVIOUR	• Set aside time in class for learners to check their answers, before submitting their work. • On returning the marked activity to the learners, let the learners check the correctness of their answers themselves by making use of the memorandum attached to the activity. This will enable them to see for themselves where they have made mistakes.
 COMPETENCE	• Give constructive feedback to learners regarding the answers to the activity. Specify to the learners what they did well. For example: *You could identify the properties of the material the objects were made of correctly.* • Avoid vague and general comments such as: *good/excellent/well done.* • Focus on the strengths of learners and what they could do well.
 SHARING BEHAVIOUR	• Provide time in class for learners to discuss the answers they gave to the various questions in the activity. • Discussion will allow learners to share their opinions and learn from one another. • The learning activity should therefore not remain a written piece of work only, but utilized to start discussions.

 INDIVIDUATION	• During the presentation of the subject content related to the properties of material, teachers need to use a variety of teaching strategies to accommodate the needs of all learners. This implies the use of visual, auditory and kinaesthetic strategies. • Individual opinions of all learners related to the activity are appreciated.
 GOAL PLANNING	• Before learners submit their activity for assessment, allow them time to reflect on the completeness of their activity. The learners themselves need to assess whether they have met the goals that were set out initially with the activity.
 NOVELTY AND CHALLENGE	• After explaining the basic concepts and content linked to the properties of material during the intentionality and reciprocity phase, activity 1 is given to the learners to complete. Although it links to the concepts and content discussed it provides a new challenge to the learners – application of what was discussed during the intentionality and reciprocity phase is now dealt with.

 SELF-CHANGE	• Learners need to be asked what they have learned during this lesson that they did not know before. • Let learners reflect on how successful they think they were in executing the activity. • Ask learners to indicate to you what they think they could have done better. • Ask learners to identify what they have done well.
 SEARCH FOR OPTIMISTIC ALTERNATIVES	• Let learners experience learning as fun. For example: let learners hypothesize about the following: • What do you think would happen if shoes were made out of paper/if a pair of scissors was made out of glass?
 BELONGING	• A feeling of belonging is created by acknowledging the contributions of all learners during teaching and learning – everybody shares their opinions with the other learners. Learning from the knowledge of others and providing your knowledge to others so that they can learn from you create a feeling of belonging in the classroom.

Activity 2: The impact of force on shape

INFORMATION TO THE TEACHER
OUTCOME ADDRESSED: **LO 1: SCIENTIFIC INVESTIGATIONS**
ASSESSMENT STANDARDS: **EVALUATE DATA AND COMMUNICATE FINDINGS**

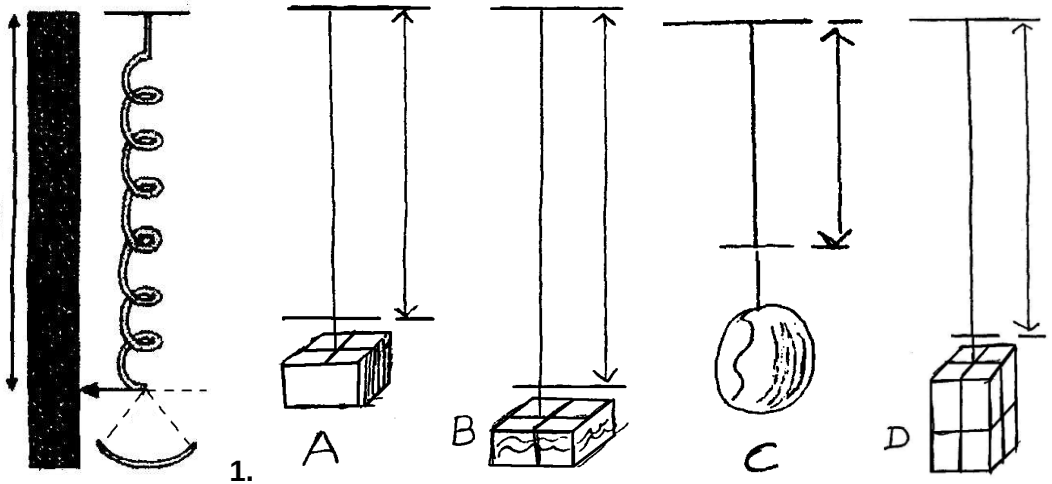
RESOURCES NEEDED: Worksheet, springs, elastic band, boxes of different weight and a ruler
PROCESS SKILLS: Observe/measure/collect data/conduct/record data/ conduct experiments/follow instructions

Group activity: Each group receives their own set of objectives to complete the activity on the worksheet.

WORKSHEET

INFORMATION
You have learned that some materials change shape when a force or forces are exerted on them. Your teacher wanted the class to investigate what happens to a spring / elastic band when a force is exerted on it.
The class carried out the investigation and different groups used different objects (boxes with different weight).

1. You must now measure the extension of the spring in each of the cases below, and record the readings on the table provided after you have attached a box with an elastic band to the spring.



1.

OBJECT	EXTENSION OF SPRING IN mm
A	
B	
C	
D	

Use your results to answer the following questions:

2. Which object, do you think, is the heaviest? ……

3. Give a reason for your answer?

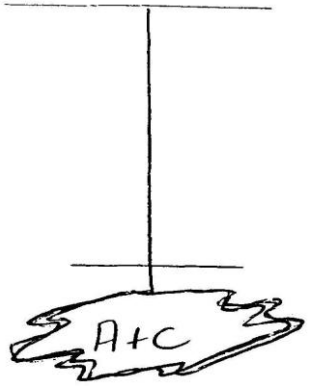
2.	
3.	

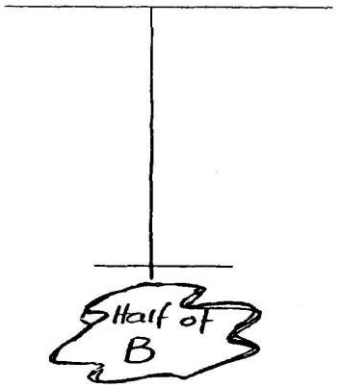
If an object is **heavier** than another, we say that is has a **bigger weight**

4. Which of the four objects has the biggest weight? How do you know this?

4.	

5. Use the results to **predict** how much the spring will extend in the following cases. (Do not measure!!)

5.1 

5.2 

EXTENSION: ……..

EXTENSION: ……

ASSESSMENT:

Memorandum:

OBJECT	EXTENSION OF SPRING IN mm
A	40
B	60
C	25
D	56

1. B

2. Bigger weight

3. The heaviest object will cause the biggest extension of the spring (or any other words connecting heaviest and biggest)

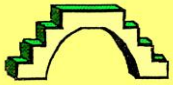
4. B

5.1 = 65mm

5.2 = 30mm

In the following section, the researcher links the principles of mediation to the execution of the learning activity.

Principles of mediation	Application (processes)
 INTENTIONALITY AND RECIPROCITY	• Teacher displays the different objects to be used in the activity in the front of the classroom. • The teacher makes use of careful questioning: let us take a closer look at the objects – what are they made of? Do the objects differ from one another? Let learners manipulate the objects to determine the differences. In what ways are they different? • Explain to learners what the activity will entail and what they will have to do. • Concepts and knowledge central to the execution of the activity need to be clarified during the intentionality and reciprocity phase.
 MEANING	• Careful questioning by the teacher: Why do you think it is necessary that we study and compare the influence of different weights on an object? Is it important to know this? Why?

 TRANSCENDENCE	• Ask learners to think of situations in life where consideration has to be paid to force and weight . Think of situations where force and weight can become problematic: for example: the number of passengers to be transported in a vehicle; packing a suitcase to go on holiday; packing groceries into a carrier bag etc. Let learners also come UP with their own examples. Let all learners contribute to the discussion.
 SELF-REGULATION AND CONTROL OF BEHAVIOUR	• Set aside time in class for learners to check their answers, before they submit their work for assessment purposes. • The activity involves careful measurement. Let learners check one another's measurements. • On returning the marked activity to the learners, let the learners check the correctness of their answers themselves by making use of the memorandum attached to the activity. This will enable them to see for themselves where they had made mistakes.
 COMPETENCE	• Give constructive feedback to learners regarding the answers to the activity. Specify to the learners exactly what they did well, and do not focus on that what they had incorrect only. For example: *Your measurements were really accurate, or please check your calculations, they are not correct.* • Avoid vague comments such as : *Well done/Good/Can improve.* • During the completion of the activity in the classroom, the teacher can move around and praise individual efforts when executed well.

 SHARING BEHAVIOUR	• During the group activity learners will get the chance to explain their views to others. • Discussion will allow learners to share their opinions and learn from one another. • Learners will learn how to take decisions together, as their answers have to reflect joint collaboration. • The group activity will provide opportunities for listening to others and learning how to respect the opinions of others.
 INDIVIDUATION	• During the presentation of the subject content related to the properties of material, teachers need to use a variety of teaching strategies to accommodate the needs of all learners. This implies the use of visual, auditory and kinaesthetic strategies. • Individual opinions of all learners related to the activity are appreciated. • Learners as individuals are involved in the execution of the group activity. Indicate a specific task to each of the learners: attaching elastic bands to boxes/attaching boxes to spring/ measurement.
 GOAL PLANNING	• Before learners commence with the activity, let them work out how they will deal with the execution of the activity so that each one in the group contributes to achieve the aim set out with the activity. The teacher can also let the learners decide who will measure, connect the boxes to the springs and who will write up the findings.

 NOVELTY AND CHALLENGE	• After explaining the basic concepts and content linked to shape and force during the intentionality and reciprocity phase, activity 2 is given to the learners to complete. Although it links to the concepts and content discussed it provides a new challenge to the learners, which they have to accomplish. The activity involves the application and reinforcement of the principles related to the subject content dealt with during the intentionality and reciprocity phase.
 SELF-CHANGE	• Learners need to be asked what they have learned during this lesson that they did not know before. • Let learners reflect on how successful they think they were in executing the activity. • Ask learners to indicate to you what they think they could have done better. • Ask learners to highlight the benefits they think working together with their peers had, and what they think were problematic working with others. Let them suggest solutions to the problems they highlighted.
 SEARCH FOR OPTIMISTIC ALTERNATIVES	• Let learners experience learning as fun. For example: let learners hypothesize about the following: What do you think would happen if we substitute the boxes used in the experiment with objects such as: a ruler, a cup, a teaspoon etc.? What do you think will be different in this experiment than in the one you executed? What contributes to the difference?

 **BELONGING**	• A feeling of belonging is created by acknowledging the contributions of all learners during teaching and learning – everybody shares their opinions with the other learners. Learning from the knowledge of others and providing your knowledge to others so that they can learn from you, create a feeling of belonging in the classroom. Learners realise that their opinions are valued, and that they can contribute to teaching and learning.

Activity 3: Force

INFORMATION TO THE TEACHER

OUTCOME ADDRESSED: **LO 1: SCIENTIFIC INVESTIGATION**

ASSESSMENT STANDARDS: **Evaluate data and communicate findings**

RESOURCES NEEDED: Different kinds of material: cardboard; different kinds of plastic, wood etc.

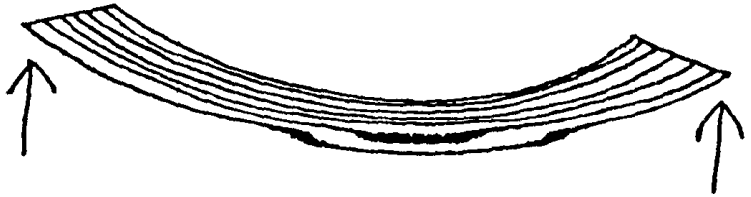
PROCESS SKILLS ADDRESSED: identify/observe/collect/record data/evaluate/follow instructions)

Learners complete this activity on their own.

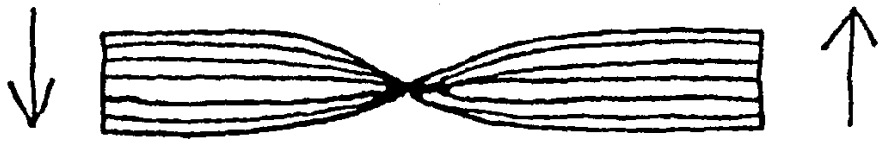
WORKSHEET

INFORMATION: In this investigation you are going to examine two types of forces. The following pictures will tell you what to do.

Bending force:

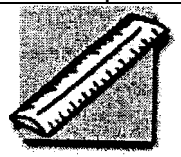
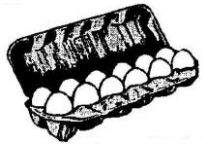
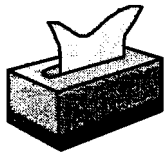


Twisting force:



INSTRUCTIONS

1. Apply the two kinds of forces to each of the materials provided.
2. Decide if it is EASY or DIFFICULT to bend or twist the material and provide a reason.
3. Record your observations in the spaces provided by drawing a circle around the correct finding.

1	Wooden ruler 	**BEND**	DIFFICULT	EASY
		TWIST	DIFFICULT	EASY
2	Egg carton 	**BEND**	DIFFICULT	EASY
		TWIST	DIFFICULT	EASY
3	Plastic bottle 	**BEND**	DIFFICULT	EASY
		TWIST	DIFFICULT	EASY
4	Pencil 	**BEND**	DIFFICULT	EASY
		TWIST	DIFFICULT	EASY
5	Corrugated cardboard 	**BEND**	DIFFICULT	EASY
		TWIST	DIFFICULT	EASY
6	A tissue 	**BEND**	DIFFICULT	EASY
		TWIST	DIFFICULT	EASY

7. Comment on the suitability of the material for the purpose with which the object is used.

ASSESSMENT

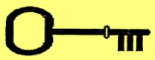
Criteria: Carries out instructions
Collects data

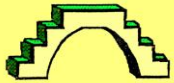
CHECKLIST/RUBRIC

The following checklist/rubric is an example. It may be used and adapted to 4 levels.

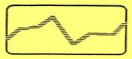
CRITERIA	Competent	Not competent
1. The learner tried to bend the materials		
2. The learner tried to twist the materials		
3. The learner recorded the data /encircled the findings		
4. The learner could comment on the suitability of the material for the purpose with which the object is used.		

In the following section, the researcher links the principles of mediation to the execution of the learning activity.

Principles of mediation	Application (processes)
 INTENTIONALITY AND RECIPROCITY	• Teacher displays the different objects to be used in the activity in the front of the classroom. • The teacher makes use of careful questioning: let us take a closer look at the objects – what are they made of? Do you think they are different? Let learners manipulate the objects to determine the differences. In what ways are they different? Why do you think the objects are made out of different material – refer specifically to the objects brought to the classroom. Let learners identify the properties of the material. • Explain to learners what the activity will entail and what they will have to do. • Conceptual and factual knowledge required for the execution of the activity are clarified during the intentionality and reciprocity phase.
 MEANING	• Careful questioning by the teacher: Why do you think it is necessary that we study and compare the different materials that can be used to make objects? Is it important to know this? Why? • Is it necessary to know that material can be bent or twisted, why?

 TRANSCENDENCE	• Ask learners to think of situations in life where the consideration has to be paid to the type of material out of which objects are made. Think of situations where the material used to make an object can become problematic: for example: clothing made out of paper. Let learners come up with examples to demonstrate the importance of objects made out of suitable material.
 SELF-REGULATION AND CONTROL OF BEHAVIOUR	• Set aside time in class for learners to check their answers, before they submit their work for assessment purposes. • Let learners explain the criteria they had to follow to complete the activity.
 COMPETENCE	• Give constructive feedback to learners regarding the answers to the activity. Specify to the learners exactly what they did well, and do not focus on that what they had incorrect only. For example: *Your reasons for the choice of material are very accurate/applicable* • Avoid vague comments such as: *Well done/Good/Can improve.* • During the completion of the activity in the classroom, the teacher can move around and praise individual efforts when executed well.

 SHARING BEHAVIOUR	• Discussions during meaning making and transcendence will allow learners to share their opinions and learn from one another. • The discussions will provide opportunities for listening to others and learning how to respect the opinions of others.
 INDIVIDUATION	• During the presentation of the subject content related to the properties of material, teachers need to use a variety of teaching strategies to accommodate the needs of all learners. This implies the use of visual, auditory and kinaesthetic strategies. • Individual opinions of all learners related to the activity are appreciated. • Learners as individuals are involved in the execution of the activity. • Allow learners to mention their own examples related to the activity during the transcendence phase.
 GOAL PLANNING	• Before learners commence with the activity, let them work out how they will deal with the execution of the activity: what will they do first, second, third. Make learners aware of a systematic process that has to be followed during the completion of a task.
 NOVELTY AND CHALLENGE	• After explaining the basic concepts and content linked to force, activity 3 is given to the learners to complete. Although it links to the concepts and content discussed it provides a new challenge to the learners, which they have to accomplish as individuals. The activity serves as an application of the principles clarified during the intentionality and reciprocity phase.

 SELF-CHANGE	• Learners need to be asked what they have learned during this lesson that they did not know before. • Let learner reflect on how successful they think they were in executing the activity. • Ask learners to indicate to you what they think they could have done better. • Ask learners to reflect on their own strengths.
 SEARCH FOR OPTIMISTIC ALTERNATIVES	• Let learners experience learning as fun. For example: let learners hypothesize about the following: What do you think would happen if we make furniture out of cardboard? Let learners come up with their own examples to hypothesize about.
 BELONGING	• A feeling of belonging is created by acknowledging the contributions of all learners during teaching and learning – everybody shares their opinions with the other learners. Learning from the knowledge of others and providing your knowledge to others so that they can learn from you, create a feeling of belonging in the classroom. Learners realise that their opinions are valued, and that they can contribute to teaching and learning.

Activity 4: Time and temperature of melting ice

INFORMATION TO TEACHER

OUTCOME ADDRESSED: **LO 3: Science, society and environment**
ASSESSMENT STANDARDS: Identifies and explains differences in two reports of the same event or in an investigation.
RESOURCES NEEDED: Worksheet; grid paper , ice blocks, water at different temperatures (hot plate, pot, kettle)
PROCESS SKILLS ADDRESSED: collect and select information / draw graphs/identify and indicate possible consequences.

Group activity

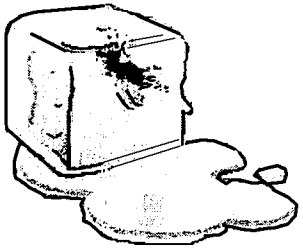
INFORMATION
The following information was obtained when the class investigated the change in temperature when ice was heated.

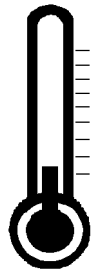
Time in minutes	Temperature in °C	Observations
0	0°C	Ice is very cold
5	25 °C	Ice has melted into water
10	50 °C	Water is hot
15	75 °C	Water is very hot
20	95 °C	Boiling water

Use the given grid paper with axes to draw a graph reflecting the information.

Instructions

- Give the graph a suitable heading.
- Label the axes.
- Divide the axes according to a suitable scale.
- Plot all the readings on the graph.
- Draw the graph.

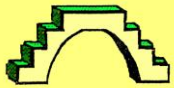




ASSESSMENT CHECKLIST

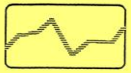
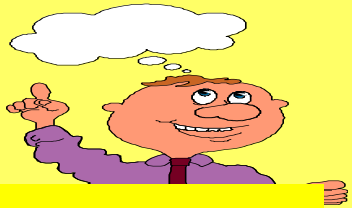
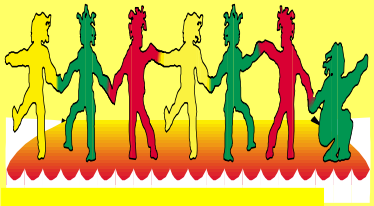
CRITERIA	YES	NO
1. Suitable heading e.g. Temperature of water as time changes		
2. One axis labeled: Temperature		
3. One axis labeled: Time		
4. Time axis divided into a suitable scale: all intervals equal values		
5. Temperature axis divided into correct scale: all intervals equal values		
6. Readings plotted correctly		
7. Attempt to draw the graph even if the scale and plotting are incorrect		

In the following section, the researcher links the principles of mediation to the execution of the learning activity.

Criteria of mediation	Application (processes)
 INTENTIONALITY AND RECIPROCITY	• Teacher displays the different objects to be used in the activity in the front of the classroom. • The teacher makes use of careful questioning: • Learners are familiarized with the concepts *solid, fluid, gas, evaporation, temperature : freezing point, melting point, the use of a thermometer.* • Explain to learners what the activity will entail and what they will have to do. • Clarify conceptual knowledge required for completing the activity.
 MEANING	• Careful questioning by the teacher: Why do you think it is necessary that we study and compare the influence of temperature on the melting of ice?
 TRANSCENDENCE	• Ask learners to think of situations in life where the consideration has to be paid to temperature in relation to certain objects . Think of situations where temperature can become problematic, for example: keeping food fresh, storing medicine, changing the clothes we wear, body temperature etc. Let learners also come up with their own examples and explain their argument regarding temperature and changes that occur due to temperature change.

 SELF-REGULATION AND CONTROL OF BEHAVIOUR	• Set aside time in class for learners to check their answers, before they submit their work for assessment purposes. • The activity involves careful measurement of temperature. Let learners check one another's measurements to make sure that they are correct. • On returning the marked activity to the learners, let the learners check the correctness of their answers themselves by making use of the memorandum. This will enable them to see for themselves where they had made mistakes.
 COMPETENCE	• Give constructive feedback to learners regarding the answers to the activity. Specify to the learners exactly what they did well, and do not focus on that what they had incorrect only. For example: *Your measurements of the temperature was really accurate, or please check your temperature measurements, they are not correct.* • Avoid vague comments such as : *Well done/Good/Can improve.* • During the completion of the activity in the classroom, the teacher can move around and praise individual efforts when executed well.
 SHARING BEHAVIOUR	• During the group activity learners will get the chance to explain their answers and views to others. • Discussion will allow learners to share their opinions and learn from one another. • Learners will learn how to take decisions together, as their answers have to reflect joint collaboration. • The group activity will provide opportunities for listening to others and learning how to respect the opinions of others.

 INDIVIDUATION	• During the presentation of the subject content related to temperature teachers need to use a variety of teaching strategies to accommodate the needs of all learners. This implies the use of visual, auditory and kinaesthetic strategies. • Individual opinions of all learners related to the activity are appreciated. • Learners as individuals are involved in the execution of the group activity. Indicate a specific task to each of the learners: measuring temperature on different occasions.
 GOAL PLANNING	• Before learners commence with the activity, let them work out how they will deal with the execution of the activity so that each one in the group contributes to achieve the aim set out with the activity. Let them decide who will measure what, and who will record the findings.
 NOVELTY AND CHALLENGE	• After explaining the basic concepts and content linked to temperature, activity 4 is given to the learners to complete. Although it links to the concepts and content discussed it provides a new challenge to the learners, which they have to accomplish. The activity involves the application and reinforcement of the principles related to the subject content dealt with during the intentionality and reciprocity phase.

 SELF-CHANGE	• Learners need to be asked what they have learned during this lesson that they did not know before. • Let learner reflect on how successful they think they were in executing the activity. • Ask learners to indicate to you what they think they could have done better. • Ask learners to highlight the benefits they think working together with their peers had, and what they think were problematic working with others. Let them suggest solutions to the problems they highlighted.
 SEARCH FOR OPTIMISTIC ALTERNATIVES	• Let learners experience learning as fun. For example: let learners hypothesize about the following: What do you think would happen if we substitute the ice block with sugar, coffee, salt etc. What do you think will be different in this experiment than in the one you have just executed? What contributes to the difference?
 BELONGING	• A feeling of belonging is created by acknowledging the contributions of all learners during teaching and learning – everybody shares their opinions with the other learners. Learning from the knowledge of others and providing your knowledge to others so that they can learn from you, creates a feeling of belonging in the classroom. Learners realise that their opinions are valued, and that they can contribute to teaching and learning.

6.5 CHAPTER SUMMARY

Teachers need to have full control over subject knowledge as well as skills related to the processes that should underpin teaching and learning in order to address the needs of visually impaired learners in an inclusive classroom. This chapter explored the benefits of the principles and processes involved in a mediated learning approach for enhancing the teaching and learning needs of visually impaired learners related to language, cognitive, social and self-esteem development in inclusive classrooms. Mediated learning has the capacity of influencing the quality of visually impaired learners' interaction with the teaching and learning world in the classroom that enables them to benefit more from teaching and learning (Feuerstein *et al.,* 2010:62).

In order to highlight the merits of mediated learning for the teaching and learning of visually impaired learners, the researcher presents the expected changes as a result of mediated learning (Feuerstein, 2007:17-18) linked to the developmental needs of visually impaired learners in Table 6.2.

Table 6.2: Mediated learning and the developmental needs of visually impaired learners

Mediated learning	Developmental needs
Spontaneous use of cognitive functions and operations	Cognitive development
An increase in self-pride, enthusiasm and involvement in learning	Self-esteem/self-confidence
An increase in the feeling of competence and improved self-image	Self-esteem/self-confidence
Divergent thinking and looking for	Cognitive development

alternative answers	
Increased social sensitivity	Social development
Increased readiness to take part in discussions	Language development
An increase in spontaneous use of vocabulary and concepts	Language development
Willingness to assist others and to accept help	Social development
Improved interpersonal relations	Social development
Increased self-monitoring (metacognitive skills)	Cognitive development
Increased tolerance – readiness to hear others out and understand their point of view	Social development

The final chapter will provide an overview of the research, summarize the main findings and make recommendations regarding the accommodation of the teaching and learning needs of visually impaired learners in inclusive classrooms.

CHAPTER SEVEN

SUMMARY, FINDINGS AND RECOMMENDATIONS

7.1 INTRODUCTION

In this chapter, the researcher endeavours to revisit the aims of the study in order to ascertain whether they have been achieved. A number of problem questions were posed in the opening chapter of this study, which had to be answered as the study unfolded. This chapter wishes to verify whether the literature review and the questionnaire data contributed to answering the problem question on which the study was based, namely to what extent teachers accommodate the teaching and learning needs of visually impaired learners in an inclusive classroom. The layout of this chapter is as follows:

- Overview of the study
- Findings from the literature review
- Findings from the empirical study
- Findings in relation to the aims of the study
- Recommendations
- Limitations of the study
- Suggestions for further research

7.2 OVERVIEW OF THE STUDY

This section intends to give a brief overview of all the previous chapters of this study, in order to focus the attention on the gist of each chapter, so that the findings and the recommendations that follow, will link up meaningfully.

7.2.1 Chapter One

The purpose of this chapter was to orientate the reader to the problem that was identified for this study. The problem statement related to the challenges and difficulties that teachers are confronted with regarding the inclusion of visually impaired learners in inclusive classrooms. The main aim was to determine to what extent the classroom practices of teachers enhance the teaching and learning needs of the visually impaired learner in an inclusive classroom (*cf.* 1.2).

7.2.2 Chapter Two

This chapter focused specifically on the literature in South Africa, dealing with a concept clarification of visual impairment which is mainly contributed to refractive errors (*cf.* 2.2.1). Furthermore, myopia, hyperopia and astigmatism (*cf.* 2.2.2) were identified as the most common refractive errors that lead to visual impairment among male and female learners in South Africa.

This chapter also focused on principles underpinning inclusive education and training in South African, as set out in White Paper 6 (*cf.* 2.2.3). Inclusive education focuses on a shift of emphasis on learner deficits and needs, to the untapped potential and value of each learner (*cf.* 2.2.3).

In the context of this study, the various barriers to learning at school were examined (*cf.* 2.2.4). Barriers to learning can comprise societal barriers, pedagogical barriers, medical barriers, intellectual barriers and systemic barriers (*cf.* 2.2.4.1-2.2.4.5). Anything that may stand in the way or prevent the learner to participate fully and learn effectively can thus be seen as a barrier to learning.

The concept visual impairment and its related definitions were also explored (*cf.* 2.3.1; 2.3.2). Genetic causes, factors affecting a baby during birth and neurological disorders were identified as major causes of visual impairment (*cf*. 2.3.3). In the context of this study, visual impairment refers to learners who have low vision and may need magnified print or special seating in the

classroom (*cf.* 2.3.4). The characteristics that visually impaired learners can display during teaching and learning were highlighted. The literature review indicated that visually impaired learners experience problems with copying from the chalk board, writing, taking part in physical activities, reading and social functioning (*cf.* 2.3.5.1-2.3.5.6).

Important effects that visual impairment can have on the development of the learner were explained. These involved motor development, cognitive development, language development, self-help skills, self-concept and social skills (*cf.* 2.4.1-2.4.6).

7.2.3 Chapter Three

This chapter presented an exploration of the different teaching and assessment strategies that could be utilized in inclusive classrooms in order to accommodate visually impaired learners (*cf.* 3.2). Teaching the visually impaired involves taking care not to overwhelm learners with a mass of visual material, encouraging cooperative learning and active learning (*cf*. 3.3.1; 3.3.2; 3.3.3), obeying general courtesy rules when working or speaking to learners with visual impairment (*cf.* 3.3.4), adapting reading material to reflect a larger font and providing verbal explanations for all activities or actions that occur in the classroom (*cf*. 3.3.5) and providing active, interactive, tactile and kinaesthetic learning (*cf.* 3.3.7). Other aspects that teachers need to be aware of during teaching and learning include an awareness of the deficits in conceptual foundations and gaps in experiences (*cf.* 3.2). Suggestions were also provided for adapting assessment of the visually impaired learner (*cf.* 3.4).

7.2.4 Chapter Four

This chapter elaborated on the quantitative research design utilized to achieve the aim and objectives of the study. In this study, the aim was to determine to what extent the teaching and learning needs of the visually impaired learner in an inclusive classroom were enhanced. As the researcher decided to be an external observer whose aim was to establish the characteristics of classroom

situations, a quantitative research design by examining the perceptions of teachers and learners by means of questionnaires, was selected (*cf.* 4.4; 4.6).

7.2.5 Chapter Five

The data collected through the questionnaires were analyzed and interpreted in this chapter. The main findings that were derived from the data were the following:

It became apparent that not all of the teachers who took part in the study have complete knowledge to identify the personal characteristics of learners with visual impairments. Misperceptions were detected regarding visually impaired learners being not intelligent, lazy, impulsive, inattentive and intellectually impaired (*cf*. 5.2.2.1).

Most of the teachers who took part in the study seem to be knowledgeable on identifying the physical and behavioural characteristic of learners with visual impairments (*cf.* 5.2.2.2; 5.2.2.3).

The responses obtained from the teachers do not convincingly indicate that they are knowledgeable on the relationships learners with visual impairments form with their teachers and peers, and their involvement during conversations in the classroom. The teachers appear to be not convinced that learning progress can be guaranteed in a classroom where the needs of visually impaired learners have to be accommodated (*cf.* 5.2.2.3; 5.2.2.5).

Teachers appear to possess adequate knowledge to recognize learners with visual impairment when doing deskwork, are aware that these learners have good listening skills and poor reading skills, and need extra time for task completion (*cf.* 5.2.2.2; 5.2.2.3).

A number of respondents appear to be under the wrong impression that learners with visual impairments have poor academic achievement, experience concentration problems and are disorganized (*cf.* 5.2.2.4).

Many of the teachers also seem to find the presence of learners with visual impairments problematic in a mainstream classroom (*cf.* 5.2.2.3) and are of the opinion that they should be taught separately in the mainstream (*cf.* 5.2.2.5).

The use of verbal explanations and lectures and bolded texts as well as the use of cooperative learning for language, cognitive, social and self-esteem development appears to be under-emphasized (*cf.* 5.2.4; 5.3.3).

The data analysis revealed that the learners who took part in the study might experience developmental needs as highlighted by Bishop (2004:60-71) (*cf.* 2.4). This conclusion is based on the following findings: visually impaired learners lack self-confidence (*cf.* Table 5.6), they do not participate in group work (*cf.* Table 5.8), cooperative learning and group work are underutilized (*cf.* Table 5.13; Table 5.18), visually impaired learners do not take part in conversations (*cf.* Table 5.8), have poor communication skills (*cf.* Table 5.9), and struggle to remember what they have learned (*cf.* Table 5.5).

7.2.6 Chapter Six

This chapter presented examples of learning activities based on the principles of mediated learning that could be incorporated in a curriculum-based teaching and learning programme for Natural Sciences Grade 7 to accommodate the development needs of visually impaired learners during teaching and learning as identified by the empirical research.

7.3 FINDINGS FROM THE LITERATURE REVIEW

In order to enhance the teaching and learning of the visually impaired learners in an inclusive classroom, a thorough literature review was conducted. From the literature review the following conclusions were drawn regarding the effective teaching and learning of the visually impaired learners.

The literature review indicated that teachers should take cognizance of the fact that visually impaired learners experience problems with copying from the

chalk board, writing, taking part in physical activities, reading and social functioning (Ormrod, 2008:179; Lewis & Doorlag, 2006:337; Donald *et al.,* 2005:237-241; Eggen & Kauchak, 2004:174) (*cf.* 2.3.5). Furthermore, teachers should be knowledgeable on the effects that visual impairment can have on the development of a learner. Visual impairment impacts on the motor development, cognitive development, language development, self-help skills, self-concept, social skills of the learner and deficits in conceptual knowledge (Mitchell, 2008:33; Gray, 2005:180; Bishop, 2004:66-71; Barraga & Erin, 2001:181; Felder, 2001; Gadbow, 2001:19-20) (*cf.* 2.4.1-2.4.6). Learners with visual impairment should not be overwhelmed with a mass of visual material (*cf.* 3.2), cooperative and active learning should be encouraged (Mitchell, 2008:33; Felder, 2001; Gadbow, 2001:19-20; (*cf*. 3.3.3; 3.3.7), general courtesy rules when working or speaking to learners with visual impairment should be obeyed (*cf.* 3.3.4), reading material should be adapted to reflect a larger font and verbal explanations should be provided for all activities or actions that occur in the classroom (Hugo, 2006:50; Keller, 2005; Barraga & Erin, 2001:119; Cox & Dykes, 2001:72) (*cf*. 3.3.5; 3.3.9). Suggestions were also provided for adapting the assessment of the visually impaired learner (Davies, 2003:205-206; Heward, 2000:6) (*cf.* 3.4; 3.4.1).

What was of importance for the study is the fact that the literature review clearly highlighted that the teaching, learning and assessment of visually impaired learners need to accommodate **general teaching and learning needs** related to the teaching and learning environment which *inter alia* include seating arrangements, using large and bolded print, supplying verbal instructions when demonstrations are done and providing active, interactive, tactile and kinaesthetic learning (*cf.* 3.3.7). Furthermore, the literature review indicated the importance of addressing specific **developmental teaching and learning needs** of visually impaired learners during teaching and learning, namely motor, language, cognitive, self-help, self-esteem and language needs (*cf.* 2.4).

7.4 FINDINGS FROM THE EMPIRICAL RESEARCH

The following findings were derived from the empirical research.

- The teachers who took part in the study appear not to have complete knowledge to identify the personal characteristics of learners with visual impairments (*cf.* 5.2.2.1).

- Misperceptions were detected regarding visually impaired learners not being intelligent, lazy, impulsive, inattentive and intellectually impaired (*cf.* 5.2.2.1).

- The teachers who took part in the study seem to be knowledgeable about identifying the physical signs of learners with visual impairments (*cf*. Table 5.7) (*cf*. 5.2.2.2).

- The teachers do not possess adequate knowledge regarding the relationships learners with visual impairments form with their teachers and peers, and the learners' involvement during conversations in the classroom (*cf.* 5.2.2.3; 5.2.2.5)

- Some of the teachers appear not to be convinced that learning progress can be guaranteed in a classroom where the needs of visually impaired learners have to be accommodated (*cf.* Table 5.8) (*cf*.5.2.2.5).

- The teacher responses indicate that the teachers possess adequate knowledge to recognize learners with visual impairment when doing deskwork, that these learners have good listening skills and poor reading skills, and need additional time for task completion (*cf.* Table 5.7; Table 5.9) (*cf.* 5.2.2.3; 5.2.2.4).

- A number of the respondents appear to be under the wrong impression that learners with visual impairments have poor academic achievement, experience concentration problems and are disorganized (*cf*. Table 5.9).

- Some of the respondents find the presence of learners with visual impairments problematic in a mainstream classroom (*cf.* Table 5.10) and these learners challenge aspects such as: organisation, tempo of teaching, paying special attention to teaching and assessment strategies to accommodate these learners and making adaptations to the learning environment and utilizing special equipment during teaching (*cf.* Table 5.11).

- The majority of the respondents indicated that they almost never use Braille, audio cassettes, dictaphones, permit learners to respond by typing, allow additional time to complete tasks, read assessment tasks to learners before they complete the tasks and use models that learners can feel and touch (*cf*. Table 5.13).

- A number of teachers indicated that they almost never use group work or cooperative learning and seldom supply verbal readings when demonstrations are done (*cf*. Table 5.13.)

- The responses of the learners indicated a strong correspondence with the responses obtained from the teachers. The majority of the learners indicated that their teachers almost never use Braille, audio cassettes, dictaphones, permit learners to respond by typing, allow learners additional time to complete tasks, allow learners to respond through descriptions instead of drawings, read assessment tasks before learners have to complete them, provide verbal explanations and lectures and utilize models to feel and touch during teaching (*cf*. Table 5.17).

- The data analysis revealed the following: the learners lack self-confidence (*cf.* Table 5.6), they do not participate in group work (*cf.* Table 5.8), cooperative learning and group work are underutilized (*cf.* Table 5.13, Table 5.18), learners do not take part in conversations (*cf.* Table 5.8), have poor communication skills as well as language problems (*cf.* Table 5.9), and struggle to remember what they have learned (*cf.* Table 5.5). All the mentioned aspects clearly point to developmental needs as highlighted

by Mitchell (2008:53), Gray (2005:180), Bishop (2004:68-71), Barraga and Erin (2001:181), and McGaha and Farran (2001:90) (*cf.* 2.4).

7.5 FINDINGS IN RELATION TO THE AIM AND OBJECTIVES OF THE STUDY

This study aimed to achieve the following objectives that were identified in chapter one (*cf*. 1.3).

Objective 1: To establish what the teaching and learning needs of the visually impaired learners in the inclusive classrooms are

This objective was achieved through the literature review and an empirical study. The literature review revealed that visually impaired learners experience general teaching and learning needs such as copying from the chalk board, writing, taking part in physical activities, reading and social functioning (*cf.* 2.3; 2.3.5.2-2.3.5.6). Furthermore, visual impairment can lead to needs that learners experience developmental needs regarding their motor development, cognitive development, language development, self-help skills, self-concept and social skills (*cf.* 2.4.1-2.4.6). Other aspects that teachers need to be aware of during teaching and learning include an awareness of the deficits in conceptual foundations and gaps in experiences and a need for auditory, active and tactile learning experiences (*cf.* 3.2; 3.3.7).

In the context of teaching and learning, teachers need to adapt their teaching and assessment strategies (*cf*. 3.3.2; 3.4) and provide special devices in order to accommodate the learning needs of the visually impaired learner, as neglecting to do so (*cf.* 3.3.11), could lead to these learners, in addition to their medical barrier, also experiencing pedagogical and systemic barriers (*cf.* 2.2.4.2; 2.2.4.5).

In order to accommodate the teaching and learning needs of the visually impaired learner in an inclusive classroom, teachers need to be knowledgeable about the characteristics of these learners which are

identifiable across a wide spectrum of activities that take place in the classroom (*cf.* 2.3.5).

Learners with visual impairments should be helped to move beyond their own negative views of themselves, often created by an exclusive focus on their difficulties. Schools have the opportunity to create the conditions for all learners to succeed. This can be achieved *inter alia* by organizing teaching and learning in such a way that all learners can attain the outcomes, identifying and understanding barriers to learning and assessment, creating safe and supportive environments, adapting teaching and assessment practices and ensuring a flexible curriculum. The provision of tactile learning, a strong focus on auditory learning and adapting printed material using an easily readable font are suggestions made in the literature to accommodate learners with visual impairments in an inclusive classroom (Barraga & Erin, 2001:153; Heward, 2000:18, 29, 81) (*cf.* 3.3).

What was of importance for the study is the fact that the empirical study clearly highlighted that the teaching, learning and assessment of visually impaired learners need to accommodate **general teaching and learning needs** related to the teaching and learning environment which *inter alia* include seating arrangements, using large and bolded print, supplying verbal instructions when demonstrations are done and providing active, interactive, tactile and kinaesthetic learning (*cf.* 2.3.5; 3.3). Furthermore, the empirical study indicated the importance of addressing specific **developmental needs** of visually impaired learners during teaching and learning, namely motor, language, cognitive, self-help, self-esteem and language needs (*cf.* 2.4). The mentioned needs correspond well with the needs identified by the literature review (*cf.* 7.3).

Objective 2: To examine whether teachers possess adequate knowledge to identify visually impaired learners in an inclusive classroom

This objective was achieved through the empirical research. The teachers' responses to the questionnaire indicated that they appear to have complete knowledge to identify the personal characteristics (*cf.* 5.2.2.1) and physical characteristics (*cf.* 5.2.2.2) of learners with visual impairments in their classrooms. The responses however revealed that educators were uncertain regarding some of the behavioural and learning characteristics of learners with visual impairment (*cf.* 5.2.2.3; 5.2.2.4). The teacher responses indicated that they could recognize learners with visual impairment when the learners are doing deskwork, that these learners have good listening skills and poor reading skills, and need extra time for task completion. However, a number of the respondents appear to be under the wrong impression that learners with visual impairments have poor academic achievement, experience concentration problems and are disorganized (*cf.* 5.2.2.4). The teachers who took part in the study apparently also do not possess adequate knowledge regarding the social relationships of visually impaired learners and their involvement during conversations (*cf*. 5.2.2.3).

Objective 3: To investigate teachers' attitudes towards learners with visual impairments in inclusive classrooms

This objective was achieved by means of the empirical research. The teachers who took part in the study had divided opinions regarding whether learners with visual impairments should be taught in mainstream, however, were of the opinion that learners with visual impairments should be taught in separate classes in mainstream schools (*cf.* Table 5.10). Some teachers appear to find the presence of learners with visual impairments problematic in a mainstream classroom, and agreed that learners with visual impairments require that the teacher pays a lot of attention to the structuring and planning of the learning environment (*cf.* 5.2.3).

Objective 4: To determine how teachers presently handle the teaching and learning needs of the visually impaired learners in an inclusive classroom

This objective was achieved by means of the empirical research. The majority of the teacher respondents indicated that they almost never use Braille, audio cassettes, dictaphones, permit learners to respond by typing, allow additional time to complete tasks, read assessment tasks to learners before they complete the tasks or use models that learners can feel and touch. A number of teachers indicated that they almost never use group work and cooperative learning or supply verbal readings when demonstrations are done (*cf*. 5.2.5). The responses of the learners indicated a strong correspondence with the responses obtained from the teachers. The majority of the learners indicated that their teachers almost never use Braille, audio cassettes, dictaphones, permit learners to respond by typing, allow learners additional time to complete tasks, allow learners to respond through descriptions instead of drawings, read assessment tasks before learners have to complete them, provide verbal explanations and lectures and utilize models to be felt and touched during teaching (*cf*. 5.2.3; Table 5.18). What appeared to be problematic is the fact that the development needs of the learners related to language, cognitive development, self-esteem and social development were not addressed adequately (*cf.* 5.5).

Objective 5: To evaluate to what extent the principles of mediated learning can address the teaching and learning needs of the visually impaired learner in an inclusive classroom.

A mediated learning approach is characterized by its socio-cognitive and interactive approach to learning and development, which could be regarded as conducive to addressing a number of negative effects that visual impairment can have on a learner, namely effects on cognitive development, language development, self-concept/esteem and social skills (*cf.* 2.4; 6.2)

Firstly, the literature revealed that learners with visual impairment require focused attention regarding their cognitive development, as this may develop in different ways than among learners without visual impairment (Bishop, 2004:68) (*cf*. 2.4.2). The researcher therefore argues that a teaching and learning approach such as mediated learning which has a strong cognitive focus, should benefit learners with visual impairment. Furthermore, a strong cognitive focus on teaching and learning is also required for learners without visual impairment. This strong cognitive focus is evident in the Critical and Developmental Outcomes that should underpin all teaching and learning (Department of Education, 2002a:11).

Secondly, language development poses difficulties to learners with visual impairments (Bishop, 2004:69) (*cf.* 2.4.3). In this regard, a socio-cognitive and interactive approach to teaching and learning can provide opportunities for the applied use of language, which could motivate that learners take part in discussions, ask questions, and initiate, continue and end conversations. The importance of language acquisition and good communication skills are also important for learners without visual impairment. In this regard the National Curriculum Statement envisages learners who can communicate effectively (Department of Education, 2002a:11).

Thirdly, a socio-cognitive approach to teaching and learning can support the development of a positive self-concept/self-esteem, which is highlighted by Mitchell (2008:53) and Bishop (2004:70) as a problematic issue among learners with visual impairment (*cf.* 2.4.5). Interactive learning can promote their acceptance as individuals who are worthwhile and valued. This, in turn, will enhance their social skills (*cf*. 2.4.6) of learning how to interact with others and they will be able to observe what behaviours are socially acceptable. Bishop (2004:71), Gray (2005:180 and McGaha and Farran (2001:90) indicate that the development of social skills is problematic among learners with visual impairment, as they have limited opportunity to observe how others behave and interact (*cf.* 2.4.6)

Objective 6: **To establish the extent to which there is a difference between the teacher and learner responses regarding the addressing of teaching and learning needs of visually impaired learners in an inclusive classroom**

This objective was achieved by means of the empirical research. The learners appeared to be more convinced than the teachers were that the application of the teaching and assessment principles and strategies accommodates learners with visual impairment. A statistical significant difference, p = 0,043 with a medium effect in practice was noted between the responses of the teachers and the learners. A statistical significant difference, p = 0,000 with a large effect in practice was also noted between the teacher and learner responses for the application of teaching and assessment strategies to accommodate learners with visual impairment (*cf.* 5.4). The results lead the researcher to reject the null hypothesis and accept the alternative hypothesis that were formulated at the onset of the study (*cf.* 5.4).

Objective 7: **To design a teaching and learning programme incorporating the principles of mediated learning to assist teachers to enhance the teaching and learning needs of the visually impaired learner in an inclusive classroom.**

This objective was achieved by designing four learning activities based on the principles of mediated learning that provided examples of learning activities that could form part of a curriculum-based teaching and learning programme that focuses on accommodating the development needs of learners with visual impairments during teaching and learning (*cf.* Chapter Six).

7.6 RECOMMENDATIONS

In light of the findings and linked to the literature review, the researcher recommends the following.

- Teachers need to specifically familiarize themselves with the behavioural and learning characteristics of learners with visual impairments, as the identification of these characteristics appeared to be the most problematic in identifying (*cf.* 5.2.2.3; 5.2.2.4).

- It is imperative for teachers to make a concerted effort to familiarize themselves with the strategies of teaching and assessment as well as the processes of learning that is important for teaching visually impaired learners. Furthermore, teachers need to augment their knowledge regarding the developmental problems these learners can experience with regard to language, cognition, social skills and self-esteem (*cf.* 2.4). This is important to avoid that pedagogical, cognitive and systemic barriers are created in addition to the medical barriers that learners with visual impairments experience (*cf*. 2.2.4.2-2.2.4.5)

- The Department of Education should introduce extensive and comprehensive training and workshop programmes that will provide the type of training, which will help teachers to develop and enhance their knowledge and understanding of the general and developmental teaching and learning needs of visually impaired learners (cf. 2.3.5; 2.4; 3.3).

  The following recommendations are not directly linked to the literature review, but the researcher regards them as important for enhancing the teaching and learning of visually impaired learners.

- It is imperative that teachers become reflective thinkers in order to examine their own practice in terms of its effectiveness to address the teaching and learning needs of visually impaired learners in inclusive classrooms.

- Teachers should, occasionally, engage in self-assessment and peer assessment activities to check and verify their level of competency regarding the utilization of the teaching and assessment strategies utilized for visually impaired learners.

- Teacher training institutions are faced with the challenge to incorporate training in mediated learning in their curriculum to enable prospective teachers to become acquainted with the mediated learning approach to teaching that can accommodate a variety of teaching and learning needs in an inclusive classroom.

- The Department of Education should commit itself to provide education for all learners. Funding should be provided to all schools to purchase basic material for teachers and learners to use at schools (Department of Education, 2005a:21). However, Wildeman and Nomdo (2007) indicate that Education White Paper 6 has not yet become a reality in the classroom, due to unmet funding and service delivery challenges.

7.7 SUGGESTIONS FOR FURTHER RESEARCH

This study made the researcher aware of related topics that require further research. The following suggestions are made for further research.

- A study to determine how factors such as time, overcrowded classes and lack of resources impact on the effective implementation of teaching and learning in an inclusive classroom.

- A study to enhance the teaching and learning of the learners with learning impairment by implementing a mediated learning approach in classrooms to determine the merits of mediated learning with visually impaired learners.

- A descriptive understanding has been obtained of the nature of classroom teaching and learning for visually impaired learners. Future studies can explore various dimensions related to teaching and learning, for example how the various development needs of visually impaired learners are addressed.

- Research can be undertaken to explore why not all the learners found the adaptation of the teaching, learning and assessment environment to address their needs as a priority.

7.8 LIMITATIONS OF THE STUDY

A number of limitations were identified concerning the research. Bearing these limitations in mind, the researcher acknowledges that only tentative conclusions regarding the extent to which teachers accommodate the needs of visually impaired learners in inclusive classrooms can be formulated. The researcher identified the following limitations:

- Only a quantitative research approach was utilized. This means that the researcher only had a limited amount of data to work with. If the researcher integrated some qualitative methods for data collection, such as interviews and observations, a deeper and holistic understanding of the extent to which teachers accommodate the teaching and learning needs of visually impaired learners in inclusive classrooms could have been obtained.

- Survey research captures a fleeting moment in time (Leedy & Ormrod, 2005:184). It is therefore not possible to suggest that what was found in one sample of the population at one particular time to be acceptable and constant for all time (Leedy & Ormrod, 2005:184). People often tell us what they believe to be true or what they think we want to hear, to present a favourable impression. To eliminate this problem interviews should be used to back-up the questionnaire responses.

- Systematic sampling might include some form of bias as the selected intervals could accidentally coincide with one or other characteristic of the study group. Purposeful sampling on the other hand limits the generalization of the findings.

- The current sample was only bounded to the one education district in the Free State Province, namely the Fezile Dabi District, and to one phase,

namely the Intermediate Phase. Furthermore, not all the schools in the district comprised the research sample. Therefore, the results of this study cannot be generalized. Similar research with larger sample in other education districts and with other grades is necessary to report conclusively on the extent to which teachers accommodate the teaching and learning needs of visually impaired learners in inclusive classrooms.

- The researcher did not perform a factor analysis to examine the construct validity statistically (Pietersen & Maree, 2007c:218), which could be regarded as a limitation in the study.

- The questionnaire did not explicitly include questionnaire items that investigated the extent to which teachers accommodate the needs of visually impaired learners related to language development, cognitive development, social development and self-esteem development, which are problematic issues among learners with visual impairment. The researcher set out to make conclusions regarding the aforementioned based on the data obtained. Although this was possible, the researcher acknowledges that he might have been able to obtain data that are more valuable when questions regarding the mentioned issues had been explicitly formulated. The reason for not formulating questions related to the problematic developmental areas explicitly was that the researcher did not want to direct teachers in providing responses that the researcher wanted. In addition to this, the literature review did not reveal information regarding the application of strategies or approaches to enhance the developmental needs of visually impaired learners that could direct the formulation of questionnaire items. Therefore, needs related to the development areas identified in the literature, were deduced from the available data.

- The questionnaires were not translated to accommodate the learners whose home language is Sesotho. This might have posed a problem concerning clearly understanding the meaning of the questionnaire items. To avoid the latter, the researcher was present during the completion of the questionnaires to clarify uncertainties.

- The impact of the various biographic variables on the perceptions of the respondents was not determined. This could have provided interesting dimensions to the data analysis.

7.9 CONCLUSION

Teachers who teach visually impaired learners in the mainstream are faced with a number of challenges. Firstly, teachers need to change their attitudes in the teaching and learning of visually impaired learners. Secondly, teachers have to change their present teaching methods to accommodate learners with visual impairment in the inclusive classroom. Another major challenge facing teachers will be to develop reflective thinking about their practice; to determine what works and what does not work; and being prepared to change what did not work. The researcher is convinced that a mediated learning approach to teaching and learning, which is not exclusively directed at the teaching and learning needs of visually impaired learners only, but at all learners in a classroom, can provide a workable solution to accommodate a variety of learner needs without enormous adaptation and restructuring of the curriculum.

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APPENDIX A

PERMISSION OF EDUCATION DEPARTMENT

FREE STATE PROVINCE

Enquiries : Mrs M V Wessels/
Reference no. : 16/4/1/41-2003

Tel :(051) 404 8075
Fax :(051) 4048074

2006-09-18

Mr MM Maloka
PO Box 812
Parys
9585

Dear Mr Maloka

REGISTRATION OF RESEARCH PROJECT

1. This letter is in reply to your application for the registration of your research project.

2. Research topic: **A model to enhance teaching and learning of the visually impaired learners**

3. Your research project has been registered and you may conduct research in the Free State Department of Education under the following conditions:

   3.1 Principals, educators and learners participate voluntarily in the project.
   3.2 The names of the schools, principals, educators and learners involved remain confidential.
   3.3 The questionnaires are completed and the interviews are conducted outside of the normal tuition time of the school.
   3.4 You consider making the suggested changes.
   3.5 This letter is shown to all participating persons.

4. You are requested to donate a report on this study to the Free State Department of Education. It will be placed in the Education Library, Bloemfontein.

5. Once your project is complete, we should appreciate it if you would present your findings to the relevant persons in the FS Department of Education. This will increase the possibility of implementing your findings wherever possible.

6. Would you please write a letter **accepting the above conditions**? Address this letter to:

   The Head: Education, for attention: CES: IRISS
   Room 1204, Provincial Government Building
   Private Bag X20565, BLOEMFONTEIN, 9301

7. We wish you every success with your research.

Yours sincerely

JS Tladi
Chief Director: Strategic Management Services

cc Director of District: Northern Free State.

APPENDIX B

QUESTIONNAIRE: TEACHERS

Questionnaire for teachers

THIS QUESTIONNAIRE IS CONFIDENTIAL AND ANONYMOUS

Your help in completing this questionnaire is appreciated.

In answering the following questionnaire, please try to be as objective as possible. The aim is to gather information regarding the extent to which you possess knowledge to identify learners with visual impairments in your classroom, and the teaching, learning and assessment practices that you utilize to accommodate the teaching and learning needs of visually impaired learners in inclusive classrooms.

SECTION A: Biographic Information

1. Your age

   Indicate your age by encircling the appropriate number:

20-25 years	26-30 years	31-35 years	36-40 years	41-45 years	46-50 years	51-55 years	56-60 years	61+ years

2. Your school type

   Indicate the school in which you are currently teaching by marking the appropriate block:

Public school	Private school

3. Phase

   Indicate the phase(s) in which you are currently teaching by marking the appropriate block(s):

Foundation	Intermediate	Senior	FET

4. How many visually impaired learners are you teaching presently?

0 – 5	6 – 10	11 – 15	16 -20

5. How did you become aware of them?

SECTION B: Knowledge regarding visual impairment

Indicate the extent to which you agree or disagree with the following statements by encircling the number corresponding to your choice.

Learners with visual impairment…….

		Disagree strongly	Disagree	Agree	Agree strongly
1	have poor academic achievement	1	2	3	4
2	are not intelligent	1	2	3	4
3	have a disorganized approach to learning	1	2	3	4
4	can be assisted if identified early	1	2	3	4
5	rely heavily on teachers	1	2	3	4
6	impact negatively on learning in the classroom	1	2	3	4
7	are inattentive	1	2	3	4
8	struggle to remember what they have learned	1	2	3	4
9	have good listening skills	1	2	3	4
10	have poor communication skills	1	2	3	4
11	do not participate in group work	1	2	3	4
12	do not take part in conversations in the classroom	1	2	3	4
13	are restless	1	2	3	4
14	are impulsive	1	2	3	4

		Disagree strongly	Disagree	Agree	Agree strongly
15	rely heavily on their peers	1	2	3	4
16	can be assisted through remedial intervention	1	2	3	4
17	can be detected by only looking at the eyes of the learner	1	2	3	4
18	blink their eyes more than usual	1	2	3	4
19	rub their eyes frequently	1	2	3	4
20	narrow their eyes	1	2	3	4
21	frown a lot	1	2	3	4
22	cannot focus their eyes on what they read	1	2	3	4
23	may hold text close to their eyes	1	2	3	4
24	may hold text far from their eyes	1	2	3	4
25	confuse letters with more or less the same shape (P, D, B, R)	1	2	3	4
26	cannot space their writing properly	1	2	3	4
27	continually write down incorrectly from the chalk board	1	2	3	4
28	have concentration problems	1	2	3	4
29	have reading problems	1	2	3	4
30	need extra time for tasks	1	2	3	4
31	often lack self-confidence	1	2	3	4
32	are lazy	1	2	3	4
33	are intellectually impaired	1	2	3	4

		Disagree strongly	Disagree	Agree	Agree strongly
34	do not belong in mainstream classrooms	1	2	3	4
35	are uneducable	1	2	3	4
36	are stressful to mainstream teachers	1	2	3	4
37	hamper the learning progress in a classroom	1	2	3	4
38	should be taught separately in the mainstream	1	2	3	4
39	requires that teachers pay careful attention to the learning environment (design, light, sound, seating arrangement)	1	2	3	4

SECTION C: Challenges related to the teaching of visually impaired learners

Indicate the extent to which you agree or disagree with the following statements by encircling the number corresponding to your choice:

Teaching visually impaired learners is challenging because….

		Disagree strongly	Disagree	Agree	Agree strongly
1	it is time consuming	1	2	3	4
2	teachers need to adapt the curriculum	1	2	3	4
3	they require a lot of individual attention	1	2	3	4

		Disagree strongly	Disagree	Agree	Agree strongly
4	teachers do not possess adequate knowledge to teach learners with visual impairment	1	2	3	4
5	teachers do not get support from district offices	1	2	3	4
6	teachers need to collaborate with teachers who teach learners with special needs	1	2	3	4
7	it can obstruct the progress of learners who do not have impairments	1	2	3	4
8	a number of factors in relation to the classroom environment have to be considered (design, light, seating arrangement, sound)	1	2	3	4

SECTION D: Classroom teaching, learning and assessment

Indicate the extent to which you agree or disagree with the following statements by encircling the number corresponding to your choice:

		Strongly Disagree	Disagree	Agree	Strongly Agree
1.	Teachers should modify teaching strategies for learners with visual impairment	1	2	3	4
2.	Teachers should modify assessment strategies for learners with visual impairment	1	2	3	4

		Strongly Disagree	Disagree	Agree	Strongly Agree
3.	Teachers should accommodate learners with visual impairment in mainstream classrooms	1	2	3	4
4.	Teachers should motivate all learners to accept each other the way they are	1	2	3	4
5.	Teachers should involve the parents of the visually impaired learners in the teaching and learning of these learners	1	2	3	4
6.	Teachers should participate in planning and implementing specific learning support programmes for the visually impaired learner	1	2	3	4
7.	Teachers should involve visually impaired learners in extra-curricular activities	1	2	3	4
8.	Learners with visual impairment need extra time for tasks	1	2	3	4
9.	Teaching for learners with visual impairment should be mostly verbal.	1	2	3	4
10.	Teachers should make use of audio tapes when teaching visually impaired learners.	1	2	3	4
11.	Teachers should enlarge reading material for the visually impaired learner.	1	2	3	4
12.	Teachers should make use of special equipment when teaching the visually impaired learner.	1	2	3	4
13.	Teachers should supply learners with a verbal reading of everything that occurs visually	1	2	3	4
14.	Teachers should utilize models during teaching in order for learners to feel and touch	1	2	3	4

SECTION E: Teaching and assessment strategies for the visually impaired

Indicate how often you utilize the following teaching and assessment strategies for the visually impaired learners by encircling the number corresponding to your choice

	Almost Always	Often	Some-times	Almost Never
1 Braille	1	2	3	4
2. Enlarged or bolded text	1	2	3	4
3. Audio cassettes	1	2	3	4
4. Dictaphones	1	2	3	4
5. Permitting learners to respond by typing	1	2	3	4
6. Allowing additional time to complete tasks	1	2	3	4
7. Allowing learners to respond through descriptions instead of drawings	1	2	3	4
8. Reading assessment tasks to the visually impaired learners before requesting them to complete it	1	2	3	4
9. Verbal explanations and lectures	1	2	3	4
10. Demonstrations	1	2	3	4
11. Group work and co-operative learning	1	2	3	4
12. Supplying verbal readings when demonstrations are done	1	2	3	4
13. Utilizing models to feel and touch	1	2	3	4

APPENDIX C

QUESTIONNAIRE: LEARNERS

Questionnaire for learners

THIS QUESTIONNAIRE IS CONFIDENTIAL AND ANONYMOUS

Your help in completing this questionnaire is appreciated.

In answering the following questionnaire, please try to be as objective as possible. The aim is to gather information about your opinions regarding the teaching, learning and assessment practices utilised by your teachers in order to accommodate your teaching and learning needs as a visually impaired learner in an inclusive classroom.

SECTION A: Biographic Information

1. Your grade

Indicate your grade by encircling the appropriate number:

1	2	3	4	5	6	7	8	9	10	11	12

2. Your age

Indicate your age group by marking the appropriate block:

6 – 8 years	9 – 11 years	12 – 14 years	15 – 17 years	18 – 20 years	20+ years

3. Your school type

Indicate the school that you are currently attending by marking the appropriate block:

Primary school	Secondary school

SECTION B: Classroom teaching, learning and assessment

Indicate the extent to which you agree or disagree with the following statements by encircling the number corresponding to your choice:

		Strongly Disagree	Disagree	Agree	Strongly Agree
1	Teachers should modify teaching strategies for learners with visual impairment	1	2	3	4
2	Teachers should modify assessment strategies for learners with visual impairment	1	2	3	4
3	Teachers should accommodate learners with visual impairment in mainstream classrooms	1	2	3	4
4	Teachers should motivate all learners to accept each other the way they are	1	2	3	4
5	Teachers should involve parents of the visually impaired learners in the teaching and learning of these learners	1	2	3	4
6	Teachers should participate in planning and implementing specific learning support programmes for the visually impaired learner	1	2	3	4
7	Teachers should involve visually impaired learners in extra-curricular activities (sport and cultural activities)	1	2	3	4
8	Learners with visual impairment need extra time for tasks	1	2	3	4
9	Teaching for learners with visual impairment should be mostly verbal.	1	2	3	4

		Strongly Disagree	Disagree	Agree	Strongly Agree
10	Teachers should make use of audio tapes when teaching visually impaired learners.	1	2	3	4
11	Teachers should enlarge reading material for the visually impaired learner.	1	2	3	4
12	Teachers should make use of special equipment when teaching the visually impaired learner.	1	2	3	4
13	Teachers should supply learners with a verbal reading of everything that occurs visually	1	2	3	4
14	Teachers should utilize models during teaching and learning in order for learners with visual impairment to feel and touch	1	2	3	4

SECTION C: Teaching and assessment strategies for the visually impaired

Indicate how often your teachers utilize the following teaching and assessment strategies for the visually impaired learners by encircling the number corresponding to your choice

	Almost Always	Often	Some-times	Almost Never
1 Braille	1	2	3	4
2. Enlarged or bolded text	1	2	3	4
3. Audio cassettes	1	2	3	4
4. Dictaphones	1	2	3	4

	Almost Always	Often	Some-times	Almost Never
5. Permitting learners to respond by typing	1	2	3	4
6. Allowing additional time to complete tasks	1	2	3	4
7. Allowing learners to respond through descriptions in stead of drawings	1	2	3	4
8. Reading assessment tasks to the visually impaired learners before requesting them to complete it	1	2	3	4
9. Verbal explanations and lectures	1	2	3	4
10. Demonstrations	1	2	3	4
11. Group work and co-operative learning	1	2	3	4
12. Supplying verbal readings when demonstrations are done	1	2	3	4
13. Utilizing models to feel and touch	1	2	3	4

APPENDIX D

LANGUAGE EDITOR REPORT

TO WHOM IT MAY CONCERN

This is to certify that the undersigned has done the language editing for th following candidate:

SURNAME and INITIALS: MALOKA, M.M.

DEGREE: ~~MEd dissertation~~ / PhD thesis

D. Kocks **Date:** 17 November 2010

Denise Kocks

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