

**SUPPORTING DEAF LEARNERS IN INCLUSIVE
EDUCATION SETTINGS IN SOUTH AFRICA**

by

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DECLARATION

Student number: 3393-513-0

I declare that **SUPPORTING DEAF LEARNERS IN INCLUSIVE EDUCATION SETTINGS IN SOUTH AFRICA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

IV Skrebneva

Date

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SUMMARY

The inclusive paradigm requires that deaf learners are educated in regular schools. In the process of implementing inclusive policies educators often feel that they lack the necessary knowledge and experience to provide effective support for deaf learners. As a result these learners are seldom effectively catered for in regular settings and frequently tend to experience frustration and failure. This research attempted to investigate the nature and manifestations of deafness in primary school learners in order to determine effective strategies to identify and address the diverse needs of deaf learners in the regular schools.

A qualitative study was conducted and data was gathered by observations and interviews with three experienced educators. The results of the empirical findings were confirmed with the literature study in order to compile practical guidelines to assist educators to support deaf learners in inclusive education settings in South Africa effectively.

Keywords: inclusion, deafness, practical guidelines, deaf learners, support, regular classrooms, mainstream educators, constructivism, bilingual approach.

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CHAPTER 1

INTRODUCTORY ORIENTATION AND STATEMENT OF THE PROBLEM

1.1 INTRODUCTION

The dramatic changes in the South African society in the past years have affected both general and special education. Previously, it was assumed that learners with impairments should be educated in special schools, and that the predominant educational approach should be that those learners would not be successful in meeting the general demands in regular classrooms. Since the introduction of a democratic dispensation in South Africa in 1994, the country has been in the process of social, political, economic and educational transformation aimed at developing a more inclusive society (Hay, Smit & Paulsen 2001:213). Schools do not function in isolation. What happens in schools reflects the developments and changes in society. A logical response to the rapidly evolving social, political and economic contexts is to create schools that are grounded in democratic principles and constructs of social justice. All schools need to support the concept of equal educational opportunities for all learners by ensuring access for all learners, including those who experience barriers to learning (Swart & Pettipher 2005:32).

Inclusion involves bringing the support services to the learner, rather than moving the learner to the services, so that learners experiencing impairments may indeed be successful in meeting the general demands in regular classrooms. Consequently, the education system should be restructured in such a way that it accommodates all learners, irrespective of their diverse needs (Department of Education 2001:6). Inclusive education can be successful only if it is organised so as to be able to provide various levels and forms of **support** to both learners and educators. The National strategy on screening, identification, assessment and support (DoE 2008: 102) defines support as all

the activities in a school that increase the school's capacity to respond to diversity. Providing support to individuals is only one way of making learning contexts and lessons accessible to all learners. Support also takes place when schools review their culture, policies and practices in terms of the extent to which they meet the individual needs of educators, parents and learners. Support, then, must focus broadly on the learning and teaching process by identifying and addressing learner, educator and institutional needs.

All learners who need high-intensity support should receive such support in **special schools**. In addition to the support that special schools should render to learners, they should also serve as resource centres to neighbouring schools. When they serve as resource centres, special schools, together with district-based support teams, offer a solid support base for full-service schools and regular schools (DoE 2005c: 12). Special schools should provide specialised professional support in the areas of curriculum issues, assessment and instruction regarding barriers to learning to teachers from neighbouring schools (DoE 2002:25).

Learners who are in need of moderate support (DoE 2001:15) should receive this support in **full-service schools**, alongside other learners without barriers to learning (DoE 2002:35). In full-service schools, the focus should be on multi-level classroom instruction, cooperative learning, problem solving and the development of learners' strengths and competencies, rather than on their shortcomings only. The DoE has identified 500 schools that will be converted to full-service schools where the communities and other role players will be involved in the development of these schools (DoE 2001:23). Support in full-service schools should not be provided according to the category of disability, but according to the intensity of support needed (DoE 2005b:5).

Since currently not all schools in South Africa are not yet fully fledged full-service or inclusive schools, the remaining schools, which are **regular or mainstream schools**, are confronted with the reality of having learners who require moderate and/or intensive support, even though they are only equipped to cater for learners who are in need of low-intensity support. Learners with impairments, such as deafness, could be educated in

regular schools (DoE 2001:10), depending on the intensity of the support required. Educators in regular schools should be able to adapt and modify their teaching and learning methodologies in order to ensure that they meet each learner's educational needs. Lesson plans have to provide differentiated learning, teaching and assessment activities to ensure effective multi-level teaching (DoE 2005a:10).

The inclusive paradigm requires that deaf learners be supported to enable them to master new skills, encouraged to strive for greater achievements, and assisted to develop healthy and positive self-concepts. Deaf learners educated in regular schools usually find new ways of coping in a normal situation very early, which results in a greater ability to cope in a hearing world (Limaye 1999:58). According to Stinson and Antia (1999:170), deaf learners who are relatively skilled in using spoken communication often experience greater academic success and greater social integration in classes with hearing learners. At the same time, hearing children learn to understand and accept deaf learners and to behave 'normally' towards them.

Whilst mainstreaming implies that deaf learners may receive their education in regular schools, this does not necessarily mean that it will happen satisfactorily within the regular classroom (Stinson & Antia 1999:164). Deaf learners are seldom effectively catered for in a regular classroom: it is often a case of learners adapting to the system, rather than the system providing for them, which defies the aim of inclusive education. Although it is generally assumed that, in an inclusive setting, the classroom educator has the primary responsibility for educating all the children in the classroom (Jenkins, Pious & Jewel 1999:156), the changes in education philosophy regarding inclusive education have resulted in educators - even experienced ones - being unfamiliar with new initiatives and the demands for rapid change in their roles. Consequently they feel that they lack the necessary knowledge and personal efficiency to develop an appropriate curriculum and plan effectively for inclusive education (Forlin 1998:103). When educators are uncertain of their ability to manage a diversity of learners, this results in learners being referred to professionals for assessments (psychologists, occupational therapists, etc.) and placement in special programmes (Swart, Engelbrecht, Eloff & Pettipher 2002:183).

However, these services are not always available and accessible for some South African communities.

Successful inclusion is associated with three requirements for educators: adequate knowledge, effective skills and positive attitudes (Marshall, Raiph & Palmer 2002:212). A specific need exists to endeavour to improve the perceptions of educators regarding the inclusion of deaf learners. These efforts could include the provision of appropriate programmes to help educators meet the instructional, communication and cultural needs of deaf learners in regular schools (Lampropoulou & Padelliadu 1997:26), and assist them in addressing issues relating to social integration, self-concept and classroom support services to promote inclusion.

In order to include deaf learners in regular schools, it is important to implement specific educational practices and strategies that will assist ordinary educators in providing appropriate support to deaf learners attending regular schools. The aim of this research is to design effective guidelines to assist educators to appropriately address the diverse needs of deaf learners in regular schools.

1.2 BACKGROUND OF THE PROBLEM

At the Durban Primary School, a regular school where the researcher is employed as a specialised educator for deaf learners, a special unit has been established for deaf learners attending the school. The specialised unit consists of two classes (Senior Phase and Junior Phase), which are attached to the mainstream school. The regular classes consist of learners from both urban and rural areas, and the school recently introduced a strategy to include deaf learners in those classes. The aim is to make the transition from a specialised school setting to a regular one as smooth as possible and to ensure the learners' successful inclusion into regular high schools. The inclusive environment helps the deaf learners to interact, cope and live in a hearing world and to prepare them for future life. The abovementioned unit consists of three educators who specialise in teaching and supporting deaf learners. An important characteristic of this

unit is that the educators utilise the oral mode of communication and are not assisted by a sign-language interpreter.

Educators teaching the deaf learners inform the educators in regular classrooms of what to expect from these learners and how best to address and meet their needs. They also help the regular educators to identify the learners' strengths and to acknowledge their potential. The school psychologist and the speech therapist also help to facilitate the inclusion process by working closely with educators and parents. The deaf learners utilise both hearing aids and a frequency modulation (FM) system. They are also involved in extramural activities with hearing peers.

Unlike the educators at the Durban Primary School, educators in other South African schools do not necessarily have day-to-day support services, such as those offered by educational audiologists and psychologists, at their disposal. They have to depend on their own knowledge and insight in order to provide the best education possible for learners who experience barriers to learning, in this case deaf learners. Other factors that often complicate and increase the workload of educators are the geographical environment of schools and limited parental involvement (Swart *et al.* 2002:186); educators often experience difficulty in finding their own learning material (Prinsloo 2001:345), and frequently experience a sense of powerlessness and of not being in control of their situation (Prinsloo 2001:345). It is clear from the discussion above that educators need to be empowered and supported to accept the responsibility of offering effective support to deaf learners.

As an educator of deaf learners at the Durban Primary School, the researcher will be able to communicate with educators who perceive themselves as sufficiently competent to educate deaf learners, and with those educators who lack the necessary knowledge and personal efficiency to deal with them. Since hearing-impaired learners experience complex patterns of educational needs, they bring together professionals from different fields: audiologists, speech and language therapists, and educators. The professionals are aware of the learners' unique needs with regard to language, speech and

communication. At the same time most ordinary educators receive very little or no training at all in the needs of deaf learners. As the needs of such learners are not always obvious, these needs create specific problems for educators (Pottas 2005:69). The researcher believes that research in this field is necessary – not only with regard to curricular modifications and assessment strategies, but also with a view to the development of appropriate intervention strategies for the inclusion of deaf learners in regular schools. The current research would place the researcher in a favourable position to outline specific guidelines for the benefit of educators, which will increase their understanding of, and their ability to respond to the needs of deaf learners in their inclusive classrooms.

1.3 PROBLEM STATEMENT

Bearing in mind the state of flux of South African inclusive education and the insufficient knowledge among educators about the nature of deafness, the following research question will be posed:

What support strategies do educators in mainstream primary schools need in order to effectively teach deaf learners?

The problem in this study is therefore to determine the support strategies that educators in inclusive primary schools need to effectively teach deaf learners.

Sub-problems emerging from the above main research problem are the following:

- What is the nature of deafness?
- Which developmental skills of deaf learners need special support in an inclusive classroom?
- Which academic skills of deaf learners require special support in an inclusive classroom?
- Which support strategies could be used to eliminate possible barriers to learning in deaf learners?

1.4 AIM OF THE RESEARCH

From the problem statement the primary aim of the current research can be distinguished, namely to develop guidelines that will enable primary school educators to support deaf learners in the inclusive classroom.

In order to achieve this aim, the following secondary research aims are necessary:

- To determine the nature of deafness
- To determine which of the developmental skills of deaf learners need effective support from educators
- To determine which of the academic skills of deaf learners need effective support from educators
- To determine strategies to prevent the potential backlogs learners may develop.

1.5 DEFINITION OF TERMS

In order for the reader to fully understand this research study, it is necessary to define the principal terms and relevant concepts that will be utilised throughout this research:

1.5.1 Inclusion

After the end of the apartheid era the new democratic government committed itself to the transformation of education. Key policy documents and legislation stress the principle of education as a basic human right, as enshrined in the Constitution. An inclusive education system is consistent with the democratic principles underlying the new democratic dispensation in South Africa (Englbrecht, Oswald & Forlin 2006:121). UNESCO (2001:21) states that inclusive education is about ensuring the rights to education of all learners, regardless of their individual characteristics or difficulties, in order to build a more just society. The Education White Paper 6 (2001) provides a framework for systemic change for the development of inclusive education. It

emphasises that inclusion is about supporting all learners, educators and the system as a whole so that the full range of learning needs can be met (DoE 2001:17).

Inclusive policies and principles encourage the integration of deaf learners into mainstream education, maintaining that such learners can be successfully integrated in regular schools through the adaptation of the curriculum and by providing appropriate support where needed (Knight & Swanwick 1999:122). In inclusive settings the classroom practices are expected to change to accommodate individual children. For inclusion to be effective, all learners must actively belong to, be welcomed by and participate in a school and community. In other words, they should be fully included. Their diversity of interests, abilities and attainment should be welcomed and be seen to enrich the life of the school (Farrell 2001:7; Sapon-Shevin 1999:4).

1.5.2 Regular schools

As far as the principle of inclusion is concerned, the ideal situation is one in which ordinary, age-appropriate education is provided for learners who are currently not identified as learners with barriers to learning, or who are in need of low-intensity support. This means that learners should be taught in regular schools and in regular classrooms, and should not be excluded from the normal school environment. The educators at regular schools need to cater for all learners, but they often are not sufficiently trained to support the diversity of learners. The severity or complexity of the impairments of specific learners will determine the increase in support and resources required by the regular schools which they attend (Farrell 2001:3).

In regular schools, partnerships need to be established with parents so that they can participate more effectively in the planning and implementation of different activities, and so that they can play a more active role in the learning and teaching of their own children, despite limitations due to disabilities or chronic illnesses (DoE 2001:50).

Some schools have adopted the practice of placing groups of learners with the same problem in separate classes or units, for example in a unit for deaf children, or in a unit for children with learning difficulties. Research has shown that such units provided more opportunities for integration and for normal learning than separate special schools (Moses, Hegarty & Jowett 1988:50).

For the purpose of this research, the term regular school will be used to refer to any mainstream school in which deaf learners may be included in the classroom, and in which teachers attempt to meet the unique needs of these learners.

1.5.3 Deaf learners

Learners may be described as deaf or hearing impaired. Some deaf learners are born deaf or become hearing impaired before they acquired their first language (prelingually deaf); others have acquired hearing impairments later during childhood or during adulthood, after the acquisition of a first language. Because of the human rights movement (and subsequently the drive towards inclusive education), researchers and practitioners worldwide are moving away from disability labelling, which includes terms such as 'hearing loss' and 'hearing disorder'. Rather, international and national researchers choose to use the more generic term 'deafness' to refer broadly to all levels of hearing loss, making the distinction between deaf and hard-of-hearing only when it is necessary to do so (Marschark, Lang & Albertini 2002:93). In this study, the term 'deaf learner' will refer to the child with severe to profound hearing loss, whereas the term 'hard-of-hearing' will refer to individuals who have mild to moderate hearing loss.

1.5.4 Educators for deaf learners

Educators for deaf learners are professional people who have acquired the necessary competence and expertise to provide education to these learners. They provide critical educational services to learners who require intense levels of support (DoE 2001:21). The role of educators working in special education settings changes in response to the

challenges of inclusion. Their role now is to provide professional support regarding the curriculum, assessment and instruction to neighbourhood schools. This role also includes providing appropriate and quality educational provision for those learners who are already in these settings or who may require accommodation in settings requiring secure care or specialised programmes with high levels of support (DoE 2001:21).

The professional staff of special education settings and general educators could use their collective expertise in a collegial, equal-status relationship. This partnership allows educators who have specialised skills to propose alternative teaching strategies or supplementary instructional materials, based on suggestions generated, or problems experienced by regular school educators. Collaborative problem-solving activities may entail the periodic observation of learners with barriers to learning in regular school classes in order to identify areas of difficulty, or to monitor the success of intervention strategies (DoE 2001:21). For the purpose of this study the term 'educators for deaf learners' will be considered to refer to those educators who have undergone intensive training, have developed competence and have gained useful experience in teaching learners with barriers to learning, particularly deaf learners.

1.5.5 Bilingual approach

A bilingual approach encompasses the use of two languages and has as its aim a high level of competency in both languages, and an emphasis on the equality of the two cultures (deaf and hearing) (Storbeck & Henning 1998:53-64). According to this approach, the development of sign-language skills is fundamental not only to life objectives, but also to the objectives of providing uninhibited access to curriculum content via a fully accessible language and a basis for the acquisition of English as a second language via reading and writing (and possibly speaking). An important point to remember when adopting a bilingual approach in deaf education is that the two languages are equal but not the same, and so should be kept separate in their usage and in the curriculum.

Since parents and teachers need to be able to make informed decisions, they should read and learn as much as they can about the options available to them. Whatever the decision, deaf learners will need additional and specialised support within the educational context in order to meet their unique needs (Mahshie 1995:26). Where, in this study, reference is made to deaf learners, it should be assumed that these learners are utilising the oral mode of communication.

1.6 RESEARCH DESIGN

This research is of a qualitative nature and combines two research methods, namely a literature study, and an empirical investigation conducted by way of interviews.

1.6.1 Literature study

The primary method for gathering information is a literature study. Literature reviews make a valuable contribution to an understanding of the selected problem. Without a review of the relevant literature, it would be difficult to build a body of accepted knowledge on an educational topic (Schumacher & McMillan 2001:108). According to Mouton (2002:87), the role and function of a comprehensive study and in-depth interpretation of relevant literature in the planning and undertaking of a research project can be summarised as follows:

A literature study

- helps the researcher to examine the most recent and authoritative theorising about the subject;
- serves to ensure that the researcher does not merely duplicate a prior study;
- allows the researcher to identify the most widely accepted empirical findings in the field of study; and
- helps the researcher to ascertain what the most widely accepted definitions of key concepts in the field are.

In this (literature) study, the researcher will illuminate the typical characteristics of deaf learners in order to better understand different aspects of their lives. It is, for instance, important to know how they learn in order to make suggestions on how teachers should support them academically. They may also experience typical social and emotional difficulties, which can be alleviated if teachers are adequately equipped to deal with them. The educational adaptations for deaf learners will be researched from available literature, and will eventually be compared with the research findings arrived at in the empirical part of the research.

The planned guidelines will eventually flow from elements identified during the literature study. Subsequently the theoretically determined guidelines will be compared to and integrated with the data flowing from practical experience and gathered during interviews with teachers.

1.6.2 Empirical investigation

An understanding of effective teaching styles for deaf learners will be obtained by analysing the styles and methods of competent teachers of deaf learners. By utilising a qualitative approach, an attempt will be made to gain insight into the problem under investigation by exploring teachers' expert knowledge of the problem being researched. An interpretative approach is adopted in this study. Neuman (2006:70) contends that 'interpretative research is rooted in empathetic understanding of everyday lived experiences of people in specific historical settings'. The main objective of interpretative research is to gain information about the social environment, in this context the school, through observational methods. By analysing people in their natural settings, the researcher is able to reach a conclusion with regard to how they construct and maintain their social world (Neuman 2006:71). The activities of the interpretive researcher are the following: formulating research questions, interpreting fieldwork experiences, and writing the research report.

According to Borg and Gall (1989:380), most writing devoted to the qualitative approach emphasises participant observation and interviews. First-hand information could be gathered through such qualitative research methods. The best method for **data collection** with a view to achieving the goals of understanding the context of deaf learners and tapping the knowledge of the teachers, will be to conduct semi-structured interviews with the teachers, who should be prepared for the interviews by informing them of the specific aspects of teaching deaf learners that will be discussed.

To further enhance the data, the participants will be asked to do pre-observation of specific aspects of the questions prior to being interviewed. Observation is direct, eyewitness accounts of everyday social action and settings, recorded in the form of field notes (Schumacher & McMillan 2001:40). Qualitative field observation entails detailed descriptions of events, people, actions and objects in specific settings. Participant observation will focus on how teachers and deaf learners interact, how teachers communicate with deaf learners, how such learners are addressed at assemblies, and how language is used.

As regards the **selection of participants**, a total of three educators agreed to participate in this study. The researcher aims to obtain valuable information from these educators, who all have experience in the education of deaf learners. The three educators and the researcher are all employed as special educators for deaf learners at the Durban Primary School. They work in a special unit for deaf learners attached to a regular school. These educators have dealt with deaf learners for many years and have helped many of them to be successfully included in regular high schools.

A purposeful sample technique will be applied, based on the experiences of the educators. Participation in this research will be on a voluntarily basis and participants will be able to terminate their participation in the research at any stage, should they desire to do so.

1.7 THE STRUCTURE OF THE STUDY

Chapter 1

This chapter serves as an introduction. It provides a brief theoretical background, followed by a statement of the problem and an explanation of the aims and objectives of the research study. It also contains a brief rationale for the research design and methodology to be employed during the research process, and concludes with definitions for key terminology used in this study.

Chapter 2

Chapter 2 is concerned with a theoretical framework in respect of the ensuing research study. The concept of 'deafness' will be discussed. In order to provide an understanding of the cognitive development of deaf learners, the developmental, foundational, and academic skills of these learners will be outlined. There will also be a focus on specific activities that could be used to address the unique needs of deaf learners in regular classrooms.

Chapter 3

Chapter 3 contains an explanation of the research design and the methodology utilised to conduct this study. Procedures relating to the collection, recording and analysis of the data will be discussed.

Chapter 4

Chapter 4 contains an analysis and a discussion of the results in accordance with the main aim and objectives of the study. A summary of the empirical research will be presented and the results of interviews and observation undertaken will be discussed.

Chapter 5

Chapter 5 will include a synthesis of the literature research (Chapter 2) and the empirical study (Chapter 4). This will enable the researcher to determine whether the results of the literature study correspond with empirical findings. Practical guidelines will be formulated

on the basis of this. This chapter will also present the conclusions and implications of the study, as well as its limitations.

1.8 CONCLUSION

This chapter served as an introduction and provided the necessary information regarding the background to the study. It focused on the statement of the research problem, research design and methodology. It also outlined the research programme, the demarcation of the study and the clarification of key terminology that will be used in this research study. The next chapter will focus on the nature of deafness. It will also contain a discussion of cognitive development, which includes the developmental and academic skills of deaf learners. Specific education support strategies, which could be used to correctly identify and appropriately address the unique needs of these learners in regular schools, will also be covered.

CHAPTER 2

THE NATURE OF DEAFNESS

2.1 INTRODUCTION

In Chapter 1 it was stated that, in order for educators to offer effective support to deaf learners in inclusive school settings, they need background knowledge about the manifestations of deafness and the various degrees of hearing loss. It must be accepted that when deaf learners experience learning difficulties, this may not necessarily be the result of the hearing loss *per se*, since their performance could also be influenced by intelligence, or by emotional, social and economic factors (Webster & Wood 1989:58).

This chapter will therefore include a review of literature on the nature of the deafness, developmental and academic skills of deaf learners, as well as on supportive strategies for the educators of these learners. The educators are dealing in the context of his or her social environment with a whole learner whose communication occurs in the context of his social environment, whose abilities will be tied to developmental skills, cognitive abilities and knowledge of the world, and whose cultural background will play a significant role in how he communicates. Although all of these factors become important in providing support to deaf learners (Mahshie, Moseley, Scott & Lee 2006:4), the researcher will concentrate on the development and academic skills of these learners only.

As an introduction to this chapter, it is important to describe constructivism as the learning theory that underlies the researcher's approach in this study.

2.2 THEORETICAL BACKGROUND

The constructivist approach assumes the relativism of multiple social realities, recognises the mutual creation of knowledge by the viewer and the viewed, and aims toward an interpretive understanding of subjects' meanings (Denzin & Lincoln 2003:250). Spencer, Erting and Marschark (1999:256) state that the constructivist approach has a critical contribution to make to the study of cognitive development, since it emphasises the importance of environmental effects, including the specific effects of schooling. This theory also suggests that it might be useful to compare the performance of individuals on different subsets of cognitive skills, rather than to consider cognition as a unitary skill (Spencer *et al.* 1999:256) (see 2.5). The epistemological assumption in the constructivist approach holds that the researcher and the primary users are engaged in an interlocking process during which each affects the other, therefore observing the interaction between learners and educators in their natural environment is a common method for collecting data (Cousins & Earl 1995:143) (see Chapter 3).

This study examines the cognitive development of deaf learners from a constructivist perspective. Constructivism is based on the assumption that learners construct their own knowledge by actively participating in the learning process, which is affected by their prior learning experiences (Van Niekerk 2002:56). Constructivism allows the educator to shift roles, finding the one most appropriate in encouraging learners to take new sensory information, compare it to stored knowledge in long term memory and construct new meanings (Lang & Albertini 2001:258-284). Educators as learners are required to reflect on the material and their experiences and justify their responses. The benefits of implementing a constructivist approach are the joy of self-discovery and the enhancement of the self-esteem for educators as learners (Costa 1999:xii).

In the constructivist paradigm it is posited that facts are the products of social constructions that reflect certain values. The sign language and the oral communication methods are two methods of communication used in the education of the deaf. Both claim to assist deaf learners to develop the skills necessary to be personally and

vocationally successful in the culture of the wider hearing community. Proponents of the sign language teaching method emphasise the importance of sign language to the deaf individuals and to the Deaf community. They point out that sign language is fully appropriate for all purposes of day-to-day life (Marschark, Lang & Albertini 2002:104). They also maintain that all deaf learners should know sign language to prevent their isolation from the Deaf community.

Even though deaf learners using the oral method of communication may consequently experience social and communication difficulties in the Deaf community, the supporters of this method emphasise that deaf learners in the mainstream settings are taught to listen to and learn speech and language in a natural manner (Crandell & Smaldino 2000:1-11). They further maintain that spoken language offers a myriad of opportunities for higher education, wider-ranging careers and greater chances of secure employment (English 1995:34). For the current research, the researcher has chosen the oral method of teaching in order to help educators of deaf learners to teach these learners to communicate through talking so as to remove some of the restrictions they would otherwise experience in their personal and social lives.

At this stage it is important to clarify the concept 'deafness' in order to provide background knowledge of this particular impairment and increase insight into the world of deaf learners.

2.3 DEFINITION OF DEAFNESS

Because of the human rights movement (and subsequently the drive towards inclusive education), researchers and practitioners worldwide are moving away from the disability labelling, which includes terms such as 'hearing loss', 'hearing impairment' and 'hearing disorder'. Researchers give preference to the more generic term 'deafness' to refer broadly to all levels of hearing loss, making the distinction between deaf and hard-of-hearing only when it is necessary to do so (Marschark *et al.* 2002:43).

Deafness is one of the largest categories of impairment in South Africa and encompasses the full spectrum of hearing loss – from mild loss of hearing to total deafness – yet as an invisible impairment it is often misunderstood and the severity of its impact upon both the child and his family is underestimated. It is believed that a better understanding of the concept ‘deafness’ will enable non-specialist educators to develop more effective classroom practices.

Although deafness is a multifaceted concept which, due to the complex nature of the condition, cannot be easily defined, Myklebust (1997:12) defined the term deaf as referring to those individuals in whom the sense of hearing is non-functional for the ordinary purposes of life. Deafness can also be described as the physical impairment that results in those affected by it being unable to hear, and usually brings to mind the need for hearing aids, speech therapy and the use of signing and gestures as a means of communication.

2.4 THE NATURE OF DEAFNESS

In order to understand the concept ‘deafness’, the concept ‘hearing’ must be understood. Hearing, which is sometimes referred to as audition, involves the gathering and interpreting of sounds.

Each part of the ear serves a purpose in translating sound waves from the environment into meaningful information to the brain. The outer ear is called pinna. It is the first point of contact between the individual and the sound. The outer ear gathers the sound and sends it down the auditory canal, or external auditory meatus. At this point, the sound enters the middle ear and sets the eardrum, or tympanic membrane, into motion (Schirmer 2001:2). What started as acoustical energy in the outer ear is turned into mechanical energy in the middle ear.

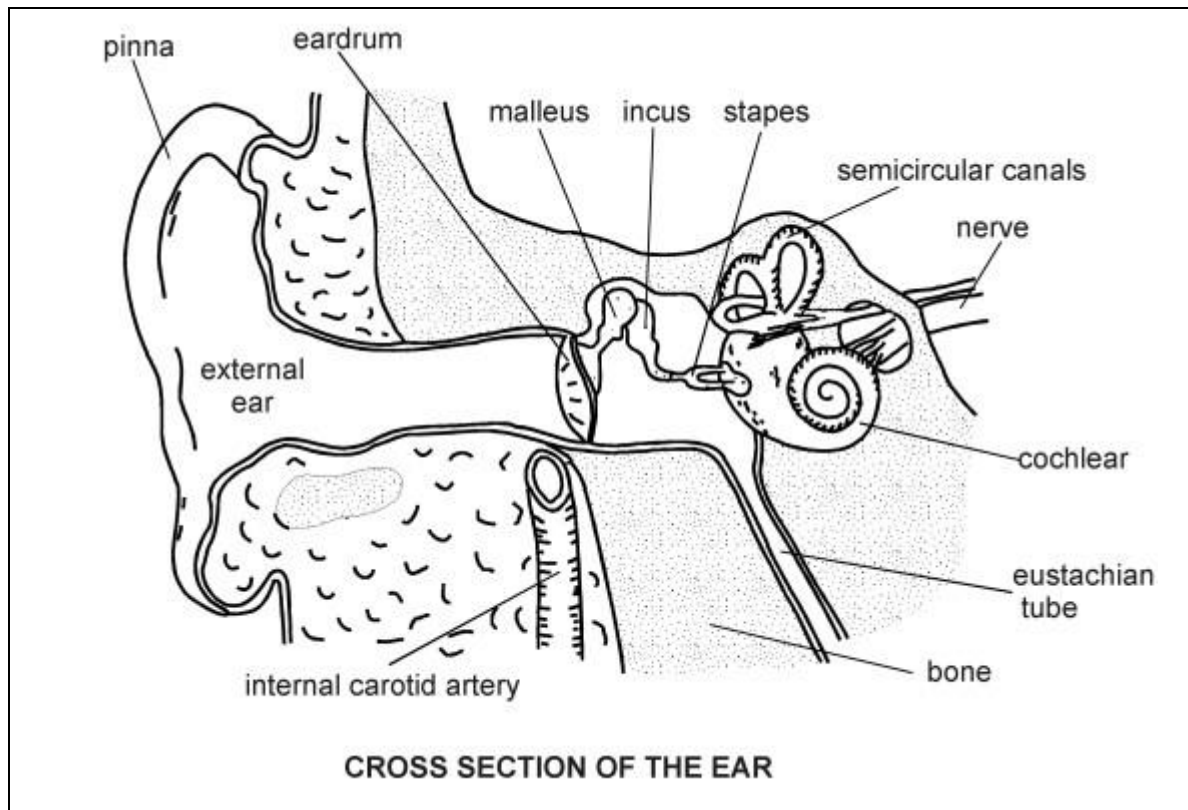


Figure 2.1 Structure of the ear

(<http://www.patient.co.uk/diagram/Ear.htm>)

Between the eardrum and the oval window, which is the window to the inner ear, are the three smallest bones in the human body. These bones, the ossicles, are individually named the hammer (malleus), the anvil (incus), and the stirrup (stapes). When the eardrum vibrates, the ossicles are set into motion, and the sound is carried through the oval window into the inner ear. The inner ear contains the cochlea and the semicircular canals. The cochlea is considered the main sensory organ for hearing. The fluid in the ducts of the snail-shaped cochlea moves in response to the mechanical energy released by the ossicles. Tiny hair cells within the cochlea convert the mechanical energy into electrical impulses that are transmitted by neurons along the auditory nerve to the brain (Schirmer 2001:3).

The Eustachian tube, which runs between the middle ear and the back of the throat, controls air pressure in the middle ear (Schirmer 2001:3). The semicircular canals in the inner ear control the sense of balance.

2.4.1 Types of hearing loss

Frederickson and Cline (2002:364) explain that hearing loss is usually categorised in terms of the main site of the damage, as this is what normally determines the nature of the impairment:

- **Conductive:** The physical transmission of sound in the outer or middle ear is interrupted.
- **Sensory-neural:** Damage has occurred to neural transmission in the inner ear or auditory nerve. This is less common and more serious. It is also called perceptive or nerve deafness.
- **Mixed:** This involves both conductive and sensory-neural loss.
- **Central:** Damage has occurred to the auditory nerve in the brain stem or the hearing centres of the cortex. This is also known as cortical deafness.

Frederickson and Cline (2002:362) further explain that in order to understand hearing loss it is necessary to appreciate the key feature of sound level. Sound level is the volume of a sound. It is measured in decibels (dB). Zero decibels (0dB) indicate the point at which the average person with normal hearing can detect the faintest sound. Each succeeding number of decibels that a person cannot detect indicates a certain degree of hearing loss. Deafness can be distinguished as mild (26-40dB), moderate (41-55dB), moderate-severe (56-70dB), severe (71-90dB), and profound (91db and above) (Andrews, Leigh & Weiner 2004:15-20).

2.4.2 Age of onset and aetiology of hearing loss

Owing to the close relationship between hearing loss and language, professionals are particularly interested in determining the age at which hearing loss was first detected.

The earlier the hearing loss occurs in a child's life, the more difficult it will be for that child to develop the language of the hearing society (e.g. English). For this reason, professionals frequently use the terms pre-lingual deafness (those who are born deaf) and post-lingual deafness (those who become deaf at some time after birth (Hallahan & Kauffman 2006:322)).

Frederickson and Cline (2002:366) indicate the following causes of pre-lingual deafness:

- Maternal illness, for instance German measles/rubella contracted by the mother, especially during the first trimester of her pregnancy. This can cause deafness as the virus attacks the foetus. A second maternal illness known to cause deafness is cytomegalovirus (CMV).
- Genetic deafness means that there is deafness in the family and it is thus hereditary in nature.
- Birth complications and/or premature birth (defined as birth before 37 weeks) is also known to cause hearing loss in some infants.

Post-lingual deafness is caused primarily by ear infections (otitis media) and meningitis. Other less prevalent causes are accidents and blows to the head, high fevers, mumps and measles, and also the side effects caused by certain types of medication.

- Meningitis is an infection (viral or bacterial) of the central nervous system, specifically the covering of the brain, which could extend into the brain and ears, thus causing deafness. Learners who become deaf as a result of contracting meningitis are usually profoundly deaf and the majority of these learners do not benefit from hearing aids.
- The most common form of hearing loss in childhood, otitis media, fluctuates over time.

If a learner catches a cold with symptoms such as a running nose, coughs and sneezes, the infection can spread into the middle ear via the Eustachian tube, which leads there from the back of the throat. While the middle ear is affected, the mechanisms that enable it to conduct sound are blocked, so that the learner's hearing is impaired. In most cases,

as soon as the infection has been effectively treated, hearing is recovered. Since some learners have repeated infections, they can experience bewildering fluctuations in their ability to make sense of what is being said around them. Parents and educators can find their behaviour puzzling, and their language development and educational progress may eventually be affected (Frederickson & Cline 2002:366).

2.4.3 Identification and assessment of deaf learners

Frederickson and Cline (2002:366) further emphasise that it is essential that educators be alert to signs of unidentified hearing loss in learners in their classes. It is worth raising a query about possible hearing loss if it is observed that a learner:

- is often slow to react to instructions or repeatedly asks what to do even though they have just been told;
- watches others to see what they are doing and then follows;
- constantly asks others to repeat what they have said;
- hears sometimes, but not always, for example when a learner hears when standing on one side of the room, but not when standing on the opposite side;
- often misinterprets information and questions, or responds to only part of what has been said;
- is unable to locate a speaker or the source of a sound, especially in noisy conditions;
- has a tendency to daydream or shows poor concentration, especially during group discussions or when a story is being read aloud;
- sometimes makes inappropriate comments, as though not having followed the topic of conversation;
- shows delayed language development (e.g. immature use of syntax, limited vocabulary);
- finds it difficult to repeat words or sounds or to remember the names of people and places;
- sometimes shouts without apparently realising that he or she is being noisy;

- makes speech errors (e.g. omits the consonants from the end of words, misses out s, f, th, t, ed, en);
- confuses words that sound similar (e.g. hat, fat, vat);
- fixes his or her eyes on the speaker as though lip-reading;
- sometimes becomes disruptive during lessons that require learners to listen;
- experiences difficulties with reading, spelling and/or writing; and
- seems to have frequent colds and coughs.

Given the impact that hearing loss can have on the development of early language, it is important to identify deaf learners as early as possible (Downs & Yoshinaga-Itano 1999:80). Anderson (1999:16) underlines the fact that early testing is vital in supporting a deaf learner to adapt to the hearing world. Every learner who may suffer from hearing loss needs thorough testing of his or her hearing and middle-ear function. A child is never too young to have a hearing test (Anderson 1999:17). Magnuson (2000:7) adds that young children with profound hearing loss who receive early intervention services have much better outcomes than those who do not.

Many learners with hearing loss need some type of technology to provide them with better access to auditory information. Even a learner with mild hearing loss may need some assistance in very noisy situations (Mahshie *et al.* 2006:33). The following section provides information about the sensory devices most commonly used by learners with hearing loss in order to gain access to sound.

2.4.4 Auditory access and technology

Some degree of artificial correction of hearing loss might be provided by assistive listening devices, most notably hearing aids, FM systems and cochlear implants.

2.4.4.1 Hearing aids

Hearing aids amplify and shape incoming sounds to make them audible to the child. The amplification device is tuned specifically to suit the child's degree of hearing loss (Mahshie *et al.* 2006:33). There are three main types of hearing aids: those worn behind the ear, those worn inside the ear, and those inserted farther down in the canal of the ear. The behind-the-ear hearing aid is the most powerful and is therefore used by those with the most severe hearing loss (Hallahan & Kauffman 2006:347).

For learners with some residual hearing, the use of hearing aids can be very important. Not only do hearing aids provide access to the spoken language of hearing parents and siblings, but in cases of progressive hearing loss, they can help learners who are learning sign language and/or receiving speech therapy to maintain their spoken language skills (Marschark *et al.* 2002:50). Where more severe hearing loss has occurred, hearing aids may provide information to support language development in a deaf learner, even if they do not provide sufficient information for the comprehension of language. Even a degraded auditory signal can indicate that a language event is happening, call attention to possible relations between prior events and language, and communicate social information such as turn-taking demands and the emotional responses of others (Marschark *et al.* 2002:50).

Most audiologists recommend the introduction of hearing aids immediately after hearing loss has been diagnosed in learners, or as soon as possible, so that they can become used to them and are exposed to auditory information as early as possible. Early use of hearing aids is typically associated with better language development in learners, although research is less clear on this issue in the case of learners with congenital hearing loss (Marschark *et al.* 2002: 50).

In the case of learners who can benefit from the use of hearing aids, it is critical for learners, parents and educators to work together to ensure that the device is used to its

maximum effect. This means that the educator should be familiar with its proper operation and maintenance (Hallahan & Kauffman 2006:348).

Another electronic amplification device that has provided an alternative to individuals with severe to profound hearing loss is the cochlear implant.

2.4.4.2 Cochlear implants

Cochlear implants, which represent relatively recent technology, provide the learner with sound that differs from the sound provided by a hearing aid. Whereas a hearing aid primarily makes sounds louder, the implant bypasses much of the hearing mechanism of the learner and provides electrical stimulation to the auditory nerve (Mahshie *et al.* 2006:36).

The cochlear implant consists of a thin wire implanted inside the cochlear (inner ear) and a speech processor worn by the learner with hearing loss (Porter 2002:152). Porter points out that when the cochlear implant is used in conjunction with an ongoing intervention programme, it can enable learners to use auditory means to learn and communicate, rather than relying on their vision, as they would if profoundly deaf. Studies undertaken to compare the language performance of learners with profound hearing loss who have cochlear implants to the performance of their peers without implants have indicated a faster rate of language learning and higher overall language achievement in the former group (Waltzman & Roland 2006:156).

Educators working with learners with cochlear implants need to know how to monitor the implants. Daily monitoring requires that the educators and the learner (depending upon the learner's age) know the parts of the implant and how they work, in other words, they should be familiar with the various knobs and settings of the particular device being used (Mahshie *et al.* 2006:39).

Mahshie *et al.* (2006:39) mention that, whereas cochlear implants and hearing aids can greatly enhance a learner's ability to access spoken language, real-world conditions often reduce the effectiveness of these devices. Assistive listening devices are devices that can be used alone, or coupled to a learner's hearing aid or cochlear implant, and function like 'binoculars for the ear'. The FM amplification system is one of the devices that are commonly found in the school setting.

2.4.4.3 The FM systems

Boothroyd and Inglehart (1998:203) emphasise the benefits offered by FM amplification systems to learners with hearing aids or cochlear implants. FM systems are used in classrooms to combat three factors that make it difficult for learners with hearing loss to hear the educator: distance from the educator, background noise and sound reverberation.

Davies, Yellow and Purdi (2001:52) add that reverberation refers to the persistence of a sound due to sound waves reflecting off hard surfaces. The intensity of reverberation depends on the size of the room and the degree to which the room contains materials that reflect, rather than absorb, sound. Background noise in a classroom can vary widely, depending on the presence of transient or steady noise sources inside (e.g. learners activity, air conditioning) and outside the classroom (e.g. playground, road traffic). High reverberation and noise levels can present listening and learning problems even for learners with normal hearing or minimal hearing loss (Nelson & Nelson 1999:163).

Scherer (2003:11) explains that the educator needs to clip a transmitter onto his or her belt and hold a microphone near his or her mouth to ensure that his or her speech is directly inputted into the receiver unit linked to the learner's hearing aid. FM signals can be transmitted to a learner's hearing aid by means of button-type ear moulds, Walkman-type head phones or an audio induction loop worn around the learner's neck.

According to experts from the American Speech-Language-Hearing Association (www.phonak.com), the benefits of FM are important for people of all ages who suffer from hearing loss:

- The signal level and signal-to-noise benefits of an FM system are typically in the range 15 to 20 dB. The resultant improvements in audibility and clarity of speech for a deaf learner can have a positive effect on language development, speech understanding and academic attainment.
- Benefits of improving the signal-to-noise ratio (e.g. with an FM system) are increased attention span, reduced distractibility and increased sound awareness and discrimination.
- Optimal benefits are to be expected when the use of an FM system is considered early in the process of fitting amplification.

Mahshie *et al.* (2006:32) add that technological advances provide many options in assistive listening devices for deaf learners. Many considerations must be taken into account in selecting and fitting appropriate amplification devices. Auditory technologies can enhance a learner's ability to perform effectively and can assist the learner to meet his or her full potential (Mahshie *et al.* 2006:32).

It is acknowledged that each learner is unique and thus has a unique set of educational needs. Educators at regular schools should be well informed on how to optimise communication access for deaf learners through hearing and vision in order to support them in the mainstream classrooms.

2.5 SKILLS DEVELOPMENT FOR WHICH DEAF LEARNERS MAY NEED SPECIAL SUPPORT

Both hearing and deaf learners need specific skills in order to be able to learn effectively. It is possible that, because of their impairment, deaf learners may need special assistance to acquire those skills. While it is difficult to generalise because of the atypical histories of individual learners, educators need to familiarise themselves with the different components of cognitive development, which include the developmental and academic skills of deaf learners, in order to understand the unique characteristics of these learners. Knowledge of those skills will allow educators to develop instructional materials, teaching strategies and learning environments that will take advantage of the learners' strengths while compensating for their weaknesses (Marschark *et al.* 2002:220).

The following sections contain a discussion of the developmental and academic skills of deaf learners.

2.5.1 Developmental skills

Developmental skills include motor skills, sensory-motor skills, perceptual skills, concentration and memory.

2.5.1.1 Motor skills

The motor development of learners is evidenced by their ability to move around and control various parts of their bodies. Motor skills are deliberate and controlled movements requiring both muscle development and maturation of the central nervous system. Hannaford (2005:107) maintains that movement awakens and activates many of our mental capacities. Movement integrates and anchors new information and experience into our neural networks. Movement is vital to all the actions by which we embody and express our learning, our understanding and ourselves (Hannaford 2005:107).

Motor skills can be divided into two major categories: gross motor (large muscle) and fine motor (small muscle). The development of fine and gross motor skills allows deaf learners to develop more refined physical and academic skills.

2.5.1.1.1 Gross motor activities

Gross motor activities refer to the motor or movement activities during which learners use their entire bodies, such as walking, running, climbing and jumping (Willis 2008:69). The development of the major movements of the larger muscles precedes that of the smaller muscles and is an introduction to the art of writing, drawing, rhythm and speech. Unfortunately not every learner is exposed to, or has sufficient opportunities for exploration and play, and this may be detrimental to the learner's development. Research shows that if learners do not acquire fundamental motor skills, they often experience a high failure rate both in school and on the playground (Brown & Brown 1996:19-24).

Deaf learners may experience gross motor problems, such as deficits in balance, general dynamic coordination, visual-motor skills and ball-catching abilities, and show clear differences in reaction times and speed of movements (Savelsbergh, Netelenbos & Whiting 1991:489-500). Horn, Pisoni and Miyamoto (2006:1500-1506) claim that possible factors responsible for delays in the development of motor skills in deaf learners are the presence of neurological problems, the time of diagnosis of deafness and the onset of intervention. Furthermore, environmental factors such as type of schooling and parental involvement in physical activity also appear to influence motor development in deaf learners (Lieberman, Volding & Winnick 2004:281-289).

Hannaford (2005:113) emphasises that it is essential to the learning process to allow learners to explore every aspect of movement and balance in their environment, whether walking on a curb, climbing a tree, or riding a bike. Deaf learners need to be involved in targeted motor intervention programmes in order to improve their gross motor coordination (Block & Davis 1996:230-246). The educators need to remember that all

primary school learners enjoy exercises designed to develop gross motor skills, therefore such exercises will be advantageous to all the learners in a class and not only to deaf learners.

Owens (2008:3-5) claims that outdoor activities are ideal for encouraging the learners to be active and for promoting gross motor development. However, educators need to remember that the outdoors might hold some danger for the learners. Adult supervision is one of the best methods to prevent any mishaps from happening. Educators have to make sure that a regular check and supervision of the playground is done. They also need to check the area for safety in terms of equipment (Borkar 2010:2). It is important that educators give the learners a thorough knowledge of what should and should not be done when the learners are involved in motor activities (Owens 2008:3-5).

Educators need to try the following activities to support the development of gross motor skills in deaf learners in mainstream settings:

- Create a running game such as a race or a chase. This activity will teach co-ordination and balance.
- Create a climbing game, such as climbing the stairs, or take the learners to a park and let them climb the jungle gym. Each time the learners climb, they improvise on this skill, which in turn enhances their motor skills.
- Play hopscotch and teach them how to skip ropes. These activities will help them to balance their bodies on their feet.
- Activities involving ball play, such as kicking or throwing, encourage gross motor development.
- Batting is also a great way to develop gross motor skills. Baseball, tennis, racquet ball, etc. are slightly more difficult sports to master, but they are well worth the reward.
- Movements such as walking, dancing, skipping, twirling and even rough and tumble play appear to contribute the minor adjustments necessary to enable the system to proceed with the learning process (Rasmussen 2004:1; Hannaford 2005:123).

The successful attainment of gross motor skills is conditional to the development of fine motor skills.

2.5.1.1.2 Fine motor activities

The term 'fine motor' means 'small muscles'. Fine motor skills involve the use of the small muscles in the fingers, the manipulation of hand and arm, and control and usage of tools and materials. Hand-eye coordination, where vision is used by a person to control the movements and actions of the small muscles, is also an important component of fine motor skills development. The development of learners' fine motor skills is an important foundation for the future attainment of other important skills, such as writing, drawing and self-help (Owens 2008:3-5).

Owens (2008:3-5) further point out that learners who struggle with fine motor activities may experience frustration and poor self-esteem because they are unable to perform everyday tasks, such as drawing or cutting with scissors, as competently as their peers. Many learners who find fine motor tasks challenging will avoid participating in these tasks to avoid the resulting frustration, fatigue or fear of failure. Such behaviour of deaf learners could lead to negative attitude of the educators towards these learners. Negative attitudes of the educators mostly come from fear and lack of knowledge about how to deal with deaf learners' particular needs.

The findings of Horn *et al.* (2006:1500-1506) suggest that the fine motor skills of deaf learners tend to develop more slowly as the learners get older. These findings provide new knowledge about the links between motor and spoken language development and suggest that auditory deprivation may lead to atypical development of certain motor and language skills that share common cortical processing resources. According to Marschark *et al.* (2002:136), the way in which the environments of deaf learners are structured play a central role in the development of their fine motor skills, and such

factors may account for some of the observed differences between them and their hearing peers.

Owens (2008:3-5) points out that when thinking about fine motor activities, many people tend to focus on 'traditional' activities, such as threading, drawing, painting, gluing or cutting with scissors. However, many other daily activities and play experiences in which learners engage also offer valuable opportunities to support fine motor development. These are particularly beneficial to deaf learners as they are often self-conscious about their fine motor abilities.

Owens (2008:3-5) offers the following ideas to assist both regular educators and educators working with deaf learners to use learners' areas of interest or particular strengths as a basis for promoting their fine motor development:

For play-dough or clay activities provide:

- interesting objects, such as marbles, or small figures that can be hidden in the dough. A game can be made of squishing the dough to find the 'mystery' object.
- materials such as rice or fine gravel to add to the play-dough to create interesting textures.

For manipulative activities provide:

- tongs or large tweezers for sorting items.
- magnets for learners to experiment with and to explore how they attract and resist, and can be used to move metal objects around.
- a range of construction materials, including commercial materials such as Mobilo and Lego, as well as carpentry tools and household objects such as boxes, fabric and sticky tape.
- 'messy' play experiences, such as 'slime', wet sand, mud or clay.

For music and movement activities include:

- finger plays and rhymes.

- fine motor activities as part of gross motor obstacle courses.

Educators can support learners' fine motor development by becoming familiar with individual learners' interests and using this knowledge as a basis for planning fine motor experiences. Spontaneous play experiences also offer opportunities for the educators to encourage the learners to practise and develop their fine motor skills in non-threatening and meaningful ways (Owens 2008:3-5).

2.5.1.2 Sensory motor skills

One of the most important factors in the development of motor control is the way in which learners use their various senses to guide their learning. Sensory motor skills rely on the interaction of sensation and movement. Most people are familiar with the senses of sight, hearing, touch, smell and taste, and have at least a general appreciation for how these senses might help learners to learn (Kurtz 2006:55). Sensory motor skills include concepts such as body awareness, laterality, balance, rhythm and time awareness. According to Zwierzchowska, Gawlik and Grabara (2004:83-116), deaf learners normally obtained average or high scores in tests evaluating motor adjustment, space orientation and body awareness. The two concepts that are the most problematic for deaf learners are to maintain laterality and balance.

2.5.1.2.1 Laterality

Laterality is an internal awareness (knowledge) that the body has two sides and that these sides are different. Initially children do not know the names of the sides of the body, even though they are aware that they are there. Along with an internal awareness, children develop the ability to use one side or both sides of the body to make desired movements (Cheatum & Hammond 2000:100). Deaf learners normally show different laterality patterns that are more left-sided or exhibit more inconsistent hand response when compared with those of learners whose hearing is normal (Hovivian & Hovivian 2009:1). Hovivian and Hovivian (2009:1) also emphasise that learners with a laterality

deficit tend to reverse letters, numbers or words in reading or writing. They may know a word in one line and fail to recognise the same word in another line. They may read the first word or two of each line, but become confused as they cross the mid-line. They usually find cursive writing difficult (Hovivian & Hovivian 2009:1).

Cheatum and Hammond (2000:103) point out that activities aimed at increasing laterality help learners to use their right and left sides independently and are designed to develop an internal awareness of left and right. For example, the right hand must work independently of the left. They suggest the following supporting activities for the development of laterality:

- Learners use both hands to toss two flimsy scarves into the air in front of them and try to catch one or both scarves in one hand. The scarves will float down at different rates and in different directions, so that learners will have to move their arms and hands independently to catch them.
- Rhythmic music can be used to accompany exercises involving one limb only, two limbs simultaneously or two limbs alternatively.

Cheatum and Hammond (2000:106) also emphasise the value of the following activities to encourage learners to use the preferred hand and leg:

- The educator marks a line on the floor. Two learners stand on opposite sides of the line and grasp each other's preferred wrists. On 'Go!' they try to pull each other across the line. The learners should use a slow, steady pull, and not jerk each other's arms.
- The educator seats the learners in pairs near one another at a table. The learners place their preferred hands on the table, with the little fingers just touching the table and their palms open and facing their opponent's palm. On 'Go!' both learners hook their fingers with their opponent's fingers. Each learner tries to get his thumb on top of the opponent's and pin it down. This can also be done in a standing position without the use of a table.

2.5.1.2.2 Balance

Balance refers to a biological system that enables us to know where our bodies are in the environment and to maintain a desired position. The majority of deaf learners achieved poor results in the balancing task (Zwierzchowska *et al.* 2004:83-116), which is an effect of the neurophysiologic consequences of deafness. The lower level of balance in deaf learners is attributed to vestibular defects, most often related to cerebral meningitis. Research also indicated that deaf learners are more clumsy and accident prone than hearing learners (Hovivian & Hovivian 2009:1).

The development of balancing skills can be effectively supported by the following activities (Seevers 2009:1):

- learners stand on one foot for 20 seconds; .
- learners balance on a strip of tape or rope;
- learners walk on a ladder placed on the floor or ground: they walk on or inside the rungs, or walk on or straddle the edges;
- they walk on a low balance beam, which directly influences the balance muscles and improves their just 'awareness' of general body alignment; and
- learners could be involved in a rhythmic gymnastic programme. Elements of this programme enable the integration of body, mind and spirit and affects the perception of sensory input, especially kinesthetic, which may lead to cognitive awareness and maintenance of inner balance (Seevers 2009:1; Fotiadou, Giagazoglou, Kokaridas, Angelopoulou, Tsimaras & Tsorbatzoudis 2002:301-309).

Hannaford (2005:131) recommends using the Cross Crawl activity in her Brain Gym programme to improve laterality and balance. By touching the right elbow to the left knee and then the left elbow to the right knee, large areas of both brain hemispheres are activated simultaneously. The Cross Crawl movements are most effective when done very slowly. When the exercise is done slowly, it requires more fine motor involvement and balance, consciously activating the vestibular system and the frontal lobes.

Hannaford (2005:132) also emphasises the ability of the simple act of walking uphill or on uneven ground to help strengthen the back and neck muscles, thus allowing the head to balance properly so the eyes can more easily team together. Having learners walk or climb up and roll down hills is a great way to develop their learning system.

The ability to learn implies the development of perceptual abilities, which greatly influences the cognitive development of deaf learners. The development of the perceptual abilities will be discussed in the following section.

2.5.1.3 Perceptual skills

Perception is the ability to give meaning to information gathered by the senses. According to Erden, Otman and Tunay (2004:281-285), acoustic deprivation in deaf learners may produce inferiority in all sensory modalities. Visual and auditory perceptions are among the areas most affected by acoustic deprivation.

The perceptual barriers most often experienced by deaf learners are in the areas of visual and auditory perception.

2.5.1.3.1 Visual perception

Although the visual modality is important for deaf learners, no evidence exists to indicate that deaf people use vision more effectively than hearing people. That is, deaf people do not appear to demonstrate any generalised sensory compensation. Depending on the specific kind of task used, these learners have been found to perform better, worse, or the same as hearing individuals (Marschark *et al.* 2002:117). In activities that involve visually oriented movement coordination, deaf learners show lower performance and lower reaction time than hearing learners (Savelsberg *et al.* 1991:489-500).

The following activities, which stimulate visual discrimination, spatial relationships and memory, are based on the work of Kurtz (2006:71):

- Sorting shapes according to shape, colour, size, or other attributes.
- Stringing beads according to colour or shape sequence shown in a picture.
- Playing bingo or lotto games using colours and shapes.
- Building puzzles.
- Tracing shapes or letters on a piece of paper so that they overlap.
- Read a comic strip to the learner, then cut apart the segments and ask the learner to re-arrange the story in the correct order.
- Show the learner a group of objects, then cover them with a cloth and remove one. Ask the learner to name the object that was removed.
- Create a design using blocks, beads, pegs, or crayons, hide the design and ask the learner to copy it from memory.

2.5.1.3.2 Auditory perception

Auditory perception is the ability to interpret and organise the stimuli perceived by the auditory sense. It includes auditory discrimination, auditory memory or sequencing, auditory figure-ground discrimination and auditory comprehension or decoding. Deaf learners' inability to hear causes severe auditory perception deficiencies (Dechant 1991:74). These deficiencies in deaf learners reveal themselves as slow language development, inadequate articulation and difficulties in speech, poor performance in tasks requiring auditory discrimination, problems in respect of following oral direction, and better recall when shown, rather than being told, what to do (Dechant 1991:74).

With auditory perception there is, obviously, a strong focus on the development of residual hearing. Paul (2008:161) states that the task of the educator is to teach learners to learn by listening, rather than to learn to hear.

The following activities stimulate learners' auditory skills:

- Identifying known single items at the end of a sentence, and then in the middle of the sentence.
- Identifying objects by listening to descriptive phrases in closed and open sets.

- Following a conversation on a known topic.
- Listening to a story and answering pertinent questions.
- Following a conversation on an undisclosed but familiar topic.
- Ask the learner to listen out for a particular word (e.g. fire truck or doorbell) while the educator reads a story with a repetitive theme. The learner can perform an action (e.g. ring a bell or push a buzzer) whenever the target word is heard.
- Ask the learner to count (initially aloud, then later silently) as the educator drops objects into a container. The learner can then be asked to repeat the actions performed by the educator (Paul 2008:161; Harmon 2008:2).

The next level that was investigated relates to concentration and memory skills.

2.5.1.4 Concentration

Deaf learners generally show poorer attention span than hearing learners, particularly in situations in which they are likely to be distracted by the noises they hear (Marschark *et al.* 2002:117).

These learners need to shift their visual attention (their eyes) from the environment to the source of communication in order to receive a person's message. This shift in attention is called 'divided attention'. It is important to remember that, when playing with toys or interacting with others, deaf learners have to divide their attention between what is in the environment and the communication that is occurring. In contrast, hearing learners can visually pay attention to the environment while simultaneously listening to a person speaking to them (Adams 1997:61). According to Marschark *et al.* (2002:127), the performance of deaf learners is essentially equivalent to that of hearing learners when successful performance requires attention to a single dimension (for example, the size of a piece of clay). When a task requires simultaneous attention to two or more dimensions (for example, the size and shape of the clay), deaf learners routinely perform more poorly than hearing learners of the same age (Marschark *et al.* 2002:127).

Marschark and Hauser (2008:445) point out that deaf learners demonstrate enhanced visual attention to peripheral stimuli. This ability is most likely adaptive, as it helps individuals with hearing loss to pay attention to, for example, possible sources of danger, other individuals seeking their attention, and environmental stimuli that lead to incidental learning. Although the enhancements found in deaf learners can be described as advantageous, the educators of these learners should be aware that this group is particularly vulnerable to visual distraction from activities going on around them (Marschark & Hauser 2008:445).

The following activities developed by Ballard (2008:1) and Buttriss and Callander (2005:5) assist in increasing the attention span of deaf learners:

- Using puzzles, word games, riddles and guessing games.
- Assigning simple, regular chores to establish routines and patterns in activities.
- Offering activities that keep the learners' hands busy and their minds active (carpentry, craft-making, or clay modelling).
- Using big books during share reading to help focus attention on the visual cues.
- Listening carefully for specific instructions and then doing the actions.
- Have the learners ask questions to discover the identity of a hidden object related to a class project (Ballard 2008:1; Buttriss & Callander 2005:5).

2.5.1.5 Memory

The information-processing model used by cognitive psychologists to represent cognition includes four steps – acquisition, storage, retrieval and use of information. Memory involves the storage and recovery of information (Reed 1995:12).

2.5.1.5.1 Short-term memory

Short-term memory or working memory is a fundamental system for human beings, which allows us to briefly retain stimuli in the order in which they were presented (Marschark & Spencer 2003:265). Studies focused on the short-term memory of deaf

learners demonstrate that those learners were inconsistent in their intentional initialisation of prior knowledge during recall, and that they frequently failed to recognise the multidimensional nature of to-be-remembered stimuli (Marschark & Hauser 2008:445). Research also provides evidence that learners with hearing loss and hearing learners may encode information in qualitatively different ways. Based on a variety of paradigms and studies, it was also concluded that both deaf learners and deaf adults tend to recall less from lists of verbal items (text or signs) than do their hearing peers. This difference results from the form of mental representation used in memory coding (i.e. speech-based versus sign-based codes), but the question regarding how such findings relate to learning still needs to be addressed (Marschark & Mayer 1998:58).

In order to enhance the short-term memory of deaf learners, Schultz (2000:1) suggests that the educator do the following:

- Ask the learners to look at something very quickly (a picture, a cereal box, a comic strip) and then hide the object, or have the learners close their eyes and tell the educator what they saw.
- Name a list of things (names, letters, numbers, etc.) and challenge the learners to repeat the given list.
- Present the learner with a series of letters (or symbols), then change the order of letters and ask the learner to arrange them in right order from memory. This is an effective method for helping learners with spelling words.
- Draw designs, shapes, letters and numbers on a piece of paper, then cover it and ask the learner to redraw/rewrite it.
- Place a nut or raisin under one of two or three cups and move them around. If the learner picks the right cup, he or she gets to eat the prize underneath.

2.5.1.5.2 Long-term memory

Long-term or semantic memory also impacts on learning in different ways (Marschark *et al.* 2002:132). Information that we have learned through a variety of external sources, or have figured out for ourselves, not only has to be retained in long-term memory, but also

has to be retrievable if it is to be utilised. Access to information in long-term memory normally happens spontaneously, as required, in the context of ongoing behaviour.

According to Marschark *et al.* (2002:123), studies of the long-term memory concept indicate that the verbal concepts of deaf learners are less homogeneous than those of hearing learners. They tend to have less strongly interconnected, less readily available, and more 'fuzzy' word meanings than their hearing peers. Thus, during memory retrieval, problem solving or reading, activation of meaning in the semantic memory of deaf learners may not be as directed as in the case of hearing learners (Marschark & Spencer 2003:471). Such findings should not be taken to imply that deaf learners will always be faced with reading difficulties. Instead, they should be seen as emphasising the need for a more complete understanding of the cognitive skills and knowledge of deaf learners if we are to foster educational success (Marschark *et al.* 2002:123).

Stevens (2007:1) recommends that educators do the following in order to enhance long-term memory:

- Give the learners crossword puzzles to encourage them to delve into long-term memory to recall a word. Such puzzles keep the brain active and stimulate thought processes and the ability to recall.
- Introduce learners to the card game 'Memory', where all the cards from a deck are placed face down on the table and the players attempt to find matching pairs.
- Ask the learner to look around the room and to note all the blue items, or all the red items. Wait a while and then ask the learner to close his or her eyes and recall all the items he or she had previously identified. This game not only improves the learner's long-term memory, but also stimulates the brain and improves observation skills.

The successful attainment of developmental skills is believed to make a valuable contribution to the academic success of learners.

2.5.2 Academic skills

The academic skills that will be discussed in this study include skills that are required for the competent use of language and mathematics.

2.5.2.1 Language

Language is an essential component of normal development and a means for discovering the world. Deaf learners frequently do not have full access to communication until they have passed the most important ages for language acquisition. Parents and educators of deaf learners therefore often struggle to find a balance between fostering effective early communication skills which, according to research findings is usually best achieved through sign language, and the provision of English skills (in this case) needed for literacy and academic success (Marschark *et al.* 2002:157).

2.5.2.2 Sign language vs. the oral mode of communication

South African Sign Language is central to the South African Deaf community's advocacy for equal human rights. According to Watermeyer, Swartz, Lorenzo, Schneider and Priestley (2006:134), access to sign language enables deaf people to communicate. They also point out that studies show that when and where sign languages are freely available, people with hearing loss are not disabled in any social sense. Supporters of the use of sign language believe that deaf learners can be best educated by educators who are themselves also deaf. They also maintain that deaf learners who are prevented from using sign language become isolated from the Deaf community. Thus the social isolation that an orally educated deaf person can suffer comes from not feeling comfortable or fully capable in either the Deaf or the hearing community. Musselman, Lindsay and Wilson (2005:348-362) also point out that research has shown that the receptive language of learners educated manually is higher than that of orally educated learners.

Opposed to the above, we have the oral approach to communicating with and educating deaf learners, which advocates auditory-oral communication. This approach includes auditory training (the use of residual hearing), speech and lip-reading. Doyle and Dye (2002:45) state that the main focus of the oral approach is to teach the learner how to use his or her residual hearing, in other words, the usable hearing that a deaf learner has.

Despite the fact that these approaches (oral and manual) are clearly at opposite ends of the communication continuum, they both have strengths and weaknesses. A strategic combination of these strengths and weaknesses has made way for a new approach to communicating with and educating deaf learners. This approach is known as the bilingual approach to Deaf education. According to Engelbrecht and Green (2003:153), this approach uses the sign language of the Deaf community as the first language, and the spoken and written language of the hearing world as the target or second language. Deafness is not considered a barrier to linguistic development, educational success and social integration. This approach enables deaf learners to participate fully in both the Deaf community and the hearing world (Engelbrecht & Green 2003:153).

Does this mean that sign language is always the best early language alternative for deaf learners? Marschark *et al.* (2002:106) state that, under optimal conditions, approximately 90 per cent of learners with severe and profound hearing loss could achieve proficiency in expressive and receptive spoken language. Those conditions include strong family support, an educational programme that strongly supports both oral and aural information, and at least average intellectual ability (Marschark *et al.* 2002:106). The importance of the input made by supportive and skilled educators should also not be underemphasised.

Language skills that are often affected by hearing impairments are reading, writing and comprehension.

2.5.2.3 Reading

Marschark *et al.* (2002:160) state that, regardless of early instruction, learning to read is a complex and challenging task for young children. It requires a variety of skills at different levels, and the difficulty of learning to read for learners who do not have English as a (fluent) first language should not be underestimated. The three levels of reading that have been reported as being the most challenging for learners experiencing problems are the decoding of individual words, vocabulary and grammar.

Several studies have suggested that the lack of reading experience among deaf learners reduces their ability to decode spontaneously (Kelly 1995:318-334). Marschark and Spencer (2003:99) further emphasise that although these learners are able to decode and learn words from context, they seem to be hampered by this process unless the words are couched in sentences that are relatively simple and appear a number of times (often unnaturally) in contrived passages.

Since deafness prevents the incidental learning of language, deaf learners frequently have a limited vocabulary with gaps where they are least expected (Mangiardi 1993:358). Marschark and Spencer (2003:100) point out that the difficulty experienced with major syntactic constructions in passages is a critical factor in the low vocabulary development of many learners. In other words, difficulties encountered with regard to understanding syntax curtail the development of fluent reading skills, as well as the use of context cues to derive the meanings of important words (Marschark & Spencer 2003:100).

Certain categories of grammatical structure, such as questions, pronouns and embedded clauses or phrases, are particularly troublesome for young deaf readers (Marschark *et al.* 2002:162).

In order to improve the reading level of deaf learners, the educator should:

- find something interesting to read;

- read out aloud in order to encourage the learners to follow a story from beginning to end (new vocabulary will be introduced, listening skills will be developed, the correct pronunciation will be initiated and letter recognition will be developed);
- work with the learners beforehand to teach vocabulary and concepts when deciding which stories to read to the class;
- help the learners to make connections between what they are reading and their real world;
- use journals to increase the learner's vocabulary; and
- build up a sight vocabulary by encouraging learners to read the basic high-frequency words incidentally. It is important that the learners understand these words in context, so the words must always be presented in the context of a sentence (Goyetche 2009:2; Easterbrooks, Estes & Nevins 2007:125; Barr & Johnson 1991:187-188).

2.5.2.4 Writing

Rief and Heimburge (2006:330) state that many learners experience significant difficulties when asked to produce on paper and to demonstrate their knowledge in written form. There is often a giant discrepancy between what they know, what information they have and can express verbally, and what they are able to actually put down on paper. If the learners struggle to express themselves in spoken language, they will find it even more difficult to express their thoughts in writing (Landsberg *et al.* 1999:156).

Marschark *et al.* (2002:178) state that deaf learners tend to produce shorter sentences than their hearing peers, and to repeatedly use subject-verb-object sentences which give the appearance of 'concrete' and literal writing. Among the other typical characteristics of writing done by deaf learners is the frequent omission of words. Marschark (2007:179) further points out that a variety of studies have documented the fact that deaf learners use fewer adjectives, conjunctions and auxiliary verbs than hearing learners, whereas

nouns and verbs are used at about the same frequencies. Their writings have been characterised as direct or stilted, with limited use of imaginative and idiomatic expressions (Marschark & Spencer 2003:99). Similar errors are normally made by many learners of English as a second language. However, Mayer and Wells (1996:93-107) emphasise the fact that although writing done by deaf learners may look similar to writing done by second-language learners, deaf learners do not have a fluent first language on which to construct a second. This means that second-language learning methods may be inappropriate, or may address only some of the needs of deaf learners.

Educators could use the following strategies to improve the writing skills of deaf learners (Wallace, Stariha & Walberg 2004:8-16):

- Ask the learners to first write a draft. They will be able to write a story faster by writing the draft first and then editing and revising it.
- Encourage learners to read good – even great – literature, which can serve as a model for their own efforts.
- Provide learners with themes that focus on their own interests. Having a topic about which a person cares deeply because of personal interest and investigation, may prove decisive for fine writing.
- Ask the learners to write about the results of their own research, and about their own feelings and experiences.
- Encourage deaf learners to talk. As talk is essential to writing – and that includes the development of conversations with ourselves – the outer experience of discussion, justification, role play and drama feed into the inner voices of a critically reflective writer.
- Help the learners to build their self-esteem. As developing writers they need to be encouraged and supported in experiments and taking risks in order to help them realise that failing to get it right the first time is a healthy part of progress.
- Encourage learners to improve their spelling and punctuation skills. Once they know how to insert commas and semicolons correctly, use verbs to create strong images in their writing, and have important language skills, the learners will gain

confidence in their writing abilities (Wallace, Stariha & Walberg 2004:8-16; Bearne 2002:25-46; Olson 2005:1).

The next aspect of language development to be discussed is comprehension.

2.5.2.5 Comprehension

Comprehension is the main objective of reading. One reads in order to understand the message that is the content of the text. The degree to which readers comprehend what they read depends on the purpose of the reading, the level of difficulty of the text, the reader's knowledge of the topic, and similar factors (Gunning 1998:310).

One of the challenges for deaf learners is the issue of reading comprehension (which is often influenced by poor vocabulary). Deaf learners are more likely to use local context in a passage to make guesses at the meaning of words rather than take into account the full content of the text. As a result, their recall of material often contains the same amount of information as that of hearing learners, but in a disjointed, less organised way that clearly reflects a lack of global comprehension (Marschark *et al.* 2002:165). Marschark also points out that when functioning in an environment with degraded (analog or digital) auditory input, deaf learners miss a certain proportion of information, misunderstand another proportion, and have to depend on vision to a greater extent than their hearing peers. Lacking full simultaneous access to both visual and auditory stimulation, they will not only be at a disadvantage with regard to incidental learning, but will also miss exposure to a variety of cause-effect relationships involving multiple agents, objects and actions. A variety of educational and psychological studies have demonstrated that information presented in a combination of visual and auditory modalities leads to better comprehension, learning and memory than information in either modality alone, even if all of the information is included (e.g. a diagram and text rather than speech) (Marschark & Hauser 2008:449). Therefore deaf learners experience problems with comprehension of oral and written information.

Gillet and Temple (1990:370-372) recommend that in order to improve the reading comprehension of deaf learners, the educators should:

- ask the learners to read the text and then answer literal, factual questions;
- ask the learners to retell or dramatise events in the text in sequence;
- cut up the text that has been read into paragraphs and ask the learners to arrange the paragraphs in the correct order;
- explain terms such as *objects*, *concepts*, *sequence of events* and *main idea* very clearly to the learners so that they can grasp and understand them;
- provide sufficient opportunities for salient reading, which is helpful for speed reading (shortening the time in which they have to silently read certain passages of text compels learners to gradually increase their reading speed); and
- ask accompanying anticipatory questions in order to help the learners to explain why events took place in a specific way.

The next aspect of academic skills is mathematical skills.

2.5.2.6 Mathematics

Mathematical proficiency is essential if learners are to realise their full potential. It focuses mainly on patterns and relationships and has a language of its own that describes mathematical terms and symbols.

Hearing learners acquire knowledge of mathematical concepts unconsciously and informally at a very young age. These concepts include pairing, comparison, sorting and quantity. Some of these concepts that hearing learners learn incidentally in everyday life may have to be explicitly taught to deaf learners in school.

Lewis and Norwich (2005:20) confirm that deaf learners are behind their hearing counterparts in mathematics, although not as far behind as they are in literacy skills. They emphasise, for instance, that a number of studies showed that the pattern of mistakes made by deaf learners in mathematics is similar to that of hearing learners.

However, various factors may prevent deaf learners from successfully constructing mathematical knowledge.

One of those factors may be that deaf learners are, to some extent, unable to take part in group activities or discussions because they lack the required language (Ray 2001:62-75). Deaf learners find it particularly difficult to grasp mathematical or cognitive concepts that involve specific language related to volume, shape, size, comparisons, measurement and reasoning. They often experience difficulties with concepts such as *in front of*, *behind*, *under*, *same* and *different*. Researchers have also identified that the specialist language of mathematics and the linguistic sequencing and manipulation of events in written mathematics problems create the most difficulty for deaf learners (Gregory 1998:119-126).

Yet another concept with which deaf learners struggle is problem solving (Ray 2001:62-75). They often tend to proceed too rapidly when trying to solve a problem, rather than pause to think it through or create a logical plan.

In order for deaf learners to develop cognitively, particularly in a mathematical sense, the learning environment must have a wide range of meaningful hands-on mathematical experiences that are *visually* engaging. Activities should be purposeful and have relevance to everyday life so that they can be experienced in a context other than a purely mathematical one (Ray 2001:62-75).

Educators could use the following strategies to improve deaf learners' knowledge of mathematical concepts:

- Translate action into a math sentence. Learners could also use pictures and drawing sets, and visualise or mimic the action in a problem to move from a concrete to a more abstract representations of the problem.
- When using charts or diagrams, allow time for deaf learners to view the blackboard, the image provided by the overhead projector, or objects, after which they must first

watch the educator giving explanations before they are allowed to offer responses. Deaf learners cannot view charts or diagrams and listen at the same time.

- The introduction of new vocabulary for coming math lessons will help learners to grasp new concepts and study new processes much more easily, since many deaf learners do not learn words incidentally.
- Encourage learners to process information at a deeper level through questioning and provide constant repetition of mathematical concepts to help learners to retain them.
- Use mathematical vocabulary alongside appropriate resources to consciously provide richer opportunities for mathematical learning.
- Rephrase instructions or ideas until the learner understands them.
- Utilise all the senses by providing verbal, auditory, visual and tactile experiences – this is especially applicable to such topics as money, time, weights, measures, calendar work and geometric figures (Ray 2001:62-75).

In order to support deaf learners effectively, educators need to develop an in-depth knowledge of both learners' mathematical thinking and the requirements for creating holistic learning environments that facilitate mathematical learning. This knowledge, together with an insight into the specific learning styles and developmental needs of deaf learners, will reduce the challenges that these learners encounter in mathematical learning (Ray 2001:62-75).

2.6 CONCLUSION

This chapter started with a discussion of the concept of 'deafness'. A discussion of the aetiology of deafness and of different types and causes of hearing loss was included to provide appropriate information about deaf learners. Auditory access and the use of technology, which includes sensory devices such as hearing aids, FM system and cochlea implants, were also mentioned in an attempt to address the successful inclusion of deaf learners in regular schools.

To ensure the development of effective inclusive classroom practices, educators should be aware of different manifestations of deafness in primary school learners. They need to consider different aspects of human development, in particular cognitive development, which includes the developmental and academic skills of the deaf learners, in order to successfully include these learners in regular schools. Educators also need specific knowledge of adequate educational support strategies, which should be used to correctly identify and appropriately address the unique needs of these learners in regular schools.

Chapter 3 will focus on explaining the research design and methodology utilised to conduct this study.

CHAPTER 3

RESEARCH DESIGN

3.1 INTRODUCTION

The qualitative investigation conducted as part of this research serves as an indispensable source of practical information in investigating the practice of inclusive education of deaf learners in the mainstream settings within the South African context. Chapter 1 explained the context and outlined the aims of the research. In Chapter 2 the nature of deafness was explored. A variety of sources were perused to identify areas in the development of deaf learners which, if not attended to, could pose problems in a mainstream setting.

It was anticipated that the informal interviews conducted with the educators of deaf learners provide valuable information for achieving a comparative analysis. The literature study and observations will provide a holistic perspective regarding the inclusion of deaf learners in the mainstream settings.

In this chapter the researcher will present a description of the research design and method used in this study. Key patterns and ideas that emerged from the literature study and observations were identified and provided the basis for the discussion of the outcomes of the interviews. The information that was gathered will enable the researcher to give meaning to the data and draw certain conclusions regarding appropriate guidelines to assist educators of deaf learners in their inclusive classrooms.

3.2 STATEMENT OF THE RESEARCH PROBLEM

Owing to the sensory impairment of deaf learners, these learners have to overcome certain obstacles in order to benefit from inclusive education (Van Dijk 2003:15). Their successful inclusion in regular schools is dependent on the development and application

of adequate support strategies. In order to provide those strategies, educators of deaf learners should be assisted in acquiring knowledge of the educational needs of these learners (Van Dijk 2003:324).

3.2.1 Orientation

The researcher's interest in the topic of this study arose from her professional context and her personal interest in the education of deaf learners. Being an educator of deaf learners, and working in an environment where opportunities exist to communicate with educators who perceive themselves as sufficiently competent to educate these learners, have influenced the researcher's decision to investigate and describe cognitive development in deaf learners. Research in this field is necessary not only in order to investigate and describe the experiences and characteristics of deaf learners, but also to develop intervention strategies for the successful inclusion of these learners in regular schools. As already mentioned, the researcher's background, combined with the current research, places her in a favourable position to outline specific guidelines that will help educators to correctly identify and appropriately address the needs of deaf learners attending regular schools.

3.2.2 Formulating the research problems

The researcher regards the problem statement as the most critical part of the research proposal. The problem statement ensures that the researcher has a good grasp of the specific problem he or she wishes to investigate (Johnson & Christensen 2000:47). The data gathered during the interviews, the literature study and the field notes were processed with the aim to answer the research question.

3.2.2.1 *Primary research question*

In order to cope effectively with changes brought about by the introduction of the inclusive education system, educators need to acquire the necessary relevant knowledge

and develop specific skills that will be required to support learners experiencing barriers to learning in regular school. Therefore, the primary research question is: **What support strategies do primary schools educators need to effectively teach deaf learners?**

3.2.2.2 Secondary research questions

The secondary questions of the research are:

- What is deafness?
- Which developmental skills of deaf learners require special support in an inclusive classroom?
- Which academic skills of deaf learners require special support in an inclusive classroom?
- Which support strategies could be used to prevent possible barriers to learning in the case of deaf learners?

3.3 AIM OF THE RESEARCH

In order to enhance their ability to effectively teach deaf learners, educators need support at different levels. The literature study (Chapter 2) has shown that there is a need for guidelines and strategies to assist educators at regular schools to improve the developmental and academic skills of these learners.

3.3.1 Primary research aim

The primary research aim of the study is **to develop the necessary guidelines to assist primary school educators in their endeavour to offer meaningful support to deaf learners in inclusive classrooms.**

3.3.2 Secondary research aims

The secondary aims of this study are:

- to determine the nature of 'deafness';
- to determine which developmental skills of deaf learners need effective support from educators;
- to determine which academic skills of deaf learners need effective support from educators; and
- to develop strategies to prevent the potential backlogs learners may develop.

3.4 RESEARCH DESIGN

The research design entails the overall approach and a detailed explanation of how the research study will be carried out, who the participants will be, and where it will be conducted (Marshall & Rossman 1995:24). Schumacher and McMillan (2001:31) point out that the purpose of a research design is to provide, within an appropriate mode of inquiry, the most valid and accurate answers possible to research questions. Research design is a very important part of an investigation, since certain limitations and cautions in interpreting the results are related to each design, and also because the research design determines how the data should be analysed.

3.4.1 Philosophical foundation

According to Henning, Van Rensburg and Smit (2004:20), knowledge is constructed not only from observable phenomena, but also from descriptions of people's intentions, beliefs, values and reasons, meaning making and self-understanding. The researcher has to look at different places and at different things in order to understand a phenomenon. The types of knowledge frameworks that drive society, also known as its discourses, become key role players in the interpretive project (Henning *et al.* 2004:20). Interpretative theory is applied mainly in the humanities and emphasises the detailed explanation of texts (Neuman 2006:88). A key task in interpretive research is seeking

meaning in context – the subject matter must be set in its social and historical context so as to enable the reader to see how the current situation emerged (Klein & Myers 1999: 67-93).

The interpretive theory is a point of reference for the current research, since the researcher examined a variety of data and different sources and methods of analysis in order to strive for validity. In this research different viewpoints construct the world through different processes of observation (Henning *et al.* 2004:20) in an attempt to understand phenomena through the meanings that people assign to them (Trauth 2001:219).

Since the constructivist theory focuses on the individual in the learning process, it will be used in this research to focus on the cognitive development of deaf learners. For the purpose of this study, the researcher has chosen the oral method as the preferred method of teaching for educators of deaf learners in order to teach these learners to communicate through talking, thus ensuring that they will have fewer limitations in their future lives.

This research is of a qualitative nature and combines a literature study and an empirical investigation conducted by way of interviews and observations.

3.4.2 The qualitative paradigm

According to Schumacher and McMillan (2001:395), qualitative research involves a process of inquiry during which researchers collect data in face-to-face situations by interacting with selected persons in their setting (field research). It describes and analyses people's individual and collective social actions, beliefs, thoughts and perceptions. Schumacher and McMillan (2001:396) add that qualitative research design is concerned above all with understanding the social phenomena from the participants' perspective. Understanding is acquired by analysing the many contexts of the participants and by narrating participants' meanings for these situations and events.

Neuman (2006:148) states that qualitative research interprets data by giving them meaning, translating them, or making them understandable. However, the meaning attached to something is influenced by the point of view of the people being studied. The researcher interprets data by finding out how the people being studied see the world, how they define the situation, or what significance they attach to it. Johnson and Christensen (2000:312) further emphasise the fact that qualitative researchers prefer to study the world as it naturally occurs, without manipulating it; they view human behaviour as dynamic and changing, and they advocate studying phenomena in depth and over an extended period of time. The product of qualitative research is usually a narrative report with rich description (vivid and detailed writing).

A literature review is an important component of the research and provides the conceptual framework against which the qualitative research is conducted. The literature study is considered in the next section.

3.4.3 Literature study

According to Gay (1996:38), the review of related literature involves the systematic identification, location and analysis of documents containing information related to the research problem. The literature review has several important functions, which make it worth the time and effort. The main purpose of reviewing the relevant literature is to determine what research relating to the current research has already been done. Johnson and Christensen (2000:41) add that related studies may give the researcher ideas about how to proceed and design the study in order to obtain answers to the problem. A literature review can point out methodological problems specific to the research problem. The literature can also provide clues as to where to find the equipment required, or how to identify the particular groups of participants needed.

Johnson and Christensen (2000:41) further emphasise that familiarity with the relevant literature will also be useful to the researcher once he or she has collected the data and

analysed the results. One of the last stages of a research project is to prepare a research report in which the results of the study are communicated to others.

The literature should be reviewed once the theory has been sufficiently grounded and developed, so that the existing literature can be related to it in order to show additional support for the developed theory, or to show points of conflict that might become evident between the developed theory and the literature. Thus ideas for further investigation will be developed (Johnson & Christensen 2000:42).

As already mentioned, an ethnographic research design has been chosen to assist the researcher to systematically obtain valuable information in order to compile the necessary guidelines to assist educators to provide meaningful support to deaf learners in mainstream settings. Educators also have to understand the educational implications of having these learners in their classrooms.

3.4.4 Ethnographic research design

Ethnography as a research methodology is quite specific to the interpretive theory of knowledge. It is one of the most popular approaches to qualitative research used by researchers in the field of education. The word ethnography literally means 'writing about people' (Johnson & Christensen 2000:29). Ethnography essentially involves descriptive data collection as the basis for interpretation. It represents a dynamic 'picture' of the way of life of some interacting social group. As a process, it is the science of cultural description (Burns 2000:393). Ethnographers are interested in documenting qualities like the attitudes, values, norms, practices, patterns of interaction, perspectives, meanings, interpretations and language of a group of people. They take a holistic approach: they endeavour to describe how the individual members of a group interact and how they come together to make up the group as a whole. In other words, the group is more than the sum of its parts (Johnson & Christensen 2000:29). The researchers using this approach employ many different methods of data gathering, they often join a group of

people that they study for a period of time and observe their lives in action. They observe them, as far as possible, as if they were 'one of them' (Henning *et al.* 2004:42).

An ethnographic research design has been chosen to assist the researcher in the task of systematically obtaining valuable information by observing deaf learners in inclusive educational settings and interviewing the expert educators in order to be able to outline specific guidelines to assist the educators of these learners.

The process of data collection will be discussed in the following section.

3.4.5 Data collection

To collect data on the support guidelines, the researcher conducted semi-structured interviews with three educators of deaf learners. To add to the richness of the data, the participants were asked to do pre-observation of specific aspects of the questions before embarking on interviews. The researcher collected copies of learners' writing and other schoolwork, and of their school reports. These data sources helped the researcher to describe the different aspects of cognitive development of the deaf learners. The participant observation and field notes were also part of the data collection process.

3.4.5.1 Observation and field notes

According to Talbot (1995:478), field notes comprise observational notes. Field notes are exactly what the name implies, i.e. notes that the researcher takes while in the field. What the researcher sees and experiences is 'put into words'. However, field notes contain not only descriptions of what the researcher has seen and experienced, but also his or her perceptions and interpretations of the events (Liamputtong & Ezzy 2005:171).

For the purpose of this research, the researcher assumed the role of a participant observer. This means that the observer performed some everyday actions on site and also observed what others did and said (Henning *et al.* 2004:85). The researcher initially explored several areas of interest at a site and selected those that she decided to study

in detail in order to search for patterns of behaviour and relationships (Schumacher & McMillan 2001:42).

Since the aim of the research study was to develop guidelines for regular educators who have to accommodate and support deaf learners in inclusive classrooms, it was imperative that the researcher observe the interactions of the deaf learners and their experienced educators during the academic and extramural activities of their particular school environment (De Vos 2005:276).

The school, which served as research site and which is a regular school, has established a special unit for deaf learners. Recently this unit has also started to include learners with learning difficulties, for example, learners with Attention Deficit Hyperactivity Disorder (ADHD) and other barriers to learning and development. For several reasons the researcher focused on only three learners with profound deafness. Although there were more learners with hearing loss in the unit, these three boys were approximately the same age (11-12 years) and did not have other disabilities or behaviour problems that significantly interfered with their performance at school. Since there were no girls with profound hearing loss in that age group, the researcher had to concentrate on the boys. In the current study the field provided the participants.

The three learners were observed during five consecutive weeks for a period of four hours a day. They were observed in their natural school setting during different lessons, breaks, extramural activities, physical education lessons, assemblies and hymn practices. Particular attention was paid to their development and academic abilities. Although during observation sessions in the classroom the researcher sat at the back of the room, she made no effort to avoid classroom activities if the educators or learners needed assistance. During breaks and assemblies the researcher was actively involved in different activities. Since the researcher is employed as an educator at the participants' school, they were less self-conscious in her presence. The results of the observations were presented in the narrative field notes. The field notes yielded the rich, complex and

potentially interpretive data that the researcher wanted to capture to complement the information obtained by way of the interviews with the educators.

During the observation period the researcher also collected copies of the participants' schoolwork, copies of their school reports and pieces of artwork. These sources of data helped the researcher to describe different aspects of the cognitive development of the deaf learners.

The observation entailed, among other things, how the educators and deaf learners interact, how the educators communicate with these learners, how language is used, and how the deaf learners behave during breaks, assemblies and extramural activities. The educators were also asked to pay attention to those aspects with a view to increasing their awareness of the possible presence of problems that had been discussed during the interviews.

3.4.5.2 *Semi-structured interview*

The semi-structured interview involves asking a series of structured questions and then probing more deeply by using open-form questions to obtain additional information (Gall, Bong & Gall 1996:310). It has the advantage of being reasonably objective while still permitting a more thorough understanding of the respondent's opinions and the reasons behind them than would be possible if a mailed questionnaire had been used. The semi-structured interview is generally the most appropriate type of interview for studies in education. It provides a desirable combination of objectivity and depth and often permits gathering valuable data that could not be successfully obtained by any other approach (Bong & Gall 1989:452).

During the semi-structured interviews the interviewer covered the same general topics and questions with all of the interviewees. The interviewer tried to keep the interview on track, bringing the respondents back whenever they broached topics that were not relevant to the research purpose (Johnson & Christensen 2000:144). Interviews of this

kind presuppose some prior information, an understanding of the problem under investigation, and a need for more specific information (Bless & Higson-Smith 1995:107). Hofstee (2006:136) suggests that 'leading' the subject to particular answers is not academically acceptable; however the researcher may, if necessary, ask for elaboration, examples, or an explanation, provided that such requests are made in a neutral manner. As audio recordings do not pose too much of a disturbance to interview situations, the interview process was recorded. Audio recordings offer a permanent record and are fairly complete in terms of the speech that occurs (Denscombe 2007:195). Permission for audio recording of the interviews was obtained from the educators.

3.4.6 Selection of participants

For this particular research a purposeful sampling technique will be applied, based on the experience of the educators. Merriam (1991:48) suggests that in choosing the research sample the researcher should choose those subjects from whom the researcher can learn the most. This means that the sample should consist of people who can serve as rich sources of the information sought by the researcher.

The researcher wanted to gain information from educators who are experienced educators for the deaf. These educators and the researcher are all employed as specialised educators for the deaf learners at the Durban Primary School. The school has established a special unit for deaf learners within the regular school and recently this unit also started to include learners with learning difficulties. The classes of the unit are not as big as some inclusive classes and also not as diverse. The educators teaching in those classes are experienced educators who have received specialised education (Advanced Certificates in Education (Inclusive Education: Hearing Impaired)) at the University of South Africa. They have worked with deaf learners for many years and their education and experience helped them to acquire valuable expertise in deaf education. As specialists they are proficient and experienced in the assessment and support of learners experiencing barriers to learning and development.

Since the deaf learners from this unit are mostly transferred to regular high schools, the aim of the unit is to make the transition from a specialised school setting to a regular one as smooth as possible for them and to ensure their successful inclusion into the new setting. The educators of this unit utilise the oral mode of communication and are not supported by a sign language interpreter.

The educators of the deaf learners often place their learners in regular classrooms in the same school to enjoy the greater academic stimulation of the mainstream environment and to develop their unique identity as hearing individuals. They also assist educators of the regular classes to accommodate and meet the academic, social and personal needs of these learners. A total of three educators agreed to participate in this study. Long-term working relationship with the participants was advantageous to their willingness to participate in the study. They were friendly, easily accessible and willing to share their personal experiences with the researcher. Participation was voluntary.

3.4.7 Educator profiles

The following section contains the profiles of the three participants.

3.4.7.1 Educator A

The first participant in this research is referred to as Educator A in order to ensure her anonymity. This educator has been teaching deaf learners for 25 years. She is employed in the specialised unit for learners with hearing impairments (Senior Phase), which is attached to the mainstream school. She received specialised education (Advance Certificates in Education (Inclusive Education: Hearing Impaired)) at the University of South Africa. She is also the HOD of the school. As an educator of deaf learners, she plays a vital role in supporting the learners in her class. She not only teaches in the specialised unit, but also participates in planning and implementing the support strategies for the deaf learners that are included in the mainstream classrooms. She plays an important role in the process of accommodating deaf learners in the mainstream

environment and promoting them into mainstream high schools. Educator A monitors the progress of these learners and provides direction to the regular educators to enable them to accommodate the needs of deaf learners in the mainstream settings.

Some learners with severe hearing loss who had been taught by this educator have successfully completed their schooling at mainstream high schools and have subsequently graduated from universities. One of her learners is currently registered for an Honours degree at the University of South Africa.

Educator A was chosen for observations during teaching time. In addition to observations made during teaching time, the interactions between the other educators and the deaf learners were also observed, particularly during breaks and extramural activities.

3.4.7.2 Educator B

The second participant in this research will be referred to as Educator B, again to ensure anonymity. She is a former educator in the specialised unit for deaf learners (Junior and Senior Phase) attached to the mainstream school. A few months prior to the interview she was transferred to the school for learners who require short-term remedial intervention. Educator B also received specialised training (Advanced Certificates in Education (Inclusive Education: Hearing Impaired)) at the University of South Africa and has been teaching deaf learners for 27 years. While she taught in the specialised unit for deaf learners she was the class educator for learners in the Junior Phase and the subject educator for those in the Senior Phase. The subjects she taught to Senior Phase learners included Economic and Management Sciences (EMS) and Technology.

Besides teaching in the specialised unit, Educator B was involved in assessing and supporting deaf learners in the mainstream classrooms. She worked collaboratively with the regular educators and the parents of deaf learners to identify and remedy target areas in the communication skills of these learners, and also advised on the supportive

procedures necessary to achieve the smooth integration of these learners into the mainstream settings.

3.4.7.3 Educator C

The third participant in this research is Educator C. This educator teaches in the mainstream school (Senior Phase). Although she never obtained a special qualification in deaf education, she is an experienced, understanding and well-organised educator who has worked with deaf learners for a number of years. She has taught subjects such as Life Orientation and Afrikaans in the specialised unit for deaf learners and has helped many of them to achieve their potential. Her experience is of great value to the current research as she deals with deaf learners in the classroom and during extramural activities. She is one of the school's hockey coordinators and is also involved in coaching athletics.

3.4.8 Pilot study

The interview questions were pilot tested. The questionnaire was given to an educator not included in the research. She is an educator at the same school and has worked for several years as an educator for learners with multiple disabilities. The aim of the pilot study was to ensure that the meanings of questions and statements were easily understandable, to gauge their level of difficulty, to develop suitable code values and to ensure reliability and validity (Keeves 1997:157; Underhill & Bradfield 1996:268). As a result of the outcome of the pilot study a few questions were changed to ensure greater clarity. The researcher also discovered that some concepts had to be discussed with the educators prior to the interviews in order to ensure maximum clarity in the answers to the interview questions.

3.4.9 Data analysis and interpretation

Qualitative data analysis is primarily an inductive process of organising the data into categories and identifying patterns (relationships) among the categories (Schumacher & McMillan 2001:461). It is a messy, ambiguous, time-consuming, creative, and fascinating process. Qualitative data analysis is a search for general statements about relationships among categories of data (Marshall & Rossman 1995:111).

Researchers must draw conclusions from the data with a view to answering their initial research questions. The researcher is the main analytical instrument because his or her knowledge, understanding and expertise will determine what happens to the data (Henning *et al.* 2004:6). Qualitative data analysis is a test of the researcher's ability to think and process information in a meaningful and useful manner (Gorman & Clayton 1997:201).

For the purpose of this study, the responses to the results of the verbatim accounts of the interviews will be described. Categories related to the research topic will be extracted from information obtained through the literature study and the interviews conducted with the educators. The information gained from these interviews and from the observations will be analysed and slotted into these categories. This will give an indication of the usefulness and relevance of information collected during the interviews and observations for the actual demarcation of the supportive guidelines for educators working with deaf learners. However, since a qualitative research study is susceptible to bias owing to its subjectivity, the reliability of the data collected needs to be established.

3.4.10 Reliability

Reliability is the degree of consistency that the instrument or procedure demonstrates (Best & Kahn 1993:208). In qualitative studies, reliability refers to the degree to which other researchers performing similar observations in the field, and analysis such as reading field notes transcribed from narrative data, would generate similar interpretations

and results. From this viewpoint, reliability is the extent to which a data collection procedure and analysis yield the same answer for multiple participants in the research process (Kirk & Miller 1986:57).

The discussion about reliability in qualitative research comes down to the need for explication in two respects. Firstly, the data must be explicated in a way that will clearly distinguish between the statements made by the subject and the researcher's interpretations. Secondly, procedures in the field or during interviews, and in the interaction with the text, need to be made explicit in order to improve their comparability. Finally, the more detailed the research process is documented as a whole, the more reliable the process will be (Flick 2006:370).

To ensure the reliability of this research, different data-collection methods will be employed. Interviews and details of observations will be correlated with the literature review to determine the match between findings of the study and the participants' reality. The educators also will be asked to undertake a thorough reading of the researcher's outlines of the discussions in order to verify that all facts have been captured correctly.

3.5 CONCLUSION

In Chapter 3, the qualitative research design was described with specific reference to ethnographic research. It also contains a discussion of the research methods applied, the types of sampling used, the selection of participants and the reliability of the research to ensure that the current study is efficient and consistent.

In the following chapter the results of the interviews and observations will be analysed and discussed. The aim of the discussion is to enrich the literature findings and outline the results of the empirical study so as to compile supportive guidelines for educators of deaf learners attending regular schools. Limitations will also be identified. Hofstee (2006:118) emphasises the need for the researcher to name the most important limitations that will affect either the reliability of research findings or the extent to which

the researcher can generalise from them. It is also important to name the possible consequences of these limitations, and to tell the reader why research findings are still worthwhile.

CHAPTER 4

RESULTS OF THE EMPIRICAL STUDY

4.1 INTRODUCTION

As mentioned in Chapter 3, this chapter is based on the qualitative paradigm. Henning, Van Rensburg and Smit (2004:3) state that in the process of a qualitative research the researcher wants to understand, and also explain the nature of the phenomenon of the study by using evidence from the literature and from the data. Observation and the educators' interviews will complement the literature study and offer valuable information with a view to comparative analysis. Together, the literature study and the empirical research will provide a holistic outlook on the support that educators of deaf learners require in their inclusive classrooms.

In this chapter interviews and observations are analysed in an attempt to gain useful knowledge from the results of the empirical study so as to be able to summarise the supportive guidelines for educators of deaf learners in mainstream settings.

4.2 FINDINGS OF THE EMPIRICAL INVESTIGATION

The findings of the developmental and academic skills will be discussed in the following section.

4.2.1 Developmental skills

The developmental skills include motor-perceptual skills, concentration and memory skills (see 2.5.1).

4.2.1.1 Motor development

As mentioned in previous chapters, motor development is vital to all the actions through which the learners express their learning, their understanding and themselves.

4.2.1.1.1 Gross motor development

It was corroborated by all the educators that deaf learners generally do not experience difficulties with gross motor coordination. They agreed that different factors, such as heredity, the presence of other disabilities and parental support do play a role in learners' motor development. The educators' remarks concurred with the researcher's findings regarding factors that influence motor development in deaf learners, based on the literature study (see 2.5.1.1). The following remarks were made by the educators:

... they generally have the same gross motor skills as hearing learners if they have been given the same opportunities (Educator A).

The problems are not necessary presented in the learners with hearing impairments; it can be a sign of multiple disabilities and then it has to be treated accordingly (Educator B).

I didn't notice the problem with these children, I noticed that they can still run, and jump, and hop, like hearing children (Educator C).

During the observation it became apparent that the degree of success with which the deaf learners performed gross motor activities depended on the level of their physical development. The activities included throwing and catching a ball, using a skipping rope and rolling a hoop, and the learners with poor physical development showed low muscle tone and low muscle development. They struggled with obstacle courses and 'stepping stone' exercises. However, similar problems were also observed among the hearing learners whose gross motor skills were poorly developed. The observations also showed that the deaf learners tended to copy the movements of the educator or other learners.

They often relied on hand signals used by the educator to help them comprehend the instructions for motor activities.

4.2.1.1.2 Fine motor coordination

All the educators interviewed agreed that deaf learners are capable of performing fine motor activities at the same level as their hearing peers, provided that they are given equal opportunities. It is evident that the learners' environment influences their development of motor skills (as also mentioned in 2.5.1.2). The educators also pointed out that problems with fine motor coordination in deaf learners might be linked to other impairments, but not to their inability to hear.

... each child is an individual and just as with hearing children these learners might have fine motor coordination problems, but they are not necessarily linked to their hearing impairment, it can be problems like cerebral palsy (Educator B).

... if these children are given opportunities to cut, to draw and to colour in, then they are fine, they can actually do it. Yes, you do get children who need occupational therapy among the learners with hearing problems, but you get children in mainstream classes who also need OT (occupational therapy)(Educator A).

One of the educators mentioned that these learners often need individual instructions to understand tasks involving fine motor coordination, but once they grasp what they have to do, they can perform these tasks successfully.

I have to face the learners so that they could see my lips, then they know what to do, so there is more with instructions where the problems lied and not with them actually being unable to cut and stick (Educator C).

The observations also showed that deaf learners can produce very beautiful artwork, but they need to be motivated and encouraged by the educator as they are often self-conscious about their performance. The researcher observed that the deaf learners

tended to look around, checking what other learners were doing. They did this to ensure that they were not missing important instructions.

4.2.1.2 Sensory motor skills

The literature study indicated that laterality is one of the most problematic sensory motor concepts for deaf learners to maintain (see 2.5.1.2). They normally show different laterality patterns that are more left-sided or exhibit more inconsistent hand response, compared with learners whose hearing is normal (see 2.5.1.2.1).

Contrary to the findings in the literature study, all the educators involved in the research pointed out that deaf learners and hearing learners experience similar problems with laterality. In this regard the following remarks were made by educators:

I have noticed that they tended to use their right hand more, and if they were left-handed they used their left hand more. I didn't find that they swop hands (Educator C).

I think it will be a similar proportion of confusion with left and right in hearing children as in deaf children. It has to be treated the same sort of way you deal with the hearing children (Educator B).

One educator also suggested that educators should consciously prompt learners to develop their laterality skills.

... a lot of that (level of laterality) depends on whether they have been allowed the activities that develop the fine-tuning of their laterality (Educator A).

According to the findings based on the literature study (see 2.5.1.2.2), deaf learners tend to have vestibular deficits, which lead to problems with balance. They are often clumsier and more accident prone than hearing learners (see 2.5.1.2.2). The educators suggested that, rather than being a result of deafness, this could be caused by an ear problem arising from the type of hearing loss affecting learners.

... If it is sensorineural hearing loss that it is more than likely not going to be problems with balance, but when the hearing loss is conductive that it might be an effect on the balance (Educator B).

One of the educators commented that deaf learners are not really clumsy, but only appear to be so because, as a result of their hearing loss, they are often unaware of what is happening around them.

When, for example, they walk past someone's desk and knock something off that desk, they don't know it is falling, so to me it is more unawareness of it, not clumsiness as such (Educator A).

Educator C expressed a different view: according to her observations, deaf learners tend to prefer walking close to objects and might even bump into other learners more often because of the problem they experience with balance.

They might walk pass the desk and bump it or maybe touch another learner without even being aware that he or she was walking so close to the child (Educator C).

The observations revealed that learners with hearing loss experience discomfort when they hang upside down on a monkey bar and also find it difficult to stay upright during spins. The fact that they can balance considerably better with their eyes open than with their eyes closed strongly indicates that they may be relying heavily on visual cues to maintain balance. They experience a slight problem with balancing when asked to hop on one leg. The observations indicated that deaf learners' ability to maintain balance often depends on their general physical development.

4.2.1.3 Perceptual skills

The literature study indicated (see 2.5.1.3) that the visual modality is important for deaf learners. Depending on the specific type of task used, these learners have been found to perform better, worse, or the same as their hearing peers.

4.2.1.3.1 Visual perceptual skills

The three educators all agreed that deaf learners have well-developed visual perception skills. They also mentioned that deaf learners are visual learners and rely mostly on their visual abilities.

Visual perception is often very well developed because it is compensation for their hearing loss (Educator B).

Visual perception skills are very important for these learners as they do base most of their learning on visual concepts (Educator C).

Hearing-impaired children are visual learners to the large degree, because they rely on their sight to give them information, because of their lack of hearing (Educator A).

The educators also indicated the importance of special training that can be undertaken by parents and educators to enhance the visual perception skills of the learners.

Those learners that have been really trained would be visually alert, but those that are not trained often are not visually alert. The parents that have been co-operated and trying to get the best for their children from little, those often are the children that would be very alert to everything (Educator A).

The educators pointed out that learners affected by other disabilities, besides hearing loss, often experience difficulties with their visual abilities.

Their visual perception is usually very well developed if it is not linked to another disability (Educator B).

You have got the whole spectrum from those who are visually capable and quick at doing things and those who have learning problems and hearing impaired. They have difficulty in finding anything or finding things in a dictionary or finding something on a blackboard, anything like that (Educator A).

The observations showed that learners experiencing difficulties with numerical problems could find the solutions with the help of visual aids. They also needed visual stimulation to memorise a story. When a story was read to them, they had to pay close attention to the illustrations as they relied heavily on visual clues when they had to recall and retell the story.

The observations revealed that most of the learners included in the study were visually alert and very quickly noticed new things around them. When the educator put a new poster on the wall, the deaf learners were first to notice the change. They were also sensitive to the facial expressions of the educator and could tell when the educator was happy with their answers, or when they had made a mistake (as mentioned 4.2.1.1.2). They often tended to look around at other learners and at the educator to make sure that they were doing what was expected of them.

4.2.1.3.2 Auditory perceptual skills

In Chapter 2 (see 2.5.1.3.2) it was stated that in learners with hearing loss, their inability to hear causes severe auditory perception deficiencies. They often show slow language development, inadequate articulation and difficulties in speech, poor performance in auditory discrimination and also difficulties in following oral instructions.

According to the educators, deaf learners experience problems with auditory skills due to their hearing impairment. The lack of aural stimulation impairs their ability to concentrate in class. In this regard the following remarks were made by the educators:

They often daydream, you have to get the child's attention, if you don't have the child's attention they won't be able to remember and retain the work that you have taught them (Educator C).

They can daydream or switch off and go into their own world, which is what they do a lot if they are not interested, or even if they are interested, unless they are brought into the conversation and into the group of people they will switch off because it just becomes too much strain for them to try to listen (Educator A).

Their auditory development hasn't developed as far as the auditory development of the hearing learners (Educator B).

It was also reported that deaf learners tend to misunderstand oral instructions; they rely on their visual perception to help them understand what the educator is saying.

They will misunderstand a lot of what you are saying, because they will mishear. They will answer incorrectly because they haven't heard the questions, they might ask to repeat a question (Educator A).

They won't go straight into the task. They actually look at one another, not copying, they just getting clues from their partners and then from there they will do the task by themselves, so they will look around for visual clues from other learners (Educator C).

During observation it was evident that the deaf learners often found it difficult to follow oral instructions. When the educator asked one of the deaf learners to fetch chalk from the storeroom, the learner looked around 'asking' for clues from the hearing learners. Also, when the learners were asked to answer the questions in writing, one of them was obviously uncertain. He first looked around at the other learners and then asked the teacher to help him as he did not know what he was expected to do. The observations revealed that deaf learners perform poorly in oral discrimination, for example, when the educator asked the question: 'Who has not finished the task?' a deaf learner who had finished his work misunderstood the question and put his hand up. Based on

observation, one might deduce that the deaf learners' inability to concentrate could possibly contribute to their inability to understand instructions correctly.

4.2.1.4 Concentration

As was pointed out in 2.5.1.4, deaf learners generally demonstrate poorer concentration than hearing learners, particularly in situations in which they are likely to be distracted. The literature study indicated that although deaf learners often demonstrate improved visual attention to peripheral stimuli, they remain susceptible to visual disruptions from activities going on around them.

The educators were of the opinion that deaf learners and hearing learners demonstrate similar problems with concentration. They commented:

It is not specifically linked to the deafness and often hearing children have just as great difficulty in concentrating as hearing-impaired children (Educator B).

You do have the ones that are ADD children and they jump up and down like a typical ADD child, and they actually can get very little done, but for a lot of them when they know what they are doing they can actually put their heads down and just go (Educator A).

The educators also indicated that deaf learners require a special environment and special skills to help them concentrate and pay attention in class.

If it is found out (problems with concentration) we can sort of teach them skills how to concentrate and how to focus on things (Educator B).

If there is a noise outside it interferes with the sound barrier and that tends to make them not to concentrate in class, so they will be distracted by outside noise, so when teaching them you have to make sure it is a quiet environment (Educator C).

One of the educators added that deaf learners are easily distracted by visual stimuli that are present around them, but once they understand what is required of them they can focus on a task for a long time.

If they look up and spot somebody is doing something, they will play around and join the fun and games. But on the whole, if they put their heads down, because they have got a task they want to finish, they switch off to everything else (Educator A).

The observations showed that the learners with hearing loss often find it hard to concentrate, especially when they do not understand the task, in which case they lose interest and tend to play around or just look out the window. This problem was clearly demonstrated when the learners were attending a play being performed in the hall: the deaf learners were disinterested, looked at the stage occasionally, but could not really understand what was happening there.

Another instance during which the deaf learners' ability to concentrate could be observed was during hymn practise: when a well-known hymn was being sung, they joined in joyfully, but when less familiar or new songs were being practised, they lost interest and tended to look around and even talk quietly to other learners.

The researcher observed that the deaf learners tended to look around to see what other learners were doing. They were always aware of any movements that occurred around them. Since they could not rely on their hearing, they constantly looked around to make sure that they were not missing something.

4.2.1.5 Memory

The literature study suggested (see 2.5.1.5) that deaf learners are often inconsistent with regard to the intentional initialisation of prior knowledge during recall and often fail to recognise the multidimensional nature of to-be-remembered stimuli. Unlike hearing learners, deaf learners may not give immediate meaning when their long-term or

semantic memory is activated. They tend to have less strongly interconnected, less readily available, and more 'fuzzy' word meanings than their hearing peers and their verbal concepts are less homogeneous than those of hearing learners (see 2.5.1.5).

All the educators agreed that deaf learners experience problems with short-term memory, particularly relating to language. They need to hear a concept several times before they can memorise it. The remarks of the educators concurred with the researcher's findings based on the literature study (see 2.5.1.5). The following remarks were made by the experts:

They do need to hear the words in the sentence, sentence structure and what you are doing, they need to hear more than two or three times, they need to hear it maybe five, six, seven times to interpret the language, to absorb the language and then be able to use it. So doing something once or twice their short-term memory might not pick it up until they actually grasped what you try to get across (Educator A).

One of the educators, who had noticed a difference between deaf learners' visual and auditory short-term memories, made the following remark:

The visual short-term memory is probably better developed than auditory short-term memory because of their exposure to the visual stimuli. Their visual short-term memory is very sensitive and quite accurate compare to auditory short-term memory (Educator B).

The educators' opinions regarding long-term memory corresponded with the findings of the literature study (see 2.5.1.5.2). They confirmed that in the case of deaf learners, long-term memory must be linked with concrete experiences and visual stimuli. The ability of deaf learners to retrieve the information depends on their comprehension; they usually remember information that has been properly understood and revised. The educators said:

Once they have properly learnt the concept, they will not forget it again, but they need revision and comeback (Educator A).

The long-term memory has to be based on comprehension. It has to be linked to concrete experiences and visual stimuli (Educator B).

If information is visual they will not have a problem recalling it, but if it is written context they might experience problems to remember it, if they didn't understand what was being said or written back then (Education C).

The difficulties experienced with short-term memory became evident to the researcher when the deaf learners were asked to recall words that were presented to them. Even though the educator explained the meanings of the new words and used pictures to enhance the learners' comprehension, they were still uncertain when asked to match the words to the correct pictures.

During observation the researcher noticed that deaf learners also experience difficulties with long-term memory. During an English lesson, the deaf learners struggled to recall the sequence of events that had been discussed a week earlier. They also found it difficult to follow the sequence of oral instructions when asked to complete an exercise and then write their answers in their books. Two of the learners forgot to write down their answers. The researcher further observed that during the library lesson the deaf learners could not explain the term 'climate', despite that fact that it had been discussed with them in detail by the teacher during a Natural Science lesson earlier.

4.2.2 Academic skills

The empirical findings relating to the academic skills of deaf learners, which include language usage and mathematic concepts, will be discussed in the following section.

4.2.2.1 Language

The literature study (2.5.2.1) indicated that deaf learners frequently do not have full access to communication until they have passed the most important age for language acquisition.

The experts involved in this research agreed that this lack of access to communication does indeed create problems for deaf children. Their language acquisition is delayed as a result of their loss of hearing, and this eventually leads to difficulties with the development of different language skills.

Their language in the whole is delayed; all their language aspects are delayed, often quite considerably, also depending on the amount of input and the level of hearing impairment (Educator A).

Deaf learners find difficulty in this aspect, particularly in the Foundation Phase (Educator B).

Where it comes to the language of hearing-impaired learners, their language is weak ... The sounding words that they are using is limited, the language is simple and short. They don't give you long, complex sentences (Educator C).

The educators stated that deaf learners tend to drop certain letters in words. They are unable to pronounce some sounds correctly because they cannot hear them properly. They also find it difficult to distinguish between different sounds in words. In this regard the educators remarked:

Children with hearing loss often can't hear quiet speech sounds as 's', 'sh', 'f', 't', 'k', etc., and they may not include them in their speech, so there are some of the sound words and letters of the alphabet that they misunderstand and find very difficult to say (Educator C).

They find it difficult to recognise sounds in the beginning of the word, in the middle of the word. They also have problems to differentiate between different words. They also find it difficult to discriminate between similar sounding sounds in the words (Educator B).

They often don't say plurals in the words, they also get their tenses incorrect and certain sounds. They might not say 'sh' and 'ch' as they don't hear them, so they don't say them (Educator A).

It was clear during the observations that deaf learners find it hard to express themselves orally. Their speech is often difficult to understand. Since they cannot hear their voices properly when they speak, they may speak either too loudly or not loud enough. They also struggle to hear the fine word-sound distinctions that denote plurality, tenses and possession. When one of the learners described his cat, he tended to say 'cat tail' instead of 'cat's tail', and 'house' instead of 'houses'. Deaf learners also show a tendency to drop different sounds in words, for example the 'h' in 'home' or 'hear', because they cannot hear the 'h' sound.

Another striking characteristic of the verbal communications of the deaf learners was that they generally used simple words in uncomplicated sentences. It was evident that they found it difficult to express themselves orally and tended to use gestures, but even so they were often not understood by the educators and hearing learners. Although the educators could eventually figure out what they were saying, situations of this nature obviously lead to some level of confusion and frustration. When one of the deaf learners wanted to use the word 'sleep' in his oral, he pronounced it 'leap' and neither the educator nor his fellow learners understood what he meant.

4.2.2.2 Sign language

The two methods used by deaf learners for oral communication, namely oral communication and manual communication, were mentioned in Chapter 2. These approaches are clearly at opposite ends of the communication continuum; however, each has its own strengths and weaknesses. A combination of these strengths and

weaknesses has created a new approach to communicating with deaf learners. This approach, known as the bilingual approach to Deaf education, requires parents to be actively involved in assisting their deaf children to develop language by any and all available means of communication (see 2.5.2.2).

The educators maintained that although deaf learners should be exposed to sign language, their main means of communication must be oral language as this will assist their successful integration into the hearing community. They suggested that all deaf learners should be taught basic sign language to enable them to communicate with people who use sign language only. The sign language approach could also be used to educate learners who are unable to communicate orally, but decisions in this regard should be made by the parents. Comments made by the educators included the following:

I think a combination would be good, so where you can use sign language and teach them how to say the words to the best of their ability would be perfect, so when they go out into the 'big' world, they will be able to communicate with people who can hear and those people will try to communicate back and learn basic sign language, so at least they could have a normal life and have a normal job (Educator C).

I do think that there is a place for sign language not necessary for every class and every child, it is just whether that child is able to communicate orally or not. And if you have tried the oral method and it really doesn't work then I would say sign language has its place (Educator A).

I think sign language can be used as an educational tool, but I don't agree that this language should be used in place of oral language. This language can be used to help the child to understand the concepts (Educator B).

The three educators agreed that the use of oral language will help deaf learners to become part of the 'far larger' hearing world, find employment, and eventually support themselves and their families. They also agreed that the educators of deaf learners need

to learn basic sign language in order to be able to use it to explain new concepts to their learners. They said:

I can't really teach without using directions and hand movements. So we use very basic sign language, but it depends on hearing impairment of the child and the needs of the child (Educator A).

I think that the teachers who are going to teach hearing impaired learners need to now basic sign language, so that if they come across the child that can't pronounce words properly at least you can teach them (Educator C).

During the observations the researcher noticed that the deaf learners use oral language when they want to express themselves orally or when they communicate with each other. For instance, during an English lesson, the researcher observed that two deaf learners were sitting and talking quietly using some gestures only occasionally while waiting for other learners to finish their work. The researcher also noticed that, in their communication with hearing people they relied mostly on lip-reading. When the educator's face was covered by the sheet of paper she was holding while explaining a new concept, they asked her to move the page because they could not see her lips clearly. The observations also showed that the educators often use simple signs and gestures while explaining new concepts or giving instructions to the learners.

4.2.2.3 Reading

The literature study (see 2.5.2.3) indicated that deaf learners may experience difficulties in decoding and learning words from context. They also have a limited vocabulary and struggle with syntax, which restrains the development of fluent reading skills, as well as the use of context cues to obtain meanings of significant words. Different categories of grammatical structure, such as questions, pronouns and embedded clauses or phrases, are particularly difficult for deaf learners.

The educators agreed that deaf learners generally have poor reading skills, specifically because learners with severe and profound hearing loss tend to learn reading by sight and not by phonics. They often need pictures to help them make a link between the image and the initial letter of the word. Due to their hearing loss, these learners may not have much exposure to conversational interaction, which hampers the enrichment of their experience and understanding of linguistic forms. They require special training and support by their educators and parents in order to improve their reading skills. The educators' inputs in this regard were as follows:

It is quite tricky for them to learn difference between written words and their sounds. They often rely on the pictures. If they see a picture of a butterfly, when they learn a sound 'b' they connect the image of a butterfly and a letter 'b' together. To be able to identify the sound in the beginning of the word auditory it is also difficult for them (Educator B).

These learners have poor reading skills. New words can cause a problem as the hearing-impaired child has never seen the printed symbols of the words before and they have never heard it. Reading is a challenge to these children (Educator C).

Initially, because they don't associate the sounds at all with the letters of the words, it's really just a visual learning that they do. The phonics can help mild to moderate hearing impaired learners because they do have an idea of what sounds are like, so they can then associate a sound with a letter, but with profoundly deaf most of those that I have taught from Grade 1 all have learnt reading just by sight (sight words) and come through that way (Educator A).

The educators also agreed that deaf learners have limited vocabulary, and that their vocabulary usually increases slowly because, in order to gain knowledge of their environment, they depend largely on what they see, here and now. They commented:

The vocabulary that deaf children learn is very limited, their learning is impulsive... They need to be exposed to the new words through songs and through reading. They need to be encouraged to question the new words they are given (Educator B).

Vocabulary depends on how much reading they have done, whether they are widely read, whether they read a lot of different stories....., if they are not exposed to these things their vocabulary is going to be very limited, because they need to hear the words so many times to first internalise them and then be able to use them so they need lots and lots of input in vocabulary all the time (Educator A).

The educators suggested the following activities to improve readings skills:

To improve reading ability is just to read, read anything and everything and grade their reading, so that they do read more difficult things that are not just relying on the easy things that they can read... The basic thing is just to read and often the repetition of reading the same passage a few times to develop fluency, expression, reading aloud (Educator A).

Ask the children what books they are interested in and then you can give them those books to take home (Educator C). This educator also added: When you read to the child make it fun, make it interesting, so if there is a lot of characters change your voice, it is very good for the child. This is how you get a child involved in reading (Educator C).

You can combine reading and writing of the learners. They can record things that are interested to them, and then they can read those passages later (Educator B).

During observations it became apparent that deaf learners find the decoding of new words extremely problematic. While observing the learners during hymn practice, the researcher noticed that learners with hearing loss struggled to read the words of a new song. They were either just opening their mouths during the singing practise, or sitting silently without even trying to utter the words that were new to them. They also experienced difficulties with metaphoric expressions, as they generally associate each new word that they learn with only one meaning. When, for instance, the educator read the expression 'he was boiling with anger', the learners were dumfounded and asked the

educator, 'How can that happen?' The deaf learners also found it hard to make sense of proverbs. They could not understand the meaning of expression such as 'Not everything that glitters is gold'. Even after the educator had tried to explain it by using different words, it was obvious that they could still not grasp the real meaning.

The problems posed by such a limited vocabulary became even more evident to the researcher when the deaf learners were asked to do a crossword puzzle. To start with, they could not find the words that were needed, and even when they eventually did, they could not figure out in which rows or columns they had to be written. This could, of course, also be a problem relating to laterality.

4.2.2.4 Writing

In Chapter 2, mention was made of the significant problems that deaf learners experience when asked to express ideas in writing. They often tend to produce shorter sentences than their hearing peers and to repeatedly use subject-verb-object sentences, which makes their writing 'concrete' and literal writing. They tend to omit some words and use fewer than usual adjectives, conjunctions and auxiliary verbs in their sentences. These learners also find it difficult to use imaginative and idiomatic expressions in their written passages (see 2.5.2.4).

The educators agreed that deaf learners find it difficult to express their ideas in writing. They pointed out that they produce short, simple sentences and encounter problems with basic sentence structure. Further comments included the following:

They battle with basic sentence structure because it is not something that they have grasped thoroughly yet. So it is hard for them to put things down on paper (Educator B).

Most of them, particularly when they start off, they battle to express their ideas in writing, they often can't formulate a proper sentence, sentence structure is not good, they won't put into a correct sentence or plurals (Educator A).

With hearing-impaired children when constructing a sentence, it is not done always correctly... . They might swap one or two words, reverse words around (Educator C).

The educators suggested that deaf learners need special training in the construction of proper sentences:

They need a lot of assistance in sentence structures. We need to go through basic developmental stages of this process from the two word sentences to the three word sentences and gradually build it up and making them more confident with it. It is something that needs to be taught because it doesn't come naturally (Educator B).

Once they have a vocabulary, the tool to actually write something down, they are able to construct a sentence. They need the ability to make sentences and since we have worked on writing shorter sentences, their sentence structure has been a lot better, because they are not getting lost in the middle of a five-line sentence (Educator A).

The educators also mentioned that deaf learners often demonstrate a poor ability to use the different parts of speech, such as adjectives, conjunctions and pronouns. They all agreed that it made more sense to teach the learners to write short, straightforward sentences correctly than to encourage them to use different parts of speech, especially conjunctions, and produce longer but incorrect sentences. One of the educators commented:

I just prefer them to write a short straightforward sentence, rather get it right, than have a conjunction in the sentence and then everything starts going wrong, verbs go wrong and all sort of other things starts to go wrong (Educator A).

The educators further mentioned that deaf learners are generally able to spell well as they use their visual memory to remember words. They remarked:

I haven't had too many problems with a hearing-impaired child with spelling as opposed to a hearing child's spelling. I think because they are visual they tend to use that memory bank to actually remember the spelling of the words (Educator A).

A lot of the children with their visual memory being so good, they have got quite a good ability to spell, because they have got that memory there (Educator B).

One of the educators recommended the following activities to improve the writing skills of deaf learners:

The learners need to practise to write short sentences, practise to use different words in different sentences, practice to use different styles of sentences. They need to do more reading, because the more they read, the more vocabulary they will have, the greater their ability would be to actually write anything (Educator A).

The problems that deaf learners experience with regard to writing ability became very evident to the researcher when the educator asked them to write a story. The learners were given a picture and were then asked to describe the activities depicted in it. They kept repeating the words 'and', 'then' and 'so' many times. Their verb tenses were muddled and they would, for example write 'walk' instead of 'walked', 'wash' instead of 'washed', etc. They also kept forgetting to add the letter 's' to indicate plural forms, and tended to leave out the article 'the' in their sentences. The researcher also noticed that they did not use their imagination and generally wrote short, simple sentences, which created the impression of 'concrete' writing.

A look at their exercise books with a view to determining typical mistakes made in written work was quite informative. The researcher noticed that learners tended to change the natural order of the words in sentences, For example, one learner wrote 'He sailed across alone the ocean', instead of 'He sailed alone across the ocean'. They also tended to confuse homophones, writing 'to' instead of 'too', 'there' instead of 'their', etc. It was evident that deaf learners experience difficulties with the correct use of prepositions, pronouns and conjunctions, which they normally cannot hear clearly in speech. One

learner wrote 'I get inside the car', instead of 'I get into the car', and 'He climbed in at the window and fell down the floor', instead of 'He climbed in through the window and fell on the floor.' Grammatical errors are also quite common. However, the researcher did notice that familiar words, i.e. words that they had learnt before, were mostly spelled correctly.

The observations showed that deaf learners need support in the form of prior information about grammatical structures and new vocabulary used in new themes in order to grasp new knowledge regarding those themes.

4.2.2.5 Comprehension

According to the literature study (see 2.5.2.5), one of the challenges faced by deaf learners is the issue of reading and oral comprehension, which is often hampered by their limited vocabulary. Deaf learners often use local contexts in the text to guess the meanings of words, rather than consider the full content of the text. They show a tendency to miss some of the information and misunderstand some of it, so that ultimately they have to depend on vision to a greater extent than hearing learners (see 2.5.2.5).

The educators agreed that deaf learners struggle to understand oral instructions. However, once they understand what is required of them and know the educator's routine, they are quite able to follow such instructions. The educators need to train deaf learners to listen carefully to their instructions, make sure that they understand them properly, and only then perform the task.

Comprehension is an understanding of what somebody has said or what you have read. If the teacher is standing in front of the learners and she is not repeating what she is saying all the time, the child is going to get confused and is going to lose interest (Educator C).

Once they get used to a teacher's way they comprehend OK, because they understand what you want. Generally, to start with, you need to show them exactly what you want, because they don't comprehend an instruction (Educator A).

That's also training, they need to be trained to do that and they need to be exposed to opportunities to learn, to follow oral instructions (Educator B).

The educators also mentioned that deaf learners experience problems with the comprehension of written texts. They often struggle to answer questions in writing and do not always understand what happened in the story. The educators remarked:

I think a lot of the time they do get a wrong idea what's written down, especially as it gets more abstract they battle with abstract concepts. You find it in comprehension, the questions at the end are more about opinion and abstract things and they found it very difficult to answer those questions (Educator B).

I think they tend to pick up the flow of the story, but they are not picking up the details that are in there, so they will have an idea of the outline, but they definitely will battle with comprehension.... Comprehension is one of the really weaker points in their language ability (Educator A).

One of the educators suggested the following strategy to improve deaf learners' comprehension of written texts. This strategy has been used successfully in her school for a number of years:

We have story grammar once a week, where the learners read a story and at the end of the story they are given oral questions and they have to say answers from what they have picked up in that story. During the story all sorts of words are explained to them about the meanings and then they learn how to use those new words in other situations, so that they grasp the meaning of that word (Educator B).

The problems that deaf learners experience with comprehension were highlighted when the researcher observed the learners in the hall during a school play. Since they could

not hear the dialogue, they could not follow the story and soon became disinterested. They started talking, using their ability to lip-read as well as signs and gestures.

During a group discussion, when the deaf learners could not follow the conversation of the hearing learners, they became disinterested and tended to yawn and look around. The teacher had to stop the discussion a few times to remind the hearing learners to include deaf learners in their conversation.

The researcher also noticed that the deaf learners tended to make puzzled faces or shrug their shoulders when they could not understand instructions. This gave the educator an indication that the learners were lost and could not carry on with the task any longer. She stopped talking, repeated the instructions a few more times, making sure that the learners knew what they had to do, and only then allowed them to complete the task. The observations showed that deaf learners require special support in the form of prior information before new vocabulary is introduced in written texts. Without such support, they will not be able to understand the text.

4.2.2.6 Mathematics

Hearing learners learn mathematical concepts incidentally in everyday life. However, these concepts may have to be explicitly taught to deaf learners by educators and parents (see 2.5.2.6). Their limited vocabulary make it difficult for deaf learners to grasp mathematical or cognitive concepts, which involve specific language relating to volume, shape, size, comparisons, measurement and reasoning. They often experience difficulties with concepts such as *in front of*, *behind*, *under*, *same* and *different* (see 2.5.2.6).

Problem solving is yet another concept that poses problems for deaf learners. They tend to try to solve mathematical problems very quickly, without pausing to think them through. The specialised language of mathematics and linguistic sequencing together create a major problem for deaf learners (see 2.5.2.6).

The educators agreed that deaf learners struggle to grasp mathematical concepts, but they also emphasised that these learners' understanding of mathematics depends on their mathematical abilities and language development. They indicated that deaf learners are able to do mechanical mathematics, but they rely mostly on concrete thinking, therefore they struggle with abstract concepts. The following remarks were made by the educators:

The deaf learners cope quite adequately with the mechanical side of mathematics. They will be able to do the bonds and tables, but they need the visual sort of backing to get concepts, and I found that they rely longer on the concrete assistance before moving across to the abstracts than a lot of the hearing children (Educator B).

Some of them because of the lack of their vocabulary have a difficulty in grasping certain concepts (Educator A).

The language is very critical, many hearing-impaired children tend to be weak in abstract thinking (Educator C).

As far as deaf learners' grasp of mathematical or cognitive concepts relating to volume, shape, size, comparisons is concerned, the inputs provided by the experts corresponded with the findings based on the literature study (see 2.5.2.6). The following comments were made by the educators:

They may have difficulty in grasping concepts relating to the space, time and quantity, for example, verbal concepts such 'as least', 'equal', 'between', 'a few' may be hard to grasp as they have no concrete references (Educator C).

It is very abstract, so it needs a lot of reinforcement with the visual, to be able to get those across and then the repetition just to consolidate those ideas, so that it becomes intrinsic (Educator B).

In addition to their comments on the ability of deaf learners to develop a clear understanding of mathematics, the educators also indicated that these learners find it difficult to grasp the concept problem solving. They commented:

The problem solving is a really difficult area and there is a lot of pictorial clues that are needed and working through the problems to make them able to visualise what is asked and what the question is about (Educator B).

They can't do story sums, because they don't understand the questions, they don't understand what you are getting at. Like my one learner (name), he just doesn't stop and think, he got it all there, but he does not stop and actually think. He just has to get an answer down and he won't relate what he is doing to anything that he has done in the past (Educator A).

Through observation it became evident that the deaf learners could generally perform tasks involving the mechanical side of mathematics quite successfully. They did not experience problems with bonds and tables and could cope quite adequately with the performance of basic mathematical computations.

The researcher found it interesting to note that one of the educators had specifically adapted a mathematics lesson to address the difficulties experienced by deaf learners. Visual aids (marbles) were used to explain the concept of division. The learners were provided with marbles and plastic bags to visualise the task and perform it at a concrete level before moving on to the abstract stage (numbers). When the educator explained the concepts 'more' and 'less', she used ice-cream cones to provide a visual presentation of the concept.

Through observation the researcher was also able to develop a better understanding of the scope of the problem that deaf learners face when they have to solve mathematical problems. They could manage the problem-solving task only after a detailed explanation of the problem by the educator, but when they had to solve a similar problem later on, they were unable to do it without further intervention by the educator. One learner simply

sat watching the others and made no attempt to solve the problem. The other learners told the educator that they did not know what to do and asked for help.

The following section tabulates the findings of the interviews in an attempt to identify the needs of deaf learners. These needs should be considered by educators who are tasked with providing appropriate support to deaf learners in mainstream settings.

4.3 COMPARISON OF THE FINDINGS OF THE LITERATURE STUDY AND THE EMPIRICAL RESEARCH

The researcher’s findings based on the literature study (see Chapter 2) and the empirical study (see Chapter 4) are compared in the table below.

Table 4.1 A comparison between the findings of the literature study and the empirical findings

DEVELOPMENTAL AND ACADEMIC SKILLS OF DEAF LEARNERS (literature study)	DEVELOPMENTAL AND ACADEMIC SKILLS OF DEAF LEARNERS (empirical findings)
<p>DEVELOPMENTAL SKILLS</p> <p>Gross motor coordination</p> <p>Deaf learners generally have the same level of gross motor skills as hearing learners. Different factors, such as type of schooling and parental involvement in physical activities, could play a role in their motor development.</p>	<p>DEVELOPMENTAL SKILLS</p> <p>Gross motor coordination</p> <p>Deaf learners do not experience difficulties with gross motor coordination. The level of their development depends on whether they have enjoyed the same opportunities as their hearing counterparts. However, gross motor coordination could be affected by the presence of other disabilities.</p>

<p>Fine motor coordination</p> <p>Problems experienced with fine motor coordination in deaf learners are normally not linked to their disability. The structuring of their environments appears to influence the development of their fine motor skills. Such factors may account for some of the differences between them and hearing learners of the same age.</p>	<p>Fine motor coordination</p> <p>Deaf learners do not experience difficulty with their fine motor coordination skills. If they do, it could be because they do not understand the instructions properly or when other disabilities are also present in the learner (cerebral palsy, etc).</p>
<p>Sensory motor skills</p> <p>Deaf learners normally show different laterality patterns that are more left-sided or exhibit more inconsistent hand response, compared with learners whose hearing is normal. Deaf learners tend to reverse letters, numbers or words in reading or writing.</p> <p>They tend to have vestibular deficits, which lead to problems with balance. They are found to be clumsier and more accident prone than hearing learners. They often have a short attention span and are most at ease when involved in physical activities.</p>	<p>Sensory motor skills</p> <p>Deaf learners do not experience problems with laterality and appear to be at the same level as their hearing peers.</p> <p>If the hearing loss is conductive, learners with hearing loss might find it difficult to maintain balance. Due to their hearing loss, they might sometimes appear to be unaware of their surroundings, but this does not necessarily cause clumsiness. Their ability to maintain balance often depends on their general physical development.</p>
<p>Perceptual skills</p> <p>The visual modality is important for deaf learners. However, there is no evidence to suggest that they have better-developed visual skills than hearing</p>	<p>Perceptual skills</p> <p>Deaf learners normally have well-developed visual perceptual skills. They tend to rely on their vision to perform their tasks.</p>

<p>learners. Depending on the specific kind of task used, these learners have been found to perform better, worse, or the same as their hearing peers.</p> <p>In deaf learners, the inability to hear leads to slow language development, inadequate articulation and difficulties in speech, poor performance in auditory discrimination, problems with following oral instructions and better recall when they are shown, rather than told what to do.</p>	<p>Findings also revealed that these learners are visually alert and are guided by the facial expressions of educators to support them in their verbal interpretations. Clearly the visibility of the educator is regarded as crucial.</p> <p>Deaf learners demonstrated poor development of auditory perceptual skills due to their inability to hear.</p> <p>The main consequence of poor hearing is that deaf learners might struggle to concentrate and tend to misunderstand much of what the teacher is saying.</p> <p>Deaf learners tend to look around for visual clues from other learners to compensate for their lack of hearing.</p>
<p>Concentration</p> <p>Deaf learners generally show poorer attention span than hearing learners, particularly in situations in which they are likely to be distracted. When a task requires simultaneous attention to two or more dimensions (for example, the size and the shape of the clay), deaf learners routinely perform more poorly than their hearing peers.</p> <p>Since they often show enhanced visual attention to peripheral stimuli, these learners may be primarily vulnerable to visual disruptions during the performance of their tasks.</p>	<p>Concentration</p> <p>The findings revealed that deaf learners demonstrate similar problems with concentration as hearing learners.</p> <p>The inability of deaf learners to concentrate could be the result of their not always understanding the task. Once they grasp what is required of them, they tend to block out everything else and carry on with the task.</p>

<p>Memory</p> <p>The short-term memory of deaf learners is often influenced by their disability. They are frequently inconsistent in their intentional initialisation of prior knowledge during recall and frequently fail to recognise the multidimensional nature of to-be-remembered stimuli. A variety of studies have indicated that, compared with hearing learners, these learners tend to recall less from lists of verbal items (text or signs).</p>	<p>Memory</p> <p>The research findings revealed that deaf learners have difficulty with short-term memory, in particular with language-based concepts. They need to hear a concept a number of times before they are able to integrate the new knowledge. Deaf learners' visual short-term memory is better developed than their auditory short-term memory. Their visual short-term memory is very sensitive and accurate when compared to their auditory short-term memory. Their long-term memory is linked with their ability to comprehend the material. They tend to remember information that has been understood and revised.</p>
<p>Sign language</p> <p>A strategic combination of strengths and weaknesses of oral and manual communication approaches has made way for a new approach to communicating with and educating deaf learners. This approach is known as the bilingual approach to Deaf education. Under optimal conditions, deaf learners can achieve proficiency in spoken and written language. These conditions include strong family support and educational programmes that are strong in their support for both oral and aural</p>	<p>Sign language</p> <p>The parents of the learners often make the final decision regarding the language of choice for communication. Deaf learners need to be exposed to sign language once the spoken language has been established. It could be introduced when the learners are older and can be used effectively as an additional tool to convey instructions and explain new concepts. Knowledge of sign language will help deaf learners to converse with members of the Deaf community who are unable to communicate orally.</p>

<p>information.</p>	<p>Deaf learners should be supported continuously in the establishment of the language of their choice.</p>
<p>Reading</p> <p>Deaf learners find it difficult to decode words in the sentences. They have a limited vocabulary and experience difficulties with syntax, which limits the development of fluent reading skills, as well as the use of context cues to derive the meanings of important words. Different categories of grammatical structures, such as questions, pronouns and embedded clauses or phrases, are particularly problematic for these learners.</p>	<p>Reading</p> <p>Deaf learners have poor reading skills. Learners with severe and profound hearing loss tend to learn reading by sight, not by phonics. They find it difficult to associate sounds with the letters that make up words and tend to perform visual learning. They often require pictures to provide a link between an image and the initial letter of a word.</p> <p>Deaf learners have a limited vocabulary. The level of their vocabulary depends on the learners' language ability and on how much reading material they have been exposed to. Deaf learners struggle to understand metaphoric expressions or proverbs as they learn to associate each word with a single meaning.</p>
<p>Writing</p> <p>Deaf learners normally write shorter sentences than their hearing peers and frequently omit words.</p> <p>They also use fewer adjectives, conjunctions and auxiliary verbs. Their writing has been characterised as direct or stilted, with limited use of imaginative and idiomatic expressions.</p>	<p>Writing</p> <p>Deaf learners find it difficult to express their ideas in writing. They tend to produce short and simple sentences with poor sentence construction. Educators of learners with hearing loss should adapt teaching procedures to help the learners to construct proper sentences. This has to be taught as it does not come naturally.</p> <p>Deaf learners struggle with the correct</p>

	<p>use of different parts of speech. They are inclined to omit words, change the order of words in their sentences and replace one word with another. They also tend to make grammatical and syntactical errors. They do not have major difficulties in spelling as they tend to use their well-developed visual memory to remember the spelling of words. Before introducing new themes to these learners, educators need to interpret and explain new vocabulary, grammatical structures and other unfamiliar concepts linked to the new theme.</p>
<p>Comprehension</p> <p>Since deaf learners often tend to miss some proportion of information and misunderstand another proportion, they have to depend on vision to a greater extent than their hearing peers. Through lack of full simultaneous access to both visual and auditory stimulation, deaf learners often miss exposure to a variety of cause-effect relationships involving multiple agents, objects and actions. They tend to use local context in the passage to make guesses at the meanings of words, rather than take into account the full content of the text.</p>	<p>Comprehension</p> <p>Deaf learners have diminished comprehension and might therefore find it difficult to understand oral instructions. However, when they understand the instructions and know the educator's routine, they are able to perform tasks. These learners need to be specially trained to follow the educator's instructions. Understanding a written context is another difficulty experienced by learners with hearing loss in mainstream settings. They find it difficult to interpret complex sentences and the meanings of unfamiliar words. Even if they have a general idea of the story, they might experience</p>

	<p>difficulties when trying to interpret the details. Their problems might get worse if the story contains a number of unfamiliar words.</p> <p>Deaf learners need prior information about new vocabulary used in the written material in order to understand the context.</p>
<p>Mathematics</p> <p>Deaf learners often find it difficult to grasp mathematical concepts that involve specific language relating to volume, shape, size, comparisons, measurement and reasoning, and struggle with concepts such as <i>in front of, behind, under, same, different</i>.</p> <p>The concept problem solving constitutes yet another problem for these learners. They often tend to try to solve the problem too quickly, without first taking time to think it through.</p>	<p>Mathematics</p> <p>Deaf learners find it difficult to grasp mathematical concepts. Their understanding of mathematical concepts depends on the learners' mathematical abilities and language development. These learners experience difficulties with abstract thinking, especially when they are exposed to unfamiliar terminology. However, deaf learners are able to do the mechanical side of mathematics and rely mostly on concrete thinking. They find it difficult to grasp the meanings of concepts relating to space, time and quantity as these concepts do not rely on concrete references.</p> <p>Deaf learners experience problems with problem solving concepts. It appears that the learners' limited vocabulary creates barriers to learning in terms of their interpretation of what is asked in the problem. The specialised language and linguistic sequencing used in mathe-</p>

	<p>matics create the most difficulties. Deaf learners tend to solve mathematical problems too quickly, without first taking time to think them through, and are often unable to relate what they performed to anything that they have done in the past.</p>
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The following table presents the summary of the literature findings, the findings of the interviews and observations.

TABLE 4.2 Summary of findings

<u>Key for the following table:</u>	
1. Impairment/difficulty completely absent	A – Educator A
2. Some indication of the difficulty/impairment	B – Educator B
3. Difficulty/impairment predominately present	C – Educator C

Developmental skills	Literature findings	Interviews			Observations
		A	B	C	
Gross motor development	1	1	1	1	1
Fine motor development	1	1	1	1	1
Sensory motor development					
<i>Laterality</i>	2	1	1	1	1
<i>Balance</i>	2	1	2	2	2
Perceptual skills					
<i>Visual perception skills</i>	1	1	1	1	1
<i>Auditory perception skills</i>	3	3	3	3	3
Concentration	2	1	1	2	2

Memory	2	2	2	2	2
Academic skills					
Language	3	3	3	3	3
Sign language	2	2	2	2	2
Reading	3	2	2	3	2
<i>Vocabulary</i>	3	3	3	3	3
Writing	3	3	3	3	3
<i>Sentence structure</i>	3	3	3	2	3
<i>Spelling</i>	2	1	1	----	3
Comprehension					
<i>Oral</i>	3	2	2	2	2
<i>Written</i>	3	3	3	----	3
Mathematics					
<i>Basic computation skills</i>	2	2	1	2	3
<i>Basic maths concepts</i>	3	----	2	3	2
<i>Problem solving skills</i>	3	3	3	3	3

4.4 CONCLUSION

In this chapter a summary of three interviews with experienced educators and researcher's observations was presented. These findings helped the researcher to evaluate the information obtained through the literature study, placing her in a position to summarise the empirical findings and the literature propositions in an attempt to attribute meaning to the data and obtain more information on how to effectively support deaf learners attending mainstream schools.

The final chapter will provide guidelines formulated to support educators of deaf learners. It will also focus on the limitations that were identified, and on significant conclusions and recommendations based on the research findings.

CHAPTER 5

SYNTHESIS, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

The focus of this study has been on finding specific strategies to support deaf learners in mainstream settings. The relevant literature was analysed in Chapter 2, and Chapter 3 described the research design of the study. Chapter 4 contained a discussion of interviews designed to obtain information on the experiences and perceptions of three educators of deaf learners, which complemented the researcher's observations. A comparison between the findings based on the literature study and those based on the interviews and observations enabled the researcher to gain valuable information on the problems faced by, and ways to offer support to deaf learners in mainstream settings.

The main purpose of the current chapter is to systematically organise the findings based on the interviews and observations, as outlined in Chapter 4, in relation to the theoretical research findings outlined in Chapter 2. This will give the researcher an opportunity to compile specific guidelines for the educators of deaf learners in mainstream settings. The results of the research will be interpreted with particular focus on their inferences and limitations. This summary will be followed by an analysis of areas in which further research is required.

This chapter begins with a summary of all the findings together with guidelines for the educators.

5.2 SUMMARY AND GUIDELINES FOR THE EDUCATORS OF DEAF LEARNERS

The findings based on the literature study and on interviews and observations respectively are discussed according to themes identified through the analysis of interviews and observations.

5.2.1 Developmental skills of deaf learners

The following section provides a summary of research findings and guidelines for educators endeavouring to enhance the developmental skills of deaf learners. These strategies could be used to improve the developmental skills of deaf and hearing learners in the inclusive classroom.

5.2.1.1 *Gross motor development*

The literature study in Chapter 2 revealed that deaf learners generally have the same level of gross motor skills as their hearing peers. Different factors, such as type of schooling and parental involvement in physical activities, could also play a role in the motor development of deaf learners.

Findings based on the interviews and observations confirm that deaf learners do not experience difficulties with gross motor coordination. According to the relevant literature, their level of development depends on whether they have enjoyed the same opportunities as hearing learners. It may, however, be affected by the presence of other disabilities.

Based on the research findings, guidelines for improving gross motor coordination were compiled. They are given below.

► ***Guidelines that educators should consider when they need to improve the gross motor coordination of deaf learners***

- Educators at mainstream schools should bear in mind that deaf learners generally demonstrate the same level of gross motor skills as hearing learners, provided that they have had similar opportunities to develop those skills.
- Educators should remember that when deaf learners experience problems with motor development skills, this could be caused by the presence of multiple disabilities (e.g. deafness and cerebral palsy).
- The activities recommended to support the development of gross motor skills in deaf learners in mainstream settings should be implemented.

5.2.1.2 Fine motor development

The literature study discussed in Chapter 2 revealed that the problems that deaf learners experience with fine motor coordination are normally not linked to their disability. The way in which the environments of deaf learners are structured appear to influence the development of their fine motor skills, and such factors may account for some of the differences between them and hearing learners of the same age.

The research findings also indicated that deaf learners do not experience difficulties in respect of their fine motor coordination skills. The educators made it clear that these learners experience problems in this regard only if they do not understand the instructions properly, or if they are affected by some other disability (e.g. cerebral palsy).

Since the level of fine motor development in deaf learners affects their ability to successfully perform in mainstream settings, it is suggested that the guidelines provided below be applied to assist these learners.

► ***Guidelines that educators should consider when they need to develop fine motor coordination of deaf learners***

- Educators at mainstream schools should realise that the structure of the environment in which deaf learners function influences their development of fine motor skills.
- Educators should bear in mind that deaf learners' failure to perform tasks involving fine motor skills is often the result of their not being able to interpret the instructions properly.
- The problems that deaf learners experience with regard to the development of fine motor skills are not necessarily linked with their inability to hear, but could be caused by other disabilities (e.g. cerebral palsy).
- Specific activities should be introduced to support the development of fine motor skills in deaf learners attending mainstream schools.

5.2.1.3 Sensory motor skills

Findings based on the literature study discussed in Chapter 2 revealed that, when compared with hearing learners, deaf learners normally show different laterality patterns that are more left-sided or exhibit more inconsistent hand response. These learners often experience spatial problems and tend to reverse letters, numbers or words when reading or writing. They also often have vestibular deficits, which lead to problems with balance. They are found to be more clumsy and accident prone than hearing learners.

In contrast to what the literature suggested, the findings based on the interviews and observations revealed that deaf learners do not in fact experience problems with laterality, but appear to be at the same level as their hearing peers. However, the educators did point out that deaf learners with conductive hearing loss (where sound waves are not conducted effectively through the outer ear, the ear drum, or the middle ear) might find it difficult to maintain balance. Due to their hearing loss, they may also experience problems caused by the fact that they are not adequately aware of their

surroundings, but not with clumsiness as such. Findings also revealed that their ability to maintain balance is often determined by their general physical development.

Based on the research findings, the guidelines listed below are recommended.

► ***Guidelines that educators should keep in mind when they have need of improving the sensory motor skills of deaf learners***

- Educators in mainstream schools should be informed that a laterality deficit in deaf learners may lead to the reversal of letters, numbers or words when reading or writing.
- Educators should realise that deaf learners tend to have vestibular deficits, which lead to problems with balance.
- Educators should bear in mind that deaf learners rely mainly on visual cues to maintain balance.
- Effective supportive activities should be introduced to maintain laterality and balance in deaf learners.

5.2.1.4 Perceptual skills

The literature findings revealed that well-developed visual skills are important for deaf learners. However, there is no evidence to suggest that these learners have better visual skills than hearing learners. Depending on the specific kind of task used, these learners have been found to perform better, worse, or the same as hearing individuals.

According to the empirical findings, deaf learners normally have well-developed visual perceptual skills. They tend to rely on their vision to perform their tasks. Findings also revealed that these learners are visually alert and use the facial expressions of educators to support them in their verbal interpretations. Clearly the visibility of the educator is regarded as crucial.

Due to the fact that visual information is the deaf learner's primary means of receiving information, it is recommended that educators of deaf learners apply the guidelines given below.

▶ ***Guidelines for improving the visual perceptual skills of deaf learners***

- Educators should be aware of the fact that deaf learners rely to a large extent on their vision to receive information.
- The classroom environment should be arranged in a way that will ensure that deaf learners receive adequate visual stimulation.
- All unnecessary visual stimuli in the classroom should be removed.
- Educators should use films, overhead projectors, diagrams and other visual aids as useful instructional tools for deaf learners.
- Educators should allow deaf learners to operate independently with visual material.
- Educators should face the class while speaking to the learners.
- All main points must be written on the blackboard.
- A circular seating arrangement is recommended as this will enable deaf learners to see all the participants in the lesson.
- Educators should bear in mind that when speaking to deaf learners, constant eye contact should be maintained, but exaggerated lip movements should be avoided.

The results of the literature study indicate that the following are characteristic of deaf learners: slow language development, inadequate articulation and difficulties in speech, poor performance in auditory discrimination, problems with following oral instructions, and an improved ability to recall when shown, rather than being told, what to do.

The empirical findings confirmed that deaf learners demonstrate poor development of auditory perceptual skills due to their inability to hear. The educators indicated that the main consequence of poor hearing is that deaf learners might find it difficult to concentrate and therefore tend to misunderstand much of what the teacher is saying.

The observations also highlighted the need to prioritise the minimising of background noise and reverberation.

The guidelines recommended for use by educators to develop deaf learners' auditory perceptual skills are given below.

► ***Guidelines for improving deaf learners' auditory perceptual skills***

- Educators of deaf learners should ensure that the supportive classroom environment is structured so as to minimise background noise.
- Educators should insist that learners refrain from talking when material is presented orally.
- Educators should try to keep windows closed and turn off air conditioners.
- All information must be presented clearly and correctly at a normal pace.
- Educators should not talk while writing on the blackboard.
- Educators must make sure that they have the attention of the deaf learners before speaking.
- Educators need to make sure that the learners' hearing aids and FM system are switched on and are operating properly at all times.
- Educators should use the specific activities designed to develop the auditory perception of deaf learners.

5.2.1.5 Concentration

The literature study revealed that deaf learners generally show poorer attention span than hearing learners, particularly in situations in which they are likely to be distracted. The literature study also indicated that deaf learners have often demonstrated enhanced visual attention to peripheral stimuli, and may consequently be primarily vulnerable to visual disruptions during the performance of their tasks.

In contrast to the findings based on the literature study, the empirical findings revealed a similarity between the problems with concentration experienced by deaf and by hearing

learners. The educators felt that there was strong evidence to suggest that deaf learners' inability to concentrate could be the consequence of their inability to understand the task. If they do not understand what is required of them, they lose interest and tend to play around. The empirical findings also confirmed that deaf learners are easily distracted by the visual stimuli in their environment.

The guidelines recommended for use by educators to improve the concentration of deaf learners are given below.

- ***Guidelines for improving the concentration skills of deaf learners***
- Educators should repeat the comments made, or questions asked by other learners.
 - Educators should acknowledge the learner who has made a particular comment so the deaf learners can focus on the speaker.
 - Should the lesson be interrupted, the educator must make sure that she has the full attention of the deaf learners before she resumes teaching.
 - If necessary, educators should allow deaf learners to ask questions about the task at hand until it is clear that they understand what is required of them.
 - Educators should gently touch a deaf learner on the shoulder or arm to get his or her attention.
 - Educators should give careful thought to the placement of deaf learners in the classroom as it is essential to be able to keep eye contact and physical contact with them all the time.
 - Specific activities designed to increase the attention span of deaf learners were discussed.

5.2.1.6 Memory

The literature study showed that a deaf learner's memory is often influenced by his or her disability. Deaf learners are often inconsistent in their intentional initialisation of prior knowledge during recall and frequently fail to recognise the multidimensional nature of to-

be-remembered stimuli. With regard to long-term or semantic memory, deaf learners tend to have less strongly interconnected, less readily available, and more 'fuzzy' word meanings than hearing learners.

The findings of the empirical research concurred with those based on the literature study and confirmed that deaf learners experience problems with short-term memory, particularly with concepts that are language based. In order to incorporate new knowledge, they need to hear the new concept a number of times. The experts also indicated that the visual memory of deaf learners is better developed than their auditory memory. Their long-term memory is linked to their ability to understand the learning material; they tend to remember information that has been comprehended and revised.

The guidelines developed to assist educators to enhance the memory skills of deaf learners are discussed below.

► ***Guidelines for improving memory skills of deaf learners***

- Educators should give instructions to deaf learners slowly, step by step.
- Educators need to repeat instructions a number of times.
- Deaf learners need to be taught to carry out instructions for the tasks in the correct sequence.
- Educators need to use visual aids to improve visual memory of the learners.
- To develop auditory memory the learners should be given only one oral instruction at a time.
- The material presented to deaf learners must be linked to their concrete experiences and visual stimuli.
- Educators should help the learners to clearly comprehend the new information.
- Educators need to make sure that the new information is frequently revised by the learners.
- Educators should use the specific activities designed to enhance the memory skills of deaf learners.

5.2.2 Academic skills of deaf learners

The following section provides a summary of, and findings relating to the academic skills of deaf learners, as well as guidelines for educators.

5.2.2.1 Language

The literature study confirmed that deaf learners often do not have full access to communication until they have passed the most important ages for language acquisition. It is crucial to find a balance between promoting effective early communication skills and developing the language skills required for literacy and academic success.

The research findings revealed that the acquisition of language by deaf learners is delayed due to their inability to hear. They tend to mispronounce certain sounds in words because they cannot hear them distinctly. These learners tend to express themselves in short and simple sentences. They find it difficult to distinguish between different sounds and tend to drop some of the sounds in words. The inability of deaf learners to properly hear the fine word-sound distinctions lead to difficulties with regard to plurality, tenses and possessives.

Guidelines for use by educators to improve the oral language skills of deaf learners are discussed below.

► ***Guidelines for improving the oral language skills of deaf learners***

- Educators need to help deaf learners to establish communication with their environment and people around them.
- Any activity that the learners perform at school should be utilised to consolidate the development of the deaf learners' oral language.
- Educators should discourage deaf learners from using telegraphic speech by exposing them to examples of natural speech.
- Educators should provide opportunities for deaf learners to practise new language skills.

- Educators should discuss themes that are relevant and meaningful to deaf learners.
- Educators should allow the learners to apply their oral skills in different situations.
- Educators should make sure that learners with hearing loss are given opportunities to experience success in expressing themselves orally.
- Educators need to make sure that they themselves pronounce words and use tenses correctly.
- Educators should provide some background knowledge before a new topic is introduced.
- Educators need to expand their knowledge regarding the teaching of oral language skills to deaf learners.

5.2.2.2 Sign language

The literature study revealed that one of the approaches that can be successfully applied by educators working with deaf learners is the bilingual approach, which combines an oral communication approach with signing and finger spelling. This approach requires parents to be actively involved in assisting learners to develop language by all and any available means of communication.

The findings indicated that a combination of oral and sign language could be used by deaf learners in mainstream settings. The experts suggested that sign language be utilised as an educational aid, but stressed that it should not replace oral language. All the educators involved agreed that the ability to use oral language will help deaf learners to become active members of a future society and to support themselves and their families later in life. The experts agreed that educators of deaf learners should know basic sign language, which could be used to assist them to explain new concepts to their learners. They also pointed out that knowledge of sign language will enable deaf learners to communicate with members of the Deaf community who are unable to communicate orally.

The guidelines for educators concerning the use of sign language by deaf learners in mainstream settings are given below.

▶ ***Guidelines for educators regarding the use of sign language by deaf learners in mainstream settings:***

- Deaf learners attending mainstream schools should be exposed to sign language, but oral language must be the main medium of communication.
- Sign language could be introduced once the spoken language has been established.
- Educators need to advise the parents of deaf learners to enable them to make informed decisions regarding the choice of the language of communication for their children.
- Educators need to know basic sign language, which can be useful when explaining new concepts to deaf learners, and also for instructions.

5.2.2.3 Reading

The literature study revealed that deaf learners find it difficult to recognise (decode) words if they are not couched in sentences that are relatively simple and appear a number of times (often unnaturally) in contrived passages. Their vocabulary is limited and they experience difficulties with syntax, which limits the development of fluent reading skills and the use of contextual cues to derive the meanings of important words.

The research findings further showed that deaf learners have poor reading skills. The educators pointed out that learners with severe and profound hearing loss tend to learn reading by sight and not by phonics. They usually find it difficult to associate sounds with the letters that make up words and tend to perform visual learning. They often require a picture in order to connect the image with the initial letter of a word.

The experts also stated that deaf learners have limited vocabularies, and that the level of their vocabulary depends on their language ability and on the extent of their exposure to reading material. Deaf learners also struggle to understand metaphoric expressions and proverbs as they learn to associate each word with a single meaning.

The recommended guidelines to be used by educators to improve the reading skills of deaf learners are given below.

▶ ***Guidelines for improving the reading skills of deaf learners***

- Educators should keep in mind that deaf learners have lower reading levels and a more limited vocabulary than their hearing peers.
- Educators should remember that learners with severe and profound hearing loss tend to learn reading by sight and not by phonics.
- Educators need to pay attention to the fact that deaf learners often require pictures illustrating words so that they can connect an image with the initial letter of a new word.
- Educators should bear in mind that deaf learners struggle to understand metaphoric expressions and proverbs as they learn to associate each word with a single meaning.
- Educators should use highly visual materials (figures, pictures) in reading assignments.
- Reading material for deaf learners should be provided at appropriate reading levels, or should be adapted to suit their ability.
- Deaf learners should be exposed to a variety of reading materials.
- Educators should help deaf learners to build their vocabulary.
- Educators should encourage deaf learners to read a story a few times to develop fluency and expression.
- Educators should provide the learners with reading materials that relate to their interests.
- Educators and parents should read a lot to deaf learners to develop their interest in reading.
- Educators should use paragraphs written by the learners themselves to practise

their reading skills.

- Educators should use the specific activities mentioned in the relevant literature to develop the reading abilities of deaf learners.

5.2.2.4 Writing

According to the findings based on the literature study, deaf learners generally write shorter sentences than their hearing peers and frequently omit some words. They also use fewer adjectives, conjunctions and auxiliary verbs in their sentences. Their writing style has been characterised as direct or stilted, with limited use of imaginative and idiomatic expressions.

The empirical findings confirmed that deaf learners experience problems when trying to express their ideas in writing. They tend to produce short and simple sentences and encounter problems with basic sentence structure. The educators involved in the study also indicated that deaf learners' ability to use the different parts of speech, such as adjectives, conjunctions and pronouns, is relatively poor. They tend to omit words, to replace them, and to make grammatical and syntactical errors.

The findings indicated that deaf learners do not have serious problems with spelling, owing to their well-developed visual memory.

The guidelines to be used by educators to improve the writing skills of deaf learners are listed below.

▶ Guidelines for improving the writing skills of deaf learners

- Educators should help deaf learners to construct correct sentences.
- Educators should teach learners to start by constructing simple sentences and then gradually build on this ability to write longer and complex sentences.
- Educators should assist deaf learners to develop their vocabulary, since a bigger vocabulary will help them to construct better sentences.
- Educators should introduce different parts of speech (adjectives, conjunctions,

and auxiliary verbs) gradually to help deaf learners to express their ideas in writing.

- Educators should rely on learners' visual memory and use highly visual materials (flash cards, diagrams) to improve their ability to spell.
- Educators should provide deaf learners with prior information about grammatical structures and new vocabulary that will be used in new themes in order to assist them to grasp new knowledge regarding the theme.
- Educators should encourage deaf learners to read more in order to build their vocabulary.
- Educators should help the learners to develop, apply, and adapt strategies that lead the learners through the complex stages of the composition process. These steps in composition are planning, composing and revising.

5.2.2.5 Comprehension

The literature study also showed that one of the challenges that deaf learners face is the issue of reading comprehension, which is often influenced by poor vocabulary. Deaf learners tend to use local context in the passage to make guesses at the meanings of words, rather than take into account the full content of the text. Deaf learners often miss some portion of information, misunderstand another portion, and have to depend on vision to a greater extent than their hearing peers.

The findings also revealed that deaf learners struggle to understand oral and written material, and consequently find it difficult to follow oral instructions. The educators pointed out that these learners need to be specially trained to follow instructions. A further problem that was identified is that although deaf learners can achieve a general understanding of the reading material, they experience problems with interpreting the details. They often struggle to answer questions in writing and get the wrong idea of what happened in the story. Owing to their inability to understand the meaning of oral or written information, they become confused and tend to lose interest. During the researcher's observations it became clear that deaf learners require support in the form

of prior information about new vocabulary used in the written text in order to understand the text.

The guidelines that educators could use to improve the comprehension skills of deaf learners are set out below.

► ***Guidelines for improving the comprehension skills of deaf learners***

- Educators should keep in mind that deaf learners' ability to comprehend is influenced by prior knowledge or previous experiences.
- Educators should train deaf learners to listen carefully to their instructions.
- Educators should give only one instruction at a time.
- Educators should repeat the instruction a few times to ensure correct comprehension.
- Educators should rephrase or simplify the instructions to help deaf learners to understand them more readily.
- Educators should provide deaf learners with prior information about new vocabulary used in written texts in order to facilitate their comprehension of the text.
- Educators should develop pre-reading questions to make inferences and predictions about the reading material.
- Educators should create post-reading activities that focus on inferential questions.
- Educators should encourage deaf learners to use the new words that they have learned from the story in other situations.
- During group discussions, educators should observe participants to make sure that the deaf learners are actively involved in the process of discussion.
- Educators can use peer tutoring and the 'buddy' system, with hearing learners assisting deaf learners to become actively involved in group discussions.
- The specific activities found recommended in literature should be used by educators to develop the comprehension skills of deaf learners.

5.2.2.6 Mathematics

The educators consulted confirmed that deaf learners often find it difficult to grasp mathematical concepts that involve specific language relating to volume, shape, size, comparisons, measurement and reasoning, as well as concepts such as *in front of, behind, under, same, different*. The literature study showed that problem solving is another problematic concept for deaf learners. They often tend to continue too quickly when trying to solve a problem, rather than to first take time to think it through. The specialised language of mathematics and the linguistic sequencing are particularly problematic for deaf learners.

Empirical findings confirmed that an understanding of mathematics depends on the learners' mathematical abilities and language development. The experts emphasised the fact that deaf learners find it difficult to grasp mathematical concepts on account of their limited relevant vocabulary. Despite the fact that they experience difficulties with abstract concepts, they are quite able to do the mechanical side of mathematics, for which they rely mostly on concrete thinking. The experts also pointed out that deaf learners struggle to grasp concepts relating to space, time and quantity as these concepts do not rely on concrete references.

The findings revealed that deaf learners experience difficulties with problem solving concepts. Their limited vocabulary creates barriers to learning regarding the interpretation of what is asked in the problem. In order to solve the problems, pictorial clues are required to enable them to visualise what is asked and what the question is about.

The guidelines for use by educators to improve the mathematical skills of deaf learners are listed below.

► ***Guidelines for improving the mathematical skills of deaf learners***

- Educators should help the learners to make connections between the physical world and mathematics in order to stimulate their interest and make them more attentive.
- Educators should make sure that concrete concepts are firmly established through practice before the learners are asked to solve mathematical problems on an abstract level.
- Educators should use visual materials (e.g. pictures, diagrams, objects) to help deaf learners to visualise instructions.
- Educators should introduce new vocabulary by providing examples and explanations.
- Educators should introduce abstract mathematical concepts such as time, space, quantity once the learners are able to apply formal logic.
- Educators should rephrase instructions to make sure that the deaf learners understand the meaning.
- Educators should make sure that the learners understand new material by requesting them to repeat information or answer inferential questions.
- The specific activities recommended in the relevant literature should be used by educators to develop the mathematical skills of deaf learners.

The following section outlines certain recommendations for further research.

5.3 RECOMMENDATIONS FOR FURTHER RESEARCH

In order to support the deaf learners in mainstream settings in South Africa, the following recommendations were outlined for further research:

- Most South African educators have had little or no exposure to educating deaf learners. To address this issue, the development of workshops to facilitate professional growth could be investigated. In-service training on a large scale will

expose educators to the best education strategies and skills to ensure the increased involvement of deaf learners in mainstream settings.

- The parents of learners with disabilities must often deal with unanticipated pressure, responsibilities and stress. Further study could focus on how to enhance the parents' awareness of the needs of deaf learners and provide specialised training for parents to inform them about programmes and strategies that could be implemented when dealing with these learners.
- While this research study focused on the cognitive development of deaf learners, it would be interesting to investigate the social integration of deaf learners in the mainstream settings in the South African context. The improvement of the social skills of deaf learners is a noteworthy area for further research.
- The current study is focused on the cognitive development of deaf learners in the primary phase of education. Further research into the cognitive development of deaf learners in secondary education could further verify or contradict the findings of this research.
- The limited vocabulary of deaf learners often prevents them from demonstrating what they actually know. Further study could investigate alternative forms of assessment for deaf learners that will ensure that the process of assessment is valid and reliable and reflects their true abilities.
- During the current research it was established that a visually rich environment is vital for the deaf learners. Further research is recommended on different visual teaching strategies to help deaf learners to focus on important information and to incorporate prior knowledge with new concepts.
- Further studies could also focus on establishing a support group for educators experiencing difficulty in supporting the deaf learners.

5.4 LIMITATIONS OF THE STUDY

The current research has a number of limitations:

- The relatively small sample could be considered as a limitation of the research. However, other educators of deaf learners in South African mainstream settings

could benefit from the strategies offered by the educators that were involved as they have vast experience in this field.

- Owing to the limited research conducted on the inclusion of deaf learners in regular schools in South Africa, the literature that was consulted for the purpose of this study reported mainly on international findings.
- The study was conducted at a school where the availability of experienced educators of deaf learners, a school psychologist and a speech therapist, who all work closely with the mainstream educators and parents, help to facilitate the whole inclusion process. Educators at mainstream schools where the expertise of such specialists is not available will encounter more challenges to the successful inclusion of deaf learners.
- The findings of the study are limited to primary education and cannot be generalised across all schools in South Africa. However, these findings suggest important ways in which the inclusion of deaf learners could be implemented in South African schools.
- Due to the limited scope of the research, the social and emotional difficulties experienced by deaf learners were not included in the study. Had it been possible to include them, a more holistic picture of the problems experienced by these learners would have emerged.
- Due to the fact that there were no girls with profound hearing loss in that age group, the researcher had to concentrate on the boys. Further research with a more diverse group of learners could determine if these findings can be generalised to the broader population of deaf learners.

5.5 CONCLUSION

In this final chapter the findings of the research study were discussed. It is evident from the content that the problems formulated in Chapter 1 have been investigated, and that the specific aims of the research have been achieved. The literature propositions and research findings were summarised in order to outline supportive strategies that could be introduced by educators to successfully include deaf learners into mainstream settings.

Finally, the limitations of the study were discussed and recommendations for further research were made, thus providing researchers interested in this field with suggestions regarding potential areas for further study with a view to enhancing the inclusion of the deaf learners in mainstream schools.

The researcher believes that the current study will motivate South African educators to include deaf learners in their mainstream classrooms and will assist them in understanding their roles and responsibilities in the inclusion effort. The findings of the research will provide educators with courage to experiment with new teaching strategies designed to involve deaf learners in the learning process and to ensure that the diverse needs of these learners are met.

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INTERVIEW SCHEDULE

1. Developmental skills of deaf learners

Motor skills

- Gross motor activities
- Fine motor coordination

Sensory motor skills

- Literality
- Balance

Perceptual skills

- Visual perception
- Auditory perception
- Concentration

Memory

- Short term memory
- Long term memory

2. Academic skills of deaf learners

Language

Reading

Writing

Comprehension

Mathematics

Principal consent letter

To the principal of _____

Mr: _____

Date: _____

I am a student at the University of South Africa trying to further my studies in Inclusive Education. The topic of my research is **Supporting Deaf Learners in Inclusive Education Settings in South Africa.**

In order to complete the requirements for the course, I have to become acquainted with various aspects of supporting learners experiencing deafness in inclusive settings.

I would like to conduct my research at your school, as your school has been one of the first mainstream educational facilities to include learners experiencing deafness. The educators of your school will be required to participate in interviews at a time convenient to them. Furthermore, I would like to be permitted to observe learners experiencing deafness within your school so as to get a more comprehensive understanding of their environment. The research should not be disruptive to your school routine.

I undertake to ensure strict confidentiality with the information collected and all respondents will remain anonymous. The participation of the educators in this research study is purely voluntary.

The results of the study will be discussed with yourself and the educators. A copy of my findings would be made available to your school.

Thank you very much for helping me to reach my goal. I would like to take responsibility for my own professional development and contribute to the development of the school as a whole.

Yours faithfully,

Iliana Skrebneva

I _____ (principal) hereby give Iliana Skrebneva permission to conduct her research study at our school.

Signature

Interview consent form – participant A

Dear Educator,

I am a student at the University of South Africa trying to further my studies in Inclusive Education. The topic of my research is **Supporting Deaf Learners in Inclusive Education Settings in South Africa**.

I am asking you to participate in this research because you have been identified as a highly successful educator who has an experience of interacting with learners experiencing deafness. You will be asked to participate in an interview. Your participation in the research is voluntarily. You will remain anonymous and will not have to answer any question you do not wish to answer.

This interview will be kept strictly confidential and will be available only to members of the research team.

You are free to withdraw your consent to participate and may discontinue your participation in the interview at any time without consequence.

I thank you in anticipation of your kind co-operation.

Kind regards,
Iliana Skrebneva

I have read the procedure described above for the **“Supporting Deaf Learners in Inclusive Education Settings in South Africa”**. I voluntarily agree to participate in the interview.

Signature of participant

Date

Interview consent form – participant B

Dear Educator,

I am a student at the University of South Africa trying to further my studies in Inclusive Education. The topic of my research is **Supporting Deaf Learners in Inclusive Education Settings in South Africa**.

I am asking you to participate in this research because you have been identified as a highly successful educator who has an experience of interacting with learners experiencing deafness. You will be asked to participate in an interview. Your participation in the research is voluntarily. You will remain anonymous and will not have to answer any question you do not wish to answer.

This interview will be kept strictly confidential and will be available only to members of the research team.

You are free to withdraw your consent to participate and may discontinue your participation in the interview at any time without consequence.

I thank you in anticipation of your kind co-operation.

Kind regards,
Iliana Skrebneva

I have read the procedure described above for the **“Supporting Deaf Learners in Inclusive Education Settings in South Africa”**. I voluntarily agree to participate in the interview.

Signature of participant

Date

Interview consent form – participant C

Dear Educator,

I am a student at the University of South Africa trying to further my studies in Inclusive Education. The topic of my research is **Supporting Deaf Learners in Inclusive Education Settings in South Africa**.

I am asking you to participate in this research because you have been identified as a highly successful educator who has an experience of interacting with learners experiencing deafness. You will be asked to participate in an interview. Your participation in the research is voluntarily. You will remain anonymous and will not have to answer any question you do not wish to answer.

This interview will be kept strictly confidential and will be available only to members of the research team.

You are free to withdraw your consent to participate and may discontinue your participation in the interview at any time without consequence.

I thank you in anticipation of your kind co-operation.

Kind regards,
Iliana Skrebneva

I have read the procedure described above for the **“Supporting Deaf Learners in Inclusive Education Settings in South Africa”**. I voluntarily agree to participate in the interview.

Signature of participant

Date